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THE EFFECT OF WET CUPPING THERAPY ON HEMODYNAMIC COMPARISONS IN POST-STROKE PATIENTS AT THE MEDAN CITY CUPPING CLINIC

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Abstract: Introduction: *Stroke can affect hemodynamics by disrupting blood flow and pressure within the circulatory system, including the heart, arteries, veins, and capillaries. High blood pressure (hypertension) is a major risk factor for stroke. Hypertension causes damage to blood vessels, including the arteries that supply blood to the brain. Wet cupping therapy can increase nitric oxide production, causing relaxation and vasodilation of blood vessels, which will result in lower blood pressure.* ***Objective:*** *This study aims to determine the effect of wet cupping therapy on hemodynamic comparison in post-stroke patients at cupping clinics in Medan city.* ***Methods:*** *is an observational comparative analytic, with a prospective cohort study approach research design, the sample of this study were post-stroke patients at the cupping clinic in Medan city.* ***Results:*** *Based on the results of the Paired T-test statistical test, the systolic p-value is 0.008 (p < 0.05). Diastolic P-value 0.044 (p < 0.05).* ***Conclusion:*** *There is an effect of wet cupping therapy on hemodynamic comparison in post-stroke patients at the cupping clinic in Medan city.*

Keywords: *Post-Stroke, Wet Cupping, Hemodynamics*

Abstrak: Pendahuluan: Stroke dapat mempengaruhi hemodinamik dengan cara mengganggu aliran darah dan tekanan di dalam sistem peredaran darah, termasuk jantung, arteri, vena, dan kapiler. Tekanan darah tinggi (hipertensi) adalah faktor risiko utama untuk stroke. Hipertensi menyebabkan kerusakan pada pembuluh darah, termasuk arteri yang memasok darah ke otak. Terapi bekam basah dapat meningkatkan produksi nitric oxide sehingga menyebabkan relaksasi dan vasodilatasi pada pembuluh darah, yang akan berdampak menurunnya tekanan darah. **Tujuan:** Penelitian ini bertujuan untuk mengetahui pengaruh terapi bekam basah terhadap perbandingan hemodinamik pada pasien pasca stroke di klinik bekam kota Medan. **Metode:** adalah analitik komparatif yang dilakukan secara observasional, dengan desain penelitian pendekatan studi cohort prospektif, sampel penelitian ini adalah pasien pasca stroke di klinik bekam kota Medan. **Hasil:** Berdasarkan hasil uji statistik Paired T-test didapatkan hasil nilai sistolik p-value 0,008 (p <0,05). Diastolik P-value 0,044 (p < 0,05). **Kesimpulan:** Terdapat pengaruh terapi bekam basah terhadap perbandingan hemodinamik pada pasien pasca stroke di klinik bekam kota Medan.

Kata Kunci: Pasca Stroke, Bekam Basah, Hemodinamik

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INTRODUCTION

Stroke is one of the biggest health problems in the world. It can affect anyone of any gender, age, and race. A stroke occurs when blood flow to the brain is interrupted, resulting in oxygen deprivation, brain damage, and loss of bodily functions. Stroke is most often caused by a blood clot in the arteries supplying blood to the brain. Risk factors for stroke include hypertension, diabetes, smoking, hyperlipidemia, atrial fibrillation, and obesity (Kuriakose & Xiao, 2020).

According to the World Health Organization (WHO), stroke is a rapidly developing clinical sign of focal or global disturbance of brain function, with symptoms lasting 24 hours or more and can lead to death, with no apparent cause other than vascular causes (Knight-Greenfield et al., 2019).

The global prevalence of stroke according to the World Health Organization (WHO) reached 13.7 million cases of stroke annually and 5.5 million of them died in 2019. Meanwhile, data from the 2018 Basic Health Research (Riskesdas) showed an increase in the incidence of stroke in Indonesia, namely from 7 per 1,000 individuals in 2013 to 10.9 per 1,000 individuals in 2018. The highest prevalence of stroke was recorded in the age group 75 years and above at 50.2%, while the lowest was in the age group 15–24 years at 0.6%. Stroke is one of the leading causes of death after coronary heart disease and cancer in developing countries (Kuriakose & Xiao, 2020). Based on data from the 2013 Basic Health Research, the highest prevalence of stroke diagnosed by health workers was in North Sulawesi, namely 10.8 per mil, while in North Sumatra it was 6.0 per mil (Ministry of Health of the Republic of Indonesia, 2015).

Strokes are divided into two categories: hemorrhagic strokes and ischemic or non-hemorrhagic strokes. Hemorrhagic strokes are caused by a ruptured blood vessel, blocking normal blood flow and causing blood to leak into brain tissue, damaging it. Hemorrhagic strokes account for approximately 10–15% of all strokes and have a high mortality rate. Meanwhile, non-hemorrhagic strokes are circulatory disorders in the brain caused by a blockage of a blood vessel without bleeding, with approximately 85% of stroke patients experiencing this type of stroke. Strokes caused by ruptured or blocked blood vessels in the brain can result in a decrease in the supply of oxygen and nutrients to the brain. If this supply of oxygen and nutrients is reduced, the patient is at risk of nerve cell death (Handayani, 2019).

Stroke can affect hemodynamics by disrupting blood flow and pressure within the circulatory system, including the heart, arteries, veins, and capillaries (da Fonseca et al., 2021). High blood pressure, or hypertension, is a major risk factor for stroke. Hypertension can damage blood vessels, including the arteries supplying blood to the brain. This condition can lead to hardening of the arteries (atherosclerosis) or rupture. Unstable hemodynamics can impact the post-stroke healing process and worsen the patient's health (Putra et al., 2020).

Stroke treatment can be performed using medication or drugs. In addition to pharmacological therapy, there are various non-pharmacological therapies, such as physiotherapy, balance training, and range of motion (ROM) exercises. Other treatments can be performed through complementary therapies, one of which is cupping therapy (Sucipto & Fadlilah, 2023).

Cupping is an ancient therapy practiced by several cultures to improve health and general well-being. Cupping therapy is divided into two types: dry cupping and wet cupping. Wet cupping involves making small incisions or punctures on the skin's surface. The

therapeutic effects of cupping are still felt by users, and it is believed to help lower blood pressure. Although some remain skeptical about its effectiveness, several studies have shown benefits experienced by those undergoing cupping therapy, including helping stabilize blood pressure, reducing pain, and alleviating headaches. In the early applications of cupping therapy, the body's physiological mechanisms were thought to work by stimulating the hormones serotonin and dopamine, which can cause vasodilation and provide a relaxing effect on the body, thereby reducing pain during the cupping process (Mohd Sobali et al., 2021).

Cupping therapy has been known since the time of the Prophet Muhammad (peace be upon him) and is supported by hadiths that recommend cupping treatment. One hadith, narrated by Bukhari, number 5294, states that cupping therapy can be performed using cupping, drinking honey, and using a hot iron, but the use of a hot iron is not recommended (Mohd Sobali et al., 2021).

Previous research by Sucipto and Fadlilah (2023) on wet cupping therapy to improve hemodynamic status in hypertensive patients showed that cupping therapy has an effect on lowering blood pressure. However, research on the effect of wet cupping therapy on hemodynamics in post-stroke patients is still limited. Therefore, the researchers were interested in conducting a study on the effect of wet cupping therapy on hemodynamic comparison in post-stroke patients at a cupping clinic in Medan City.

METHOD

This study used an observational comparative analytic approach, using a prospective cohort study design. The effects of one group without a comparison group were observed by comparing the pretest and posttest before and after the intervention. This study was conducted from November 2024 to January 2025 at the Dr. Abdurrahman Health Clinic and the Specialist Clinic of the Faculty of Medicine, Muhammadiyah University of North Sumatra.

The number of samples in this study was 22 post-stroke patients at the cupping clinic in Medan City who met the inclusion criteria using a purposive sampling technique, including patients who had been diagnosed with stroke, in the sub-acute post-stroke recovery phase (2 weeks - 6 months), whose general condition was stable, and were willing to be research samples by signing an informed consent form.

Before the study began, respondents were given an explanation of the benefits and confidentiality of their data, and they had the right to refuse or accept participation by signing an informed consent form if they wished. Subjects' blood pressure was checked before cupping therapy, and then they underwent a session of cupping therapy at sunnah points by a clinical therapist. Blood pressure was re-measured 30 minutes after the treatment to evaluate any changes.

Data collection techniques are carried out through editing, coding, data entry, cleaning, and saving processes. Data analysis is carried out in stages with univariate tests to provide a general overview of the research data and bivariate to determine the effect of cupping on hemodynamic comparisons in Post-Stroke patients using Paired Sample T-Test with the help of SPSS 26 software. Interpretation of the results will use the degree of significance where if $p < 0.05$ then the hypothesis is accepted, whereas if $p > 0.05$ then the hypothesis is rejected.

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RESULTS AND DISCUSSION

Table 1Respondent Age Distribution

	Age
Min	41
Max	79
Mean	58.82
Std. Dev	10.95

Based on the age distribution of respondents, it is known that the youngest age was 41 years old, while the oldest age reached 79 years old. The average age of respondents was 58.82 years old with a standard deviation of 10.95 years, indicating a variation in the ages of respondents in this study. This indicates that the majority of post-stroke patients who participated in this study were in the adult to elderly age range.

Table 2 Distribution of Respondents' Gender

Gender	n	%
Man	14	63.6
Woman	8	36.4
Total	**22**	**100**

Based on patient gender distribution, the majority of respondents in this study were male, with a total of 14 people (63.6%). Meanwhile, there were 8 female respondents (36.4%). With a total of 22 patients, this data indicates that post-stroke patients treated at the Medan City Cupping Clinic are predominantly male compared to female..

Table 3 Distribution of Hypertension History

History of Hypertension	n	%
No	20	90.9
Yes	2	9.1
Total	**22**	**100**

Table 3 above shows the distribution of hypertension history in post-stroke patients at the Medan City Cupping Clinic. Of the 22 patients, 20 (90.9%) had hypertension, while 2 (9.1%) did not. The high prevalence of hypertension in post-stroke patients indicates that hypertension is a significant risk factor in this patient group.

Table 4 Distribution of Antihypertensive Drug Consumption

Drug Consumption	n	%
No	14	70.0
Yes	6	30.0
Total	**20**	**100**

Table 4 shows the distribution of antihypertensive medication use in post-stroke patients with hypertension. Of the 20 hypertensive patients, 14 (70.0%) were not taking antihypertensive medication, while only 6 (30.0%) were taking antihypertensive medication. These data indicate that the majority of post-stroke hypertensive patients at the Medan City Cupping Clinic were not undergoing antihypertensive medication therapy, which may be an important factor to consider in patient health management.

Table 5 Normality Test Results

Blood pressure	Group	*P-Value*	Conclusion
Systolic	Pretest	0.134	Normally Distributed
	Posttest	0.082	Normally Distributed
Diastolic	Pretest	0.099	Normally Distributed
	Posttest	0.055	Normally Distributed

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The test results showed that the blood pressure data, both systolic and diastolic, in the pretest and posttest measurements, had p-values greater than 0.05, respectively. For systolic blood pressure, the p-value was 0.134 (pretest) and 0.082 (posttest). Meanwhile, for diastolic blood pressure, the p-value was 0.099 (pretest) and 0.055 (posttest). Thus, all data were normally distributed, so the statistical analysis used to test the effect of wet cupping therapy was parametric analysis, namely the Paired Sample T-Test.

Based on the results of the normality test, the next step was to conduct a hypothesis test to determine whether wet cupping therapy had an effect on hemodynamic changes in post-stroke patients. This test was conducted using a paired sample t-test.

Table 6 Paired Sample T-Test Results

Blood pressure	Group	Average	*P-Value*	Conclusion
Systolic	Pretest	145.45	0.008	Effective
	Posttest	139.55		
Diastolic	Pretest	88.41	0.044	Effective
	Posttest	85.09		

The results of the Paired Sample T-Test showed significant changes in systolic and diastolic blood pressure in post-stroke patients following wet cupping therapy. The average pre-treatment systolic blood pressure was 145.45 mmHg, which isdecreaseto 139.55 mmHg after therapy (posttest). With a p-value of 0.008 ($p < 0.05$), these results indicate that wet cupping therapy is effective in significantly lowering systolic blood pressure.

For diastolic blood pressure, the pretest average was 88.41 mmHg, which decreased to 85.09 mmHg in the posttest. The p-value obtained was 0.044 ($p < 0.05$), indicating that this therapy was also effective in significantly lowering diastolic blood pressure. Thus, wet cupping therapy can be concluded to have a positive effect on the hemodynamics of post-stroke patients.ClinicCupping in Medan City.

Based on the results of the Paired Sample T-Test, wet cupping therapy was shown to have a significant effect on hemodynamic changes in post-stroke patients. A significant decrease in systolic and diastolic blood pressure with p-values of 0.008 and 0.044, respectively, demonstrated the effectiveness of this therapy in reducingpressureblood. Therefore, hypothesis H1, which states that wet cupping therapy has an effect on hemodynamic comparisons in post-stroke patients, is accepted, while hypothesis H0, which states that there is no effect of this therapy, can be rejected.

DISCUSSION

Patient Characteristics

The results of this study indicate that the majority of respondents were men, with a percentage of 63.6% (14 people), while women were 36.4% (8 people). In general, this gender distribution is in line with epidemiological data showing that men have a higher risk of stroke than women, especially before entering menopause. This may be linked to the role of the hormone estrogen in women, which functions to protect blood vessels from damage due to hypertension and cardiovascular disease, which are more common in men who have lower estrogen levels than women. In addition to hormonal factors, this difference in risk may also be linked to lifestyle and behavioral factors, where men are more likely to smoke, consume alcohol, and have an unhealthy diet, which are major risk factors for stroke (Potter et al., 2022).

The age range of respondents in this study was 41–79 years, with a mean of 58.82 years and a standard deviation of 10.95 years. This age range reflects the adult to elderly population, which is a high-risk group for stroke and its complications. Decreased physiological function, accumulation of cardiovascular risk factors, and the increasing prevalence of hypertension in the elderly may be underlying factors in the high stroke rate in this age group (Kuriakose & Xiao, 2020). This finding is also relevant to the literature stating that age over 50 years is a major risk factor for stroke (Potter et al., 2022).

The majority of patients, 90.9%, had a history of hypertension, while 9.1% had no history of hypertension. This indicates that hypertension is a risk factor in post-stroke patients. Uncontrolled hypertension can worsen the patient's condition and increase the risk of stroke. Therefore, proper hypertension management is crucial for stroke prevention.

Most patients (70.0%) were not taking medication, while 30.0% were taking antihypertensive medications. This is interesting because wet cupping therapy can be effective in lowering blood pressure even though the majority of respondents did not receive pharmacotherapy support. This supports the use of wet cupping therapy as a complementary method, especially for patients who are not undergoing or cannot undergo pharmacological therapy. However, it is important to note that the effectiveness of cupping therapy may also depend on the severity of hypertension and the patient's overall blood pressure control.

The Effect of Wet Cupping Therapy on Hemodynamics

The results of this study indicate that wet cupping therapy significantly impacts the hemodynamics of post-stroke patients, as indicated by a decrease in systolic and diastolic blood pressure. The average systolic blood pressure before therapy was 145.45 mmHg, which decreased to 139.55 mmHg after therapy. This decrease indicates a change in the patient's hemodynamic condition. A decrease in diastolic blood pressure was also seen, from an average of 88.41 mmHg before therapy to 85.09 mmHg after therapy.

These results were supported by statistical analysis, with p-values of 0.008 for systolic blood pressure and 0.044 for diastolic blood pressure, both below the 5% significance threshold ($p < 0.05$). Thus, there was a significant difference in systolic and diastolic blood pressure before and after wet cupping therapy in post-stroke patients. These results indicate changes in hemodynamic parameters following wet cupping therapy intervention.

These findings are consistent with previous research by Sucipto and Fadlilah (2023), which demonstrated that wet cupping therapy lowers blood pressure in hypertensive patients. The study demonstrated that cupping can relax blood vessels, resulting in a decrease in total peripheral resistance. This effect contributes to lower blood pressure and increased blood flow to organs (Sucipto & Fadlilah, 2023). This previous research provides the basis for the present study, particularly in post-stroke patients who also experience changes in hemodynamic status. Therefore, the results of this study are consistent with previous findings in the hypertensive patient population.

Cupping therapy is thought to influence nitric oxide (NO) production through stimulation of the skin produced during the suction and incision processes. NO is a molecule that acts as a vasodilator by causing blood vessel dilation, thereby increasing blood flow and potentially lowering blood pressure. This effect is relevant in post-stroke patients because blood pressure stability is a crucial aspect of patient management. Furthermore, nerve stimulation during cupping therapy is thought to increase endorphin levels, which play a role in providing a relaxing effect. Activation of the parasympathetic nervous system may also

contribute to a decrease in heart rate and cardiac output. This combination of mechanisms may provide a physiological explanation for changes in hemodynamic parameters after cupping therapy (Rahmadi, 2019; Sustiyono & Maulina, 2024; Samiasih, 2019).

The results of this study indicate that wet cupping therapy can be considered as a complementary approach in the management of post-stroke patients. The relevance of this therapy is evident in the context of this study because the majority of respondents (70.0%) were not taking antihypertensive medications. However, these results cannot be used to replace medically recommended pharmacological therapy. Cupping therapy can be considered as a complementary therapy, provided that the patient's clinical condition, hypertension severity, medication use, and blood pressure monitoring are taken into account. This study provides additional evidence regarding changes in hemodynamic parameters after wet cupping therapy in post-stroke patients and can serve as a basis for further research with a larger sample size and a more robust study design.

CONCLUSION

Based on the results of a study on 22 post-stroke patients, wet cupping therapy showed hemodynamic changes in the form of a decrease in systolic and diastolic blood pressure after the intervention. The average systolic blood pressure decreased from 145.45 mmHg to 139.55 mmHg with a p-value of 0.008, while diastolic blood pressure decreased from 88.41 mmHg to 85.09 mmHg with a p-value of 0.044. Both values showed a statistically significant difference between before and after therapy. These findings indicate that wet cupping therapy has the potential to provide benefits as a complementary therapy in helping manage hemodynamic parameters in post-stroke patients at the Medan City Cupping Clinic.

This study has limitations in the form of a relatively small sample size, namely 22 comparison groups, so the results cannot be generalized widely and cannot confirm that changes in blood pressure are entirely due to wet cupping therapy. Future studies are recommended using a larger sample size, a control or comparison group, and a longer observation period to obtain stronger evidence regarding the effectiveness and sustainability of the therapy's effects. Practically, wet cupping therapy can be considered a complementary approach in hemodynamic monitoring of post-stroke patients, but its application still needs to be adjusted to the patient's clinical condition and does not replace pharmacological therapy or recommended medical management.

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