The effect of wet cupping therapy on the clinical symptoms of adult-onset asthma: A randomized clinical trial

Abstract

Background:

Asthma is an inflammatory disease of the lung. Cupping therapy is a traditional method used in Persian medicine for the treatment of various ailments. This study was aimed to evaluate the anti-asthmatic effects of wet cupping therapy (WCT) in patients with mild to moderate asthma.

Methods:

This is a randomized clinical trial conducted on 103 asthma patients who were referred to Loghman Hakim Hospital, Tehran, Iran. The diagnosis of the disease was confirmed by a pulmonologist based on the patient's history and clinical examinations. The patients who were treated with common asthma medications were assigned to intervention and control groups. The intervention group underwent one session WCT in the region between two shoulders on one of the 17th, 19th, and 21st days of the lunar month. The clinical signs of all patients were gathered based on the asthma control test questionnaire (ACT) before the intervention and in the first, second, fourth, sixth, and eighth weeks after the intervention. The scores of the five questionnaire items and the mean total treatment score (MTTS) were compared between the two groups. Additionally, the satisfaction scores of the participants in the two groups were compared.

Results:

Of 103 patients, 82 patients completed the study. The mean total treatment score (MTTS) was not significantly different between the control and intervention groups at the beginning of the study (P = 0.06). In the intervention group, the MTTS was 11.44 before WCT, while it was significantly increased (24.24) eighth week after the intervention (p <0.001). However, the MTTS in the intervention group was significantly higher than the control group in the first week (p <0.001). In addition, at the end of the trial, the subjects' satisfaction scores in the WCT and control groups were 7.48 and 4.53, respectively (p < 0.001).

Conclusion:

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Wet Cupping Therapy can be an efficient therapeutic method to ameliorate respiratory complications of asthma patients.

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Keywords: Wet cupping therapy, Asthma, Bronchial asthma, Shortness of breath, Persian medicine.

1. Introduction

Asthma is an inflammatory disease of the airways that is accompanied by reversible bronchoconstriction and symptoms such as coughing and breath shortness (1). It was estimated that prevalence of asthma in population of different countries would be up to %18. Asthma, a common chronic disease, will affect approximately 400 million people worldwide by 2025 (2, 3). Current treatments for asthma including class β2 agonist drugs, anticholinergics, corticosteroids and xanthine drugs fail in some patients due to complicated pathophysiology of asthma or lack of medication adherence of patients. High economic and social burden of asthma as well as its high prevalence and adverse side effects necessitate to seek supplementary ways for the treatment of the disease (4, 5). The global trend toward Traditional and Complementary Medicine for respiratory disorders, including asthma, is increasing. Studies have been published on the beneficial effects of herbal medicines, natural and food-based products, as well as manual treatments, like acupuncture and cupping therapy (5, 6) (7).

Cupping therapy is a well-known manual method used in Persian medicine for the treatment of a variety of diseases. It is generally divided into two types, including wet cupping and dry cupping (8). Dry cupping is generally carried out by applying negative pressure sucking on the skin without any bloodletting (9). However, wet cupping therapy (WCT) is mainly based on bloodletting similar to venesection (Fasd) and leech therapy. As has been described in Persian medicine, WCT is performed by the superficial scarification of the congested skin followed by the creation of short time suction on the skin to allow bloodletting (10). According to previous reports, WCT is an effective therapeutic technique to treat a number of diseases such as neck pain, low back pain, carpal tunnel syndrome, herpes zoster, and knee osteoarthritis (11-15). This method is also applicable for the treatment of acute and chronic inflammation and diseases of the immune system. WCT has been shown to alleviate oxidative stress and modulates the release of inflammatory cytokines, resulting in the regulation of immune system (16). Moreover, an animal

study showed that WCT has anti-asthmatic effects by reducing eosinophil trafficking and modulating Th2 inflammatory cytokines (17).

This therapeutic method has been increasingly accepted by different cultures and people around the world. Several advantages of cupping have encouraged many practitioners to introduce this technique into their therapeutic practices, which are extensive and easy application, good efficacy, low, and safety (18). Considering WCT's benefits on respiratory disorders published in previous studies (17, 19), this study as a randomized clinical trial, was designed to investigate the effect of WTC on the clinical symptoms of adult-onset asthma in patients with mild to moderate asthma aged 18-60 years.

2. Methods

2.1. Study Design

This randomized clinical trial was performed on patients with mild to moderate asthma with the age of 18-60 years who referred to the Respiratory Diseases Clinic of Loghman Hospital, Tehran, Iran between August 1 and November 6, 2020. Data collection was carried out through interview, examination, patient information form, cupping complications form, and standard asthma control test questionnaire (ACT) form. The ACT questionnaire includes 5 questions based on the frequency of symptoms of asthma and any drug used during the previous 4 weeks. The questionnaire encompassed questions related to daily activities, the frequency of shortness of breath, nocturnal asthma symptoms, the necessity for rescue inhaler or nebulizer medication, and the assessment of the patient's asthma control. The scores in this test are based on Likert scale that ranges from 5 (poor control) to 25 (complete control). The scores for controlled asthma, not well-controlled asthma, and uncontrolled asthma are ≥20, 16-19, and ≤15, respectively (20). It should be noted that the ACT questionnaire is a valid and widely accepted tool for evaluating asthmatic patients in research studies. In our study, we utilized the Persian version of this questionnaire, which has been approved by the Ministry of Health and Medical Education of Iran (21). Furthermore, the patient's satisfaction with the intervention in each group was measured at the end of the trial using the VAS scale (0-10).

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2.2. Inclusion and Exclusion Criteria

The inclusion criteria were as follows: patients with mild and moderate asthma, having stable conditions without hospitalization, being in the range of 18 to 60 years old, consent to participate in the study, no underlying diseases including cystic fibrosis, bronchopulmonary disease, dysplasia, heart failure, pulmonary embolism, tracheobronchomalacia, bronchiectasis, sarcoidosis and diabetes, no medication use, such as aspirin, beta-blocker, and NSAIDs, no cupping therapy during the previous month, no history of coagulation disorders. The exclusion criteria was as follows: patients who were unable to express the severity of symptoms, patients who needed hospitalization, full stomach or being hungry at the time of therapy, menstruation, sexual activity during the last 12 hours of wet cupping, anemia, immune deficiency, smoking, breastfeeding, and pregnancy.

2.3. Sample size

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By assuming the detection of at least 5 scores difference in the ACT measurement criteria in the control and experimental groups (2 scores in standard drug treatment group and 7 scores in the cupping therapy group), with an effect size of 0.25, common variance of 5, test power of 80% and significant level of 0.05, the sample size was estimated as 30 subjects for each group. The formula for calculating the sample size is as follows:

$$n = \frac{2 \cdot (Z_{\alpha/2} + Z_{\beta})^2 \cdot \mathrm{Var}}{\mathrm{Effect\ Size}^2}$$

Finally, by considering 20% possibility of withdrawal rate, the total calculated sample size was 72 patients (36 patients in each group). Using random block procedure, 103 patients (51 patients in the control group and 52 subjects in the intervention group) were included in the study by considering the inclusion criteria and obtaining informed consent.

2.4. Intervention

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The informed consent was signed by all participants, their demographic information was obtained, and the standard ACT questionnaire was completed for each patient. Utilizing a random block procedure through a computer-generated table of random numbers, we included 103 patients (51 in the control group and 52 in the intervention group) in the study. According to this study's protocol, both groups were treated with common asthma medications, including

fluticasone (25.25 µg, two puffs twice a day) and salbutamol sprays (250 mg/kg) (if needed). The patients in intervention group were also treated with a wet cupping session on one of the 17th, 19th or 21th day of lunar month.

To perform wet cupping, the patient was sat cross-legged on the bed and the practitioner applied an antiseptic agent such as alcohol to disinfect a specific site on the body where cupping would take place. The cupping site was the patient's back, specifically the area between the two scapula, situated between the second and fifth thoracic vertebrae (22). Then, the cup was put on the skin and vacuum produced in the cup using a suction device. This vacuum condition and the environmental air pressure cause the skin to be pulled into the cup. This process leads to the formation of a skin dome that its height is between 1-1.5 cm. After 3-5 min, the cup was removed and 10-15 skin-deep scars (0.5 to 1 mm) were made by a surgical razor. The cup was put back on the same place and re-suction process was continued to draw out the blood gradually. Afterward, the suction devise was removed from the cup and the cycle was repeated 3 times, each lasting for 5 min (Figure 1). It is noteworthy that the patient's position during cupping was in accordance with Iranian customs, with the patient sitting. This seated position facilitated the removal and reapplication of the cup, making the cupping process more convenient for the practitioner.

Finally, the post-cupping recommendations were given to the patient which were include: Avoiding exercise and strenuous physical activity as well as eating egg, fish, dairy products (yogurt, milk, buttermilk), salty foods and frying up to 24 hours after cupping, abstaining from sexual intercourse up to 24 hours, and avoiding sleeping immediately after cupping. Notably, this WCT protocol was designed based on PM resources and Islam's medical recommendations (8, 23).

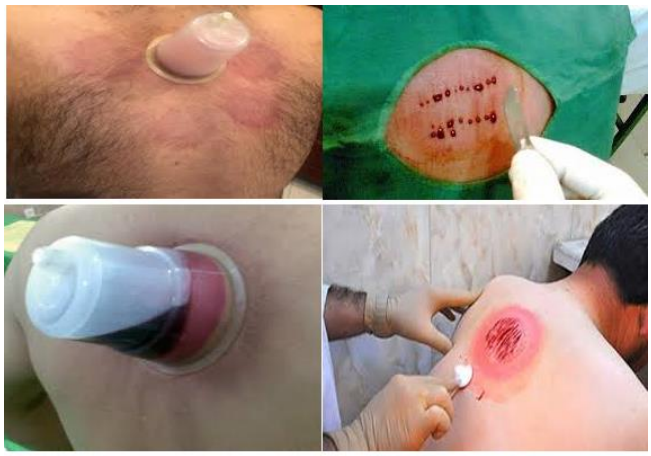

Figure 2: Wet Cupping's Sites and Steps

Patients in both groups were visited and evaluated by a pulmonologist in the first, fourth, and eighth weeks of the study and the ACT questionnaire was completed. Moreover, all patients were followed up by phone call at the end of the first, second and sixth weeks. Again, the ACT questionnaire was completed for each patient to determine the status of asthma control. The groups were then compared. A researcher-deigned questionnaire regarding wet cupping's complications was also provided for the patients in the intervention group to record any complications.

2.5. Ethical considerations

This study was approved by the local ethics committee of Shahid Beheshti University of Medical Sciences in Tehran, Iran in 2020 (ethical code: IR.SBMU.RETECH.REC.1399.351), and followed the declaration of Helsinki. Additionally, the clinical trial was registered with the Iranian registry of clinical trials (registration code: IRCT20181110041600N1). Written consent form was signed by all participants and thereby the participants were informed about the purpose and method of the study. The personal information of the volunteers remained protected. In case of any complication or treatment problem, the necessary instructions were given to the participants.

2.6. Data analysis

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After collecting the questionnaire information, data were analyzed using SPSS software version 22 through descriptive and inferential statistics. We utilized descriptive statistics, including frequency, percentage, and mean ± standard deviation, as well as the independent t-test for quantitative variables, to describe and analyze the data. P values of less than 0.05 were considered to be statistically significant.

3. Results

3.1. Enrollment, exclusions and demographic data

In this study, 103 subjects were recruited and divided randomly into two groups (53 subjects in the WCT and 51 in the control groups). Amongst them, 82 patients completed the trial, 41 of the WCT and 41 of the control groups. Of 52 patients in the intervention group, 25 (48.1%) were male and 27 (51.9%) were female. Of 51 patients in the control group, 12 were male (23.5) and 39 were female (76.5%). The mean age of participants in the intervention and control groups was 44.34 and 43.92 years, respectively. Comparing the marital status distribution of patients showed that in the intervention group, 46 (88.5%) were married and 6 (11.5%) single, while in the controls, 41 (80.4%) were married and 10 (19.6%) single. Besides, the two groups did not differ significantly regarding their educational status (P= 0.51). In terms of demographic variables, in all cases except gender, history of disease and other diseases, there was no statistically significant difference between the two groups (P< 0.05; Table 1).

Table 1. Comparison of demographic variables between the two groups

Variable	Control		Wet Cupping		P-value
Average age	43.92		44.34		0.84
Gender distribution	Male	Female	Male	Female	0.009
	23.5%	76.5%	48.1%	51.9%	
Body Mass Index (kg/m 2)	29.15		28.20		0.38
The year of the disease	3.33		> 5.0		0.038
The frequency of other diseases (non-respiratory)	56.9%		76.9%		0.03

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3.2. Treatment efficacy

Patients' answers to the questions provided in the ACT questionnaire were recorded and evaluated for zero, first, second, fourth, sixth, and eighth weeks of the study. The results of the mean total treatment score (MTTS) in the intervention group at eighth week post-treatment (24.2) was significantly higher than this score at the first week (11.44; P <0.001). The MTTS between the control and intervention groups are shown in and Figure 2. The MTTS in all visit examinations post-treatment, except for week 0, was significantly higher in the intervention group than in the control group (P <0.001). According to the data extracted from the ACT questionnaire, total treatment score in the wet cupping group was increased during 8 weeks of the study. This increase was from the out-of-control range (11.44) to the complete control of symptoms (24.24).

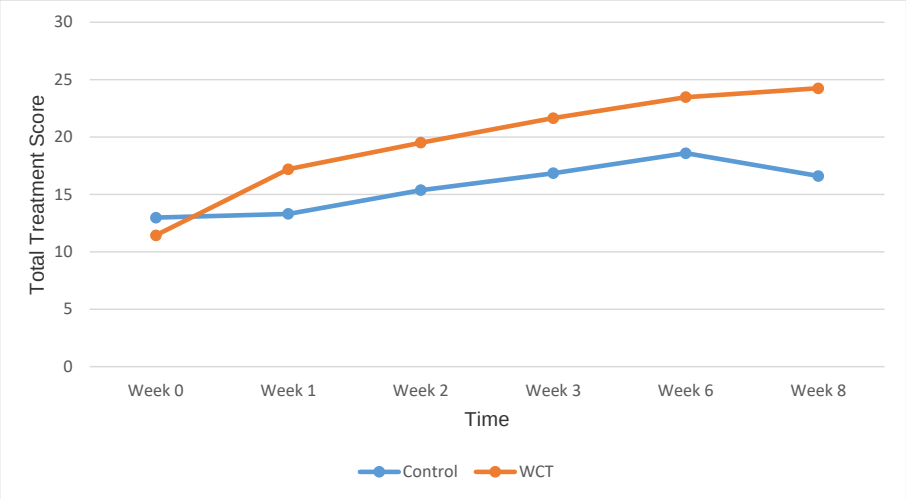

Figure 2. Total treatment score status based on ACT questionnaire

The results showed that WCT significantly increased the ability of patients to perform their normal tasks at work, school or home. Therapeutic efficacy of WCT in alleviating asthma

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complications was gradually appeared from the first to the eighth week post-treatment. Approximately, 100% of patients of WCT group had no asthma-related complication at the end of the eighth week. However, 53.7% of the patients in the control group still had some difficulties with their asthma signs and daily activities during that time. WCT also had a significant effect on the improvement of breath shortness in these patients. Based on our findings, 97.6% of patients receiving wet cupping had no complaints of shortness of breath at the end of the eighth week, while 53.8% had this problem more than once a day at the week zero. Conversely, only 30% of the patients in the control group had no sign of breath shortness.

Another positive finding was the effect of cupping therapy on improving nocturnal symptoms in patients with asthma. Although 11.5% of patients in the cupping group had high quality sleep at the week zero, the sleep quality of all patients who treated with cupping method at the end of the eighth week was unchanged. Nonetheless, about 70% of patients in the control group complained poor sleep quality due to asthma problems. Our further evaluations indicated that cupping therapy had a significant effect on reducing the use of asthma medications by patients over the study period. According to the present data, only 3.8% of patients in the intervention group had no need to use inhaled asthma medications at the zero week, while more than 50% of them didn't use these drugs at the end of the eighth week. Additionally, in the WCT group, the need to use the rescue inhaler (salbutamol) was significantly less than in the control group ($p<0.001$). 56.1% of the subjects in the WCT group did not use salbutamol, while this rate in the control group was only 19.5%.

The results of asthma control status showed that patients who were under the WCT had complete control of asthma in comparison to control group. None of the patients had complete control of asthma at the beginning of the first week, but 75.6% of them in the intervention group and 7.3% in the controls had complete control at the end of the eighth week. Detailed information pertaining to the ACT questionnaire is summarized in Table 2. Finally, at the end of the trial, the subjects' satisfaction scores in the WCT and the control groups were 7.48 and 4.53, respectively ($p<0.001$).

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Question number-Subject area	Item	Participants answers at week 4 (%)	Participants answers at week 8 (%)	

Table2. Comparison of the frequency of ACT questionnaire items between groups at the end of 4th and 8th weeks of study

		Control	Wet cupping therapy	P-value	Control	Wet cupping therapy	
1-Disturbances of daily activities	All the time	4.8	0	0.001	0	0	<0.001
	Most of the time	2.4	0		0	0	
	Some of the time	19	0		9.8	0	
	A little of the time	33.3	0.15		43.9	0	
	None of the time	40.5	0.85		46.3	100	
2- Frequency of shortness of breath	More than once a day	9.5	2.5	<0.001	12.2	0	
	Once a day	16.7	0		4.9	0	
	3-6 times a week	11.9	2.5		7.3	0	
	Once or twice a week	47.6	17.5		46.3	2.4	
	Not at all	14.3	77.5		29.3	97.6	
3- Nocturnal symptoms	4 or more nights a week	7.1	0	0.09	0	0	0.005
	2 or 3 nights a week	4.8	2.5		2.4	0	
	Once a week	31	15		2.4	0	
	Once or twice	0	2.5		22	0	
	Not at all	57.1	80		73.2	100	
4- Using rescue inhaler or nebulizer medication	3 or more times per day	0	0	<0.001	2.4	0	<0.001
	1 or 2 times per day	88.1	20		78.1	0	
	2 or 3 times per week	7.1	27.5		0	2.4	
	Once a week or less	0	40		0	41.5	
	Not at all	4.8	12.5		19.5	56.1	
5- Asthma control	Not controlled at all	2.4	0	<0.001			<0.001
	Poorly controlled	11.9	0				
	Somewhat controlled	40.5	7.5		22	0	
	Well controlled	40.5	90		70.7	24.4	
	Completely controlled	4.8	2.5		7.3	75.6	

3.3. Evaluation of treatment safety

Assessment of side effects of cupping therapy showed no bruising, ecchymosis, blistering, weakness and lethargy or fainting during the application of cup followed by suction, skin scarification, and bleeding. Only mild scar at the cupping site was reported in 2 patients. No weakness, lethargy, or fainting was observed after medicinal bleeding in 97.6% of the patients. One case presented with weakness and lethargy (2.4%), improved by supportive measures.

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4. Discussion

Wet cupping therapy is one of the traditional methods used for the treatment many diseases (24). In spite of the significance of this therapeutic method and various points on the effectiveness of cupping (25), the present study was conducted to investigate the effect of wet cupping on the clinical symptoms of adult-onset asthma. Based on the results, WCT could control the clinical symptoms of patients with mild to moderate asthma. Compared to the control group, the patients who underwent a wet cupping session experienced better symptom control, higher sleep quality, fewer complications, and a decreased need to use the rescue inhalator.

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Numerous studies have examined the effect of cupping on respiratory diseases; Abd al-Jawad et al. conducted a clinical trial showing that wet cupping, as an adjuvant therapy, cloud improve clinical symptoms of asthma (including daytime symptoms, nocturnal symptoms, need for the reliever, and the number of exacerbations) and the patient's preclinical profile (including FEV1, FVC %, FEV1/FVC, and FEF25-75%) (19). In comparison to our study, our study included a larger sample size, and WCT was administered on specific days with a different protocol. Unlike Abd al-Jawad study, where 3-point wet cupping was conducted over 3 sessions, our study utilized one-point cupping, which appears to be more patient-friendly.

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Hekmatpou et al, designed a randomized controlled clinical study to compare the effect of wet cupping on arterial O2 saturation level in cigarrete smokers in comparison to venesection. Their results suggested the positive effect of wet cupping on O2 saturation leading to an improved respiration both during intervention and post-treatment (26). A study conducted by Ting et al, uncovered that positive effect of cupping therapy on O2 saturation arise from its effects on the induction of the concentration of oxyhemoglobin (HbO2) and reduction of

deoxyhemoglobin (Hb) level in the tissue surrounding the cupping location (27). Sungchul and colleagues had similar observations regarding tissue oxygenation following cupping therapy (28). These data are consistent with the findings of the present study in terms of improving the respiration quality of patients. Another study conducted by Kordafshari et al, examined the effect of cupping on quality of life (29). Results of the study indicated the positive effect of cupping on improving the quality of life of the subjects, which is in line with the findings of our study. Results of a randomized clinical trial designed to evaluate the effect of cupping therapy on patients with suboptimal health status who had body pain illustrated the efficacy of the method in improving quality of life of the patients (30).

Chronic inflammatory responses in lungs and airways are involved in the development and progression of asthma. Therefore, any approach to block these responses can be of great importance in alleviating symptoms of the patients with asthma (31). Tagil et al, showed that WTC effectively removed oxidative stress-induced products and thereby reduced inflammatory complications from 31 healthy participants (16). A recently published animal study revealed that WCT could decrease eosinophil counts and interleukin levels in the Balb/c mice model of allergic asthma. Moreover, in histological findings, wet cupping has decreased lung tissue inflammations compared to the control group. (17). Oxidative stress and its related factors and products are major role-players in the induction of inflammatory processes (32). Therefore, removing these oxidants and decreasing oxidative stress in the body may lead to the amelioration of inflammatory responses and helps to improve the quality of life of patients with inflammatory diseases such as asthma. Many previous data also affirm that the severity of asthma is also associated with a decrease in antioxidant defenses and an increase in oxidative mechanisms (33-35). However, this may be one of the potential mechanisms that can be targeted by cupping method to tackle the asthma-associated adverse effects. Therefore, further clinical trials are needed to establish the therapeutic potential of this technique in the treatment of asthma or at least decrease of its adverse side effects.

In this trial, the time for performing wet cupping was adjusted according to Persian Medicine resources and Islamic texts. Accordingly, WCT was performed only on the 17th, 19th, and 21st of the lunar days, minorly limiting subject recruitments. According to traditional medicine, cupping during the initial days of the second half of the lunar month leads to the extraction of more

concentrated substances present in the blood. This phenomenon is believed to be influenced by the moon's gravitational effect on blood circulation (8). Several studies have demonstrated the potential impact of lunar cycles on the physiology and behavior of both humans and certain animals (36). Additionally, some studies have indicated that wet cupping therapy performed during the second half of the lunar cycle may be more beneficial. (37, 38). However, in order to draw accurate conclusions, it is necessary to conduct further studies comparing the effects of WCT on asthma at specific days with normal days.

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In this study, a gender disparity was observed between the two groups, with a higher number of men in the intervention group. This difference can be attributed to the higher prevalence of exclusion criteria for women, such as anemia and menstruation, as well as lower interest among women in the intervention group regarding WCT. While recent research has explored the impact of gender and sex on the pathogenesis and effective management of asthma (3), it is noteworthy that current asthma guidelines do not delineate separate protocols for women and men (39). Furthermore, in previous studies on WCT, its distinct effects on both men and women were not clearly established (40). Consequently, no definitive conclusions can be drawn in this regard.

One of the present study's strengths, the subjects' two-month follow-up in six visits, provided a more accurate assessment of the gradual changes in the WCT compared to the control group. A lack of paraclinical tools, such as respiratory function and laboratory tests, was a limitation this study faced. Regarding the WCT's positive effects in this study, it is recommended to be considered in the following studies.

5. Conclusion

Performing a wet cupping session on the 17th, 19th, or 21st day of the lunar month, in conjunction with conventional medications, may result in improved respiratory function with a reduced need for asthma medications. This therapeutic approach also could increase treatment satisfaction, improve sleep quality, daily activities and ultimately quality of life in patients with asthma. Therefore, WTC can be considered a promising complementary and therapeutic modality in patients who are suffering from asthma.

Author contributions

Abbas Joushan: Conceptualization, Methodology, Investigation, Data curation, writing original draft. **Hamid Reza Hatami**: Conceptualization, editing original draft, Resources. **Khosrow Agin**: Conceptualization, Methodology, Resources, Supervision. **Hoorieh Mohammadi Kenari**: Supervision, Methodology, editing original draft, Resources. **Sajjad Sadeghi:** Methodology, Conceptualization, editing original draft. **Rasool Choopani**: Conceptualization, Data curation, Validation, editing original draft, Supervision, Project administration.

Conflict of interest

The authors declare that they have no conflict of interest.

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Ethical statement

The protocols of this study were approved by the ethics committee of Shahid Beheshti University of Medical Sciences (IR.SBMU.RETECH.REC.1399.351). Also, this study was registered in the Iranian Registry of Clinical Trials (IRCT), (IRCT20181110041600N1).

Data availability

The data will be made available by the corresponding author upon reasonable request.

Abbreviations

WCT, Wet cupping therapy; ACT, asthma control test questionnaire; MTTS, mean total treatment score; IRCT, Iranian Registry of Clinical Trials.

References

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