Evaluation of Wet Cupping Therapy: Systematic Review of Randomized Clinical Trials

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Abstract

Background: Wet cupping is a widely used traditional therapy in many countries, which justifies a continuous scientific evaluation of its efficacy and safety.

Objectives: To perform a systematic review to critically evaluate and update the available evidence of wet cupping in traditional and complementary medicine.

Methods: Ten electronic databases were searched from their inceptions to February 2016. Included studies were randomized clinical trials (RCTs) that evaluated wet cupping against any type of control interventions in patients with any clinical condition, as well as healthy individuals. Cochrane risk of bias tool was used to appraise the included RCTs.

Results: Fourteen RCTs met the eligibility criteria. The included studies evaluated the following clinical conditions: nonspecific low back pain (NSLBP), hypertension, brachialgia, carpal tunnel syndrome (CTS), chronic neck pain, metabolic syndrome, migraine headaches, oxygen saturation in smokers with chronic obstructive pulmonary disease (COPD), and oral and genital ulcers due to Behcet disease. Two RCTs evaluated physiologic and biochemical parameters of healthy individuals. Overall, 9 RCTs favored wet cupping over various control interventions in NSLBP (n=2), hypertension (n=1), brachialgia (n=1), CTS (n=1), chronic neck pain (n=2), oxygen saturation in smokers with COPD (n=1), and oral and genital ulcers due to Behcet disease (n=1). Five RCTs showed no statistically significant between-group differences: NSLBP (n=1), metabolic syndrome (n=1), migraine headaches (n=1), and physiologic and biochemical parameters of healthy individuals (n=2). Included RCTs had a variable risk of bias across all domains and suffered methodologic limitations.

Conclusions: There is a promising evidence in favor of the use of wet cupping for musculoskeletal pain, specifically NSLBP, neck pain, CTS, and brachialgia. Better-quality trials are needed to generate solid evidence and firmly inform policy makers.

Keywords: cupping, wet cupping, clinical trial, systematic review, evaluation

Introduction

Cupping is a traditional therapy used worldwide, and it is divided mainly into dry and wet cupping. Wet cupping is a popular traditional therapy in Asia, the Middle East, and Central Europe. In the Middle East and in Muslim countries, wet cupping is called Hijamah and is linked to religious beliefs because it was favored by the Prophet of Islam. Wet cupping has long been used to treat chronic conditions, such as musculoskeletal pain, headache, radiculopathy, and respiratory disorders. After selection of specific points for each condition on which to place the cups, the wet cupping procedure includes scarification with a blade or puncturing of the skin with a needle before application of bamboo, glass, or plastic cups. A vacuum is then produced by manual suction, electromechanical suction, or, rarely, heat production so that skin is sucked in and the stagnant blood is drawn into the cup.
Different techniques are used in different regions. In certain regions, such as the Middle East, cups are placed and suction is performed before and after scarification, not just after scarification.

The mechanism of action of wet cupping is not clear, and many theories have been proposed. It may act by triggering a diffuse noxious inhibitory control or by the removal of oxidants and the decrease of oxidative stress. Some researchers suggest that this therapy drains excess fluids; increases blood flow to skin and muscles; and stimulates the peripheral nervous, neurohormone, circulatory, and immune systems.

Several systematic reviews on wet and dry cupping therapy have been published, both for specific conditions, such as pain, stroke rehabilitation, hypertension, low back pain, and herpes zoster, and for all medical conditions. But with the growing interest in the subject, increased number of publications in recent years, and relatively improved quality of clinical trials, these reviews should be updated. In addition, systematic reviews should separate dry and wet cupping trials because wet cupping is mainly used in certain regions, such as the Middle East.

The aim of this systematic review was to critically evaluate and reflect the current research evidence of wet cupping in different conditions and thus to help form the scientific basis for developing a clinical guideline for practitioners and to support the policy of developing integrative health approaches.

Methods

The Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines and the Cochrane Handbook for Systematic Reviews of Interventions were included. Included were randomized clinical trials (RCTs) that used wet cupping alone or in addition to other therapy, in medically compromised or healthy individuals, compared with no treatment or other active controls. Participants were without age or sex restrictions. Any primary outcome measures were admissible. Studies were excluded if they used dry cupping; were uncontrolled clinical trials, clinical observations, or case reports; or were not published in English.

Literature searches

Electronic searches were carried out in February 2016 via OVID in the following databases (from their inception until the dates shown): ACP Journal Club, 1991–January 2016; Cochrane Central Register of Controlled Trials, January 2016; Cochrane Database of Systematic Reviews, 2005–February 12, 2016; Cochrane Methodology Register, third quarter 2012; Database of Abstracts of Reviews of Effects, first quarter 2016; Health Technology Assessment, first quarter 2016; NHS Economic Evaluation Database, first quarter 2016; AMED (Allied and Complementary Medicine), 1985–February 2016; Ovid MEDLINE In-Process & Other Non-Indexed Citations, Ovid MEDLINE Daily, and Ovid MEDLINE, 1946–present.

“Cupping” was used as a broad search term, followed by manual screening of articles to ensure that relevant studies were not missed. All retrieved abstracts were screened to remove irrelevant and duplicates studies. Nonelectronic search was conducted through screening of different sources and direct communications with expert authors in the field.

Data extraction

Data from the included studies were extracted by two reviewers (P.P. and M.K.) and subsequently validated by a third reviewer (A.A.). The following information was extracted: first author’s name and publication date; study design; sample size and characteristics of participants (including mean age and demographics); condition; description of wet cupping intervention in terms of duration, frequency, and anatomic cupping sites; comparators; primary outcomes; main results (with p-values and confidence intervals where available); study authors’ conclusion; and adverse/undesirable or side effects of the intervention. Comments related to validity were added at the end of the descriptive Table 1 and disagreements were resolved by discussion and consensus.

Risk of bias assessment

The Cochrane Collaboration’s tool for assessing the risk of bias of the included RCTs was used. Risk of bias assessments were performed by two reviewers independently (P.P. and M.K.) and validated by a third reviewer. Any disagreements about whether a study was judged high, low, or unclear in any domain of the tool were settled through discussions.

Data analysis and synthesis

Narrative data synthesis was used because clinical and methodologic heterogeneity in terms of populations, interventions, comparison groups, outcome measures, and study designs, as well as the lack of overlap of confidence intervals assessed by visual inspection of scatter of forest plots, precluded a formal meta-analysis.

Results

Study description

The searches generated a total of 51 references and 14 RCTs, with a total of 863 individuals meeting the inclusion criteria. Figure 1 shows the PRISMA diagram of the included studies. The key data from the included RCTs are presented in Table 1. The trials originated from Germany (n = 3), Iran (n = 5), Jordon (n = 1), Morocco (n = 1), Saudi Arabia (n = 2), and South Korea (n = 2). Sample sizes ranged from 20 to 126 (mean, 61.63; standard deviation, 32.5). All RCTs used parallel design with two groups.

Risk of bias in the included studies

The overall quality of the included RCTs is suboptimal. Of the 14 included studies, 2 were assessed as having high risk of bias on random sequence generation, 3 on allocation concealment, 8 on blinding of participants and outcome assessors, 1 on addressing of incomplete data, 0 on selective outcome reporting, and 2 on other sources of bias. Table 2 illustrates the risk of bias in specific domains of the RCTs. Across all domains, 4 trials had low or unclear risk of bias, 8 had only one high risk of bias in one domain (mainly in blinding), and the remaining 2 had high risk of bias in more than 1 domain (Table 2).
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<tr>
<th>Study, year, reference</th>
<th>Design</th>
<th>Sample/condition (mean age, yr)</th>
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<tr>
<td>Al Bedah et al., 2015</td>
<td>Parallel RCT with 2 groups</td>
<td>80/NSLBP (30.45)</td>
<td>Wet cupping/6 sessions over 2 wk plus acetaminophen if needed</td>
<td>Acetaminophen if needed</td>
<td>1. NRS 2. PPI 3. ODQ 4. Number of acetaminophen tablets 4. NS (p = 0.1)</td>
<td>1. Significant (p = 0.0001) 2. Significant (p = 0.0001) 3. Significant (p = 0.0001) 4. NS (p = 0.1)</td>
<td>“Wet cupping is potentially effective in reducing pain and improving disability associated with NSLBP at least for 2 weeks after cupping”</td>
<td>None reported</td>
<td>Lack of blinding No control for placebo effect</td>
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<tr>
<td>Aleyeidi et al., 2015</td>
<td>Parallel RCT with 2 groups</td>
<td>80/hypertension (52.9)</td>
<td>Wet cupping plus conventional treatment/3 sessions every other day</td>
<td>Conventional treatment</td>
<td>1. Mean systolic blood pressure 2. Diastolic blood pressure</td>
<td>1. Systolic: significant (p = 0.046) 2. Diastolic: NS (p = 0.68)</td>
<td>“Wet cupping therapy is effective in reducing systolic blood pressure in hypertensive patients for up to 4 weeks without serious side effects”</td>
<td>Headache Hijamah site Pnritis Dizziness Tiredness and sleepiness Nausea Vomiting Pain at site 1-d insomnia scar</td>
<td>Lack of blinding No control for placebo effect</td>
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<td>Dehghani-Firoozabadi et al., 2014</td>
<td>Parallel RCT with 2 groups</td>
<td>60/migraine (32.1)</td>
<td>Cupping therapy (monthly for 3 sessions) plus serkangabin</td>
<td>Conventional treatment group</td>
<td>1. Severity of headache 2. Frequency of attacks in a week 3. Duration of attacks per hour in 5 visits</td>
<td>1. NS (p = 0.80) 2. NS (p = 0.63) 3. NS (p = 0.48)</td>
<td>“There was no significant difference between cupping plus serkangabin therapy and conventional treatment in the treatment and prophylaxis of migraine”</td>
<td>No information Insufficient information to judge methodologic quality</td>
<td></td>
</tr>
<tr>
<td>Erras et al., 2013</td>
<td>Parallel RCT with 2 groups</td>
<td>24 patients/oral and genital ulcers due to Behcet disease (37.2)</td>
<td>Single session (approximately 20 min) + UC</td>
<td>UC only$^a$</td>
<td>1. Number of episodes/mo 2. Number of ulcers/episode 3. Duration of episode</td>
<td>1. Significant (p = 0.005) 2. Significant (p = 0.018) 3. Significant (p = 0.018) all at 6 mo</td>
<td>“…combining Wet Cupping plus conventional treatment shows great promise as an effective treatment for oral and genital ulceration in patients with Behcet disease”</td>
<td>None reported Small sample, no confidence intervals, no power calculations</td>
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<tr>
<td>Farhadi et al., 200915</td>
<td>Parallel RCT with 2 groups</td>
<td>98 patients/ NSLBP (43.3)</td>
<td>3 sessions over 6 days (20 min each)</td>
<td>UC (education, acetaminophen, bed rest, exercises)</td>
<td>MQS</td>
<td>Significant ($p&lt;0.01$)</td>
<td>“Traditional wet-cupping care delivered in a primary care setting was safe and acceptable to patients with nonspecific low back pain. Wet cupping was significantly more effective in reducing bodily pain than usual care at 3 month follow up”</td>
<td>Fainting ($n=3$)</td>
<td>Lack of blinding, no control for placebo effects</td>
</tr>
<tr>
<td>Farahmand et al., 2012</td>
<td>Parallel RCT with 2 groups</td>
<td>126 patients/ metabolic syndrome</td>
<td>2-stage wet cupping treatments with 6-wk intervals + dietary advice</td>
<td>Dietary advice for 6 wk</td>
<td>Anthropometric</td>
<td>NS ($p&gt;0.05$)</td>
<td>“Wet cupping does not have a significant effect on anthropometric or biochemical indices compared to the effect of dietary advice alone”</td>
<td>None reported</td>
<td>Confounding effects of dietary advice regimen</td>
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<tr>
<td>Hekmatpour et al., 2013</td>
<td>Parallel RCT with 2 groups</td>
<td>110 male smokers/ positive result on pulmonary function test, COPD</td>
<td>Wet cupping (15–20 min) (/50–75 mL blood drawn)</td>
<td>Venesection (100–200 mL blood drawn)</td>
<td>O$_2$ saturation</td>
<td>Immediately after: NS ($p=0.88$) After 6 h: Significant ($p&lt;0.001$) After 12 h: Significant ($p&lt;0.001$)</td>
<td>“Wet cupping caused a continued O$_2$ saturation in the intervention group up to 12 hours afterward”</td>
<td>Not reported</td>
<td>Lack of blinding No control for placebo effect</td>
</tr>
<tr>
<td>Khalil et al., 201314</td>
<td>Parallel RCT with 2 groups</td>
<td>44 healthy men (30.5)</td>
<td>Single session (approximately 20 min)</td>
<td>No treatment</td>
<td>Physiologic</td>
<td>NS ($p&gt;0.05$) at 1 wk and 1 mo</td>
<td>“No correlation between cupping and cytogenetic parameters (CRI and SCE) was observed. However, cupping seems to play a role in activation of complement system as well as cellular part of immune system”</td>
<td>Discomfort, light-headedness</td>
<td>Lack of active controls No power or sample size calculations</td>
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<tr>
<td>Kim et al., 2011(^{16})</td>
<td>Parallel RCT with 2 groups</td>
<td>32 patients/ NSLBP (46.1)</td>
<td>Wet cupping 3 times per week for 2 wk + UC (including stretching and strengthening exercises)</td>
<td>Waiting list</td>
<td>NRS</td>
<td>NS (p = 0.52) at 2 wk</td>
<td>“This pilot study may provide preliminary data on the effectiveness and safety of wet-cupping treatments for persistent NSLBP”</td>
<td>None reported</td>
<td>Small sample Unequal distribution between the groups</td>
</tr>
<tr>
<td>Kim et al, 2012(^{18})</td>
<td>Parallel RCT with 2 groups</td>
<td>40 patients/neck pain</td>
<td>6 sessions of both wet and dry cupping (3 times per week for 2 wk) + stretching exercises</td>
<td>Heating pads for 10 min, 3 times per week for 2 wk + stretching exercises</td>
<td>Pain (1–100 NRS)</td>
<td>Significant at 3 wk (p = 0.025) and 7 wk (p = 0.005)</td>
<td>“Two weeks of cupping therapy and an exercise program may be effective in reducing pain and improving neck function...”</td>
<td>4 skin lacerations; whole body itching, pain at the cupping sites, and generalized body ache</td>
<td>Small sample Confounding effect of exercises</td>
</tr>
<tr>
<td>Lauche et al., 2012(^{19})</td>
<td>Parallel RCT with 2 groups</td>
<td>50 patients/ chronic nonspecific neck pain</td>
<td>Single session (approximately 15–20 min)</td>
<td>Waiting list</td>
<td>PM and PR</td>
<td>1. Significant (p &lt; 0.05) 2. Significant (p &lt; 0.05) 3. NS (p = 0.168) 4. NS (p = 0.686) 5. NS (p = 0.447) 6. Significant (p &lt; 0.01) 7. Significant at days 2–4 (p &lt; 0.05)</td>
<td>“A single application of traditional cupping might be an effective treatment for improving pain, quality of life and hyperalgesia in CNP”</td>
<td>Pain, circulatory instability, tension headaches, a migraine attack, a reappearing tinnitus, wound-healing itch</td>
<td>Lack of blinding Power calculations Underreporting</td>
</tr>
<tr>
<td>Ludtke et al., 2006(^{19})</td>
<td>Parallel RCT with 2 groups</td>
<td>20 patients/ brachialgia (50.4)</td>
<td>Single session (approximately 10 min) + UC</td>
<td>UC(^{e}) only</td>
<td>11-point NAS(^{d})</td>
<td>Significant at days 1–7 after intervention (p = 0.002)</td>
<td>“This study suggests short-term effects of a single wet cupping therapy, which remain at least for 1 week.”</td>
<td>None reported</td>
<td>Small sample Lack of follow-up</td>
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\(^{a}\)TLC: traditional medical care \(^{b}\)Control condition \(^{c}\)Includes physical therapy \(^{d}\)Fatigue, anxiety, sleep disturbance \(^{e}\)Usual care \(^{f}\)Lower back pain \(^{g}\)Sciatica \(^{h}\)Neck pain \(^{i}\)Shoulder pain

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<tr>
<td>Michalsen et al., 2009</td>
<td>Parallel RCT with 2 groups</td>
<td>52 patients/CTS (58.5)</td>
<td>Single session (5–10 min)</td>
<td>Heating pad once only for 15 min</td>
<td>Symptom severity measured with 100-mm VAS</td>
<td>Significant at day 7 ($p &lt; 0.001$)</td>
<td>“…a single course of wet cupping of the shoulder triangle … appears to be effective in relieving symptoms and pain for at least 1 week in patients with manifest CTS”</td>
<td>None reported</td>
<td>Lack of blinding</td>
</tr>
<tr>
<td>Niasari et al., 2007</td>
<td>Parallel RCT with 2 groups</td>
<td>47 healthy men</td>
<td>Single session (5–10 min)</td>
<td>No treatment</td>
<td>1. Serum triglycerides 2. Serum total cholesterol 3. Serum LDL lipoproteins 4. Serum HDL lipoproteins</td>
<td>1. NS ($p &gt; 0.05$) 2. NS ($p &gt; 0.05$) 3. Significant at 1, 2, 3 wk ($p &lt; 0.0001$) 4. NS ($p &gt; 0.05$)</td>
<td>“Wet cupping may be an effective method of reducing LDL cholesterol in men and consequently may have a preventive effect against atherosclerosis.”</td>
<td>No information</td>
<td>Lack of active controls Poor reporting</td>
</tr>
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</table>

*Colchicine, corticosteroids, and azathioprine.

*Physical functioning, bodily pain, and physical component scores.

*aUsual care also included analgesic drugs (peripheral or central acting), physiotherapies (manual therapy, hydrotherapy, electrotherapy, physical exercise), psychological care (single or group therapy), and music therapy.

*bAverage of three subscales: pain, tingling, and numbness.

RCT, randomized clinical trial; NSLBP, nonspecific low back pain; NRS, numeric rating scale; PPI, Present Pain Intensity Scale of the McGill Pain Questionnaire; ODQ, Oswestry Disability Questionnaire; UC, usual care; MQS, Medication Quantification Scale Version III; OD1, Oswestry Pain Disability Index; NS, not significant; COPD, chronic obstructive pulmonary disease; CRI, Cell Replication Index; SCE, Sister Chromatid Exchanges; VAS, visual analog scale; PM, pain related to movement; PR, pain at rest; SF-36, Medical Outcomes Study Short-Form 36-item quality of life questionnaire; NDI, Neck Disability Index; MDT, mechanical detection threshold; VDT, vibration detection threshold; PPT, pressure pain thresholds; CNP, chronic neck pain; NAS, numeric analog scale; CTS, carpal tunnel syndrome; LDL, low-density lipoprotein; HDL, high-density lipoprotein.
Wet cupping in healthy persons

Two RCTs in healthy persons were included. The first RCT evaluated the effect of wet cupping on selected immune-cytogenetic parameters in 44 healthy men. The study reported that a single session of cupping (approximately 20 minutes in duration) compared with no treatment had no statistically significant effect on the cytogenetic parameters or hemoglobin concentration at 1 week and 1 month after intervention. But white cell counts were significantly higher after wet cupping in the intervention group ($p \leq 0.05$).

The second RCT evaluated the effects of wet cupping on serum lipoprotein concentrations. The authors concluded that compared with no treatment, a single session of wet cupping (approximately 5–10 minutes) had no effect on serum triglycerides, total cholesterol, and high-density lipoproteins and had significant effect on serum low-density lipoproteins at 1, 2, and 3 weeks ($p < 0.0001$).

Clinical conditions

Nonspecific low back pain. Farhadi et al. (2009) aimed to determine the efficacy of wet cupping versus usual care (UC) in 98 patients with nonspecific low back pain. They reported that 3 sessions over 7 days (20 minutes each) had a statistically significant reduction in medications consumed, pain, and disability scores (all at $p < 0.01$) at 3 months.

Kim et al. (2011) evaluated the effectiveness and safety of wet cupping in 32 patients with the condition. They reported that compared with UC, wet cupping plus UC (three times per week for 2 weeks) had no significant differences between groups on the numeric rating scale for pain at 2 weeks ($p = 0.52$). A significant decrease was seen in the Present Pain Intensity score in the wet cupping group ($p \leq 0.01$).

Al Bedah et al. used the same protocol developed by Kim et al., but UC consisted of only acetaminophen tablets as rescue treatment. (no stretching or strengthening exercises were given). In 80 patients with nonspecific low back pain, a statistically significant improvement in pain and disability scores ($p = 0.0001$ on the Oswestry Disability Questionnaire) was observed in the wet cupping group compared with the control group. This significant improvement persisted for 2 weeks after intervention.

Neck pain

Kim et al. (2012) evaluated the effectiveness of cupping therapy in 40 patients with neck pain. They reported that...
6 sessions of both wet and dry cupping (3 times per week for 2 weeks) in addition to stretching exercises significantly reduced pain intensity at 3 weeks ($p=0.025$) and at 7 weeks ($p=0.005$) compared with heating pads (applied for 10 minutes, 3 times per week for 2 weeks in addition to stretching exercises).

Lauche et al. (2012)\textsuperscript{19} evaluated the effect of wet cupping therapy in 50 patients with neck pain. They reported that compared with waiting list, a single session of wet cupping (approximately 10–15 minutes) significantly reduced pain intensity ($p<0.05$), pressure pain thresholds ($p<0.01$), and improved quality of life ($p<0.05$); however, there were no significant between-group differences in disability, mechanical detection threshold, and vibration detection threshold.

**Carpal tunnel syndrome**

Michalsen et al. (2009)\textsuperscript{5} investigated the effectiveness of wet cupping in 52 patients with carpal tunnel syndrome. They reported that compared with heating pad (applied once only for 15 minutes), a single session of wet cupping (approximately 5–10 minutes) significantly reduced symptom severity ($p<0.001$) at day 7.

**Brachialgia**

Ludtke et al. (2006)\textsuperscript{20} investigated the effectiveness of wet cupping in 20 patients with brachialgia. They reported that compared with UC alone, a single session of wet cupping (approximately 10 minutes) in addition to UC significantly reduced pain intensity ($p=0.002$) at days 1–7 after the intervention.

**Migraine**

Dehghani-Firoozabadi et al. (2014)\textsuperscript{21} aimed to examine the efficacy of cupping therapy (taking place monthly for three times) plus serkangabin syrup (a traditional drink used in Iran for headache and other illnesses) in the treatment of migraine headaches in 60 patients. They reported that compared with conventional treatment alone, wet cupping had no effect on the severity of headache, frequency of attacks in a week, and duration of attacks per hour in 5 visits.

**Behçet disease**

Erras et al. (2013)\textsuperscript{22} aimed to determine the efficacy of wet cupping as an adjuvant treatment in 24 patients with oral and genital ulcers due to Behçet disease. They reported that compared with UC alone, a single session of wet cupping (approximately 20 minutes) in addition to UC significantly reduced the number of episodes per month ($p=0.005$), the number of ulcers per episode ($p=0.018$), and duration of the episode ($p=0.018$) at 6 months.

**Metabolic syndrome**

Farahmand et al. (2012)\textsuperscript{23} aimed to determine the effects of wet cupping on lipid profiles and anthropometric characteristics in 126 patients with metabolic syndrome. They reported that compared with dietary advice for 6 weeks, a two-stage wet cupping treatments at 6-week intervals plus dietary advice had no significant effect on anthropometric measures and biochemical parameters.

**Hypertension**

Aleyedi et al. (2015)\textsuperscript{24} aimed to evaluate the effect of wet cupping on 80 hypertensive patients. They reported that wet cupping (three sessions every other day) in addition to conventional hypertension treatment is more effective than conventional treatment alone in reducing systolic blood pressure ($p=0.046$) after 4 weeks.

**Smokers with chronic obstructive pulmonary disease**

Hekmatpou et al. (2013)\textsuperscript{25} evaluated the effect of wet cupping on 110 male smokers with positive results on a pulmonary function test and chronic obstructive pulmonary disease. They reported that wet cupping (approximately 15–20 minutes) compared with venesection caused a continued $O_2$ saturation in the intervention group up to 12 hours ($p \leq 0.001$).

**Study limitations**

Limitations of all included RCTs are shown in Table 1.

**Discussion**

An increasing number of systematic reviews of cupping therapies were published in recent years.\textsuperscript{2,3,8–11,26} The majority concluded wet cupping has a favorable effect in pain conditions. A recent systematic review and meta-analysis (in which 78% of trials concentrated on wet cupping) concluded that cupping therapy combined with other Traditional Chinese Medicine treatments was significantly superior to other treatments alone.\textsuperscript{12} All published systematic reviews reported that poor methodologic quality of included RCTs is the main factor for not providing a strong recommendation for practice.

The current review included only wet cupping (Hijamah). This modality is widely used in the Middle East, as evidenced by the high number of and recently published RCTs included in this review. Most other reviews have included dry and wet cupping and most probably in addition to other Chinese medicine therapies that may not be commonly be used elsewhere.

**Summary of main results**

The aim of this systematic review was to evaluate the current evidence and to add to the published systematic reviews on the use of wet cupping. Fourteen trials were found. Nine RCTs favored wet cupping over various control interventions for nonspecific low back pain ($n=2$), hypertension ($n=1$), brachialgia ($n=1$), carpal tunnel syndrome ($n=1$), chronic neck pain ($n=2$), oxygen saturation in smokers with chronic obstructive pulmonary disease ($n=1$), and oral and genital ulcers due to Behçet disease ($n=1$). Five RCTs showed no statistically significant between-group differences compared with various controls for nonspecific low back pain ($n=1$), metabolic syndrome ($n=1$), migraine headaches ($n=1$), and physiologic and biochemical parameters of healthy individuals ($n=2$). As reported in
other systematic reviews, the overall methodologic quality of the included RCTs was poor.

Of the 14 RCTs, 11 reported adverse effects (AEs) of wet cupping (Table 1). Six of them reported that no AEs had occurred. Adverse effects included fainting, discomfort, headache, skin laceration, whole body itching, pain, generalized body pain, ache, circulatory instability, migraine attack, repeating tinnitus, and wound-healing itch. Various AE related to cupping therapy were reported, but these were rare and can be avoided if the practitioners are trained and strictly adhered to the safety guidelines.27

Quality of evidence and risk of bias

Biases included small sample size with no power of calculations, unequal distribution between groups, lack of adequate follow-up, confounding effect of control intervention, and under-reporting or poor reporting. But lack of blinding and control for placebo effects were the main causes of risk of bias. The use of an adequate placebo or sham device can minimize performance and detection bias. Unlike with dry cupping,28 creating a sham device for wet cupping is more challenging, especially when used in patients who are familiar with the actual skin scarification and blood suction in wet cupping.

As for other published systematic reviews, there was a high degree of unavoidable heterogeneity in terms of the population, duration, frequency and intensity of wet cupping intervention, control, and outcome measures used. The small number of published RCTs in each condition was the main reason to include RCTs in the absence of standardization of wet cupping intervention or trials with active and inactive controls or wet cupping as monotherapy or in addition to other therapies.

Most included trials used self-reported outcome measures, such as pain scoring scales, as primary outcome measure. Self-reported outcome measures may increase the risk of bias in the absence of placebo. The use of multiple dimension pain measurement and overall functioning can improve self-reporting until more objective outcome measures are developed.

Limitations and potential bias of review process

This systematic review has several limitations. Publication bias is a frequent limitation in most systematic reviews. Specifically, language restriction was an important limitation because it led to the exclusion of a substantial number of publications, especially from China.

Conclusion and implications for practice

There is growing evidence for the effectiveness of wet cupping in pain management in general and specifically in nonspecific low back pain and neck pain. This study and other published studies29 showed that AEs related to wet cupping were rare and were mostly related to improper training or low standards of hygiene. Therefore, there is a need to develop a benchmark for training in wet cupping with a consensus agreement on safety standards and techniques used. The small number of RCTs for each condition, in addition to the low quality and heterogeneity, made it difficult to reach a definite conclusion. High-quality placebo-controlled RCTs with more objective outcome measures are needed to generate solid evidence, firmly inform policymakers, and support the integration of wet cupping into healthcare practice.

Author Disclosure Statement

One of the included trials was conducted by the authors involved in this review (A.A.M.N.A. and M.K.M.K.). An external evaluator (P.P.) was involved to independently evaluate the quality of all RCTs.

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