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The Comparative Effects of Cupping Massage and Exercise Training in Patients with Trapezius Myofascial Syndrome on Pain, Disability, and Fatigue. A Randomized Controlled Trial

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SUMMARY

Background. Cupping therapy is one of the treatments for myofascial pain that has not been sufficiently studied. This study aimed to compare the effects of cupping massage and exercise training on pain, disability and Fatigue severity in patients with trapezius myofascial syndrome.

Patients and methods. Forty-four patients were randomly divided into two groups of cupping massage and conventional exercise training. The outcome measure included pain intensity, disability, and fatigue. The duration of intervention was 4 weeks (3 times a week) for both groups. The intervention included moving cup with negative pressure on the trapezius muscle for 5 minutes in each session in the cupping group and strengthening and stretching exercises for trapezius muscle in the exercise group. Questionnaires were completed and analyzed immediately after the last intervention session and three months later.

Results. Immediately after the intervention and three months later, in both groups, pain, disability and fatigue severity were significantly reduced (P value < 0.01). These changes were significantly greater in the cupping group than in the exercise group (P value < 0.01).

Conclusions. Massage cupping should be considered as a feasible, safe, fast, and effective method for patients with trapezius pain syndrome, also, can be combined with other rehabilitation programs in the treatment of myofascial pain and muscle strain.

KEY WORDS

Myofascial pain syndrome; cupping therapy; exercise training; disability; fatigue.

INTRODUCTION

Myofascial pain syndrome (MPS) characterized by nonspecific pain in muscles with both motor and sensory abnormalities due to presence of trigger points (1, 2). Trigger points are excitatory points in muscle bands that cause local tenderness and pain when pressed. They exist due to overload, prolonged repetitive and mechanical stress, are one of the most important causes of myofascial pain (3).

Mechanical stimulation such as snapping-palpation, pressure, or needle insertion can elicit a local twitch response and non-dermatomal, non-myotomal referred pain (4). Trigger points activate dorsal horn neurons through sustained nociceptive input, resulting in neuronal microstructural alterations (5).

Considering sedentary lifestyle and static postures during daily work and leisure tasks, such as using cellphone and

computer, myofascial pain syndrome is one of the most common musculoskeletal disorders that reduce the function and constitutes a considerable individual and socioeconomic burden (6, 7). MPS is reported to have a prevalence ranging from 30% to 93% (8).
The trapezius muscle is one of the most common place for trigger points, causing pain and functional problems, which is associated with carrying light loads and certain postures, such as working on a computer for long periods of time (9). The symptoms include aching sensation in the upper trapezius muscle, posterior neck and headaches and shoulder regions causing difficulty with sleeping due to shoulder pain. The symptoms can be increased with activity and relieved by rest.
In addition to pharmacological treatments, there are various non-pharmacological treatments for patients with myofascial pain, including electrotherapy, massage, cupping therapy, dry needling, acupuncture and trigger point injections to allow participation in an active exercise program such as postural correction and exercise therapy (10-12). Oral medications can have side effects or interactions with other drugs the patient may be taking. A systematic review of a limited number of trials indicates that combined stretching and strengthening exercise has positive small to moderate effects on pain intensity in MPS (13).
Cupping therapy is an old method that is used by creating negative pressure through heat or suction by cups (cups) that are placed on the skin (14). The mechanism of action of cupping therapy is not yet fully understood (15). However, the most important mechanisms proposed is the effects of negative pressure and mechanical pressure of cupping massage, by increase of peripheral blood circulation and immunity, alteration of skin biomechanical properties, increase of pain threshold, inhibition of neural activity, stimulation of local mechanoreceptors, pain gate control inputs, release of local endorphins and brain enkephalins, mechanical stretching of tissues, alters gel-like tissues to softer state, release of taut bands and enhanced energy flow, improvement of local anaerobic mechanism, decrease inflammation, and modulation of cellular immune system (2, 16-21).
According to the immune modulation theory, microscopic environmental changes in the skin cause the conversion of biological signals and activation of the neuroendocrine immune system (22). From the point of view of genetic theory, mechanical stress of the skin due to negative pressure and local anaerobic mechanism causes physiological and mechanical signals that activate or inhibit gene expression (23).
In recent years, the effect of cupping therapy has been studied on various diseases, including neck pain and Low back pain (24-31). In our country, cupping therapy is more traditional and little research has been done in this regard.
In cupping massage, combining the effects of both massage and cupping therapy can increase the effectiveness of treatment in myofascial pain. Therefore, the aim of this study was to evaluate the short-term and long-term effects of cupping massage on pain, disability, and fatigue in comparison with conventional exercise training in patients with myofascial pain of trapezius muscle.

MATERIALS AND METHODS

Study design

This study was a randomized controlled clinical trial with two parallel groups which performed in Shariati hospital in Tehran University of Medical Sciences (TUMS) from October 2020 to December 2021. The subjects were diagnosed and referred an attending physiatrist according to the inclusion and exclusion criteria. After description, the study goals, assessment and intervention, the patients signed the informed consent form and entered into the study. The subjects were randomly assigned into two groups using sealed envelopes: the massage cupping and the exercise therapy groups. The study protocol was approved by the ethics committee of TUMS (IR.TUMS.MEDICINE.REC.1398.177) and registered in the Iranian Registry of Clinical Trials Database (IRCT20180804040685N2).

Sample size

The sample size was calculated to be 20 in each group based on the mean difference and standard deviation of pain intensity (2.5 ± 3.5) in a similar study, when $\alpha = 0.05$ and $\beta = 0.2$. Considering 10% of missing cases, we designated 22 cases in each group.

Participants

Forty-four patients with trapezius myofascial pain participated in the study. The inclusion criteria consisted of an established clinical diagnosis of trapezius myofascial pain syndrome by a physical medicine and rehabilitation specialist, duration of at least 3 months, age range 30 to 55 years and pain intensity at least 3 (based on a numerical scale of 0 to 10). The exclusion criteria consisted of history of trauma, disc herniation, congenital deformity of the neck and shoulders, inflammatory and systemic diseases, mental disorders that need treatment, pregnancy, a history of surgery in the past month, and participation in another

treatment or exercise program during this study. **Figure 1** displays the flowchart of the study.

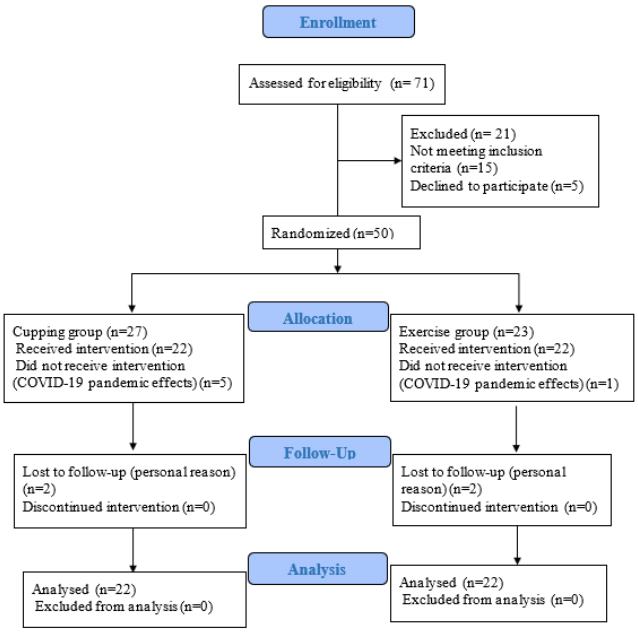

Figure 1. Flowchart of the study.

Initial evaluation

Before the intervention, demographic data and medical history, pain intensity (numerical scale 0 to 10), Dash Quick disability questionnaire (32) and Fatigue Severity Scale (Fatigue Severity Scale) (33) were completed by the patients. Dash Quick disability questionnaire consisted of 19 items with a 7-point Likert scale and the fatigue severity questionnaire consisted of 9 items with a 5-point Likert scale.

Intervention

Each group was treated for 4 weeks (three sessions per week). Both groups were the same in terms of drug treatment (Acetaminophen 500 mg). The cupping group was treated by a physiotherapist by applying negative pressure through a suction device and moving the cup with a diameter of 4 cm on the trapezius muscle. Patients were lying in prone position. Maintaining negative pressure, the cup was massaged from the occiput to the middle of the thoracic vertebrae along the upper trapezius muscle for 5 minutes using a lubricant gel. The patient was reminded that the massage site would be red and sensitive for several days. For the second group (control group), a conventional exercise therapy was performed. The exercises consisted of three strengthening exercises and five stretching exercises for the upper, middle and lower trapezius muscles. Each movement was performed 10 repetitions and 3 times a day. These exercises were taught face to face and by given an educational pamphlet to remind the patient at home and follow-up phone calls were also made to monitor their exercise program on a weekly basis during the study so that the physiotherapist confirmed the correctness of their exercise performance. The effectiveness of home-based exercise therapy was confirmed by previous studies (34).

Immediately after the last treatment session and three months later, all initial measurements were performed again for both groups.

Statistical analysis

Data were analyzed by IBM SPSS statistics 24 software with a significance level of $P < 0.05$. Shapiro-Wilk test was used to evaluate the normality of data distribution. Independent t-test was used to compare the data between the two groups and paired t-test was used to compare the data before and after the intervention in each group. If the data distribution was not normal, the Wilcoxon signed-rank test was used to compare the variables before and after the intervention in each group, and the Mann-Whitney test was used to compare the variables between the groups. The results were analyzed by an assessor blinded to the group allocation.

RESULTS

A total of 44 patients (mean age 42.73 ± 10.88) were admitted to the study after being diagnosed by a physician and examining the inclusion and exclusion criteria, and were divided into two groups of intervention (massage cupping therapy) and control (exercise therapy). Preliminary patient information is presented in **table I**. Prior to the intervention, there was no significant difference between the two groups in terms of age, body mass index, duration of illness, pain intensity, disability and fatigue severity. According to the COVID-19 pandemic effects 5 patients in cupping group and one patient in exercise group abandoned the study. There were no adverse effects for exercise group but most patients in cupping group felt some pain just the day after intervention and someone accompanied with ecchymosis at the site of the cupping technique. Almost all of these adverse effects were related to the first two weeks of treatment course.

The results of the present study showed a significant reduction of pain intensity, disability and fatigue severity immediately after the intervention and three months later in each group (**table II**). The between group comparison showed that there was a significant different between the two groups

Table I. Basic characteristics of the studied population.

Variables	Total (n = 44)	Cupping group (n = 22)	Exercise group (n = 22)	P Value
Male (%) Female (%)	9 (20.5) 35 (79.5)	5 (22.7) 17 (77.3)	4 (18.2) 18 (81.8)	0.71
Age (year)	42.73 ± 10.88	43.09 ± 10.6	42.36 ± 11.39	0.83
Body mass index (kg/m2)	26.84 ± 3.13	27.15 ± 2.99	26.53 ± 3.32	0.52
Duration of disease (month)	31.88 ± 25.22	28.64 ± 23.69	35.29 ± 26.88	0.31
Pain intensity (score)	6.55 ± 1.65	6.86 ± 1.67	6.23 ± 1.60	0.15
Disability (score)	39.75 ± 8.39	40.86 ± 5.67	38.64 ± 10.46	0.39
Fatigue severity (score)	39.32 ± 6.71	39.09 ± 7.12	39.55 ± 6.43	0.83

in terms of pain intensity, disability and fatigue severity, so that the pain intensity and disability reduced in the cupping group more than the exercise group. The reduction of the fatigue severity score in the cupping group was more than the exercise group immediately after the intervention and three months later but the difference was significant only after three months (**table III**).

DISCUSSION

This is the first study to evaluate the short-term and long-term effects of cupping massage on pain, disability, and fatigue in comparison with conventional exercise training in patients with myofascial pain of trapezius muscle.

The results of the present study showed that both cupping and exercise therapy were effective in reducing pain, disabil-

Table II. Intra-group comparison before and after the intervention.

Groups	Time	Pain intensity Mean ± SD	Disability Mean ± SD	Fatigue severity Mean ± SD
Cupping group (n = 22)	Pre-intervention	6.90 ± 1.70	41.24 ± 5.52	39.67 ± 6.76
	Post intervention	2.67 ± 1.46	27.57 ± 7.60	27.52 ± 8.21
	P Value	0.00	0.00	0.00
	3-months follow-up	2.12 ± 2.10	25.10 ± 7.05	24.52 ± 10.40
	P Value	0.00	0.00	0.00
Exercise group (n = 22)	Pre-intervention	6.15 ± 1.53	38.65 ± 8.76	39.15 ± 5.47
	Post intervention	3.95 ± 1.47	32.85 ± 7.36	34.45 ± 5.96
	P Value	0.00	0.00	0.00
	3-months follow-up	4.38 ± 2.27	31.62 ± 9.15	33.86 ± 9.98
	P Value	0.001	0.00	0.00

Table III. Between-group comparison of mean difference after the intervention.

Groups	Time	Pain intensity Mean ± SD	Disability Mean ± SD	Fatigue severity Mean ± SD
Post intervention	Cupping group	- 4.20 ± 1.87	- 13.67 ± 7.45	- 12.14 ± 5.82
	Exercise group	- 2.20 ± 0.83	- 5.80 ± 4.67	- 4.70 ± 3.71
	P. Value	0.00	0.04	0.07
3-months follow-up	Cupping group	- 4.67 ± 2.56	- 15.52 ± 8.51	- 14.33 ± 10.99
	Exercise group	- 1.90 ± 2.07	- 7.19 ± 5.93	- 5.57 ± 5.90
	P Value	0.001	0.001	0.04

ity, and fatigue severity in patients with trapezius strain in both short-term (immediately after treatment) and long-term (three months later). However, the effect of cupping therapy was greater than exercise therapy, so that immediately after treatment and three months later, a significant difference was observed between the two groups for pain intensity, disability, and fatigue.

It should be noted that a similar study in this regard has not been done before, but these findings were consistent with the results of the Saha (18) study, in which, the effect of five sessions of massage cupping on pain intensity, disability and quality of life of patients with non-specific chronic neck pain was investigated. However, the control group in that study had performed routine treatment, while in the present study, the effects of massage cupping were compared with exercise therapy and the results showed the superiority of massage cupping over the exercise therapy. The synergistic effects massage and cupping therapy for reducing pain and improving function in these patients can be related to increasing local blood circulation and reducing spasm and thus reducing the sensitivity caused by tissue ischemia (18, 19). Michalsen showed the effect of a cupping therapy session on the trapezius muscle in reducing the symptoms of carpal tunnel syndrome and improving neck pain in 52 patients. They used wet cupping technique on trapezius muscle using static mechanical suctioning. Pain intensity decreased (29). In a study by Lauche, the use of a cupping therapy session was effective for pain reduction in chronic nonspecific neck pain, compared to the control group, and the amount of pain reduction was clinically acceptable and comparable to other methods used in other studies such as dry cupping or massage (30).

In another study, the results of four randomized clinical trial studies were analyzed (31). The effect of one wet cupping session, 5 dry cupping sessions, pulsative cupping and cupping massage in patients with chronic nonspecific neck pain were compared to the control group. The pain intensity (VAS), disability (Neck Disability Index), and quality of life (SF-36) were measured before and after the intervention. Minimal clinically significant difference (MCID) and substantial clinical benefit (SCB) were also measured. MCID and SCB for pain relief were 21.3% and 66.8% respectively. MCID and SCB for disability were 9.8% and 29.8% and for quality of life were 20.5% and 43.1%, respectively. According to these results, the patient's perception of the usefulness of treatment in reducing pain is comparable to other common treatments, but in terms of disability and quality of life, this effect is not as great as other studies, which can be due to higher quality of life and lower disability score at onset of the Study (31).

A meta-analysis review study examined the effect of cupping therapy on neck pain (35). The results showed that this technique was effective in improving pain, disability, and quality of life compared to the control group. In this meta-analysis, the rate of pain reduction and disability compared to the control group without treatment was 2.42 and 4.34 units, respectively, but compared to the active control group, pain reduction was less than one unit and there was not a significant difference between groups for functional improvement. However, due to the low quality of the evaluated studies, for better and more accurate conclusions, more research is needed. In the present study, the reduction of pain and disability compared to the exercise therapy group was 2.04 and 7.87, respectively. Variation in the method of cupping technique may have played a role in the difference in effectiveness in the studies. However, the guidelines revealed a good level of evidence for therapeutic exercises in rehabilitation treatment (36, 37).

Several studies showed the influence of manual therapy on trapezius, neck, and shoulder myofascial pain reduction (38-40). An investigation showed that manual techniques on upper trapezius with latent trigger point improved the cervical range of motion and the pressure pain sensitivity and the effects persisted for one week after the intervention (41). A study by Alghadir *et al.* (42) showed that muscle energy technique plus ischemic compression technique is highly effective in dismissing myofascial trigger points pain within a very brief period of time, is cost effective, is noninvasive, and achieves relief without causing much pain. Massage and dry cupping as a manual technique are safe and effective treatment modalities for MPS. In the present study, the synergistic effects of the combined dry cupping and massage were evaluated and the results showed a significant improvement of pain, disability, and fatigue.

In this study, we aimed to investigate the role of massage cupping on treatment of a common and debilitating disease. The findings of our study revealed that this manual approach can be used as a practical method in MPSs, especially trapezius strain by reason of its safety, effectiveness, and less time and energy consumption. This method does less damage to the therapist joints because of using the negative pressure of the cup and the mechanical pressure of the cup itself, which makes it easier for the therapist to apply force. Therefore, it is applicable even by therapist with less strength to perform manual-therapy for the patients who need.

Limitations

This study had some limitations including short duration follow-up and use functional assessments to evaluate the functional effects of massage cupping technique in compression to exercise therapy.

CONCLUSIONS

According to our finding for improvement of pain, disability, and fatigue in patients with trapezius pain syndrome, massage cupping should be considered as a feasible, safe, fast, and effective method for patients with trapezius pain syndrome, also, this method could be combined with other rehabilitation programs in the treatment of myofascial pain and muscle strain. More studies need to confirm these results as well as the effectiveness of this method on improvement of the other conditions such as myofascial pain syndrome of different muscles or other musculoskeletal disorders.

ETHICS

This study was conducted with the approval of the Vice Chancellor for Research, TUMS. Informed consent form was received from all participants at the beginning of the study. Participants could withdraw the study at any stage when they did not want to continue without affecting their treatment process.

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CONFLICT OF INTERESTS

The authors declare that they have no conflict of interests.

REFERENCES

1. Simons D, Travel J, Simons L. Travell and Simon's Myofascial Pain and dysfunction: the trigger point manual. 2nd ed. Baltimore, MD: Williams and Wilkins; 1999.
2. Gerwin RD. Classification, epidemiology, and natural history of myofascial pain syndrome. Curr Pain Headache Rep 2001;5:412–20.
3. Travell JG, Simons DG. Apropos of all muscles. Myofascial pain and dysfunction. Baltimore: Williams and Wilkins; 1992.
4. Hong CZ. Pathophysiology of myofascial trigger point. J Formos Med Assoc 1996;95:93–104.
5. Cao H, Gao YJ, Ren WH, *et al*. Activation of extracellular signal-regulated kinase in the anterior cingulate cortex contributes to the induction and expression of affective pain. J Neurosci 2009;29:3307–21.
6. Mense S, Simons DG. Myofascial pain caused by trigger points. Muscle pain, understanding its nature, diagnosis, and treatment. Baltimore: Lippincott Williams & Wilkins; 2001.
7. Duyur Cakit B, Genç H, Altuntaş V, Erdem HR. Disability and related factors in patients with chronic cervical myofascial pain. Clin Rheumatol 2009;28(6):647–54.
8. Lisi AJ, Breuer P, Gallagher RM, *et al*. Deconstructing chronic low back pain in the older adult–step by step evidence and expert-based recommendations for evaluation and treatment: part II: myofascial pain. Pain Med 2015;16(7):1282–9.
9. Hong CZ, Simons DG. Pathophysiologic and electrophysiologic mechanisms of myofascial trigger points. Arch Phys Med Rehabil 1998;79:863–72.
10. Hou CR, Tsai LC, Cheng KF, *et al*. Immediate effects of various physical therapeutic modalities on cervical myofascial pain and trigger-point sensitivity. Arch Phys Med Rehabil 2002;83:1406–14.
11. Chi LM, Lin LM, Chen CL, *et al*. The Effectiveness of Cupping Therapy on Relieving Chronic Neck and Shoulder Pain: A Randomized Controlled Trial. Evid Based Complement Alternat Med 2016;2016:7358918.
12. Mata Diz JB, de Souza JR, Leopoldino AA, Oliveira VC. Exercise, especially combined stretching and strengthening exercise, reduces myofascial pain: a systematic review. J Physiother 2017;63(1):17–22.
13. Piyush M, Vividha D. Cupping therapy: a prudent remedy for a plethora of medical ailments. J Tradit Complement Med 2015;5.3:127e34.
14. Amjad F, Shahid HA, Batool S, Ahmad A, Ahmed I. A comparison on efficiency of transcutaneous electrical nerve stimulation and therapeutic ultrasound in treatment of myofascial trigger points. KMUJ: Khyber Med Univ J 2016;8(1):3–6.
15. Cao H, Li X, Liu J. An updated review of the efficacy of cupping therapy. PLoS One 2012;7(2):e31793.
16. Zeng K, Wang JW. Clinical application and research progress of cupping. J Acupunct Tuina Sci 2016;14(4):300e4.
17. Wei LI, Piao SA, Meng XW, Wei LH. Effects of cupping on blood flow under skin of back in healthy human. World J Acupunct Moxibustion 2013;23(3):50e2.
18. Saha FJ, Schumann S, Cramer H, *et al*. The effects of cupping massage in patients with chronic neck pain-a randomized controlled trial. Complement Med Res 2017;24(1):26e32.
19. Emerich M, Braeunig M, Clement HW, Lu¨dtke R, Huber R. Mode of action of cupping on local metabolism and pain thresholds in neck pain patients and healthy subjects. Complement Ther Med 2014;22(1):148e58.
20. Lin ML, Lin CW, Hsieh YH, *et al*. Evaluating the effectiveness of low level laser and cupping on low back pain by checking the plasma cortisol level. IEEE International Symposium on Bioelectronics and Bioinformatics (IEEE ISBB). Chung Li, Taiwan, 2014; p. 1e4.
21. Khalil AM, Al-Qaoud KM, Shaqqour HM. Investigation of selected immunocytogenetic effects of wet cupping in healthy men. Spatula DD 2013;3(2):51e7.

22. Guo Y, Chen B, Wang DQ, *et al*. Cupping regulates local immunomodulation to activate neural endocrine-immune work net. Complement Ther Clin Pract 2017;28:1e3.
23. Shaban T, Ravalia M. Genetic theory a suggested cupping therapy mechanism of action. F1000Res 2017;6. Available at: https://f1000research.com/slides/6-1684.
24. Ahmadi A, Schwebel DC, Rezaei M. The efficacy of wet-cupping in the treatment of tension and migraine headache. Am J Chinese Med 2008;36(1):37–44.
25. Cao H, Liu J, Lewith GT. Traditional Chinese medicine for treatment of fibromyalgia: a systematic review of randomized controlled trials. J Altern Complement Med 2010;16(4):397–409.
26. Farhadi K, Schwebel DC, Saeb M, Choubsaz M, Mohammadi R, Ahmadi A. The effectiveness of wet cupping for nonspecific low back pain in Iran: a randomized controlled trial. Complement Ther Med 2009;17(1):9–15.
27. Kim JI, Lee MS, Lee DH, Boddy K, Ernst E. Cupping for treating pain: a systematic review. Evid Based Complement Alternat Med 2011;2011:467014.
28. L¨udtke R, Albrecht U, Stange R, Uehleke B. Brachialgia paraesthetic a nocturna can be relieved by "wet cupping"—results of a randomized pilot study. Complement Ther Med 2006;14(4):247–53.
29. Michalsen A, Bock S, L¨udtke R, *et al*. Effects of traditional cupping therapy in patients with carpal tunnel syndrome: a randomized controlled trial. J Pain 2009;10(6):601–8.
30. Lauche R, Cramer H, Hohmann C, *et al*. The Effect of Traditional Cupping on Pain and Mechanical Thresholds in Patients with Chronic Nonspecific Neck Pain: A Randomized Controlled Pilot Study. Evid Based Complement Alternat Med 2012;2012:429718.
31. Lauche R, Langhorst J, Dobos GJ, Cramer H. Clinically meaningful differences in pain, disability and quality of life for chronic nonspecific neck pain - a reanalysis of 4 randomized controlled trials of cupping therapy. Complement Ther Med 2013;21(4):342-7.
32. Ebrahimzadeh MH, Moradi A, Vahedi E, Kachooei AR, Birjandinejad A. Validity and Reliability of the Persian Version of Shortened Disabilities of the Arm, Shoulder and Hand Questionnaire (QuickDASH). Int J Prev Med 2015;6:59.
33. Ziaeirad M, Ziaei GH, Mohammady M. The relation of fatigue severity with demographic and clinical features in patients with congestive heart failure. Midwifery Nurs Clin J 2016;6(3):72–81.
34. Granviken F, Vasselje O. Home exercises and supervised exercises are similarly effective for people with subacromial impingement: a randomized trial. J Physiother 2015;61(3):135-141.
35. Kim S, Lee SH, Kim MR, *et al*. Is cupping therapy effective in patients with neck pain? A systematic review and meta-analysis. BMJ Open 2018;8:e021070.
36. Diz JBM, Souza JRLM, Leopoldino AAO, Oliveira VC. Exercise, especially combined stretching and strengthening exercise, reduces myofascial pain: a systematic review. J Physiother 2017;63:17-22.
37. Cao QW, Peng BG, Wang L, *et al*. Expert consensus on the diagnosis and treatment of myofascial pain syndrome. World J Clin Cases 2021;9(9):2077-89.
38. Go S-UK, Lee BH. Effects of manual therapy on shoulder pain in office workers. J Phys Ther Sci 2016;28:2422–5.
39. Sharma V, Kalra SH, Pawaria S. Manual physical therapy in patients with myofascial pain in upper trapezius: A case series. Indian J Physiother Occup Ther 2016;10(4):67.
40. Oliveira-Campelo NM, de Melo CA, Alburquerque-Sendín F, Machado JP. Short- and medium-term effects of manual therapy on cervical active range of motion and pressure pain sensitivity in latent myofascial pain of the upper trapezius muscle: a randomized controlled trial. J Manipulative Physiol Ther 2013;36(5):300-9.
41. Alghadir AH, Iqbal A, Anwer Sh, Iqbal ZA, Ahmed H. Efficacy of combination therapies on neck pain and muscle tenderness in male patients with upper trapezius active myofascial trigger points. Biomed Res Int 2020;2020:9361405.