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The Role of Cupping Therapy in Non-Pharmacological Approaches to Hypertension Control: Analysis of Changes in Systolic and Diastolic Blood Pressure

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ABSTRACT

Purpose of the study: This study aimed to analyze changes in systolic and diastolic blood pressure following wet cupping therapy as a non-pharmacological intervention for hypertension control.

Methodology: An analytical pre–post experimental study was conducted involving 32 adult participants undergoing wet cupping therapy. Blood pressure was measured before and after intervention using standardized procedures. Data were processed through editing and coding stages and analyzed using paired-samples t-test or Wilcoxon signed-rank test based on normality distribution. Statistical significance was set at $p < 0.05$.

Main Findings: The mean change in systolic blood pressure was 1.09 ± 8.20 mmHg, while the mean change in diastolic blood pressure was 0.31 ± 7.06 mmHg. Twelve participants (38%) experienced a reduction in systolic blood pressure. However, overall differences in systolic and diastolic values before and after therapy were not statistically significant ($p > 0.05$).

Novelty/Originality of this study: This study advances current evidence by positioning wet cupping therapy within an evidence-based non-pharmacological hypertension control framework and by separately analyzing systolic and diastolic hemodynamic responses using standardized statistical procedures.

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1. INTRODUCTION

Hypertension remains one of the most significant global public health challenges, contributing substantially to cardiovascular morbidity and mortality worldwide [1]-[3]. Persistent elevation of systolic and diastolic blood pressure is strongly associated with stroke, coronary artery disease, heart failure, and chronic kidney disease [4]-[6]. Although pharmacological therapy has proven effective in reducing cardiovascular risk, long-term adherence remains suboptimal due to side effects, economic burden, limited access to care, and patient-related factors [7], [8]. Consequently, there is growing interest in non-pharmacological approaches that are safe, accessible, culturally acceptable, and capable of complementing standard medical treatment [9]-[11]. Within this context, complementary and integrative therapies are increasingly explored as potential adjuncts in hypertension control.

Cupping therapy, particularly wet cupping (Hijama), represents one of the oldest forms of traditional medical practice and is widely utilized across Middle Eastern and Asian communities [12]-[14]. In contemporary healthcare discourse, cupping therapy is categorized within complementary and alternative medicine and is often sought by patients as part of holistic health management [15]-[17]. Biophysiologically, wet cupping involves controlled negative pressure followed by superficial skin incisions to facilitate blood extraction [18], which is hypothesized to influence microcirculation, autonomic nervous system balance, oxidative stress pathways, and inflammatory mediators mechanisms that may be relevant to blood pressure regulation [19], [20]. Despite its historical longevity and widespread community acceptance, the clinical evidence supporting its role in cardiovascular modulation, particularly in hypertension management, remains inconsistent and methodologically limited.

A critical review of existing literature reveals several research gaps. Previous studies have used small sample sizes, lacked rigorous experimental controls, or failed to clearly distinguish between systolic and diastolic responses as distinct physiological outcomes [21], [22]. Most studies have focused on short-term effects without sufficient analytical emphasis on hemodynamic modulation patterns [23]. Integration of cupping therapy within a broader framework of evidence-based non-pharmacological hypertension management strategies remains limited [24]. Consequently, the scientific position of cupping therapy in modern cardiovascular prevention remains unclear, leading to uncertainty among clinicians and policymakers regarding its potential inclusion within integrative care models.

The present study addresses these gaps by systematically analyzing changes in systolic and diastolic blood pressure following cupping therapy within a structured non-pharmacological intervention framework. Unlike previous descriptive or tradition-centered narratives, this research emphasizes objective hemodynamic indicators as primary endpoints, thereby strengthening clinical interpretability. The novelty of this study lies in its analytical focus on differential blood pressure components (systolic versus diastolic), its positioning of cupping therapy within contemporary hypertension control paradigms, and its contribution to the evidence base required for integrative health policy development. By bridging traditional therapeutic practice with measurable cardiovascular outcomes, this study advances the discourse from cultural validation toward clinical evaluation [14], [25].

The urgency of this research is underscored by the escalating prevalence of hypertension and the global call for cost-effective, community-based preventive strategies. In resource-constrained settings, where access to continuous pharmacological therapy may be limited, evidence-informed complementary interventions could provide supportive options for risk reduction. Establishing the role of cupping therapy in non-pharmacological blood pressure management is therefore not only academically relevant but also strategically important for public health innovation. Through rigorous analysis of systolic and diastolic blood pressure changes, this study seeks to clarify whether cupping therapy can be positioned as a scientifically grounded adjunct in hypertension control, contributing to safer, more integrative, and patient-centered cardiovascular care.

2. RESEARCH METHOD

2.1. Study Design

This study employed an analytical pre–post experimental approach with a single-group design to evaluate changes in systolic and diastolic blood pressure following wet cupping therapy as a non-pharmacological intervention [26]-[28]. Although measurements were conducted at a single time frame for each participant, the structure of data collection was longitudinal at the individual level (Before–after comparison), enabling within-subject analysis of hemodynamic changes. The research was conducted at Rumah Sehat Afiat Cinere, a community-based complementary health service facility. Data collection took place from April 1 to August 21, 2023. This setting was selected due to its structured implementation of wet cupping therapy and standardized clinical recording practices, which supported data reliability and procedural consistency.

2.2. Population and Sample

The study population comprised adult clients undergoing wet cupping therapy during the study period. Eligibility criteria included individuals aged ≥18 years who voluntarily underwent cupping therapy and agreed to blood pressure assessment before and after the procedure. Participants with incomplete measurements, unstable clinical conditions, or contraindications to cupping therapy were excluded to ensure internal validity. The required minimum sample size was calculated using a paired mean difference formula for continuous outcomes, resulting in a total of 32 participants to achieve adequate statistical power for detecting clinically meaningful changes in systolic and diastolic blood pressure. Consecutive sampling was applied to minimize selection bias and enhance transparency in recruitment [29], [30].

2.3. Variables and Measurements

The primary outcome variables were systolic blood pressure (SBP) and diastolic blood pressure (DBP), measured in mmHg before and immediately after the intervention. Secondary descriptive variables included age, sex, primary complaint, prior cupping experience, number of cupping points, and anatomical location of cupping points. Blood pressure was measured using a calibrated digital sphygmomanometer under standardized resting conditions. Participants were seated comfortably for at least 5 minutes prior to measurement, with back support and arm positioned at heart level. Two measurements were obtained for each time point, and the average value was recorded to improve accuracy [31], [32].

To ensure standardized interpretation of blood pressure categories, classification was based on the criteria from the Seventh Report of the Joint National Committee (JNC VII). The classification framework used in this study is presented below. Before presenting the classification table, it is important to note that categorization supports both descriptive epidemiological interpretation and subgroup analysis of hemodynamic changes.

Table 1. Classification of Blood Pressure (JNC VII)

Blood Pressure Classification	Systolic (mmHg)	Diastolic (mmHg)
Normal	<120	and <80
Pre-hypertension	120–139	or 80–89
Hypertension Stage 1	140–159	or 90–99
Hypertension Stage 2	≥160	or ≥100

This classification framework allowed stratification of participants based on baseline blood pressure status, thereby strengthening analytical depth and contextual interpretation of intervention effects.

Wet cupping therapy was administered by trained practitioners following standard operational procedures at the facility. The intervention consisted of skin sterilization, application of suction cups to predetermined anatomical points, controlled superficial incisions, and secondary suction to facilitate blood extraction. The number and location of cupping points were recorded for each participant to allow exploratory subgroup analysis.

The procedure duration ranged between 15–30 minutes. Post-intervention blood pressure measurements were conducted after participants had rested for approximately 10–15 minutes to reduce acute procedural stress effects.

2.4. Data Analysis

Data management followed a structured and transparent workflow. The initial stage involved on-site editing to ensure completeness and consistency of recorded data [33], [34]. Incomplete forms were immediately clarified with participants whenever feasible; otherwise, the data were excluded according to predefined criteria. Subsequently, data coding was performed to facilitate statistical analysis using IBM SPSS Statistics version 20. Continuous variables were entered numerically, while categorical variables were coded systematically to prevent entry errors. Normality testing (Shapiro–Wilk test) was conducted to determine data distribution. If the distribution of pre–post differences was normal, a paired-samples t-test was applied to evaluate mean differences in SBP and DBP. If normality assumptions were violated, the non-parametric Wilcoxon signed-rank test was used. Statistical significance was determined at a p-value < 0.05 with 95% confidence intervals reported where applicable. This analytical approach ensured methodological rigor by aligning statistical testing with data characteristics, thereby minimizing inferential bias. To enhance methodological transparency, the overall structure of the study is illustrated in the following research flow diagram.

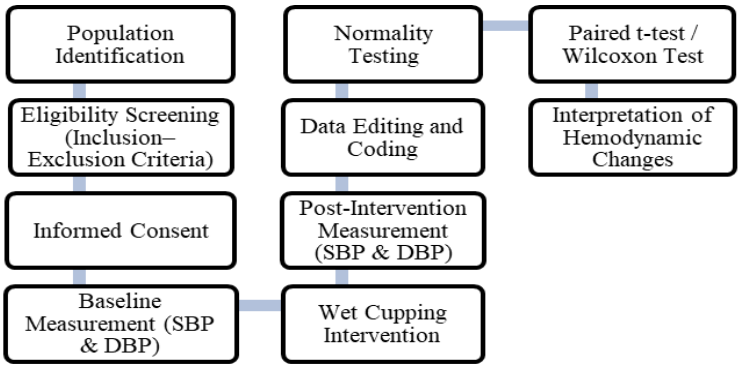

Figure 1. Research flow

2.5. Ethical Considerations

All participants provided informed consent prior to inclusion. Confidentiality of personal data was maintained through anonymized coding. The intervention was performed by certified practitioners to ensure patient safety and adherence to clinical standards.

3. RESULTS AND DISCUSSION

A total of 32 participants who underwent wet cupping therapy at Rumah Sehat Afiat Cinere between April 1 and August 24, 2023 met the inclusion criteria and were included in the final analysis. All participants completed both pre- and post-intervention blood pressure measurements; therefore, no attrition occurred during the study period. Table 2 presents the baseline demographic characteristics of the participants. The majority were male (72%), while females accounted for 28% of the sample.

Table 2. Distribution of Participants by Sex (n = 32)

Sex	Frequency (n)	Percentage (%)
Male	23	72
Female	9	28

The predominance of male participants reflects the higher utilization of cupping therapy among men in this setting during the study period. Age distribution is summarized in Table 2. Participants were predominantly young adults aged 19–24 years (56%). The proportion of participants decreased progressively with increasing age.

Table 3. Distribution of Participants by Age Group (n = 32)

Age Group (years)	Frequency (n)	Percentage (%)
19–24	18	56
25–30	4	13
31–36	4	13
37–42	2	6
43–48	3	9
52	1	3

The relatively small representation of older adults may be attributed to the exclusion of individuals with established hypertension or unstable medical conditions. Participants reported various motivations for undergoing cupping therapy. As shown in Table 3, the most common reason (41%) was routine health maintenance or general wellness without a specific complaint. Musculoskeletal discomfort (28%) and upper respiratory symptoms such as cough and cold (19%) were also reported.

Table 3. Distribution of Participants by Primary Reason for Cupping (n = 32)

Reason for Therapy	Frequency (n)	Percentage (%)
Routine/Health Maintenance	13	41
Muscle Pain/Fatigue	9	28
Cough and Cold Symptoms	6	19
Other Complaints	4	12

These findings suggest that cupping therapy in this setting is commonly utilized as a preventive or wellness-oriented intervention rather than solely for disease-specific management. Table 4 summarizes participants' prior exposure to cupping therapy. Most participants (43%) were first-time users, while 38% had undergone the procedure 2–5 times, and 19% had more than five previous sessions.

Table 4. Previous Experience with Cupping Therapy (n = 32)

Frequency of Previous Therapy	Frequency (n)	Percentage (%)
First-time	14	43
2–5 times	12	38
>5 times	6	19

Baseline and post-intervention systolic and diastolic blood pressure values were compared to evaluate the hemodynamic impact of wet cupping therapy. The mean change in systolic blood pressure (post minus pre) was 1.09 ± 8.20 mmHg, while the mean change in diastolic blood pressure was 0.31 ± 7.06 mmHg. Table 5 summarizes the overall pre–post blood pressure measurements.

Table 5. Pre- and Post-Intervention Blood Pressure (n = 32)

Parameter	Mean Change (mmHg)	Standard Deviation (±)
Systolic Blood Pressure	1.09	8.20
Diastolic Blood Pressure	0.31	7.06

Although the mean differences appear modest, individual responses varied considerably. A total of 12 participants (38%) experienced a reduction in systolic blood pressure after therapy, whereas the remaining participants showed either no change or a slight increase. Similar variability was observed in diastolic measurements. The distribution of directional changes is presented in Table 6.

Table 6. Direction of Blood Pressure Change After Cupping Therapy (n = 32)

Outcome	Systolic n (%)
Decrease	12 (38%)
No change / Increase	20 (62%)

Normality testing was performed prior to selecting the appropriate statistical test. Based on data distribution, either a paired-samples t-test or Wilcoxon signed-rank test was applied accordingly. Statistical testing demonstrated that the observed mean differences in systolic and diastolic blood pressure did not reach statistical significance at the 0.05 level ($p > 0.05$). Thus, within this sample of predominantly normotensive young adults, wet cupping therapy did not produce a statistically significant short-term reduction in systolic or diastolic blood pressure.

Overall, the results indicate that while individual variability in blood pressure response was observed, the average changes in systolic and diastolic blood pressure following wet cupping therapy were small and not statistically significant. These findings suggest that in a relatively young, largely non-hypertensive population, cupping therapy may not exert a substantial acute hemodynamic effect. However, the presence of blood pressure reductions in a subset of participants indicates potential individual responsiveness, warranting further investigation in larger and clinically hypertensive populations.

This study examined the role of wet cupping therapy as a non-pharmacological approach to blood pressure control by analyzing changes in systolic and diastolic values before and after intervention. The findings demonstrate that although a proportion of participants experienced reductions in systolic blood pressure (38%), the overall mean changes in both systolic (1.09 ± 8.20 mmHg) and diastolic (0.31 ± 7.06 mmHg) blood pressure were small and statistically non-significant. These results suggest that, within a predominantly young and largely normotensive population, wet cupping therapy did not produce a substantial acute hemodynamic effect. However, the observed inter-individual variability indicates that certain participants may respond differently to the intervention, raising important considerations for patient selection and clinical context [35].

The absence of statistically significant reductions in this study contrasts with several previous investigations reporting meaningful decreases in blood pressure following cupping therapy, particularly among hypertensive populations [36]. Many earlier studies have suggested that cupping may improve microcirculation, modulate autonomic balance, and reduce oxidative stress mechanisms that could contribute to blood pressure reduction [37]. Nevertheless, much of the existing literature is characterized by methodological limitations, including small sample sizes, lack of control groups, heterogeneous participant profiles, and insufficient differentiation between systolic and diastolic responses [38]. Furthermore, a considerable number of prior studies have focused primarily on hypertensive or older populations, whereas the present study predominantly involved young adults, most of whom were not clinically hypertensive at baseline [39], [40]. This difference in population characteristics may partially explain the modest effect observed. In normotensive individuals, physiological homeostatic mechanisms tightly regulate blood pressure, potentially limiting the magnitude of observable reductions after a single complementary intervention.

The novelty of this study lies in its explicit positioning of wet cupping therapy within the contemporary framework of non-pharmacological hypertension control and its analytical emphasis on distinct systolic and diastolic outcomes rather than generalized blood pressure trends. By treating systolic and diastolic parameters as separate yet related hemodynamic endpoints, this study contributes to a more nuanced understanding of cardiovascular responses to complementary interventions. In addition, the study integrates standardized measurement procedures and transparent statistical selection based on data distribution, thereby strengthening methodological rigor compared with many tradition-centered descriptive reports. Rather than presuming therapeutic benefit based on historical or cultural validation, this research adopts an evidence-oriented approach that critically evaluates measurable cardiovascular outcomes.

From a clinical and public health perspective, the findings carry important implications. First, the results suggest that wet cupping therapy should not be positioned as a primary acute strategy for lowering blood pressure in normotensive young adults. However, the variability in individual responses indicates the possibility of subgroup-specific benefits, particularly among individuals with elevated baseline blood pressure or autonomic

imbalance. Second, the high proportion of participants undergoing cupping for health maintenance rather than specific disease management reflects a preventive health-seeking behavior that may be leveraged in community-based cardiovascular risk reduction strategies. If integrated appropriately, complementary therapies such as cupping could serve as supportive components within broader lifestyle modification programs that include diet, physical activity, and stress management. Importantly, integration into formal health systems would require stronger evidence derived from randomized controlled designs and longitudinal follow-up.

Several limitations must be acknowledged. The single-group pre–post design without a control group limits causal inference and makes it difficult to exclude placebo effects or regression to the mean. The relatively small sample size reduces statistical power and may obscure subtle effects. Additionally, the predominance of young, non-hypertensive participants constrains generalizability to older or clinically hypertensive populations, where physiological responses might differ. The study also assessed only short-term changes immediately after intervention, thereby not capturing potential delayed or cumulative effects of repeated sessions. Finally, unmeasured confounding factors such as dietary intake, stress levels, sleep patterns, and prior physical activity may have influenced blood pressure measurements.

Despite these limitations, this study contributes to the evolving discourse on integrative cardiovascular care by providing structured empirical data on the acute hemodynamic effects of wet cupping therapy. The findings underscore the importance of distinguishing between cultural popularity and clinical efficacy, while also highlighting the need for more rigorous, adequately powered trials involving hypertensive populations and longer follow-up periods. Future research should incorporate randomized controlled designs, biomarker analysis (e.g., inflammatory markers or heart rate variability), and stratified analysis based on baseline blood pressure status to clarify whether cupping therapy has a clinically meaningful role in non-pharmacological hypertension management.

4. CONCLUSION

This study aimed to evaluate the role of wet cupping therapy as a non-pharmacological approach to hypertension control by analyzing changes in systolic and diastolic blood pressure before and after intervention. Among 32 participants, the mean change in systolic blood pressure was 1.09 ± 8.20 mmHg and the mean change in diastolic blood pressure was 0.31 ± 7.06 mmHg. Although 38% of participants experienced a reduction in systolic blood pressure, the overall differences were not statistically significant ($p > 0.05$). These findings indicate that, in a predominantly young and normotensive population, a single session of wet cupping therapy did not produce a significant acute reduction in systolic or diastolic blood pressure. The study contributes to the evidence base by critically evaluating cupping therapy within a measurable hemodynamic framework rather than relying solely on traditional or cultural justification. Future studies should involve larger hypertensive populations and randomized controlled designs to determine long-term and clinically meaningful cardiovascular effects. Additionally, integrating biomarker analysis and repeated intervention sessions is recommended to clarify potential cumulative physiological benefits.

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USE OF ARTIFICIAL INTELLIGENCE (AI)-ASSISTED TECHNOLOGY

The authors confirm that no artificial intelligence (AI)-assisted technologieswere utilized in the preparation, analysis, or writing of this manuscript. Allstages of the research process, including data collection, data interpretation, and the development of the manuscript, were conducted solely by the authors without any support from AI-based tools.

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