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RESEARCH ARTICLE

EFFECT OF WET CUPPING VERSUS MICROCURRENT ON OVERWEIGHT ELDERLY WITH NON-SPECIFIC LOW BACK PAIN

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ABSTRACT

Background: Worldwide attention for Non-specific low back pain is due to its growing negative impact either economic or reported physical dysfunction. Potential evidence regarding wet cupping therapy as an alternative therapy, and well-known micro currents for their therapeutic benefits on chronic non-specific low back pain. **Purpose:** To determine efficacy of wet cupping versus microcurrent on overweight elderly with non-specific low back pain. **Method:** Forty overweight elderly males' participants with non-specific low back pain from military rehabilitation center, Agouza, age range was 65-75 years old, body mass index range 25- 29.9 kg/ cm². They were randomly allocated into two equal groups; **Group I** received wet cupping therapy 1 session per week; and **Group II** received micro-current stimulation 3 sessions per week, from June 2022 to January 2023. Baseline evaluation involving sagittal lumbar mobility using baseline bubble inclinometer and pressure pain threshold using pressure algometer. Statistical analyses were conducted significance level was settled at 0.05 level. **Result:** insignificant differs revealed at baseline analysis. Both groups had revealed a significant increase in sagittal lumbar mobility, and pressure pain threshold, and quality of life scale values post treatment. *While, there were significant increase in group I compared with group II post treatment in term of sagittal lumbar extension, only.* **Conclusion:** Both microcurrent and wet cupping modalities is valuable with superiority for wet cupping in terms of lumbar sagittal extension therefore, could be recommended in overweight elderly with non-specific low back pain management.

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INTRODUCTION

Moderate evidence suggested the global burden of non-specific low back pain (NSLBP) as a disability leading cause with remarkable socioeconomic impacts, which consumed huge healthcare costs, particularly among overweight elders (1). Current estimated prevalence of NSLBP is remarkable widespread with a substantial proportion has been found to have extended clinical manifestations. Often reported NSLBP associated features involve sort of headache, visceral pain that even might be referred along lower extremities.

Such mentioned complains among overweight elders address regressive NSLBP course in compare with well-defined LBP (2). Recent identified evidence indicates that sedentary life style, restricted physical functioning and limited fitness almost reported among individuals with CNSLBP. (3). Almost overweight elder populations have a repeated complains recognized clinically in NSLBP as a medical diagnosis, which overload elders whom were overweighted with multiple comorbidities. The traditional algorism initiated with pharmacological medicines for overweight elderly' whom suffering from NSLBP, unless overloaded by numerous side effects, plus significant financial costs (4). Numerous complementary therapeutic modalities have been addressed i.e.,

acupuncture, dry needling, and wet cupping even reflexology since earlier centuries. Where, Kratzenstein has addressed as the 'electrotherapy father' so, in the same line Ancient Chinese, and Ancient Egyptian had reported cupping which recently has been classified into various techniques involving wet cupping under clear medical standards (5,6). As well, micro-current therapy benefits could be explained its due to stimuli for physiological response at cellular level including elevated ATP generation up to 500%. Also, microcurrent could enhance amino acid transport and protein synthesis those plus pain modulation (7). In addition, wet cupping has a potential benefit such as relieving pain and improving associated disabilities mainly among NSLBP sufferers of elder overweight individuals (8). Furthermore, superior micro-current therapy is capability to modulate pain (9). To available data, there is a research red era showing actual awareness among healthcare providers, whom focusing on minimizing complications and gaining as possible prognosis of non-specific low back pain (4). Therefore, current study was conducted to determine efficacy of wet cupping versus microcurrent on overweight elderly with non-specific low back pain that in line to minimize healthcare overload, also financial costs, as well provide physical therapists as healthcare team members with valuable conclusion assists them in clinical decision making.

MATERIAL AND METHODS

This study was designed as a Pre/ Posttreatment, randomized controlled study. Approval of the ethical committee of Faculty of Physical Therapy, Cairo University, Egypt (P.T.REC/012/003339), the procedures of the present study were discussed thoroughly and each participant has signed a written informed consent. Upon results of prior study and by using G*POWER statistical software (version 3.1.9.2; Franz Faul, University at Kiel, Germany). Current study sample size was calculated as a function of expected change in sagittal ROM 'flexion and extension' of lower back. In order to detect a mean difference of 20 milliseconds between both groups, so required sample size was 20 patients in each group under the assumption of a two-sided type I error of 5% and a power of 80%, effect size of 0.458.

Participants: Forty overweight participants suffering from NSLBP, were allocated randomly into two equal groups (twenty patient for each), with age range 65-75 years old, randomly recruited from military rehabilitation centre in Agouza, during the period of June 2022 to January 2023.

Group I: received wet cupping therapy 1 session per week for eight consecutive weeks.

Group II: received micro-current stimulation 3 sessions per week for eight consecutive weeks. Randomization were conducted using a computer-generated randomized table using SPSS program "version 25 for windows; SPSS Inc., Chicago, Illinois, USA". Each participant had one identification number that was used to assign participants into two equal groups in number (n=20), sequentially numbered index cards were secured in opaque envelopes.

Inclusion Criteria: Participants' age range 65-75 years old, body mass index range 25-29.9 kg/cm². Each participant main

complaints were persistent non-specific low back pain and held a written referral from specialist (Orthopedist, or Neurosurgeon).

Exclusion Criteria: All participants with specific low back pain including prolapsed intervertebral disc/s, spondylosis, spondylolisthesis, also whom were hemodynamically unstable or with serious cardiac diseases, diabetes mellitus or anemic populations, particularly whom with hemophilia were excluded from the study.

Instruments Assessment Instrument

Baseline Bubble Inclinometer: is a latex free pocket size that was used for objective sagittal lumbar mobility evaluation, through measuring angle and spinal articulations' incline in angles with great accuracy. It has high reliability and validity in measure lumbar sagittal mobility, and follow-up for determining effectiveness of therapeutic interventions (10).

Pressure Algometer: is an assessment tool, widely utilized for objective pressure pain threshold determination. It has been concluded as a valid and reliable outcome measure evaluator. It is a hand-held instrument that consists of a gauge attached to a hard rubber tip one centimeters in diameter. This gauge is calibrated in kg/cm² and ranges from 1 to 10 kg/cm² (11).

Therapeutic Instrument

Chattanooga electric stimulation: is a FDA-approved intellect movable unit for micro-current stimulator with four channels, manufactured by DJO, LLC. Addressed as a extraordinary versatility based on simple operating procedures with a logical control system and an easy to read graphical LCD.

Wet Cupping tools: Almost cupping tools package dimensions are a 10.4 X 8 X 3.5 inches, those were D&D- 5513 model, ASIN/ B00U7A0152, of twelve ounces. Hijama Box Arabic Health Vacuum

Evaluating Procedures

History taking: Detailed medical history was taken from each participant at the baseline of current study then recorded.

Specific outcome measures

Lumbar range of motion measurement: Lumbar sagittal mobility involving flexion/extension was measured using inclinometer, each patient was subjected to measurement while wearing a comfortable clothe. Two inclinometers were employed simultaneously for recording sagittal lumbar mobility. One inclinometer was placed at the top of the measured spine segment and other at the lower spine location. The measurement value of the lower spine was subtracted from upper spine value. This result was known as the "true angle". (12)

Pain threshold measurement: for each patient using pressure algometer to indicate the pain threshold suffering from (13).

Therapeutic procedures

Wet cupping treatment (Group I only): Adequate counselling for each participant regarding procedures then relaxed in prone over sterilized bed with uncovered lower back, after that disinfected. Primary suctioning with one cup for five minutes (at one site then conducted at predetermined six cupping sites; started at last dorsal vertebra and ends at sacroiliac joint bilateral according to Shaban, (14) then suction and bloodletting for five minutes. (15) After removal of wet cups, the fifth step was dressing area after disinfecting using an antiseptic cream then rechecked the participant post treatment and rechecked after around thirty minutes before participant was asked leaved.

Microcurrent electrical stimulation (Group II only): Initially, therapeutic program explained then ask participant to relax in prone, and examined for any wounds then cleaned lower back. Then applied stimulating electrodes bilaterally at BL23, BL24 and BL25 points (9), with securely and ensured good contact, checked regularly along the session extended for preadjusted twenty minutes. Participants had been re-examined.

Statistical Analysis: SPSS version 25 was used to conduct analysis, where descriptive statistics was calculated mean, standard deviation (SD) per each group. Inferential statistical analysis using paired T- test to compare pre and post-test reported values and to compare between both groups. The association between outcome measures was analyzed using Spearman correlation coefficient. The level of significance was settled at 0.05 (16).

RESULTS

Participants characteristics No significant differences regarding age, weight height and BMI as t values were -1.453, -0.923, 0.839 and -1.39 and P-values were 0.163, 0.368, 0.412 and 0.181, respectively, table (1).

Table (1). Participants` characteristics

Measured variable	Group I Mean ±SD	Group II Mean ±SD	t-value	p-value
Age (years)	70.1±3.06	70.7±2.97	-1.453	0.163
Weight (kg)	70.7±2.98	71.18±2.34	-0.932	0.368
Height (cm)	160.4±3.23	160.1±3.19	0.839	0.412
BMI (kg/m ²)	27.63±1.06	27.91±1.06	-1.39	0.181

Effect of treatment on Lumbar Sagittal mobility and Pressure Pain Threshold: a significant interaction effect of treatment and time (P 0.001). There was a significant main effect time (P 0.001). There was a significant main effect of treatment (P 0.004).

Effect of treatment on Lumbar Sagittal mobility

Within group comparison: A significant increase in lumbar mobility of both groups post treatment compared with pretreatment (P 0.001) with mean differences were -10.3°, -8.75°, -9.45° and -5.1°, respectively.

Between groups` comparison: No significant differences in lumbar ROM “flexion-extension” between both groups

pretreatment (P 0.205 and 0.02, respectively). However, there were significant differences of group I compared with that of group II post treatment in extension (0.01 and 0.001 respectively), table (2).

Effect of treatment on Pressure Pain Threshold table (2).

Within group comparison: A significant increase in pressure pain threshold (PPT) values of both groups post treatment compared with pretreatment (P 0.001) with mean differences were -3 and -2.99, respectively.

Between groups` comparison: No significant difference in pressure pain threshold of group I compared with that of group II either pre nor post treatment (P 0.93 and 0.59), respectively.

Effect of treatment on quality of life (SF-36): table (2).

Within group comparison: A significant increase in SF-36 values of both groups post treatment compared with pretreatment (P 0.001) with mean differences were -20.1, and -20.65, respectively.

Between groups` comparison: No significant differences in SF-36 between both groups pretreatment (P 0.05 and 0.042, respectively). However, there were significant differences of group I compared with that of group II post treatment (0.053 and 0.042, respectively), table (2).

Table (2): Mean differs in outcome measures

Lumbar ROM		Pre treatment	Post treatment	MD	P-value
		$\bar{X} \pm SD$	$\bar{X} \pm SD$		
Group I	Flexion	33.6° ± 3.14°	43.9° ± 3.81°	-10.3°	0.001
	Extension	14.85° ± 3.19°	23.6° ± 2.89°	-8.75°	
	PPT	0.89 ± 0.39	3.89 ± 0.38	-3	
	SF-36	48.65 ± 8.27	68.75 ± 3.19	-20.1	
Group II	Flexion	32.65° ± 2.08°	42.1° ± 2.1°	-9.45°	
	Extension	13.1° ± 1.68°	18.2° ± 1.47°	-5.1°	
	PPT	0.85 ± 0.33	3.84 ± 0.31	-2.99	
	SF-36	47.6 ± 4.17	68.25 ± 4.42	-20.65	
MD	Flexion	0.95° ± 3.24°	1.8° ± 2.8°		
	Extension	1.75° ± 2.73°	5.4° ± 2.52°		
	PPT	0.04 ± 0.06	0.05 ± 0.07		
	SF-36	1.05 ± 6.49	0.5 ± 4.09		
P-value	Flexion	0.205	0.02		
	Extension	0.01	0.001		
	PPT	0.93	0.59		
	SF-36	0.053	0.042		

DISCUSSION

Clinical features of NSLBP include wide range of specific complains, unless almost ensure NSLBP negative socioeconomic impacts i.e., with unequivocal structural etiologies, as confirmed by Frenken et al. (17) practical algorithm for management of chronic NSLBP focuses on specialization of the rehabilitation course, plus kinesiological basis (18). Moreover, many academic and clinicians ensured actual need to control of shear-strain transmission in lumbodorsal fascia in whom suffering from chronic NSLBP, particularly among overweight or obese, as well among whom have comorbidities lead to accelerate inflammatory response (17). Our results revealed the treatment effect on sagittal lumbar mobility among group I has stated that pretreatment means ± SD value were 33.6° ± 3.14°; 14.85° ± 3.19°, also post treatment were 43.9° ± 3.81°; 23.6° ± 2.89°, respectively; with

mean difference were -10.3° and -8.75° , respectively with a significant increase in lumbar (P 0.001). While, among group II has stated that mean \pm SD value pretreatment were $32.65^\circ \pm 2.08^\circ$; $13.1^\circ \pm 1.68^\circ$ and post treatment was $42.1^\circ \pm 2.1^\circ$; $18.2^\circ \pm 1.47^\circ$, respectively with difference were -9.45° and -5.1° , respectively. Thus, a significant increase (P 0.001). In addition, significant differences in sagittal lumbar mobility of group I compared with group II posttreatment (P 0.02 and 0.001, respectively). Present study findings were agreed with current physical therapy guidelines ensured noninvasive management for chronic NSLBP, focusing on pain along with conventional physical modalities for improving lumbar sagittal flexion among whom have no specific pathological etiologies for low back pain (19). Hyun-Gun et al. stated a significant improvement in sagittal lumbar flexibility which agreed with current study findings (20). On the other hand, prior clinical trial conducted by Ebadi et al. had ensured limited therapeutic gains in overall sagittal lumbar mobility 59.8 ± 17.9 for flexion and 24.1 ± 9.3 for extension those indicate no favor according to their conclusion for any of traditional physical modalities i.e., ultrasound therapy (21). Recent clinical trial by Durmus et al. has reported tiny improvements only in lumbar sagittal flexion unless Durmus and his colleagues had used "Schober method in centimeters- posttreatment" (22). Where, unambiguous points relating to chronic NSLBP were determined based on earlier concluded therapeutic acupuncture benefits. As well, kinesio taping was advised for NSLBP management, as a supporting for not only sensorimotor, but also a proprioceptive interaction (23, 24).

As well, traditional approaches are therapeutic methods that conceptually combines psychoemotional and structural balance. Several clinical trials had reported that restricted pelvic rotation reported no difference in lumbar extensor force-output between individuals with or without NSLBP (25,26). Clinical guidelines for NSLBP management in primary care advise applying microcurrent stimulation on percutaneous neural tissues with specific parameters; $60 \mu\text{A}$ intensity and a pulsation frequency of 3 pps along 15 minutes for each session, which shown a significant difference in sagittal lumbar flexion extends along couple of days, later (27). Earlier published article by Manepaa et al. had reported that microcurrent therapy relieves myocontracture and could enhance conventional rehabilitation programs for children with cerebral palsy (28), where Cho et al. had advised microcurrent stimulation for 15 minutes per session based on revealed therapeutic effects for sagittal lumbar mobility along one month later ($p < 0.05$), (29). Recently, Kwon et al. had revealed superiority of microcurrent therapy for gaining elbow mobility improvements among fifteen participants with acute lateral epicondylitis ($p < 0.01$), and that was explained based on stimulating specific proteins over particular receptor through opening Na^+ and Ca^{2+} pathways at cellular membranes thus activates cellular proliferation i.e., chondrocytes, fibroblasts and vascular endothelial cells, so accelerates differentiating and migrating at cellular level, which enhances functional improvement (30). Current result findings regarding pressure pain threshold among group I has stated that pretreatment value of pressure pain threshold pretreatment was 3.89 ± 0.38 and post treatment was 0.89 ± 0.39 , where the mean difference between pre and post treatment was -3 . Thus, a significant increase in pressure pain threshold of group I post treatment compared with pretreatment ($p.001$).

While, among group II has stated pressure pain threshold pretreatment was 3.84 ± 0.31 and that post treatment was 0.85 ± 0.33 , where mean difference between pre and post treatment was -2.99 . Thus, a significant decrease in pressure pain threshold of group II post treatment compared with pretreatment ($p 0.001$). Furthermore, the mean difference in pressure pain threshold between groups pretreatment was 0.06 ± 0.31 . Thus, no significant difference in the pressure pain threshold between both groups' pretreatment ($p 0.93$), while mean difference in pressure pain threshold between groups post treatment was 0.05 ± 0.37 . Thus, no significant difference in the pressure pain threshold of group I compared with that of group II post treatment ($p 0.59$).

Could explain current study findings those agreed with recent recommendation regarding microcurrent therapy as a novel single modality contributing most consistent improvements in patient-reported pain relief with immediate overall improvements in patient pain levels that could extended for couple of days among whom with chronic mechanical neck pain (31). Present study findings disagreed with previous trial that recommended active microcurrent therapy with peak intensity $50 \mu\text{A}$ vs. $500 \mu\text{A}$ that gained additional decreased worst pain from baseline for overweight elders with acute knee pain, especially at third week (32) Alshehri et al. had offered a valuable explanation regarding analgesic benefits for particular acupuncture points activation either via microcurrent stimulation, (20) or wet cupping approaches (33), that physiologically depends on regulating autonomic nervous system, activating beta-endorphins release, modulating central nervous system thus could gain localized therapeutic benefits particularly along peripheries. Therefore, electro-acupuncture has been advised as an adjunctive pain modulator for decades using microcurrent "applied microamp or millionth of amp (10–6 amperes) range; weak DCs ($80 \mu\text{A}$ to $<1 \text{mA}$)" over specific points in a noninvasively.

In addition, current study findings agreed with many conclusions stated an extended pain relief in response to microcurrent therapy considering as a particular future research era (34,35). According to current compelling evidence, nerve growth factor (NGF) that gained via localized inflamed tissues, elevates hyperalgesia (pain sensitivity), also a mediator for managing chronic painful cases (36) thus contributed to peripheral neural structures sensitization through stimulating pro-inflammatory cytokines those central release peptides and contributes in pain central sensitization along spinal dorsal horn. Therefore, such mechanism classified for particular role for either central and/ or peripheral pain components (18). On disagreement for our findings, prior clinical trials recommended microcurrent to achieve a 3.8-fold in average regarding pain intensity modulation along five up to six weeks (37). Wet-cupping could be an adequate modality for modulating persistent NSLBP alone along first month with respect for follow-up visits. The therapeutic effects of wet-cupping could be longer lasting than conventional therapy even the functional outcomes of wet-cupping at the third up to six month follow up were significantly increased compared to the conventional approaches (38). Another conflicting opinion is based on that specific multidisciplinary treatment for non-specific low back pain is aimed at directly challenging the catastrophic misinterpretations of pain and various expectations about the relationship between physical activities

and pain and/or back injury. The treatment is designed to create harm expectation violations by exposing patients to movements or activities that they consider harmful or that they predicted to increase pain (35). However, the effects of these treatments on disability levels were no different than a graded activity approach (31). Finally, regarding the participants' effect of treatment on Sagittal lumbar mobility and pressure pain threshold outcome measures have revealed a significant interaction effect of treatment and time (p 0.001).

There was a significant main effect time (p 0.001). There was a significant main effect of treatment (p 0.004). Clinically, chronic NSLBP is not a medical emergency, also required a risk stratification approach at low risk receive less- intensive multimodal combination therapies. Thus, non-specific low back pain is a vast term that contains various aspects in which core strengthening plays a major role (39). As well, various combination of therapeutic various exercise protocols, mobilizing and manipulative approaches, also lumbopelvic stabilization exercise were reported as a beneficial modality in reducing pain and disability in NSLBP (40). Plus, Opioids are not recommended for treating chronic low back pain, because the associated obvious side effects and demonstrate no greater effectiveness than NSAIDs (41).

Wet cupping therapy could be an effective treatment either alone or as a combination therapy. Evidence mapping can facilitate the transfer of knowledge from researchers to policymakers and promote research on musculoskeletal pain i.e., lower back, neck pain and knee osteoarthritis (35). Traditional wet-cupping care delivered in a primary care setting was safe and acceptable to patients with nonspecific low back pain. Wet-cupping care was significantly more effective in reducing bodily pain than usual care at 3- month follow-up (34). In disagreement with current study findings, numerous evaluated structured exercise protocols and spinal manipulative therapy were stated to offer equal benefit in the management of pain and function in chronic NSLBP (42). Furthermore, very low to moderate-certainty evidence that individualized (especially motor-control based treatments) exercise is effective for treatment of chronic non- specific low back pain (43). As a conflicting opinion to current study findings, wet cupping is potentially safe and effective in reducing pain and improving disability associated with persistent NSLBP at least for two weeks after the end of the wetcupping period (44,45).

On the other hand, recent published trial was conducted by Al-Eidi et al. had ensured that no superiority of either wet cupping or even traditional Hijamah techniques thus and they had concluded a longer follow-up period and more than one cupping session may be needed to evaluate their effectiveness (32). Evidence was of poor to moderate grade and most of it pertained to chronic nonspecific pain, making it difficult to draw more definitive conclusions regarding benefits and harms of various approaches of alternative modalities such as cupping (46). The clinical guidelines assert that the chronic NSLBP population is heterogenous. Current study findings regarding management of NSLBP populations revealed better response to complementary wet cupping than microcurrent mainly on flexibility "lumbar flexion-extension outcome measure", although NSLBP individuals represented significant benefits for applied conservative management.

Such gained benefits orient physical therapists to conduct wet cupping for management overweight elderly suffering from non-specific low back pain.

CONCLUSION

Based on current study revealed results and we could conclude that both microcurrent electrical stimulation and wet cupping are valuable for managing overweight elder populations suffering from chronic NSLBP, with superiority for wet cupping in terms of lumbar sagittal ROM so, it can be considered as an alternative as well as, adjacent method for treating non-specific low back pain in overweight elderly.

Limitation of this study: The limited sample population and focusing on non-specific low back pain among overweight elder individuals result might not apply to younger individuals. Moreover, current study populations were varied, since it comprised people with various diagnosis, thus it might have distinct effects on study populations' prognosis. Also, lack of a direct follow-up is a serious deficiency.

Conflict of interest: The authors confirmed that this article content has no conflict of interest.

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