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THE EFFECT OF NECK MASSAGE THERAPY ON MEAN ARTERIAL PRESSURE IN HYPERTENSION PATIENTS

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Abstract

Hypertension is one of the most significant global non-communicable disease (NCDs) contributing to increased mortality rates in many countries. Predicting hypertension through Mean Arterial Pressure (MAP) measurement is more accurate than relying solely on systolic and diastolic blood pressure readings. MAP represents the average arterial pressure and is derived from both diastolic and systolic measurements. The management of hypertension encompasses not only pharmacological interventions but also non-pharmacological therapies aimed at maintaining stable blood pressure levels. This study aims to assess the effect of neck massage therapy on mean arterial pressure in hypertension patients in Telaga Dewa Health Center Working Area, Bengkulu City. This research utilized a pre-experimental design, specifically a pre- and post-test one-group design combined with accidental sampling. The sample comprised 43 participants, and statistical analyses were conducted using a one-sample t-test. The findings revealed a statistically significant difference in the average MAP values before and after the application of neck massage therapy, with a p-value of 0.001, which is less than the significance level of α 0.05. This indicates that neck massage therapy positively influences mean arterial pressure in hypertensive patients in the aforementioned health center area. It is recommended that healthcare providers consider incorporating neck massage therapy as a complementary treatment option for patients with hypertension.

Keywords: Hypertension, Mean Arterial Pressure, Neck Massage

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INTRODUCTION

Hypertension constitutes one of the leading non-communicable diseases (NCDs) and is recognized as the primary cause of premature mortality globally. Often designated as the "silent killer," this condition frequently presents without noticeable symptoms yet has the potential to result in severe complications, such as stroke, renal failure, and coronary heart disease (WHO, 2023). According to data, 1.28 billion people between the ages of 30 and 79 worldwide suffer with hypertension, and about 46% of them are unaware that they have the condition. In Indonesia, the 2023 Indonesian Health Survey (IHS) revealed that hypertension is the fourth most significant risk factor for mortality, accounting for 10.2% of deaths, alongside a national prevalence rate of 30.8%.

Currently, blood pressure assessments among hypertensive patients have primarily concentrated on

systolic and diastolic values. However, measuring mean arterial pressure (MAP) is becoming more important for predicting how well blood is flowing to tissues and the risk of complications. Mean arterial pressure (MAP) reflects the average driving force of blood flow to organs throughout the entire cardiac cycle. As such, it serves as a more precise indicator of systemic perfusion pressure compared to systolic or diastolic blood pressure alone (Kandil et al., 2023). Evaluating MAP provides valuable insight into the physiological impact of hypertension on vital organs, particularly the brain and the heart. The formula (systolic blood pressure + 2 × diastolic blood pressure)/3 is used to calculate MAP. The normal MAP range is established between 70 and 100 mmHg; elevations in MAP reflect an increased workload on the heart and correspondingly heighten the risk of target organ damage (Masruroh & Santoso, 2020). In individuals with or without hypertension, greater visit-to-visit MAP variability was associated with a higher risk of all-cause mortality and HF, indicating that the BP variability assessed by MAP might be a potential risk factor for HF and death (Liu. *Et al.* 2021). Observational/cohort studies have shown an association between MAP (including 24-hour MAP or mean MAP) and cardiovascular events/mortality; in some populations MAP is stronger or provides additional information than SBP/DBP alone (Karahan & Zar, 2024).

In the management of hypertension, non-pharmacological management is now receiving attention because it has fewer long-term side effects. One approach that has proven effective is neck massage therapy. The way this therapy works is by activating the skin and the tissue just below it, which leads to the release of histamine, causing blood vessels to widen and lowering resistance in the blood flow (Sitepu et al., 2021). Massage is also known to stimulate the release of endorphins and reduce sympathetic nerve activity, resulting in a relaxing effect and a decrease in blood pressure (Sulistyorini, 2019).

Numerous studies have produced noteworthy findings regarding hypertension management. Virgin Coconut Oil (VCO) massages for the neck have been shown to dramatically reduce systolic and diastolic blood pressure (Faidah and Muliawati, 2021). These findings are corroborated by research conducted by Intarti (2022), which explored the synergistic effects of neck massage and cucumber consumption in elderly patients with hypertension. Additionally, the investigation by Shalafina and Febriana (2024) examined the impact of gymnastics combined with nape massage as an intervention for hypertension. In contrast, initial findings from researchers at the Telaga Dewa Health Center indicated that the predominant treatments administered were pharmacological in nature, lacking supplementary therapies such as neck massage.

Based on this, this study aims to evaluate the impact of neck massage therapy on mean arterial pressure (MAP) readings in hypertensive patients in the Telaga Dewa Community Health Center area of Bengkulu City.

MATERIALS AND METHODS

This study employs a quantitative research methodology characterized by a pre- and post-test one-group design. Between April and May of 2025, the study was carried out in Bengkulu City under the auspices of the Telaga Dewa Health Center. The study's population consisted of all local hypertensive patients that were registered. The investigation focuses on the effects of neck massage intervention on mean arterial pressure in patients diagnosed with hypertension. Those who fulfilled the inclusion criteria and were present throughout the data collection phase were chosen for the study using the accidental sampling approach. The sample comprised 43 respondents.

The independent variable is neck massage therapy, while the dependent variable is the MAP value, calculated using the formula MAP = (Systolic + 2 × Diastolic) / 3 (Masruroh & Santoso, 2020). MAP was measured before and after the intervention for three consecutive days. Measurements were made using an Omron brand digital tensimeter that had been calibrated and tested for validity and reliability through repeated measurements three times.

The research procedure began with a pre-test in the form of a MAP measurement, continued with 10-minute daily neck massage therapy for 3 days, and concluded with a post-test in the form of another MAP measurement. The neck massage intervention was carried out using VCO oil according to the SOP, with the number of movements being 20 times per session. This process was carried out by researchers who already had a massage training certificate.

The data analysis utilized the Shapiro-Wilk normality test and the one-sample t-test, as the data demonstrated a normal distribution ($p = 0.001 < \alpha = 0.05$). This study has secured ethical approval from the Health Research Ethics Commission of the Poltekkes Kemenkes Bengkulu (Approval Number: KEPK.BKL/206/04/2025) and adheres to essential research ethical principles, including autonomy (self-determination), confidentiality (privacy), justice (fairness), non-maleficence (do no harm), and beneficence (maximizing benefits).

RESULTS AND DISCUSSION

Results

Table 1. Overview of Respondent Characteristics Based on Age, Gender, Occupation, Smoking History Smoking History, History of Hypertension, and Genetic History (N=43)

Variable	Value
Age	
Mean	72
Median	00
Min-Max	·70
SD	55
95% CI	78-53.66
Gender	
Male	(25.6%)
Female	(74.4%)
Occupation	
Employed	(39.5%)
Not Employed	(60.5%)
Smoking History	
Smoking	(23.3%)
No Smoking	(76.7%)
History of Hypertension	
≤ 5 Years	(44.2%)
5 Years	(55.8%)
Genetic History	
None	(69.8%)
None	(30.2%)

Table 1 demonstrates that the mean age of responders is 51 years, with a range from 34 to 70 years. Most respondents (74.4%) were female. Most (60.5%) respondents did not work. Almost all (76.7%) respondents did not smoke. Most (69.8%) of the respondents had a family history of hypertension. Most of the respondents (55.8%) have a history of hypertension greater≥ 5 years.

Table 2. Effect of neck massage on Mean Arterial Pressure

Variable	**Before Mean ± SD**	**After Mean ± SD**	***Diff Mean***	**P-value**
MAP Value	110.40± 4.539	103.66± 3.548	6.79± 2.559	0.001*

Based on Table 2, it can be seen that the average MAP value before neck massage is 110.40 mmHg (SD 4.539), and after neck massage, it decreases to 103.66 mmHg (SD 3.548). There is a difference in the decrease in MAP value after being given an intervention of 6.79 mmHg. The statistical test results of *a one-sample t-test found that the* p-value was less01≤ 0.05. It can be concluded that neck massage therapy affects *mean arterial pressure* in patients with hypertension.

Discussion

Table 1 illustrates that the average age of the respondents is 51 years. This finding is corroborated by the research conducted by Maulidina (2019), which suggests that a major determinant of the prevalence of

hypertension is age. As people become older, their risk of developing hypertension increases. Numerous reasons, including normal physiological aging-related changes in the heart and blood arteries, might be blamed for this condition. Specifically, as individuals grow older, the walls of the arteries tend to become stiffer and lose elasticity, restricting the ability of blood vessels to accommodate changes in blood flow, which may lead to elevated blood pressure (Redho et al., 2023).

In the present study, a majority of the respondents were female, accounting for 74.4% of the sample. This finding is further supported by research conducted by Nazaruddin et al, (2021). Female respondents, as many as 17 respondents (54.8%), in general, women tend to suffer more hypertension due to increasing age. Women's production of the estrogen hormone, which is crucial in avoiding hypertension, will decline beyond the age of 35. The number of women who experience hypertension is because before women experience menopause, estrogen hormone levels function to increase HDL (high-density lipoprotein) levels. Increased HDL levels are a protective factor that prevents the process of atherosclerosis. With increasing age, women experience menopause, where estrogen hormone levels will decrease, causing blood pressure to increase significantly in women (Riyadina, 2019).

The results of this study show that most of the people who answered, 60.5%, were either jobless or stayed at home. This outcome is consistent with the study conducted by Maulidina (2019), which established a correlation between employment status and the incidence of hypertension, suggesting that individuals who are not engaged in work may be at a higher risk of developing hypertension due to insufficient physical activity, characterized by a lack of active or moderate physical engagements.

Moreover, the study reveals that the predominant demographic among the respondents was female, representing 74.4% of the total population surveyed. This prevalence suggests that women are particularly vulnerable to exposure to cigarette smoke, given that they typically engage in fewer smoking habits. This observation aligns with the findings of Ni'mah (2019), which demonstrated that women aged 40 to 70 years who are passive smokers are at an increased risk of hypertension, specifically within the jurisdiction of the Tlogosari Kulon Health Center in Semarang City.

This research aligns with the work of Habibah (2023). Genetics or family history is one risk factor for high blood pressure that can't be changed. The closer the family with high blood pressure, the higher the risk of developing primary hypertension. Researchers assume there is a family history relationship with hypertension due to genetic traits inherited from both parents. An elevated risk of cardiovascular disease and other causes of death is linked to the length of hypertension. Not in line with the study by Pebrisiana et al. (2022), which found that the more respondents who experienced hypertension ≤ 5 years ago, the greater the history of hypertension, the greater the risk of hypertension incidence rate.

According to the findings presented in Table 2, the study revealed that the average mean arterial pressure

(MAP) prior to the neck massage intervention was 110.40 mmHg. Following the intervention, this value decreased to 103.66 mmHg. The recorded average reduction was 6.79 mmHg, with a significance value of $\rho = 0.001$ ($\rho < 0.05$). This study shows that among hypertension patients in Bengkulu City's Telaga Dewa Puskesmas Work Area, a neck massage substantially reduces blood pressure. The study produced a p-value of 0.001, indicating a statistically significant difference in MAP values before to and after the implementation of neck massage treatment.

Massage techniques applied to the face, neck, shoulders, and chest can help regulate blood pressure through various methods, including gentle pressure, gentle rubbing, gentle squeezing, or gentle stretching of the muscles. Neck *massage* can stimulate the hypothalamus to increase endorphin hormones, which in turn affect parasympathetic nerve activity and decrease cortisol and dopamine levels, allowing blood flow to return more quickly to the heart and blood vessels (Refangga et al., 2024).

Neck massage can stimulate the hypothalamus to increase endorphin hormones, which in turn affect parasympathetic nerve activity and decrease cortisol and dopamine levels, thereby facilitating a more rapid return of blood flow to the heart and blood vessels (Refangga et al., 2024). According to Faidah and Muliawati (2021), massage movements applied to the skin, connective tissue, muscle tissue, and periosteum stimulate the receptors located in these areas. This stimulation is sent to the brain, and the brain will respond by sending a return signal through other nerves. This response causes the body to release substances such as acetylcholine and histamine, which help to dilate the blood vessels (vasodilation reflex) automatically. This vasodilation raises the parasympathetic nervous system's (which functions when the body is relaxed) workload while decreasing that of the sympathetic nervous system. Thus, the heart rate and pulse rate decrease, the body becomes more relaxed, and blood pressure decreases. At the carotid bifurcation, there are baroreceptors (stretch sensors) that monitor local arterial pressure. Mechanical or external pressure on the neck (e.g., massage of the carotid sinus or similar mechanical stimulation) increases the emptying/transmural pressure at these receptors, thereby increasing the frequency of afferent impulses to the nucleus tractus solitarius (NTS) in the brainstem. This response increases parasympathetic tone and suppresses sympathetic tone, producing bradycardia and peripheral vasodilation, which together decrease mean arterial pressure (MAP) (Amstrong & Moore, 2023). Baroreceptor stimulation rapidly activates the baroreflex, reducing sympathetic tone, peripheral resistance, and cardiac output, which together lower mean arterial pressure (MAP). Classic experiments manipulating carotid transmural pressure demonstrated a clear quantitative link between carotid and systemic arterial pressure changes (Mancia. *et.al*, 1978).

This aligns with the findings of studies undertaken by Intarti (2022), that neck massage and cucumber consumption are effective for lowering blood pressure by showing a ρ-value of 0.000; it may be concluded that Ha is acknowledged, indicating an influence of neck massage and cucumber ingestion on alterations

in blood pressure. This study aligns with the research by Sutomo (2022). The results showed that the average SBP and DBP was significantly lower ($\rho < 0.001$) in the massage group. This implies that massage treatment is a safe, practical, pertinent, and reasonably priced method of reducing blood pressure in prehypertensive ladies. It may be used at home or in medical institutions.

This is also consistent with the findings of a study by Sitepu et al (2021) indicating nape reflexology lowers blood pressure, as shown by the ρ-value on the diastolic blood pressure (0.005) and systolic blood pressure (0.004), which are both less than 0.05. This finding also matches the research by Sulistyorini (2019), Having a p-value of 0.0001, the results show that hypnosis and nape massage treatment are statistically significant. This implies that both treatments successfully reduce blood pressure in individuals with a diagnosis of hypertension.

This finding aligns with the research conducted by Shalafina and Febriana (2024), which indicates a significant reduction in blood pressure among hypertensive patients. Additionally, it corroborates the study by Delano et al. (2022), which documented an initial systolic blood pressure of 158.36 mmHg prior to treatment, subsequently decreasing to 137.93 mmHg after the intervention. This represents a decline of 12.90%, Having a p-value of 0.000, indicating statistical significance ($p < 0.05$). Furthermore, the diastolic blood pressure exhibited a reduction from 98.07 mmHg before treatment to 86.79 mmHg post-treatment, resulting in an 11.50% decrease, also reflecting a significant value of $\rho = 0.000$ ($p < 0.05$). It can be concluded that the application of massage therapy in conjunction with stretching methods is effective in lowering blood pressure in elderly individuals diagnosed with hypertension.

CONCLUSION

According to the study's findings, the MAP value significantly drops after intervention. The findings indicated a reduction in mean arterial pressure, specifically amounting to 6.79 mmHg. A p-value of 0.001 was found in the one-sample t-test findings, which is below the significance threshold of 0.05. Therefore, it can be established that neck massage treatment significantly affects mean arterial pressure in hypertension patients within the Telaga Dewa Health Center Working Area in Bengkulu City, as shown by a p-value of 0.001. This study aims to promote the enhancement of nurses' competencies in complementary therapy techniques and underscores the necessity for support from healthcare institutions to incorporate neck massage therapy into the nursing practice guidelines for hypertension management.

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Declaration of Interest Statement

The authors declare that we have no conflict of interests.

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