Jurnal
Berita Ilmu Keperawatan

Jurnal Berita Ilmu Keperawatan
Vol. 19 (1), 2026
p-ISSN: 1979-2697
e-ISSN: 2721-1797
https://doi.org/10.23917/bik.v19i1.12526

Wet Cupping Therapy as A Complementary Intervention for Blood Glucose Reduction: Pre-Experimental Study

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Abstract:
Diabetes mellitus is a metabolic disease characterized by persistently elevated blood glucose levels and is a significant global public health problem. Wet cupping therapy is a complementary therapy that supports glycemic control, although community-based evidence is still very limited. This study was conducted to examine the short-term impact of wet cupping therapy on blood glucose levels in adults. This study used a pre-experimental, single-group pre-test-post-test design and was conducted in Wirobrajan Village, Yogyakarta, Indonesia, in April 2025. Thirty adults aged 26-45 years who were not receiving glucose-lowering medication were recruited using quota sampling. Blood glucose levels were measured before and immediately after one wet cupping therapy session. A paired-sample t-test with a significance level of $p < 0.05$ was used to look at the data. The mean blood glucose level dropped from 131 mg/dL before the intervention to 117 mg/dL after, a difference of 14.2 mg/dL. This drop was statistically significant ($p = 0.0001$). These findings indicate that wet cupping therapy significantly reduces short-term blood glucose levels in adults. Wet cupping therapy can be considered a complementary intervention for glycemic control. However, further randomized controlled trials are needed to confirm these findings.

Keywords: *Cupping therapy, Blood glucose, Diabetes mellitus*
Submitted: 20 August 2025, Review: 26 October 2025, Revised: 23 December 2025, accepted: 24 December 2025, published: 31 January 2026

INTRODUCTION

High blood glucose levels due to abnormalities in insulin secretion, insulin sensitivity, or a combination of both are a sign of the metabolic disease diabetes mellitus (DM). The prevalence of diabetes mellitus in Indonesia continues to increase. In the national health system, diabetes mellitus is a major global health problem and poses a significant economic burden. The International Diabetes Federation (2023) says that about 537 million adults around the world have diabetes. This number is expected to rise to 643 million by 2030 and 783 million by 2045. The Basic Health Research (Riskesdas, 2018) in Indonesia noted that the prevalence of diabetes increased from 6.9% to 10.9% in 2013, with the highest concentration in urban areas such as Jakarta and Yogyakarta. This demonstrates importance treating diabetes a public health issue. One non-pharmacological treatment option is wet cupping therapy, a complementary and alternative therapy approach based on cultural and spiritual beliefs. The wet cupping therapy (hijamah) method is widely practiced, especially in Muslim-majority countries. Cupping therapy is a strong tradition in history and religion, as conveyed in the hadith of the Prophet Muhammad SAW: "The best treatment you can use is cupping" (Bukhari, Hadith No. 5683). This

spiritual aspect is a strong reason for Muslim communities to use cupping therapy as a way to heal their bodies and minds. Numerous scientific studies have investigated cupping therapy as a non-pharmacological method with possible advantages in reducing blood glucose levels.

A study by (Farhadi, K et al., 2016) found that cupping therapy can lower oxidative stress, make insulin more sensitive, and improve microcirculation. A meta-analysis by (Liu, W., Zhang, Y., Wang, Y., 2022) confirmed that cupping can help lower blood sugar levels by increasing the production of nitric oxide (NO), improving endothelial function, and lowering systemic inflammation.

Research findings by (Zhang, L., Zheng, Y., & Qiao, 2021b) indicate that blood glucose levels in patients with prediabetes and type 2 diabetes can be stabilized with cupping therapy. Many people in Indonesia use cupping therapy as a way to improve their health. The Indonesian Cupping Therapists Association (ITBI, 2020) says that in 2020, there were more than 5,000 certified cupping therapists working in different provinces. This trend shows that cupping therapy is widely accepted in Indonesia as a traditional medicine that works well with other treatments. Given the increasing prevalence of diabetes mellitus, cupping therapy is highly sought after by the public.

In a health context, this study aims to determine the effectiveness of wet cupping therapy in reducing blood glucose levels in adults aged 26-45 years in Wirobrajan Village, Yogyakarta.

Wet cupping therapy is becoming more popular around the world, but there isn't much evidence that it works to lower blood sugar levels in adults aged 26 to 45 in Wirobrajan Village. Most of the studies that came before this one looked at older people or groups of people of all ages. There have been studies (El Sayed, N., Mostafa, R., & Farouk, 2021) on wet cupping therapy for type 2 diabetes patients with a wider age range and a mix of adults, but there isn't much research on this adult population.

Based on this gap, we hypothesize that a structured wet cupping therapy intervention can significantly lower blood glucose levels in this population. The results of this study are anticipated to provide scientific evidence supporting the advancement of holistic, context-sensitive non-pharmacological interventions and to enhance the incorporation of traditional practices into the national healthcare system.

METHODS

Study Design and Setting

A quantitative pre-experimental design with a one-group pretest-posttest framework was applied in this study. The data collection occurred over one month in April 2025 in Wirobrajan Village, Yogyakarta, Indonesia. This design is suitable for assessing the short-term effects of an intervention when randomisation and a control group are impractical, especially in preliminary and community-based health research (Polit, D. F., & Beck, 2021); (Gray, J. R., Grove, S. K., & Sutherland, 2023).

Population and Sample

The study looked at adults between the ages of 26 and 45 who lived in Wirobrajan Village and met the criteria for inclusion and exclusion. A non-probability quota sampling method was used, in which eligible participants were recruited one after the other until the desired sample size was reached. This method of sampling works well for community-based health research that looks at specific population traits and where random sampling can't be used (Polit, D. F., & Beck, 2021); (Boddy, C., & Boddy, 2023).

Inclusion Criteria

People between the ages of 26 and 45, Not currently getting medication to lower blood sugar levels, Agree to have wet cupping therapy and sign a form saying they understand what it is, No diagnosed chronic comorbidities like kidney disease, heart disease, or blood clotting disorders.

Exclusion Criteria

Already having an allergy to cupping materials or procedures, Not fully participating in the intervention session, A history of haemophilia or other bleeding problems.

Procedure Study

Figure 1 shows a summary of the study procedures. Participants were selected via community-based screening and assessed for eligibility based on predefined inclusion and exclusion criteria. Those who met the criteria provided written informed consent prior to enrollment. Random blood glucose levels were recorded at baseline before the intervention (pretest). Participants then received a single session of standardized wet cupping therapy. Follow-up measurements of blood glucose levels were obtained 10 minutes after the completion of the intervention.

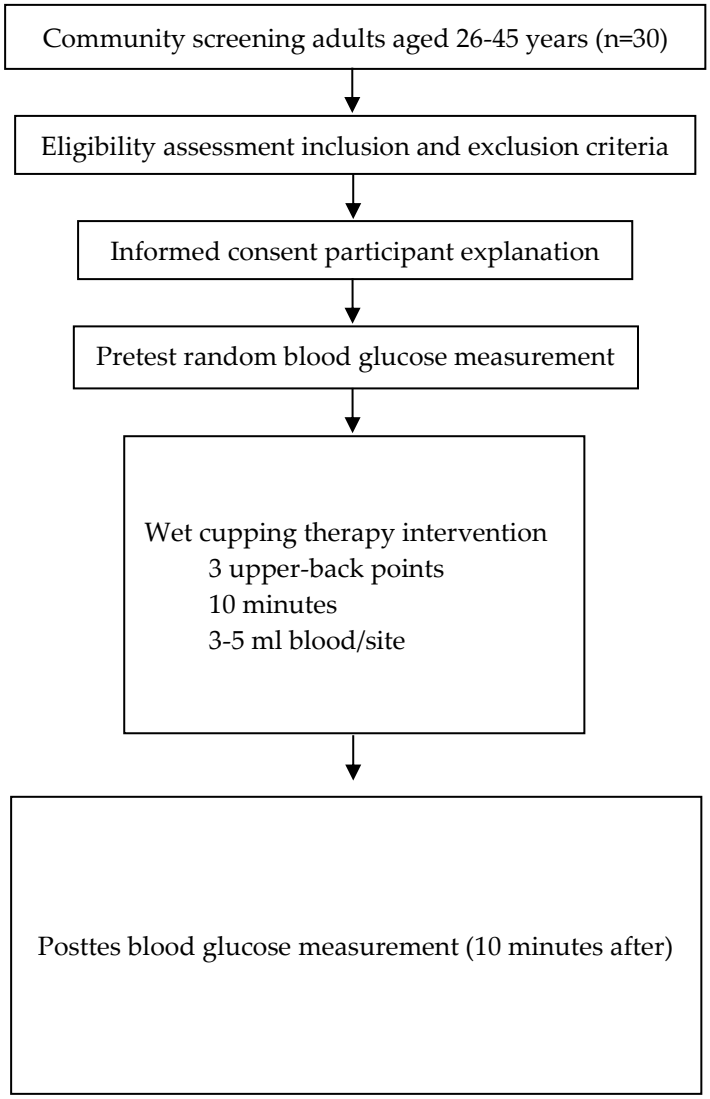

Figure 1. Study Procedure Flow Diagram

Sample Size Determination and Statistical Power

The sample size in the one-group pre-test-post-test design used the appropriate paired comparison of means method (Chow, S. C., Shao, J., Wang, H., & Lokhnygina, 2018). The calculation was based on a 95% confidence level ($Z\alpha/2 = 1.96$), 80% statistical power ($Z\beta = 0.84$), a standard deviation of paired differences of 20 mg/dL, and an estimated mean difference of 13 to 15 mg/dL, based on previous studies on wet cupping therapy (Al-Bedah, A. M. N., Khalil, M. K. M., Elolemy, A. T., & Hussein, 2022) ; (Kim, J. I., Lee, M. S., Lee, D. H., & Ernst, 2019).Parameter formed the basis for determining the required

sample size, which was a minimum of 27 participants. The final sample size was increased to 30 participants to anticipate potential attrition or incomplete data.

G*Power software version 3.1.9.7 (Heinrich Heine University Düsseldorf, Germany) was used to conduct a post hoc statistical power analysis. The resulting statistical power was 0.86, indicating sufficient power to detect significant differences between pre- and post-intervention blood glucose measurements, assuming an effect size (Cohen's d) of 0.65, an alpha level of 0.05, and a total sample size of thirty (Faul, F., Erdfelder, E., Buchner, A., & Lang, 2009).

Intervention Procedure

The cupping therapy intervention involved a single standard wet cupping session. The procedure took place in the morning, between 8:00 and 11:00 AM, to keep blood glucose levels from changing too much throughout the day. Wet cupping therapy was performed by certified cupping therapists holding national certification from the Indonesian Cupping Therapy Association.

Prior to the intervention, one hour prior, participants were instructed to avoid heavy meals and maintain adequate hydration. Three cupping points were selected on the upper back between the shoulder blades and along the paraspinal muscles, according to established wet cupping protocols. After the skin was disinfected with 70% alcohol, sterile cups were applied using negative pressure. Superficial skin scraping was performed using sterile, disposable lancets. Each cupping point was held for about 10 minutes, and the average amount of blood at each point was 3 to 5 mL. To keep participants safe and prevent infections, all of the materials used were sterile and only used once (Kim, J. I., Lee, M. S., Lee, D. H., & Ernst, 2019); (Al-Bedah, A. M. N., Khalil, M. K. M., Elolemy, A. T., & Hussein, 2022).

After the procedure, participants were watched for 10 minutes to see if they had any immediate side effects, like dizziness, bleeding, or pain. Due to the characteristics of wet cupping therapy interventions, blinding of both participants and providers was unfeasible. But standardised outcome assessment was used to try to lower measurement bias. We used the same calibrated glucometer to measure blood glucose levels for all participants, following the same steps and at the same times.

Outcome Measurement

A digital glucometer that has been calibrated was used to measure blood glucose. Measurements were made ten minutes following the conclusion of the wet cupping therapy session (posttest) and right before the intervention (pretest). To guarantee measurement consistency and reliability, the same measuring tool and standard operating procedures were applied to each participant (ADA., 2024)

Data Analysis

Data were analyzed using IBM SPSS software. Changes mean blood glucose levels before and after the intervention were tested using paired-sample t-test, as data met sumption a normal distribution. Significance determined at p-value less than 0.05. Sample adequacy was assessed using a priori sample size estimation and post-hoc power analysis, which demonstrated sufficient statistical power to identify a meaningful intervention effect (Polit, D. F., & Beck, 2021).

Ethical Considerations

The Health Research Ethics Committee at Alma Ata University in Yogyakarta gave ethics permission (permission Number KE/AA/III/10112395/EC/2025; INA-CRR Registration Number: INA-C273848). After being fully informed about the study, each participant gave their written consent. In conducting this study, the ethical guidelines of the Declaration of Helsinki were followed. These guidelines ensure the safety, well-being, and protection of participants throughout the research process (Association, 2022).

RESULTS

Respondent Characteristics

This study involved 30 participants aged 25–45 years. The demographic and clinical characteristics of the respondents are in Table 1.

Table 1. Respondent characteristics (n=30)

Characteristics	Frequency	Percentage (%)
Age 25-35 tahun	19	63
Age 36-45 tahun	11	37
Blood glucose levels after light fasting for 1 hour		
< 110 mg/dL	4	13
> 110 mg/dL	26	87

Note: n = total number of respondents

The findings in Table 1 show that the majority of participants (63%) were aged 25–35 years. Prior to the intervention, the majority of respondents (86.6%) had fasting blood glucose levels exceeding 110 mg/dL, indicating a predominance of mild hyperglycemia.

Blood Glucose Levels Before and After Intervention

Table 2. Blood glucose levels before and after cupping therapy intervention (n=30)

Measurement	Mean (mg/dL)	SD	SE	Min-Max (mg/dL)	Shapiro-Wilk p-value	Mean Difference (mg/dL)	Paired t-test p-value
Before intervention	131	23.8	4.35	100-180	0.71		
After intervention	117	21.2	3.80	90-170	0.31		
Before-After						14.2	0.0001

Note: SD = standard deviation; SE = standard error, Normality was assessed using the Shapiro-Wilk test.

The Shapiro-Wilk test showed that the data were normally distributed before the intervention ($p = 0.71 > 0.05$) see Table 2. Before the intervention, the average blood glucose level was 131 mg/dL with a standard deviation of 23.8, ranging from 100 to 180 mg/dL, indicating mild to moderate hyperglycemia among the participants and meeting the specified inclusion criteria (Farhadi, K., Schwebel, D. C., Saeb, M., Choubsaz, M., Mohammadi, R., & Ahmadi, 2016).

Mean blood glucose levels decreased to 117 mg/dL after the intervention, and post-intervention data also showed a normal distribution ($p = 0.31 > 0.05$). These findings indicate that the parametric analysis is accurate and that wet cupping therapy significantly reduces blood sugar levels. These alterations suggest a potential beneficial effect of the intervention on short-term glycaemic control; however, further investigation is required in studies employing more rigorous experimental techniques.

Effectiveness Cupping Therapy

Table 3. Effectiveness of Wet Cupping Therapy in Reducing Blood Glucose Levels (n = 30)

Outcome	Pre-Intervention Mean ± SD (mg/dL)	Post-Intervention Mean ± SD (mg/dL)	Mean Difference (95% CI)	Effect Size (Cohen's d)	p-value*
Random blood glucose	131 ± 23.8	117 ± 21.2	14.2 (9.1-19.3)	0.65	0.0001

Note: SD = standard deviation; CI = confidence interval

In Table 3 average blood glucose level decreased from 131 ± 23.8 mg/dL before intervention, 117 ± 21.2 mg/dL after the intervention. The average decrease of 14.2 mg/dL (95% CI: 9.1-19.3) statistically indicated a significant change in blood sugar levels (p = 0.0001). The intervention effect the moderate category, Cohen's d value of 0.65, indicating that the decrease was statistically significant and clinically meaningful. The reduction in mean blood glucose levels after wet cupping therapy is consistent with previous research. A single-group intervention study (Nik Husain, R., Mohd Hairon, S., Mohd Zain, 2020) found a significant reduction in fasting blood glucose levels after wet cupping therapy, with a measurable mean difference and a statistically significant confidence interval among adult populations.

A systematic review of cupping therapy outcomes found that cupping therapy was linked to improvements in metabolic parameters and blood glucose regulation. This suggests that the pattern of metabolic effects has broad benefits (Li-Kung Wu, Yi-Chen Chen, 2024). Overall, these results support the use of wet cupping therapy as a short-term, non-drug complementary treatment for controlling blood sugar levels.

The 14.2 mg/dL drop is statistically significant, but it should be looked at more broadly in terms of how it affects diabetes management. People with type 2 diabetes have blood sugar levels between 100 and 125 mg/dL. If their blood sugar levels are higher than 126 mg/dL, they have diabetic disorder (American Diabetes Association Professional Practice Committee, 2024). Good glycaemic control can lower blood sugar levels by about 14 mg/dL when combined with lifestyle changes and medication.

So, wet cupping therapy is an additional or complementary treatment for managing diabetes along with self-medication. Regarding safety, no adverse events occurred during or after the wet cupping therapy sessions. No participants experienced excessive bleeding, infection, fainting, or other complications during the intervention or during post-intervention monitoring, indicating that the procedure was well tolerated in this study.

DISCUSSION

Comparison of Pre and Post-Therapy Blood Glucose Levels

The average pre-intervention level of 131 mg/dL compared to 117 mg/dL after the intervention indicated a decrease in blood glucose levels after wet cupping therapy. The difference was statistically significant ($p = 0.0001$; $p < 0.05$), indicating that cupping therapy has a therapeutic effect on lowering blood glucose.

Physiologically, glucose homeostasis is sustained by intricate regulatory mechanisms that include insulin, glucagon, and various regulatory factors such as physical activity, psychological stress, and dietary intake. Disruption of this regulatory process can result in chronic hyperglycemia, a characteristic of diabetes mellitus (Guyton, A. C., & Hall, 2021); (Sherwood, 2020).

So, it's very important to find effective non-invasive ways to keep blood sugar stable. This intervention is culturally acceptable and possible at the community level, which makes it a good addition to diabetes management. These results are similar to those of a single-group intervention study by (Nik Husain, R., Mohd Hairon, S., Mohd Zain, 2020) which found that wet cupping therapy changed fasting blood glucose levels. This suggests that cupping may have effects on the whole body, not just the area being treated. Nonetheless, a systematic review and meta-analysis indicated inconsistent cumulative effects of cupping therapy on fasting blood glucose levels, likely attributable to variability in populations, intervention protocols, and timing of outcome assessments (Wu, L.-K., Chen, Y.-C., Hung, C.-S., 2023).

Unlike the study by (Tao, J., Zhao, P., Mo, T., Zhao, R., Yang, N., Lee, M. S., Liu, J., & Cao, 2020) which examined repeated sessions and long-term indicators such as fasting glucose or HbA1c, this study measured random blood glucose immediately following a single intervention, indicating acute neuroendocrine and microcirculatory responses rather than enduring metabolic adaptations. Physiologically, the effects are facilitated by enhanced microcirculation, diminished oxidative stress, and temporary alteration of stress-related hormonal pathways that regulate glucose levels. In a clinical setting, wet cupping therapy is a culturally acceptable and affordable adjunctive treatment for

individuals with mild hyperglycemia. To confirm long-lasting glycaemic benefits, more controlled trials with standardised protocols and longer follow-up are needed.

Effectiveness of Cupping Therapy in Reducing Blood Glucose

Wet cupping therapy is thought to lower blood glucose by two main ways: (1) getting rid of stagnant blood and pathological substances (CPS) that upset homeostasis, and (2) improving microcirculation and tissue oxygenation (Farhadi, K., Schwebel, D. C., Saeb, M., Choubsaz, M., Mohammadi, R., & Ahmadi, 2016) ; (Ebrahim, N., Hashem, M., & El-Masry, 2018). These results are consistent with the findings of (Zhang, L., Zheng, Y., & Qiao, 2021), which indicated that cupping therapy enhances nitric oxide (NO) bioavailability, improves endothelial function, and increases insulin sensitivity. Research (Li, H., Wang, J., & Zhang, 2022) indicates that cupping therapy activates the sympathetic nervous system and improves neuroendocrine communication related to glucose metabolism. This aligns with research (Wulandari, 2015) indicating a substantial decrease in blood glucose levels following cupping therapy in individuals with type 2 diabetes. Cupping therapy also enhances liver function by facilitating glucose metabolism and glycogen storage (Syaikhu, 2008); (Liu, W., Zhang, Y., Wang, Y., 2022).

From a holistic nursing standpoint, this intervention engages the spiritual and psychosocial aspects for Muslims, who regard cupping as a prophetic healing practice (Qureshi, N. A., Ali, G. I., & Alqahtani, 2020).The primary mechanism in this study is that cupping therapy markedly decreases glucose levels, and the intervention can even elicit a swift physiological response that modulates glucose levels.

Statistical Significance and Clinical Relevance

A mean difference of 14.2 mg/dL with statistical significance ($p<0.001$) was demonstrated in the paired t-test analysis. According to (ADA., 2024) this reduction is important for individuals with high glucose levels because it can reduce the risk of microvascular and macrovascular complications, such as nephropathy, retinopathy, and coronary heart disease.

Research (Liu et al., 2022) ; (Zhang et al., 2021) indicates that cupping therapy has been shown to reduce oxidative stress and systemic inflammation, two important factors in insulin resistance and endothelial dysfunction. Research (Xiong, J., Zhang, Y., & Zhang, 2021) states that the benefits of cupping therapy, as a holistic intervention that addresses physical, emotional, and spiritual needs, can improve sleep quality, relieve pain, and increase vital energy. Cupping therapy can be integrated into community nursing practice because it is effective, safe, and culturally relevant, especially in areas with limited access to pharmacological therapy. Although the glucose reduction is small, this change is clinically relevant for individuals with mild hyperglycemia, and is comparable to short-term reductions in non-pharmacological lifestyle interventions.

Study Limitations

This study has limitations, including a single-group pretest-posttest pre-experimental design without a control group. The small sample size and non-probability sampling may limit generalizability. Blood glucose levels were measured after a single, short-term intervention session. Future studies using a randomized controlled design on a larger sample with a longer follow-up period are recommended.

Implications for Nursing Practice

Wet cupping therapy serves as a non-pharmacological complementary option for short-term blood glucose reduction. Evidence-based complementary intervention is supported research. The integration of wet cupping therapy is culturally and spiritually accepted in community nursing. Culturally appropriate interventions have been shown to provide effective patient care. The reduction in blood

glucose levels is clinically significant, as it may contribute to a lower risk of long-term diabetes-related complications. These findings integrate safe, evidence-based complementary therapies

CONCLUSION

Wet cupping therapy statistically significantly reduced blood glucose levels in adults. There was an average decrease of 14.2 mg/dL in blood glucose after a single cupping session ($p < 0.001$). Physiologically, cupping therapy functions improving microcirculation, releasing nitric oxide, detoxifying the blood, and enhancing metabolic function liver and pancreas. Findings contribute society and support cupping therapy as a culturally relevant non-pharmacological approach diabetes management. Cupping therapy also provides psychological and spiritual benefits for Muslim patients, considered part prophetic healing tradition.

ACKNOWLEDGMENT

The authors gratefully acknowledge the support and cooperation of health workers and the local government in Wirobrajan Village, Yogyakarta.
The authors also thank all participants who provided informed consent. The authors also thank the research ethics committee.

AUTHOR CONTRIBUTION

MM : Conceptualization, Methodology, Investigation, Data Curation, Formal Analysis, Writing – Original Draft, Project Administration
RJS : Investigation, Data Curation, Formal Analysis, Writing – Original Draft, Writing - Review & Editing
DFM: Investigation, Data Curation, Formal Analysis, Writing – Original Draft, Writing - Review & Editing.
AZA: Investigation, Data Curation, Formal Analysis, Writing – Original Draft, Writing - Review & Editing.
AA : Investigation, Data Curation, Formal Analysis, Writing – Original Draft, Writing - Review & Editing.

FUNDING STATEMENT

The authors declare that no funding was received for this research.

CONFLICT OF INTEREST STATEMENT

The authors declare no conflict of interest in publishing this study.

PROTOCOL REGISTRATION

The protocol registration of this article available at INA-CRR (Indonesia Clinical Research Registry), INA-CRR Registration Number: INA-C273848).

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