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INVESTIGATION OF THE EFFECT OF WARM CUPPING ON THE CLINICAL SYMPTOMS OF ASTHMA IN ADULTS AGED 18–60: A RANDOMIZED CONTROLLED CLINICAL TRIAL STUDY

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ABSTRACT

Background: Asthma is a widespread chronic respiratory condition that impacts patients' quality of life worldwide. Warm cupping, a traditional therapy in Iranian medicine, may help alleviate respiratory symptoms; however, there is limited clinical evidence to support this claim. Objectives: This randomized controlled trial aimed to assess the effect of warm cupping on asthma symptoms and control in adults aged 18–60 years with mild to moderate asthma.

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Barzegary y Col.
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DOI:

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Methods: In this randomized controlled clinical trial, 64 participants were randomly assigned to two groups: the intervention group received warm cupping (two sessions in the first week) plus standard care. In contrast, the control group received only standard care. Asthma control was evaluated using the Asthma Control Test (ACT) at baseline, and at weeks 2, 5, and 8. Results: The intervention group experienced a significant increase in ACT scores (from 10.37 to 27.03, $P < 0.001$), indicating improved asthma control. Conversely, the control group showed no notable change. The intervention group also reported higher satisfaction and minimal side effects, mainly temporary bruising. Conclusions: Adding warm cupping to standard care improved asthma control, daily activities, and patient satisfaction, with few side effects. It may be a helpful complementary therapy, but more studies with placebo controls are necessary.

KEYWORDS: Warm cupping; Asthma; Asthma control; Complementary medicine; Iranian Medicine.

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INVESTIGACIÓN DEL EFECTO DE LA VENTOSATERAPIA CALIENTE SOBRE LOS SÍNTOMAS CLÍNICOS DEL ASMA EN ADULTOS DE 18 A 60 AÑOS: UN ESTUDIO CLÍNICO ALEATORIZADO Y CONTROLADO

RESUMEN

Antecedentes: El asma es una afección respiratoria crónica muy extendida que afecta la calidad de vida de los pacientes en todo el mundo. La ventosaterapia, una terapia tradicional de la medicina iraní, podría ayudar a aliviar los síntomas respiratorios; sin embargo, la evidencia clínica que respalda esta afirmación es limitada. Objetivos: Este ensayo clínico aleatorizado y controlado tuvo como objetivo evaluar el efecto de la ventosaterapia sobre los síntomas y el control del asma en adultos de 18 a 60 años con asma leve a moderada. Métodos: En este ensayo clínico aleatorizado y controlado, 64 participantes fueron asignados aleatoriamente a dos grupos: el grupo de intervención recibió ventosaterapia (dos sesiones en la primera semana) más atención estándar. El grupo de control recibió únicamente atención estándar. El control del asma se evaluó mediante la Prueba de Control del Asma (ACT) al inicio del estudio y en las semanas 2, 5 y 8. Resultados: El grupo de intervención experimentó un aumento significativo en las puntuaciones de la ACT (de 10,37 a 27,03, $p < 0,001$), lo que indica una mejoría en el control del asma. Por el contrario, el grupo de control no mostró cambios significativos. El grupo de intervención también reportó mayor satisfacción y mínimos efectos secundarios, principalmente hematomas temporales. Conclusiones: La incorporación de la ventosaterapia caliente al tratamiento estándar mejoró el control del asma, las actividades diarias y la satisfacción del paciente, con pocos efectos secundarios. Podría ser

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Barzegary y Col.
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una terapia complementaria útil, pero se necesitan más estudios con grupos de control con placebo.

PALABRAS CLAVE: Ventosaterapia; Asma; Control del asma; Medicina complementaria; Medicina iraní.

INTRODUCCTION

Asthma is a chronic inflammatory disease of the airways, characterized by episodic symptoms such as wheezing, dyspnea, chest tightness, and coughing (1). These symptoms result from reversible airflow obstruction and bronchial hyperresponsiveness, with their frequency ranging from occasional to persistent, significantly impacting patients' quality of life (2). According to the World Health Organization, approximately 262 million people worldwide had asthma in 2019, and it caused 461,000 deaths, with most of the mortality occurring in low- and middle-income countries (3).

Despite advances in pharmacological treatments—including inhaled corticosteroids, long-acting beta-agonists, and leukotriene modifiers—many patients still face suboptimal symptom control, side effects from medications, and challenges with medication adherence. These limitations highlight the ongoing need to explore complementary and alternative approaches that may improve asthma management and patient outcomes (4, 5).

Cupping therapy, especially warm cupping, is a traditional treatment frequently used in

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various cultures, including Iranian medicine, to manage respiratory diseases. It involves creating suction on the skin, which is believed to help remove "stagnant blood" and improve circulation (6, 7). While cupping has been practiced for centuries, its proposed mechanisms remain mostly theoretical and lack solid scientific proof (8). Previous studies examining the effects of cupping on respiratory conditions have shown mixed results and are often limited by methodological flaws, small sample sizes, or a lack of proper controls (9-11). Therefore, the clinical effectiveness and biological basis of cupping therapy for asthma remain uncertain, and well-designed randomized controlled trials are necessary to provide more conclusive evidence.

This study aims to fill this gap by systematically evaluating how warm cupping therapy affects symptoms and quality of life in adults with asthma aged 18–60. Using a randomized controlled trial design, it strives to generate high-quality evidence about the potential benefits or limitations of warm cupping as an additional treatment for asthma. The findings could enhance understanding of alternative therapies for asthma and guide future clinical practice and research.

Materials and Methods

Study Design and Setting

This study was a parallel-group, randomized controlled clinical trial conducted at the

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Barzegary y Col.
Pg. 224-244

DOI:

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ISSN Electrónico: 3105-403X

respiratory clinic of Shahid Rahnamoon Hospital in Yazd, Iran, from February to July 2025. The trial protocol was approved at Shahid Sadoughi University of Medical Sciences and received ethical approval from the university's Medical Ethics Committee (Ethics code: IR.SSU.SRH.REC.1401.025). It was registered in the Iranian Registry of Clinical Trials (IRCT code: IRCT20230413057896N1). Participants who satisfied the eligibility criteria provided written informed consent after being thoroughly briefed on the study procedures, including the potential risks and benefits of the intervention.

Participants

Adults aged 18 to 60 years with a confirmed diagnosis of mild-to-moderate asthma by a pulmonary specialist were recruited. Inclusion criteria included: stable clinical condition without the need for hospitalization, willingness to participate and provide informed consent, fluency in Persian, and no history of underlying diseases such as cystic fibrosis, bronchopulmonary dysplasia, heart failure, pulmonary embolism, bronchiotracheomalacia, bronchiectasis, sarcoidosis, or diabetes. Exclusion criteria included use of medications such as aspirin, beta-blockers, or NSAIDs; recent cupping therapy within the last month; history of coagulation disorders or immunodeficiency; current smoking, lactation, or pregnancy.

Sample Size

The sample size was calculated using the formula $n = [(z_{1-}\alpha/_2 + z_{1-}\beta)^2 (\sigma_1^2 + \sigma_2^2)]/d^2$, with $\sigma_1 = \sigma_2 = 4$, $\alpha = 0.05$ (95% confidence),

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β = 0.2 (80% power), and a minimum detectable difference of 3 points in ACT score between groups. This calculation yielded an initial estimate of 29 participants per group. To account for a 10% dropout rate, the final sample size was increased to 32 per group (total n = 64).

Randomization and Blinding

Participants were randomly assigned to either the intervention (warm cupping) or control group in a 1:1 ratio using a computer-generated randomization list. An independent researcher who was not involved in patient recruitment, data collection, or analysis prepared the randomization sequence. Allocation concealment was maintained with sealed, opaque, sequentially numbered envelopes. Blinding of participants was not possible because of the nature of the intervention. However, outcome assessors and data analysts were blinded to group assignment to reduce bias. All clinical assessments and questionnaire scoring were carried out by independent evaluators who were unaware of the participants' group assignments.

Interventions

Both groups received standard asthma treatment as prescribed by their pulmonary specialist, including inhaled bronchodilators and corticosteroids. The intervention group also received warm cupping therapy, conducted in two sessions during the first week (with a three-day interval). The cupping involved placing five specialized cups (6 cm in diameter, 8 cm in depth)

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Volumen 16, N° 33. Julio-diciembre 2026
Barzegary y Col.
Pg. 224-244

DOI:

Acta BIOCLÍNICA
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along each side of the spine, from the level of the clavicle to above the last rib. The procedure was performed with the patient in a prone position, and each cup was applied for 10 minutes after creating a vacuum using an ignited alcohol-soaked cotton ball.

Outcome Measures

The primary outcome was the change in asthma control, measured by the Asthma Control Test (ACT) questionnaire at baseline and at weeks 0, 1, 2, 4, 6, and 8 after the intervention. The ACT is a validated five-item questionnaire with total scores ranging from 5 to 25, where scores above 20 indicate complete asthma control, 16–19 indicate partial control, and below 15 reflect uncontrolled asthma.

Secondary outcomes included patient-reported improvements in respiratory symptoms, satisfaction with treatment, and quality of life, measured using Visual Analogue Scales (VAS). Adverse effects related to cupping were recorded in a dedicated reporting form.

Data Collection and Follow-up

Data were gathered through patient interviews, phone calls, physical exams, and standardized forms. All enrolled patients had their baseline demographic and clinical data recorded. Follow-up assessments were scheduled for weeks 1, 5, and 9. At each point, a pulmonary specialist (blinded to group assignment) re-evaluated participants and administered the relevant questionnaires.

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Barzegary y Col.
Pg. 224-244

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Statistical Analysis

Statistical analysis was performed using SPSS version 22. Descriptive statistics summarized baseline characteristics. Between-group comparisons were conducted with Independent T-tests, Chi-square tests, Fisher's exact test, and Mann-Whitney U tests as appropriate. The Kolmogorov-Smirnov test was employed to evaluate data normality. Within-group changes over time were analyzed with paired T-tests and the Friedman test. A p-value <0.05 was considered statistically significant.

Results

A total of 64 participants were randomized, with 62 completing the study (31 in each group). The participant flow is summarized in **Figure 1**, illustrating the distribution of participants from screening through to study completion.

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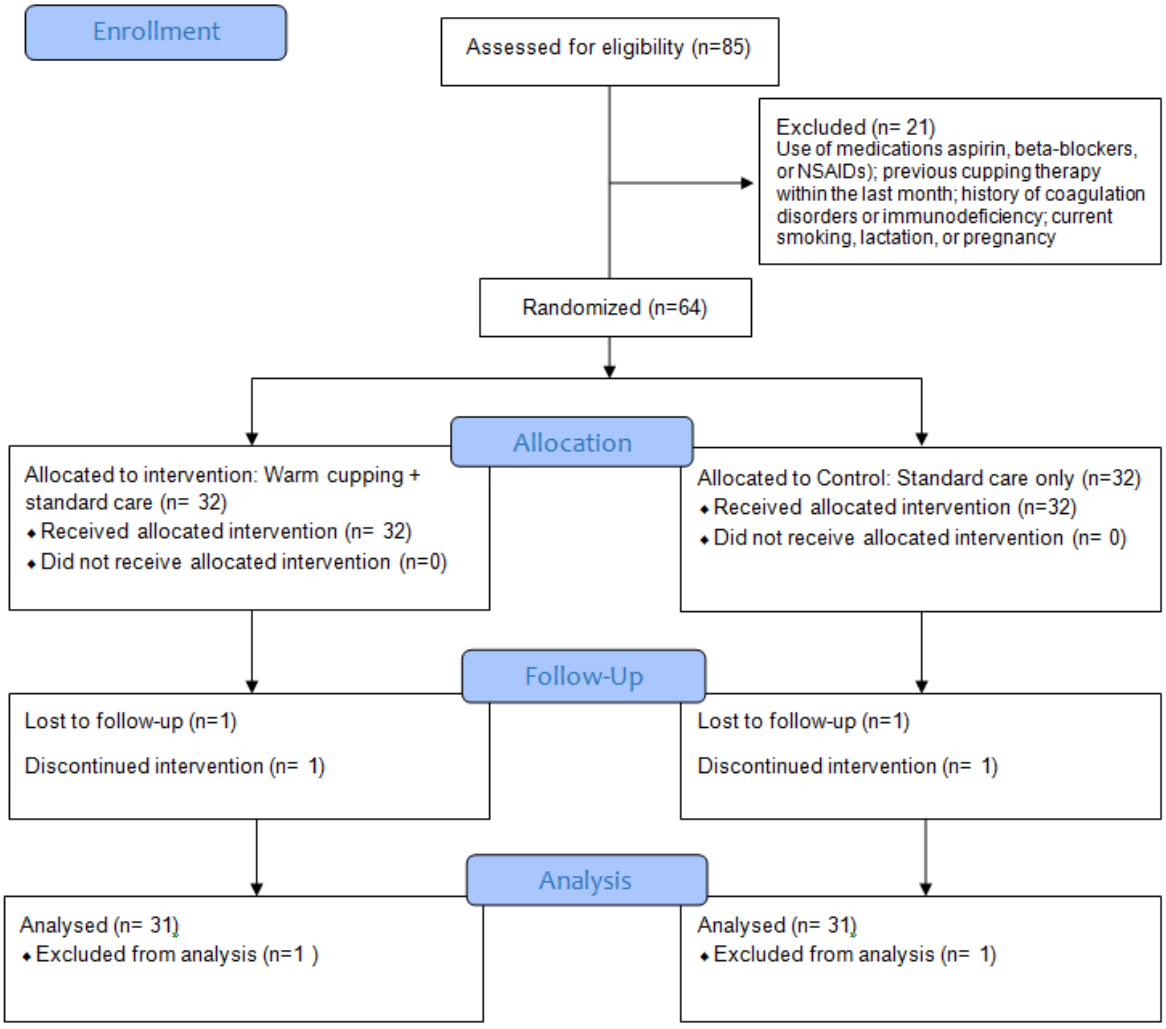


Figure 1. Flowchart of participant progress through the trial

The mean age was 45.14 ± 8.27 years, and 53.1% of participants were male and 46.9% were female. No statistically significant differences were observed between the intervention and control groups in terms of age, gender, BMI, education level, marital status, or occupation (P > 0.05) (**Table 1**).

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Barzegary y Col.
Pg. 224-244

DOI:

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Table 1. Comparison of Demographic Characteristics Between Study Groups

Variable	Index	Control Group	Intervention Group	Total	p-value
Age	Mean (SD)	44.56 (8.10)	45.72 (8.53)	45.14 (8.27)	0.580
BMI	Mean (SD)	26.65 (4.98)	25.75 (3.86)	26.20 (4.45)	0.426
Gender	Male	17 (53.1%)	17 (53.1%)	34 (53.1%)	1
	Female	15 (46.9%)	15 (46.9%)	30 (46.9%)	
Education	Elementary	12 (37.5%)	11 (34.4%)	23 (35.9%)	0.794
	Middle School	17 (53.1%)	11 (34.4%)	28 (43.8%)	
	High School	3 (9.4%)	10 (31.2%)	13 (20.3%)	
Marital Status	Without Spouse	5 (15.6%)	0 (0%)	5 (7.8%)	0.053
	With Spouse	27 (84.4%)	32 (100%)	59 (92.2%)	
Occupation	1	10 (31.3%)	11 (34.4%)	21 (32.8%)	0.434
	2	14 (43.8%)	17 (53.1%)	31 (48.4%)	
	3	8 (25%)	4 (12.5%)	12 (18.8%)	

SD: Standard Deviation; BMI: Body Mass Index. Data are presented as mean (SD) for continuous variables and number (%) for categorical variables. P-values were calculated using Independent T-tests for continuous variables and Chi-square tests or Fisher's exact test for categorical variables.

Kolmogorov-Smirnov tests indicated that ACT scores at each measurement stage were not normally distributed ($P < 0.05$). Therefore, nonparametric statistical tests were used for analysis. **Table 2** shows the mean ACT scores at baseline and follow-up for each group. At baseline, there was no significant difference in ACT scores between the groups. During the study, the intervention group demonstrated a statistically significant increase in ACT scores compared to the control group.

Received: February 21, 2026
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Volumen 16, N° 33. Julio-diciembre 2026
Barzegary y Col.
Pg. 224-244

DOI:

Acta BIOCLÍNICA
ISSN Electrónico: 3105-403X

Table 2. The mean ACT scores at baseline and follow-up points for each group

Time Point	Control Group (Mean ± SD)	Intervention Group (Mean ± SD)	Effect Size (Cohen's d)	p-value (between groups)
Baseline	10.09 ± 4.27	10.37 ± 4.42	0.07	0.81
Week 2	9.96 ± 4.66	24.81 ± 6.03	2.91	<0.001
Week 5	10.09 ± 4.61	26.12 ± 9.52	2.37	<0.001
Week 8	10.87 ± 4.70	27.03 ± 8.01	2.43	<0.001

ACT: Asthma Control Test; SD: Standard Deviation. P-values were calculated using nonparametric statistical tests due to non-normal distribution of ACT scores. Cohen's d is a measure of effect size, with values > 0.8 considered large.

The average increase in ACT score for the intervention group from baseline to week 8 was 16.66 points (rising from 10.37 to 27.03), indicating a large effect size (Cohen's d = 2.43). This improvement is clinically meaningful, changing the typical participant from the "uncontrolled" to the "completely controlled" asthma category. Meanwhile, the control group's ACT score stayed mostly the same.

To determine whether warm cupping's effect varied by baseline asthma severity, gender, and age, subgroup analyses were conducted. The improvement in ACT scores in the intervention group was consistent across all subgroups (all $P < 0.01$), with no significant interaction effects. No notable differences were found in effect size between males and females or between participants above or below the median

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Barzegary y Col.
Pg. 224-244

DOI:

Acta BIOCLÍNICA
ISSN Electrónico: 3105-403X

age. **Table 3** displays the distribution of asthma control categories (uncontrolled, partially controlled, fully controlled) over time.

Table 3. Distribution of asthma control categories (uncontrolled, partially controlled, completely controlled) over time.

Stage	Uncontrolled	Partially Controlled	Completely Controlled	p-value
Baseline	68.8%	20.3%	10.9%	0.013
Week 2	32.8%	45.3%	21.8%	
Week 5	23.5%	32.8%	43.7%	
Week 8	12.6%	29.6%	57.8%	

Categories are based on ACT scores: uncontrolled (ACT < 15), partially controlled (ACT 16-19), and completely controlled (ACT ≥ 20). P-value was calculated using the Friedman test to assess changes over time.

The proportion of patients with uncontrolled asthma decreased significantly in the intervention group, while the distribution in the control group showed no notable change (data not shown). The difference between the groups was statistically significant (P = 0.013, Friedman test). **Table 4** provides details on the adverse events observed in the intervention group.

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Barzegary y Col.
Pg. 224-244

DOI:

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Table 4. The adverse events observed in the intervention group

Side Effect	Number (%)	Median Duration (days)	Pain Severity (VAS, 0-10)
Ecchymosis	24 (75.0)	6 (range: 3–13)	2 (mild)
Blister	1 (3.1)	4	3
Pain	1 (3.1)	1	4
No side effects	6 (18.8)	—	—

VAS: Visual Analogue Scale. Adverse events were recorded in a dedicated reporting form. Pain severity was measured on a scale from 0 to 10, with 0 being no pain and 10 being the worst pain imaginable.

Most adverse events were mild and temporary. Ecchymosis was the most common side effect, usually resolving within 1–2 weeks. Only one patient experienced moderate pain (VAS 4) during the procedure, which cleared up within 24 hours. No serious adverse events or infections were reported. The average satisfaction score with cupping therapy among participants in the intervention group was 7.09 ± 1.51 on a 10-point VAS scale. Notably, 17 participants (54.8%) rated their satisfaction as 8 or higher, indicating generally high satisfaction.

Discussion

This randomized controlled trial assessed the impact of warm cupping therapy on clinical and respiratory symptoms in adults with asthma over nine weeks. The findings indicate that adding warm cupping to standard asthma treatment results in

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Barzegary y Col.
Pg. 224-244

DOI:

Acta BIOCLÍNICA
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significant improvements in asthma control (as measured by ACT scores), daily functioning, and patient satisfaction compared to standard care alone. These results support the potential of warm cupping as a complementary approach for managing asthma.

Several previous studies have evaluated the effectiveness of cupping therapy for different health conditions, with some evidence indicating benefits for pain syndromes, hypertension, and certain respiratory disorders (12, 13). In the context of respiratory health, a small number of clinical investigations have reported that cupping may enhance oxygen saturation and subjective breathing quality, especially in smokers and patients with chronic pulmonary diseases. For example, one study found that warm cupping increased arterial oxygen saturation in smokers for up to 12 hours after the intervention, along with improvements in subjective breathing (14). Similarly, studies involving pediatric asthma populations have shown improved lung function and quality of life following cupping therapy, although intervention protocols and outcome measures have varied across studies (15-17). Our results align with these findings, showing a significant and lasting improvement in both clinical asthma control and patient-reported outcomes in adults. It is important to note that, unlike some earlier studies that used intensive multi-session cupping protocols (18-20), Our study implemented a more practical two-session intervention. This

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ISSN Electrónico: 3105-403X

streamlined approach may improve the feasibility and acceptability of cupping as an adjunct to conventional asthma treatments care.

While complementary therapies such as acupuncture and massage therapy have also been studied for asthma, direct comparisons are limited. Meta-analyses of acupuncture, for example, have shown some benefit in reducing asthma symptoms and inflammatory markers, but the effects on objective lung function are inconsistent and often require many sessions in specialized settings (21). In contrast, our study indicates that a short cupping protocol may provide comparable or even greater improvements in patient-reported asthma control, along with the benefit of being easier to administer. However, future research should include direct comparisons with other complementary modalities to determine their relative effectiveness and impact on patients' preference.

The precise mechanisms by which warm cupping affects asthma are still not fully understood. Proposed mechanisms include altering inflammatory mediators, decreasing oxidative stress, and improving immune function (22, 23). Some experimental studies suggest that cupping can affect levels of immunoglobulins, inflammatory cytokines, and markers of oxidative stress in conditions like COPD (24, 25). However, our study did not include paraclinical assessments—such as spirometry, laboratory markers, or

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DOI:

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measurement of oxidative stress biomarkers—that are necessary to test these mechanistic hypotheses directly. Therefore, our findings are limited to clinical and patient-reported outcomes, and the biological plausibility of cupping in asthma management requires further investigation with more rigorous experimental designs.

A major strength of this study is its randomized controlled design, which boosts the internal validity of our findings. Using standardized assessment tools for asthma control and patient satisfaction also supports the reliability of our results. However, several important limitations should be recognized: 1) no paraclinical tests, such as spirometry or laboratory analyses, were performed in our study, which limits our ability to evaluate changes in lung function or explore mechanistic pathways objectively; 2) the study did not include a placebo or sham cupping group, which may influence patient expectations or placebo responses and induce bias; 3) the study population was limited to adults with mild-to-moderate asthma, and results may not generalize to those with severe disease or pediatric populations; 4) the study did not include biochemical or immunological assessments, or direct comparisons with other complementary therapies such as acupuncture or massage therapy, limiting the scope of mechanistic and comparative efficacy conclusions.

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Barzegary y Col.
Pg. 224-244

DOI:

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Given these limitations, our findings should be viewed as preliminary evidence of potential benefit rather than definitive proof of efficacy. Larger, multi-center trials with sham controls, objective paraclinical endpoints (e.g., spirometry, biomarkers), and direct comparisons with other complementary and alternative therapies are necessary. Future research should also investigate the mechanisms behind cupping's effects in asthma, ideally by integrating clinical, biochemical, and imaging data.

Conclusion

In summary, warm cupping therapy was linked to notable improvements in asthma control and quality of life in adults with asthma, along with minimal and self-limiting adverse effects. However, because of the lack of placebo controls and objective paraclinical assessments, these results should be viewed as preliminary. More rigorous research is needed to verify the effectiveness and understand the mechanisms of warm cupping in managing asthma.

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Pg. 224-244

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Pg. 224-244

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