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# THE IMPACT OF BLOOD CUPPING (AL HAJAMA) ON BLOOD PARAMETERS IN RHEUMATOID ARTHRITIS PATIENTS IN RAWALPINDI

*Original Research*

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**Acknowledgement:** The authors sincerely acknowledge the support of Riphah International University, Islamabad, and all participants for their valuable contributions to this study.

Conflict of Interest: None

Grant Support & Financial Support: None

## ABSTRACT

**Background:** Rheumatoid arthritis (RA) is a chronic autoimmune condition marked by systemic inflammation and elevated levels of biomarkers such as erythrocyte sedimentation rate (ESR), C-reactive protein (CRP), uric acid, and rheumatoid factor (RF). This study evaluates the therapeutic effects of blood cupping (Al-Hijama) on these inflammatory markers in RA patients from Rawalpindi, Pakistan.

**Objective:** To Given the limitations of conventional RA treatments, exploring complementary therapies like cupping is essential for holistic disease management. This study aims to evaluate the effects of cupping therapy on pain reduction, functional disability, and inflammatory markers in RA patients in Rawalpindi. By providing empirical evidence, this research seeks to establish cupping therapy as a potential adjunctive treatment for RA.

**Methods:** Out of 60 rheumatoid arthritis (RA) patients, 32 (53%) were selected for the study. Participants were chosen based on their age (20-60 years) and absence of serious health conditions. Information about their age, gender, place of residence, education level, and previous experience with cupping therapy was collected. The inflammatory markers erythrocyte sedimentation rate (ESR), C-reactive protein (CRP), uric acid, and rheumatoid factor (RF)—were measured both before and after the 10 days of cupping therapy.

**Results:** The majority of participants were aged 51-60 years (50%) and predominantly from Rawalpindi (62.5%). Over half (56.25%) were experiencing cupping therapy for the first time. While the reduction in ESR after therapy was not statistically significant (p-value < 0.2), CRP and uric acid levels significantly (p-value < 0.05). RF levels showed a highly significant reduction (p-value < 0.005), highlighting the potential anti-inflammatory benefits of cupping therapy in RA management.

**Conclusion:** Cupping therapy shows potential in lowering inflammatory markers like CRP, uric acid, and RF in rheumatoid arthritis patients. It may be a useful complementary treatment for inflammation management. Further studies are required to confirm its long-term effectiveness.

**Keywords:** Rheumatoid arthritis, blood cupping, Al-Hijama, inflammatory markers, erythrocyte sedimentation rate, C-reactive protein, rheumatoid factor, uric acid, alternative therapy.

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## INTRODUCTION

Rheumatoid arthritis (RA) is a widespread systemic chronic inflammatory condition that affects approximately 1% of the global population, often leading to disability and imposing considerable social and economic burdens (1). RA is marked by polyarthritis, immune system irregularities, autoimmune responses, a high rate of comorbidities, and premature mortality. A key feature of RA is the degradation of the extracellular matrix, leading to the breakdown of cartilage, tendons, bones, and ligaments. Additionally, various constitutional symptoms of RA include fever, fatigue, weight loss, general discomfort, and loss of appetite (2). The condition primarily arises from the relationship of genetic predisposition and environmental influences. Other contributing risk factors include age, gender, and environmental exposures such as smoking, air pollutants, and infectious agents (3). In developed countries, RA affects approximately 5 to 10 individuals per 1,000 people (4). Between 1990 and 2023, RA significantly affected global health, contributing to a loss of 3.4 million lives (5). As the disease advances, patients frequently experience a diminished quality of life along with heightened levels of anxiety and depression (6).

Unfortunately, the prolonged use of current RA treatment protocols, including NSAIDs, steroids, disease-modifying antirheumatic drugs (DMARDs), and biologic agents, often faces challenges such as reduced effectiveness over time and the development of significant adverse effects (7). Consequently, many patients turn to complementary and alternative medicine (CAM) therapies, like cupping therapy, which has gained global popularity due to its affordability and minimal side effects. Cupping therapy, known as Al-Hijama in Arabic, is an ancient holistic practice used to treat various ailments and is considered one of the oldest forms of medical treatment. While its precise origins remain a subject of debate, evidence of its use has been found in early Egyptian and Chinese medical traditions (8).

Cupping, or Hijama, involves creating a vacuum on specific areas of the skin, leading to the formation of small, visible hematomas. This practice is divided into two main types: dry cupping and wet cupping. Dry cupping involves the direct application of suction to the skin, while wet cupping includes superficial skin incisions to draw blood from the dermal microcirculation (9). Cupping therapy employs techniques, such as using suction cups to create negative pressure on the skin. This process involves suction and scarification, facilitating the removal of harmful pathogenic substances from the interstitial fluid and the blood within the skin's capillary network (10). The therapy can improve venous drainage, tissue perfusion, cellular oxygenation, local and systemic circulation, and blood detoxification (11).

Cupping therapy has been widely utilized for health promotion, as well as for preventive and therapeutic purposes (12). Numerous systematic reviews have investigated its effects on various pain conditions (13). Studies suggest that cupping therapy can aid in managing rheumatoid arthritis, lower back pain, neck and shoulder pain, headaches, migraines, and knee pain (14). Its mechanisms of action are thought to involve hematological, immunological, and neural effects (15). Cupping therapy is primarily practiced for four purposes, alleviating pain, reducing inflammation, modulating the immune response, and promoting hematological balance. Several theories have been proposed to explain its mechanisms of action. Among these, the Pain-Gate Theory (PGT) is one of the most prominent explanations for pain relief (16). According to this theory, stimulating pain receptors increases the frequency of nerve impulses, which ultimately leads to the closure of pain gates and, as a result, a reduction in pain (17). When a diseased organ transmits signals to the skin via autonomic nerves, the skin may respond with tenderness, pain, and swelling. Applying cups to the skin activates skin receptors, which stimulates increased blood flow and enhances circulation. This process improves the blood supply to both the skin and internal organs through neural connections (18).

The anti-inflammatory effects of cupping therapy are primarily facilitated by nitric oxide (NO), which plays a role in vasodilation and regulates both blood flow and volume (19). Studies have shown that blood collected during wet cupping exhibits increased myeloperoxidase activity, reduced superoxide dismutase activity. Researchers concluded that wet cupping aids in removing oxidants and reducing oxidative stress (20). Cupping therapy's immunomodulatory effects involve regulating immunoglobulin and hemoglobin activity. Research, including a study by Ahmed et al., demonstrated that cupping reduces rheumatoid arthritis pain and inflammatory markers while modulating immune responses, particularly natural killer cells and adaptive immunity via Soluble Interleukin 2 Receptor (SIL-2R) (21).

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Additionally, its hematological benefits from detoxification, with studies highlighting significant differences in biochemical, hematological, and immunological parameters (22). The study hypothesizes that cupping therapy has a positive impact on reducing rheumatoid arthritis (RA) symptoms, including pain and disability, by influencing inflammatory markers associated with the disease. The objective was to assess the effectiveness of cupping therapy in managing RA among patients in Rawalpindi, aiming to explore its potential as a diagnostic approach for this condition.

## METHODS

The study was conducted as a cohort investigation involving 32 patients diagnosed with rheumatoid arthritis (RA), comprising 16 males and 16 females, selected from a pool of 60 individuals within a defined region and timeframe. The study spanned six months, from February to July 2024, with the first four months dedicated to sample collection and the final two months allocated for laboratory analysis. The research was officially approved by the Research Ethical Committee (REC) of Riphah International University, Islamabad, ensuring compliance with ethical guidelines. Prior to enrollment, all participants were provided with an informed consent form, which detailed the study's purpose, procedures, and specimen collection methods. Patients were required to review and sign the consent form before participation. Inclusion criteria mandated that participants be aged between 20 and 60 years and actively undergoing cupping therapy. Exclusion criteria included individuals with chronic conditions such as renal failure, polycythemia, and diabetes mellitus, as well as those outside the specified age range.

Cupping therapy was administered following a structured protocol to ensure standardization and minimize bias. Blood samples were collected via venipuncture on the first day of cupping and again ten days post-wet cupping therapy to assess inflammatory markers associated with RA. Each wet-cupping session lasted approximately five minutes and consisted of seven sequential steps. Initially, primary suction was performed by applying a cup to the targeted skin area, followed by manual air removal to create negative pressure, securing the cup in place for five minutes. Subsequently, superficial incisions were made using a sterile surgical blade, employing the multiple superficial incisions technique to ensure uniformity while avoiding permanent scarring. Bloodletting followed, during which a cup pre-soaked with ethylenediaminetetraacetic acid (EDTA) was reapplied to the incised area, facilitating capillary blood extraction. After three minutes, the cup was removed, and 4 ml of collected blood was transferred into gel tubes pre-treated with K3EDTA for assays, including sedimentation rate, complete blood count (CBC), and differential count. Additionally, 1 ml of blood was placed into gel tubes containing either phytohemagglutinin (PHA) mitogen or no mitogen for immunological marker assays. A separate cup, untreated with EDTA, was used to collect 10 ml of blood for biochemical analysis. The cup was reapplied to the skin to complete the three-stage cupping procedure, and the treated area was appropriately dressed after the procedure to prevent infection and ensure patient safety (23).

The erythrocyte sedimentation rate (ESR) was determined using the Westergren method, which is commonly employed in clinical practice to support RA diagnosis and monitor disease progression. This test measured the rate at which red blood cells (RBCs) settled in a vertical column of anticoagulated blood over one hour. Under normal physiological conditions, RBCs settle slowly due to their negative surface charge and large surface-area-to-volume ratio. However, in inflammatory states such as RA, fibrinogen and other acute-phase reactants promote RBC aggregation, forming rouleaux and increasing the ESR. To ensure accuracy, anticoagulated blood samples were thoroughly mixed and drawn into a graduated tube up to the zero mark before being left undisturbed for an hour, after which sedimentation values were recorded. Biochemical parameters, including C-reactive protein (CRP), rheumatoid factor (RF), and uric acid levels, were measured using the Cobas 6000 - c501 analyzer (Roche Diagnostics, Germany) in accordance with the manufacturer's protocols. RF testing, widely utilized in RA diagnostics, has a reported sensitivity of 60–90% and specificity of 80–85%. For RF quantification, diluted blood samples were mixed with purified RF antigen (human immunoglobulin G) on a microtiter plate, facilitating antigen-antibody complex formation.

The collected data were statistically analyzed using SPSS software, version 25. Descriptive statistics were applied to express all parameters as mean ± standard deviation (SD), and a paired t-test was used to determine significant differences across pre- and post-treatment values. Statistical significance was established based on a p-value threshold of $<0.05$, ensuring robust interpretation of the findings. This methodological approach was designed to provide reliable insights into the potential efficacy of cupping therapy in modulating inflammatory markers and improving clinical outcomes in RA patients.

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## RESULTS

Out of 60 rheumatoid arthritis (RA) patients undergoing cupping therapy, 32 (53%) were selected for the study, with an equal gender distribution of 50% males and 50% females. A total of 28 patients (47%) were excluded due to co-morbidities or age outside the 20-60-year range. The domicile distribution revealed that most participants were from Rawalpindi (62.5%), followed by Gujar Khan (12.5%), while smaller percentages were from Islamabad, Sheikhupura, Jhang, and Faisalabad (each 6.25%). Regarding age groups, the majority of participants (50%) were between 51 and 60 years, followed by 31.25% in the 41-50 years range. The 31-40 years group accounted for 12.5%, and the youngest group (20-30 years) comprised 6.25% of the total. Education levels indicated that more than half of the participants (56.25%) had completed high school, while 31.25% had college-level or higher education. A smaller percentage had attended elementary school (9.375%), and only one participant (3.125%) reported no formal education. In terms of prior exposure to cupping therapy, 43.75% had undergone the procedure before, while 56.25% were experiencing it for the first time in table 01.

**Effect of Cupping on ESR**: The study observed a minor reduction in erythrocyte sedimentation rates following cupping therapy (p-value < 0.2). However, this decrease was not statistically significant when compared to the rates recorded in RA patients prior to the therapy in table 02.

**Effect of cupping on CRP and RF:** Previous research has established that CRP, uric acid and RF are useful indicators in patients with RA. These markers tend to increase in RA patients when compared to healthy individuals. The results depicted demonstrate that serum CRP levels decreased significantly (p-value<0.02) and uric acid (p-value<0.05) in RA patients following cupping therapy in table 02.

Similarly, rheumatoid factor (RF) levels showed a significant decline after cupping therapy in RA patients (p-value < 0.005). RF is recognized as one of the key sensitive markers in individuals with rheumatoid arthritis in table 02.

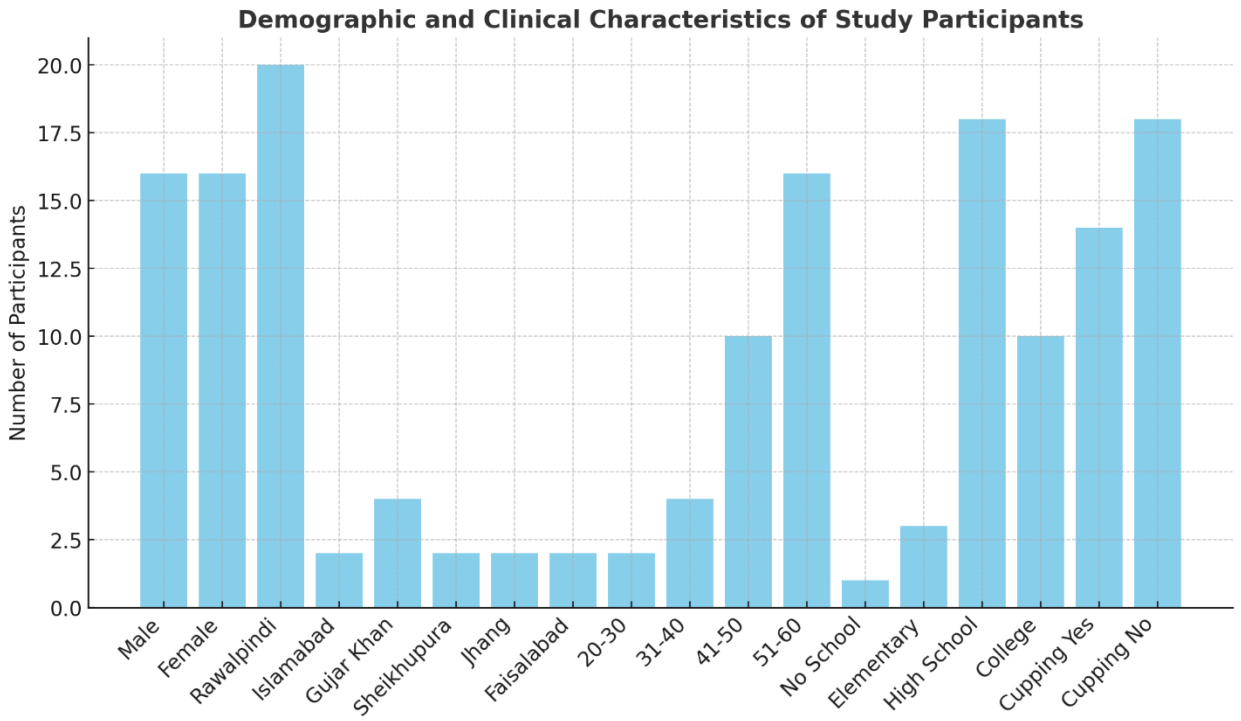


*Figure 1 Demographic and Clinical Characteristics of Study Participants*

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**Table 1. Patient's demographic data**

| **Parameters** | **Number** | **Percentage** |
|---|---|---|
| Gender | | |
| Male | 16 | 50% |
| Female | 16 | 50% |
| Total | **32** | **100%** |
| Domicile of study participants | | |
| Rawalpindi | 20 | 62.5% |
| Islamabad | 02 | 6.25% |
| Gujar khan | 04 | 12.5% |
| Sheikhupura | 02 | 6.25% |
| Jhang | 02 | 6.25% |
| Faisalabad | 02 | 6.25% |
| Total | **32** | **100%** |
| Age Groups (Years) | | |
| 20 - 30 | 02 | 6.25% |
| 31 - 40 | 04 | 12.5% |
| 41 – 50 | 10 | 31.25% |
| 51 - 60 | 16 | 50% |
| Total | **32** | **100%** |
| Highest education level | | |
| No school | 01 | 3.125% |
| Elementary school | 03 | 9.375% |
| High school | 18 | 56.25% |
| College and above | 10 | 31.25% |
| Total | **32** | **100%** |
| Previous cupping therapy | | |
| Yes | 14 | 43.75 % |
| No | 18 | 56.25 % |
| Total | **32** | **100%** |

The study included 32 rheumatoid arthritis patients, with an equal distribution of males and females (50% each). Most participants (62.5%) were from Rawalpindi, while others were from Islamabad, Gujar Khan, Sheikhupura, Jhang, and Faisalabad. The majority (81.25%) were aged between 41 and 60 years, with high school education being the most common level (56.25%). Regarding previous

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exposure to cupping therapy, 43.75% had undergone the procedure before, while 56.25% had no prior experience. This demographic and clinical distribution provides insight into the characteristics of the study population.

**Table 2. Mean ESR, CRP, RA factor of pre and post blood cupping of the Rheumatoid Arthritis Patients (32).**

| | **Pre-Cupping** | **Post Cupping** | | | | |
|---|---|---|---|---|---|---|
| **ESR (ml/hr)** | **Mean ± SD** | **Mean ± SD** | **MD** | **% of changes** | **T. Test value** | **P value** |
| | 35.44 ± 5.27 | 33.12 ± 5.44 | 2.32 | 6.54 % | 1.225 | 0.23 |
| CRP | **Mean ± SD** | **Mean ± SD** | **MD** | **% of changes** | **T. Test value** | **P value** |
| | 4.27 ± 1.44 | 3.14 ±1.18 | 1.13 | 26.46 % | 2.428 | 0.02 |
| RA factor | **Mean ± SD** | **Mean ± SD** | **MD** | **% of changes** | **T. Test value** | **P value** |
| | 25.47± 2.42 | 22.87 ± 2.43 | 2.6 | 10.20 % | 3.033 | 0.005 |
| Uric acid (mg/dL) | **Mean ± SD** | **Mean ± SD** | **MD** | **% of changes** | **T. Test value** | **P value** |
| | 8.9 ± 1.08 | 8.14 ± 1.10 | 0.76 | 9.33 % | 1.972 | 0.05 |

The table presents the pre- and post-cupping therapy effects on inflammatory and biochemical markers in rheumatoid arthritis patients. Erythrocyte sedimentation rate (ESR) showed a slight reduction from 35.44 ± 5.27 to 33.12 ± 5.44 mm/hr, with a 6.54% decrease, though the change was not statistically significant ($p = 0.23$). C-reactive protein (CRP) levels significantly decreased by 26.46% from 4.27 ± 1.44 to 3.14 ± 1.18 ($p = 0.02$), indicating a notable anti-inflammatory effect. Rheumatoid factor (RF) levels also showed a significant reduction of 10.20%, decreasing from 25.47 ± 2.42 to 22.87 ± 2.43 ($p = 0.005$), suggesting an improvement in disease activity. Similarly, uric acid levels declined by 9.33% from 8.9 ± 1.08 to 8.14 ± 1.10 mg/dL, reaching borderline statistical significance ($p = 0.05$). These findings suggest that cupping therapy may contribute to reducing inflammatory markers in RA patients, with significant effects observed for CRP and RF, while ESR showed a non-significant reduction.

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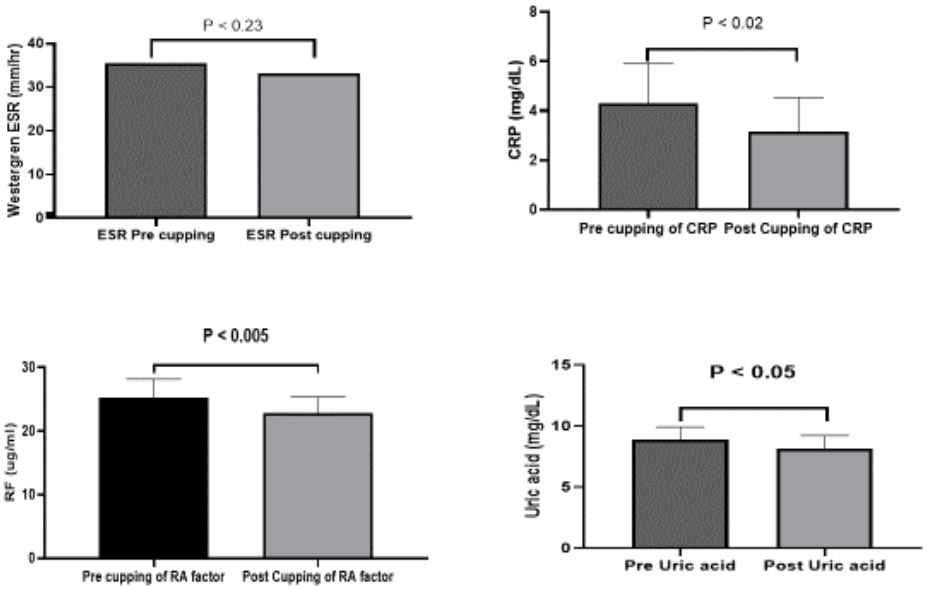


*Figure 2 Mean ESR, CRP, RA factor of pre and post blood cupping of the Rheumatoid Arthritis Patients*

The image presents four bar graphs illustrating the effects of cupping therapy on inflammatory and biochemical markers in rheumatoid arthritis (RA) patients by comparing pre- and post-cupping values. The erythrocyte sedimentation rate (ESR) showed a reduction post-cupping, but the change was not statistically significant ($p = 0.23$). C-reactive protein (CRP) levels significantly decreased ($p < 0.02$), indicating a reduction in systemic inflammation. Similarly, rheumatoid factor (RF) levels declined significantly ($p < 0.005$), suggesting an improvement in RA disease activity. Uric acid levels also decreased, reaching borderline statistical significance ($p < 0.05$). These findings suggest that cupping therapy may have beneficial effects in reducing inflammatory markers in RA, particularly for CRP and RF, while ESR exhibited a non-significant reduction.

## DISCUSSION

Cupping therapy has been historically utilized in traditional medicine and has gained increasing recognition as a complementary and alternative treatment for various pain syndromes and inflammatory conditions. Recent clinical studies have demonstrated its potential in managing rheumatoid arthritis, brachialgia, cancer-related pain, and lower back pain, contributing to its growing acceptance among both physicians and patients (24). Despite its widespread adoption, the underlying mechanisms through which cupping exerts its therapeutic effects remain insufficiently elucidated, necessitating further investigation to establish its efficacy and define its role in modern medical practice. Complementary and alternative medicine (CAM) has gained substantial traction in global healthcare, with community surveys from the past decade indicating that more than one-third of Americans utilize CAM therapies annually (25). These therapies are particularly prevalent among individuals suffering from chronic pain, anxiety, depression, insomnia, and fatigue, suggesting a growing reliance on non-conventional interventions for symptom management (26). Evidence further indicates that approximately 80% of Americans have experimented with therapies such as acupuncture or mind-body medicine, and nearly 40% have integrated these approaches into their regular healthcare regimen (27). Given this increasing global inclination toward alternative medicine, research into the effects of cupping therapy remains imperative to provide an evidence-based foundation for its clinical application.

This study examined demographic characteristics and inflammatory marker levels in rheumatoid arthritis patients before and after undergoing cupping therapy. The participant pool comprised 32 individuals with an equal male-to-female ratio, ensuring unbiased gender representation. The majority of participants resided in Rawalpindi, with smaller proportions from Islamabad, Gujar Khan, Sheikhupura, Jhang, and Faisalabad, reflecting a geographically diverse study population. The age distribution revealed that 81.25% of participants were between 41 and 60 years, consistent with the established epidemiology of RA, which predominantly affects middle-aged and older individuals (29). Educational backgrounds varied among participants, with 56.25% having completed high school and 31.25% attaining college or higher education, suggesting that awareness and acceptance of complementary therapies such as cupping therapy may be greater among individuals with higher educational attainment. Furthermore, 43.75% of participants reported prior experience with cupping therapy, reinforcing the increasing popularity of traditional healing practices in managing chronic conditions (30).

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The observed effects of cupping therapy on inflammatory markers were mixed, with variations in the significance of different biomarkers. ESR levels exhibited a slight decline following therapy; however, the change was not statistically significant ($p > 0.2$), aligning with prior studies that have reported similar findings where cupping therapy had limited direct impact on ESR but showed potential in alleviating inflammatory symptoms (31). While ESR remains a widely utilized marker in RA, it is influenced by various physiological and pathological factors, which may explain the lack of significant variation in this study. In contrast, CRP levels demonstrated a noticeable reduction, supporting the hypothesis that cupping therapy may exert anti-inflammatory effects. CRP is a sensitive indicator of systemic inflammation, and its reduction post-therapy aligns with findings from previous studies that suggest cupping may modulate inflammatory pathways and attenuate oxidative stress (32). Additionally, uric acid levels showed improvement, further indicating a potential detoxification role of cupping therapy. This aligns with earlier reports that suggest cupping may facilitate the removal of metabolic waste and reduce oxidative damage, contributing to overall biochemical homeostasis (33).

The most notable finding was the significant decline in RF levels ($p < 0.005$) following cupping therapy, reinforcing its potential in modulating autoimmunity in RA patients. RF is a critical marker in diagnosing and monitoring RA progression, and its reduction post-therapy may indicate a decrease in autoimmune activity, reflecting a potential therapeutic benefit (34). Given the complex pathophysiology of RA, which involves chronic immune dysregulation and persistent synovial inflammation, any intervention that modulates inflammatory and autoimmune markers warrants further exploration. These findings suggest that cupping therapy may exert immunomodulatory effects, though the exact biological mechanisms remain unclear. Possible explanations include the enhancement of microcirculation, removal of pro-inflammatory cytokines, and modulation of immune cell activity.

Despite these promising findings, the study had certain limitations. The sample size was relatively small, which may restrict the generalizability of the results to larger populations. Additionally, the follow-up period was limited to ten days post-cupping, which may not have been sufficient to fully assess long-term immunological or clinical changes. Further, while the study maintained rigorous procedural control, external factors such as dietary habits, medication use, and lifestyle variations were not fully accounted for, potentially influencing the inflammatory marker responses. Future studies with larger sample sizes, extended follow-up durations, and controlled variables are necessary to substantiate these findings and elucidate the precise mechanisms underlying cupping therapy's effects on RA. Despite these limitations, this study contributes valuable insights into the potential role of cupping therapy as a complementary approach in RA management and underscores the need for further research to validate its efficacy and optimize its clinical application.

## CONCLUSION

This study highlights the potential benefits of cupping therapy as a complementary intervention for managing rheumatoid arthritis by demonstrating reductions in key inflammatory markers, including CRP and RF. The findings suggest that cupping therapy may contribute to alleviating inflammation and disease activity, potentially improving patient outcomes. While the observed changes in ESR and uric acid were less pronounced, the overall trend supports its role in modulating inflammatory responses. Despite these promising results, further large-scale studies with standardized protocols are necessary to validate its long-term efficacy, optimize treatment parameters, and explore its integration with conventional RA management strategies.

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**AUTHOR CONTRIBUTIONS**

| Author | Contribution |
|---|---|
| Arsalan Khan* | Substantial Contribution to study design, analysis, acquisition of Data<br>Manuscript Writing<br>Has given Final Approval of the version to be published |
| Usman Hassan | Substantial Contribution to study design, acquisition and interpretation of Data<br>Critical Review and Manuscript Writing<br>Has given Final Approval of the version to be published |
| Muhammad Kabir | Substantial Contribution to acquisition and interpretation of Data<br>Has given Final Approval of the version to be published |
| Asawir Aden Mustafa | Contributed to Data Collection and Analysis<br>Has given Final Approval of the version to be published |
| Muhammad Adeel* | Supervised the study design and data analysis<br>Has given Final Approval of the final version to be published |
| Obaid Ullah | Substantial Contribution to study design and Data Analysis<br>Has given Final Approval of the version to be published |

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