

■ **Basic Research**

Effect of Wet Cupping Therapy on Low Back Pain Severity and Functional Ability among Community Dwelling Older Adults

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Abstract

Low back pain (LBP) is a common symptom among older adults and a major cause of functional disability due to its high prevalence and persistence. Pain-related disability affects functional and psychosocial status which leads to poor quality of life of the older adults. Cupping therapy has become common approach used for management of LBP which has several advantages; as it is simple, cost effective, and safe method with low side effects than other current therapeutics. **Objective:** to determine the effect of wet cupping therapy on low back pain severity and functional ability among community dwelling older adults. **Design:** A quasi-experimental research design was used in this study. **Setting:** the orthopedic outpatient clinic of Damanhour National Medical Institute, El-Behaira Governorate, Egypt. **Subjects:** The study subjects comprised fifty (50) older adults with LBP divided randomly into two matched groups of 25 subjects. **Tools:** three tools were used for data collection: 1) Socio-demographic characteristics and Clinical Data of the Community Dwelling Older Adults with LBP Structured Interview schedule, 2) Iowa Pain Thermometer (IPT), 3) Modified Oswestry Low Back Pain Disability Questionnaire. **Results:** the wet cupping group had a highly statistical significant reduction in pain severity ($P= 0.008$) and significant improvement in functional ability ($P= 0.001$) post cupping therapy compared to pre cupping therapy with a statistically significant difference between the wet cupping and control groups. **Conclusion:** wet cupping therapy had affected positively the severity of LBP and functional ability among older adults in the cupping group. **Recommendations:** Coordination with different health care settings and health care team members to facilitate integration of wet cupping therapy in care of older adults with LBP as an effective treatment method.

Key words: wet cupping therapy, Low back pain severity, functional ability, community dwelling older adults.

Introduction:

Low Back Pain (LBP) is one of the most prevalent musculoskeletal problems affecting older adults. Its prevalence ranged from 21% to 75% worldwide and older adults represented the highest prevalence compared to younger adults ^(1,2). A recent systemic review revealed that 21% to 68% of community dwelling older adults had LBP ⁽³⁾. In USA, LBP affected more than 25 million elders and it was the second common cause of their disabilities ⁽⁴⁾. In Egypt, Alexandria, the incidence of LBP among geriatric patients was estimated to be about 66% ⁽⁵⁾. In Egypt, Ismailia, it is reported that LBP was prevalent among 48% of older adults ⁽⁶⁾. LBP is defined as a feeling of pain or discomfort in the region of the back from the lower margin of the 12th rib to the lower gluteal folds with or without pain radiated into lower limbs that lasts for at least one day and its severity ranges from mild to very severe ⁽⁷⁾.

Age related changes in lumbar spine and supporting structures explain such higher prevalence of LBP among older adults. These changes include decreased bone density, reduced strength and elasticity of spinal muscles and ligaments, narrowing of spinal canal, postural changes, and other degenerative changes due to wear and tear process. Common risk factors for LBP in older adults are unhealthy nutrition, lack of exercise, incorrect use of body mechanics, obesity, and smoking. Furthermore, other medical conditions that can aggravate LBP among elderly include spinal diseases and other non-spinal disorders such as hypertension, diabetes mellitus, respiratory diseases, and musculoskeletal conditions ⁽³⁾.

LBP is a persistent and disabling condition that has a burden on older adults, families, societies, and health care systems. It impairs their functional abilities, prevents an active life style, and often results in severe physical disability and loss of independence ^(1,8). Moreover, LBP limits social and recreational activities and is associated with anxiety, depression, insomnia, poor mental health, and severe physiological as well as psychosocial deterioration ⁽⁹⁾. Two studies in Egypt demonstrated that LBP severity is strongly correlated with increased risk for falling, depression, and functional disability among community dwelling older adults ^(5,10).

Management of LBP in older adults can be a challenging; evidence shows that medications have limited or no effect on pain. Furthermore, age-related changes in drug pharmacokinetics and pharmacodynamics combined with multiple comorbidities and polypharmacy in older adults can lead to greater risk for adverse drug reactions and

toxicity which negatively impacts the elders' health and wellbeing. This in turn increases health care burden and costs⁽¹¹⁾. Therefore, the World Health Organization (WHO) reported that nondrug and nonsurgical care is the preferred approach for the management of LBP and recommended advocating complementary alternative therapies⁽¹²⁾.

Cupping therapy is one of the recommended complementary therapies for managing LBP. It leads to increase of cerebral endogenous opioid production which induces comfort and relaxation and ultimately enhances pain management. Also, cupping therapy improves blood circulation and removes toxins and wastes from the body. This could be done by improving microcirculation, maintaining capillary endothelial cell repair, and stimulating angiogenesis in the local tissues, all of which would decrease pain severity and improve the patient's functional status⁽¹³⁾.

Cupping therapy is classified in to two main types; wet and dry, however wet cupping therapy is widely used in Middle Eastern countries including Egypt in which a glass, plastic or silicon cups are heated producing a vacuum effect, then applied to specific points of the skin. Small skin incision or scratching is done so that toxic blood is drawn in to the cup to get rid of it^(14, 15).

The exact mechanism of the cupping therapy isn't fully understood but several theories have been postulated. One theory suggested that cupping therapy stimulates release of neurotransmitters and opioid- like substances which induce pain relief. Another suggestion is that applying suction force to acupoints is possible to control how energy functions, which will subsequently improve LBP symptoms⁽¹⁶⁾. The acupoints BL23, BL24, and BL25 are most frequently used in cupping therapy to treat LBP and additional points (GV4, BL30, BL40, and BL58) should be included as these points are acupoints that are related to LBP and strengthening the lower back region. It is also recommended that cupping therapy should involve the HT3 and ST36 points which are associated with the heart and stomach meridians because they have an impact on symptoms of depression, insomnia, and anxiety while also improve the painful symptoms and functional status^(14, 17).

In China, about 60 % of LBP recurrence is due to increased pain severity and functional disability. Therefore, it is essential to identify older adults with LBP and help them to control their pain and improve their functional status⁽³⁾. This is consistent with health goal of the international Sustainable Development Goals 2030 (SDGs) and the Egyptian Sustainable Development Strategy (Egypt Vision 2030) which focus on ensuring healthy lives and promoting wellbeing for all at all ages through early interventions and

preventive care ⁽¹⁸⁾. In this context, the gerontological nurse has an integral role toward older adults with LBP. He/or she is responsible for assessing patient's pain and providing effective interventions. This helps patients to maintain physical and psychological wellbeing, restore their lost functional abilities, and prevent long term disability. It is also necessary for the gerontological nurse to assist the physiotherapists during cupping sessions and provide education for older adults about cupping therapy including action, benefits, and necessary precautions or preparation before, during, as well as after the cupping sessions ⁽¹⁹⁾.

Aim of study:

This study aims to determine the effect of wet cupping therapy on low back pain severity and functional ability among community dwelling older adults.

Research hypothesis:

Community dwelling older adults who receive wet cupping therapy exhibit lower low back pain severity and higher functional ability than those who do not receive it.

Materials and Method:

Materials

Design: A quasi-experimental research design was used in this study.

Setting: This study was conducted in the orthopedic outpatient clinic which affiliated to the Damanhour National Medical Institute, El-Beheira Governorate, Egypt. The working hours of this clinic is from 8.30 am to 12 MD all days per week except Friday. The estimated number of older adults suffering from LBP and attending this clinic ranged from 3 to 4 older adults every day.

Subjects: The study subjects included fifty (50) older adults with LBP from the previously mentioned setting during the data collection period and fulfilling the following criteria; aged 60 years and above, suffer from LBP, able to communicate effectively, and accept to participate in this study. The exclusion criteria included older adults who had spinal stenosis, prolapsed disc, history of back surgery, severe neurological diseases such as stroke or Parkinson disease, severe cardiopulmonary disease, sciatica pain of equal or greater severity than back pain, open wounds, allergic skin conditions, traumatic injuries, bleeding disorder, circulatory problems, and those who undergone previous cupping therapy. The study subjects were divided equally into two matched groups; of 25 older adults with LBP.

Group 1: Wet cupping group received the proposed cupping therapy.

Group 2: Control group received the routine care.

The Epi info V 7.0 program was used to estimate the sample size based on the following parameters: Population size: 84, Expected frequency: 50%, Acceptable error: 10%, Confidence coefficient: 95%. A minimum sample size of 42 older adults was revealed by this program. However, this study was conducted on a sample size of 50 older adults to improve validity of the study results.

Tools: three tools were used to collect the necessary data for the study.

Tool (I): "Socio-demographic characteristics and Clinical Data of the Community Dwelling Older Adults with LBP Structured Interview schedule"

This tool was developed by the researchers based on thorough systemic review of the relevant literature and consists of two parts:

Part 1: Socio-demographic characteristics of older adults such as age, sex, marital status, level of education, and occupation before retirement.

Part 2: Clinical data of older adults which included general health problems, medications used, and Body Mass Index (BMI). In addition to assessment of LBP including onset, site, duration, radiation, quality of pain, pattern, aggravating and alleviating factors.

Tool (II): "Iowa Pain Thermometer (IPT) "

This scale was developed by **Herr et al. (2007)** to assess pain severity. The IPT looks like a thermometer filled with color that gradually progresses from white to red. There are also numerical response options range from zero to 10 where zero (0) indicates no pain and ten (10) indicates the most severe pain with 5 categories describing pain severity (no, mild, moderate, severe, and most severe). The older adult is asked to select the point which represents his/ her pain severity⁽²⁰⁾. The IPT is judged to be the most preferred scale for assessing pain severity among older adults⁽²¹⁾.

The total score of the IPT is 10 and classified as follows:-

- 0 indicates no Pain
- 1 to 3 indicates mild Pain
- 4 to 6 indicates moderate Pain
- 7 to 9 indicates severe Pain
- 10 indicates the most severe pain (imaginable)

Tool (III): "Modified Oswestry Low Back Pain Disability Questionnaire"

The Modified Oswestry Low Back Pain Disability Questionnaire (also known as the Oswestry Disability Index) was developed by **Fairbank and Pynsent (2000)** to measure functional ability in patients with LBP. It includes 10 functional subscales that can be affected by LBP including pain severity, personal care, lifting, walking, sitting, standing, sleeping, social life, travelling, and employment or homemaking. Each subscale contains 6 statements that are scored from 0 (minimum difficulty) to 5 (maximum difficulty)⁽²²⁾. This scale is considered the gold standard for assessing LBP functional outcome in older adults⁽²³⁾. The higher the score on this scale, the greater level of disability. The total score of the scale is 50 and classified as:-

- 0-4 indicates no disability
- 5 to 14 indicates mild disability
- 15 to 24 indicates moderate disability
- 25 to 34 indicates severe disability
- 35 to 50 indicates completely disabled

Method:**I-Preparation phase:**

1. The researchers received a training course by an expert in cupping therapy from the Faculty of Physical Education for boys, Alexandria University. The training was completed in 6 days five hours a day with a total of 30 hours. It included two parts, theoretical part and practical part. The theoretical part included definition, importance, uses, contraindications, and theories of cupping therapy. The practical training included the proper selection of cupping points, the technique of cupping therapy, precautions that should be used before, during and after applying cupping therapy, duration of each cupping point as well as the duration needed for each cupping therapy session. At the end of this course, the researchers had taken a certificate of completion.
2. An official letter was issued from the Faculty of Nursing, Damanhour University and forwarded to the director of the study setting of Damanhur National Medical Institute at El-Behaira Governorate to obtain the approval to carry out the study after informing him about the purpose of the study, the date and the time of data collection.
3. Tool I was developed by the researchers based on a thorough review of relevant literature.

4. Tools II and III were translated into Arabic language by the researchers.
5. Tool I, II and III were tested for content validity by five experts in the related fields (Medical Surgical Nursing and Gerontological Nursing).
6. Reliability of Tool II and tool III were tested using Cronbach's alpha. The results of reliability for tool II was $r= 0.72$, and tool III was $r= 0.87$.
7. A pilot study was carried out on 5 older adults with LBP selected from the study setting to assess the applicability, clarity and feasibility of the study tools; they were excluded from the study sample. The necessary modifications were done accordingly.
8. The researchers used to visit the orthopedic outpatient clinic every day to identify subjects who fulfill the inclusion criteria; they were assigned randomly until a total number of 50 subjects were selected (25 for the cupping group and 25 for the control group).
9. Before starting the first session, participants from both cupping and control groups were interviewed individually in order to explain the purpose of the study then an informed written consent was obtained to participate in the study. The researcher assessed each study subject baseline data (socio-demographic and clinical data, pain severity, and functional ability) using tools I, II, and III.
10. The researcher conducted the assessment in the orthopedic outpatient clinic within 24 hours before the first session. Also, the address and telephone number was taken from each study subject. As well, an appointment from the cupping group subjects was taken for performing sessions at their homes and they were informed about required preparation for the session.

II-Implementation phase:

1. The proposed cupping therapy was implemented at the patient's home once weekly for four consecutive weeks, each cupping session took from 20- 30 minutes.
2. Cupping therapy plan was conducted for the wet cupping group as follows:

A) Pre-intervention phase:

It includes preparation of the required equipment, environment, researchers, and older adults.

- a. **Preparation of the equipments:** the researchers prepared all supplies needed for the cupping sessions including suction cups, manual suction pump, olive oil, tissue papers, alcohol (70%), sphygmomanometer, stethoscope, adhesive strips, disposable gloves and surgical scalpel blade (size 15 to 21) .

- b. **Preparation of the environment:** the researchers maintained suitable home temperature and keep the elderly warm before and during each session to prevent sudden hypothermia.
- c. **The researchers preparation:**
1. The researchers washed hands and dried them well.
 2. The researchers warmed hands in the winter by rubbing them to prevent touching the patient's skin with cold hands.
 3. The researchers stand in front of the patient's back while conducting the cupping sessions.
- d. **Preparation of the older adults:**
1. The researchers explained the wet cupping procedure to each older adult and reassured the elderly that cupping therapy is safe with fewer side effects.
 2. Teaching the older adult precautions before the cupping sessions include instructions to fast from 3-4 hrs, drink plenty of water but stop 2hrs before session, take warm shower, and avoid strenuous physical activities or heavy work 24hrs before each session. In addition, teaching the older adult to wear comfortable loose cotton clothes, empty bladder and bowel, and shave the skin 4 hours before session when necessary.
 3. Older adult's blood pressure was measured using sphygmomanometer and stethoscope before and after each session.
 4. The researchers placed the older adult in prone position and ensured that he/she was comfortable in this position.
 5. The researchers instructed the older adult to keep quiet during the time of the session.
 6. The researchers disinfected the skin on selected cupping points with alcohol 70%.
 7. The suction force should be medium (not more than 300 to 500 milibar/three or four manual pumping) in order to avoid bruising as older adults usually have thin fragile skin with less elasticity due to collagen and elastin changes, low subcutaneous fat, and decline of general body composition.

B) Intervention phase:

- Cupping sessions were carried out by a certified expert who is specialized in cupping therapy with 20 years' experience with assistance of the other two researchers.
- Cupping points were selected depending on nature of the patient's pain and according to the WHO guidelines for cupping therapy.
- The cupping therapy sessions were conducted in the following four steps:

1. **The first step:** included primary suction during which the suction cups were placed on the selected sites and the therapist suck the air inside the cup by manual pump gently. Then, the cups were applied to the skin and left for 3 to 5 minutes.
2. **The second step:** include scarification or puncturing the skin; in which superficial incisions were done on the skin using a surgical scalpel blade.
3. **The third step:** includes suction and bloodletting in which the cups were applied again on the skin for 3 to 5 minutes as described above.
4. **The fourth step:** includes removal of the cups and dressing the area after cleaning and disinfecting it. Also, adhesive strips of suitable size were applied to the area for 48 hours.



Figure (1): wet cupping points for low back pain ⁽²⁴⁾.

C) Post intervention phase:

After completion of each cupping therapy session, the researchers taught the older adult post cupping therapy care including;

1. It is necessary to drink enough water, stay warm, and take adequate rest.
2. Teaching to avoid caffeine, sugary foods and drinks, and processed meats as these products may slowdown the body's ability to respond to cupping therapy. Also, older adult instructed to avoid hot showers, saunas, and strong air conditioning immediately following sessions.
3. Teaching about expected side effects of cupping therapy and how to control them such as fatigue, skin changes, and flu-like symptoms (e.g. headache or general body aches).
3. The researchers used to do follow up phone calls with each subject from the cupping group every week after each session to clarify any vague points and answer any

questions, ensure adherence with post cupping therapy, remember them with the appointment of the next session, maintain their motivation, and give positive feedback and reinforcement.

4. The control group received routine care for LBP in orthopedic outpatient clinic.

III-Evaluation phase:

After completion of the last cupping therapy session, the researchers evaluated the effect of the cupping therapy for older adults in the cupping group while evaluation of older adults in the control group was done after 4 weeks of pretest assessment by using the tools; II and III. The data collection started from the mid of July 2022 until the end of November 2022.

Ethical considerations:

Ethical approval was taken from the research ethics committee at faculty of Nursing, Damanhour University. After explanation of the study purpose an informed written consent was obtained from each study subject included in this study. Anonymity and privacy of the study subjects, confidentiality of the collected data were maintained. The subjects were informed about the right to withdraw at any time from the study.

Statistical analysis:

Data were fed to the computer and statistically analyzed using IBM SPSS software package version 26.0. (Armonk, NY: IBM Corp). Number and percent were used to represent qualitative data. The Shapiro-Wilk test was used to verify the normality of distribution. Quantitative data were described using range, mean, and standard deviation. Significance of the obtained results was judged at the 5% level. The tests used include; Chi-square test was used for categorical variables to compare between different groups, Monte Carlo correction was used for correction for chi-square when more than 20% of the cells have expected count less than 5, Marginal Homogeneity Test was used to analyze the significance between the different stages, Student t-test was used for normally distributed quantitative variables to compare between two studied groups, Mann Whitney test was used for abnormally distributed quantitative variables to compare between two studied groups, and Wilcoxon signed ranks test was used for abnormally distributed quantitative variables to compare between two periods.

Results:

Table (1) reveals the wet cupping and control groups ranged in age from 60 up to 88 years with a mean of 69.48 ± 6.89 years for those in the cupping group and 69.76 ± 6.47 years for those in the control group. 56% of the cupping group was female compared to 52% of

the control group. More than half of the cupping and control groups (52% and 56% respectively) were married. Regarding the age, sex and marital status, no statistical significant difference was noticed between the cupping and control groups ($P=0.651$, $P=0.777$ and $P=1.000$ respectively).

Concerning the level of education, the table reveals that 40% and 32% respectively of the cupping and control groups were illiterate. 56% of the cupping group and 64% of the control group lived in rural areas. According to living arrangement, 48% of the cupping group and 60% of the control group were living with their family or relatives. No statistical significant differences were found between the two groups regarding the level of education ($P=0.951$), residence ($P=0.564$) and living arrangement ($P=0.696$).

In relation to their economic status, inadequate income was reported by 64% of the cupping group and 72% of the control group. Pension was the main source of income reported by 44% of the cupping group and 52% of control group. Regarding the income and its source no statistical significant differences were noticed between the cupping and control groups ($P=0.544$, $P=0.855$ respectively).

Table (2) portrays the distribution of the cupping and control groups according to their health profile. Concerning presence of comorbidity, 72% and 80% respectively of both the cupping and control groups suffering from musculoskeletal diseases followed by hypertension (64% and 52% respectively). No statistical significant difference was found between both groups ($P=0.920$).

Regarding prescribed medications, it was noticed that 72% and 80% of the cupping and control groups respectively used musculoskeletal medications followed by antihypertensive medications (64% and 52% respectively). No statistical significant difference was found between both groups ($P=0.891$). Regarding body mass index, 60% of the cupping group were overweight compared to 52% of those in the control group with no statistical significant difference between the cupping group and control group ($P=0.883$).

Table (3) reveals the distribution of the cupping and control groups according to their pain characteristics. It was found that 68% of the cupping group and 64% of the control group had LBP. Concerning radiation of pain, 68% of the cupping group reported pain radiated to other sites compared to 60% of the control group. 52% and 44% of the cupping and control groups reported that pain persisted more than 30 minutes. No statistical significant differences were found between the cupping and control groups concerning site, radiation and duration of pain ($P=0.831$, $P=0.556$ and $P=0.709$ respectively).

As regard the quality of pain, it is observed that 32% of the cupping group and 40% of the control group described their pain as needle like. Continuous pain was reported by 64% of the cupping group compared to 56% of those in the control group. No statistical significant difference was found between the both groups concerning quality and pattern of pain ($P=0.951$, $P=0.564$ respectively).

Table (4) shows the comparison of pre and post cupping therapy LBP severity in the cupping and control groups. severe pain was reported by 40% of the cupping group pre cupping therapy and this percent decreased to 12% post cupping therapy and the difference between pre and post cupping therapy in the cupping group was statistically significant ($P= 0.008$). On the other hand, severe pain reported by 48% of the control group pre cupping therapy and increased to 52% post cupping therapy. Also, there is a statistical significant difference between the cupping and control groups post cupping therapy ($P= 0.014$).

As for functional ability, **Table (5)** reveals a significant improvement in mean and standard deviation score between pre and post cupping therapy in the cupping group in most functional ability subscales including pain intensity, lifting, walking, social life, travelling and employment or home making ($P= 0.023$, $P= 0.068$, $P= 0.018$, $P= 0.009$, $P= 0.021$, $P= 0.010$ and $P= 0.014$ respectively). While personal care, sleeping, and sitting didn't significantly differ pre and post cupping therapy ($P=0.068$, $P=0.0347$, $P=0.509$ respectively). Additionally, moderate or severe functional disability was reported by 68% of the cupping group pre cupping therapy and this percent decreased to 36% post cupping therapy and the difference between pre and post cupping therapy in the cupping group was statistically significant ($p= 0.001$). On the other hand, 56% of the control group reported either moderate or severe functional disability when assessed pre cupping therapy which increased to 72% post cupping therapy evaluation. Also, there is a statistical significant difference between the both groups post cupping therapy ($P= 0.002$).

Table (6) explains the relationship between LBP severity and functional disability in the cupping group pre as well as post cupping therapy. It shows that higher severity of LBP before cupping therapy was associated with greater functional disability. Following cupping therapy, decrease of LBP severity was associated with decreased functional disability. There is a statistical significant relation between LBP severity and functional ability among the cupping group pre as well as post cupping therapy ($P=0.028$ and $P=0.001$).

Table (1):- Distribution of the cupping and control groups according to their socio demographic characteristics:

Socio demographic characteristics	Cupping group (n=25)		Control group (n=25)		Test of significance
	No	%	No	%	
Age in years:					
60-	16	64.0	14	56.0	$\chi^2=1.078$ MC _p =0.651
75-	7	28.0	10	40.0	
≥85+	2	8.0	1	4.0	
Mean ±SD	69.48 ± 6.89		69.76 ± 6.47		t=0.148,p=0.883
Sex:					
Female	14	56.0	13	52.0	$\chi^2=0.081$ p=0.777
Male	11	44.0	12	48.0	
Marital status:					
Married	13	52.0	14	56.0	$\chi^2=1.467$ MC _p =1.000
Widow	9	36.0	10	40.0	
Single	2	8.0	1	4.0	
Divorced	1	4.0	0	0.0	
Level of education:					
Illiterate	10	40.0	8	32.0	$\chi^2=1.101$ MC _p =0.951
Read and write	6	24.0	7	28.0	
Basic education	4	16.0	5	20.0	
Secondary education	3	12.0	4	16.0	
university education	2	8.0	1	4.0	
Occupation before retirement:					
Housewife	10	40.0	9	36.0	$\chi^2=0.513$ MC _p =1.000
Employee	8	32.0	7	28.0	
Worker	4	16.0	5	20.0	
Free business	3	12.0	4	16.0	
Current work:					
No	20	80.0	22	88.0	$\chi^2=0.595$ FE _p =0.702
Yes	5	20.0	3	12.0	
Residence:					
Rural	14	56.0	16	64.0	$\chi^2=0.333$ p=0.564
Urban	11	44.0	9	36.0	
Living arrangement:					
Living with family\ relatives	12	48.0	15	60.0	$\chi^2=1.055$ MC _p =0.696
Living with wife	10	40.0	9	36.0	
Living alone	3	12.0	1	4.0	
Income:					
Inadequate	16	64.0	18	72.0	$\chi^2=0.368$ P=0.544
Adequate	9	36.0	7	28.0	
Source of income:					
Pension	11	44.0	13	52.0	$\chi^2=1.055$ MC _p =0.855
Family	6	24.0	7	28.0	
Current work	5	20.0	3	12.0	
Social affairs	3	12.0	2	8.0	

 χ^2 : Chi square test

MC: Monte Carlo

t: Student t-test

P: p value for comparing between the both groups

FE: Fisher Exact

Table (2): Distribution of the cupping and control groups according to their health history:

Health history	Cupping group (n=25)		Control group (n=25)		Test of significance
	No	%	No	%	
Type of medical disease: #					
Musculoskeletal diseases	18	72.0	20	80.0	$\chi^2=1.442$ p=0.920
Hypertension	16	64.0	13	52.0	
Endocrine disease	12	48.0	10	40.0	
GIT diseases	8	32.0	9	36.0	
Kidney and urinary system diseases	7	28.0	4	16.0	
Current medication used: #					
Musculoskeletal medications	18	72.0	20	80.0	$\chi^2=1.687$ p=0.891
Antihypertensive medications	16	64.0	13	52.0	
Endocrine medications	12	48.0	10	40.0	
GIT medications	8	32.0	9	36.0	
Kidney and urinary medications	7	28.0	4	16.0	
BMI:					
Under weight	2	8.0	1	4.0	$\chi^2=1.195$ ^{MC} p=0.833
Normal	3	12.0	5	20.0	
Overweight	15	60.0	13	52.0	
Obese	5	20.0	6	24.0	

 χ^2 : Chi square test

MC: Monte Carlo

P: p value for comparing between the both groups

Table (3): Distribution of the cupping and control groups according to their LBP characteristics:

LBP characteristics	Cupping group (n=25)		Control group (n=25)		Test of significant.
	No	%	No	%	
Site:					
Lower back	17	68.0	16	64.0	$\chi^2=0.650$ MC p=0.831
Buttock	5	20.0	7	28.0	
Center of buttock	3	12.0	2	8.0	
Radiation's site:					
No	8	32.0	10	40.0	$\chi^2=0.347$ p=0.556
Yes	(17)	68.0	(15)	60.0	
All back	5	41.67	6	40.0	$\chi^2=1.313$ MC p=0.970
Right thigh, leg to heel	4	23.52	3	20.0	
Left thigh, leg to heel	3	17.65	3	20.0	
Both thighs, leg to heel	3	17.65	2	13.33	
Neck	2	11.76	1	6.67	
Duration of pain:					
10<15	3	12.0	2	8.0	$\chi^2=0.870$ MC p=0.709
15-30	9	36.0	12	48.0	
>30	13	52.0	11	44.0	
Quality of pain:					
Needle- like	8	32.0	10	40.0	$\chi^2=1.101$ MC p=0.951
Crushing	6	24.0	7	28.0	
Burning	5	16.0	4	16.0	
Stabbing	4	20.0	3	12.0	
Sharp	2	8.0	1	4.0	
Pattern:					
Continuous	16	64.0	14	56.0	$\chi^2=0.333$ p=0.564
Intermittent	9	36.0	11	44.0	
Aggravating factors: #					
Improper use of back	19	76.0	17	68.0	$\chi^2=0.662$ p=0.985
Standing /sitting for long period /walking for long distance	17	68.0	16	64.0	
Strenuous effort	13	52.0	15	60.0	
Cold climate	11	44.0	12	48.0	
Lifting heavy weights	7	28.0	9	36.0	
Straining from constipation/ cough	6	24.0	5	20.0	
Alleviating factors: #					
Medications	18	72.0	16	64.0	$\chi^2=1.019$ p=0.961
Warm shower	10	40.0	12	48.0	
Rest\ Sleep	6	24.0	8	32.0	
Back massage	5	20.0	6	24.0	

 χ^2 : Chi square test

MC: Monte Carlo

P: p value for comparing between the both groups

Table (4): Comparison of pre and post cupping therapy LBP severity in the cupping and control groups:

Pain severity	Cupping group (n = 25)				Control group (n = 25)				Test of Significance
	Pre cupping		Post cupping		Pre cupping		Post cupping		
	No	%	No	%	No	%	No	%	
• no pain	0	0.0	5	20.0	0	0.0	1	4.0	$\chi^2=10.700^*$ $p=0.014^*$
• mild	7	28.0	12	48.0	6	24.0	3	12.0	
• moderate	8	32.0	5	20.0	7	28.0	8	32.0	
• severe	10	40.0	3	12.0	12	48.0	13	52.0	
Test of Significance	MH =62.0* (p₀=0.008*)				MH =45.00 (p₀=0.537)				

χ^2 : Chi square test

MC: Monte Carlo

MH: Marginal Homogeneity Test

P: p value for comparing between the both groups in Post cupping

p₀: p value for comparing between Pre cupping and Post cupping in each group

*: Statistically significant at $p \leq 0.05$

Table (5): comparison of pre and post cupping therapy level of functional disability in the study and control groups:

Level of functional disability	Cupping group (n = 25)		Control group (n = 25)		Test of Significance
	Pre cupping	Post cupping	Pre cupping	Post cupping	
Pain intensity					
Total score					
Min. – Max.	0.0 – 5.0	0.0 – 4.0	5.0 – 0.0	5.00 – 0.00	U=200.50* p=0.027*
Mean ± SD.	3.0 ± 1.44	2.0 ± 1.63	2.72 ± 1.43	3.00 ± 1.44	
Test of significance	Z=2.276* (p₀=0.023*)		Z=1.633 (p₀=0.102)		
Personal care					
Total score					
Min. – Max.	0.00 – 4.00	0.00 – 4.00	0.00 – 4.00	0.00 – 4.00	U=203.50* p=0.030*
Mean ± SD.	2.16 ± 1.21	1.60 ± 1.22	2.12 ± 1.33	2.36 ± 1.15	
Test of significance	Z=1.824 (p₀=0.068)		Z=1.414 (p₀=0.157)		
Lifting					
Total score					
Min. – Max.	1.0 – 5.0	0.00 – 4.00	1.0 – 5.0	1.0 – 5.0	U=177.000* p=0.006*
Mean ± SD.	3.12 ± 1.20	2.20 ± 1.44	3.00 ± 1.29	3.28 ± 1.02	
Test of significance	Z=2.369* (p₀=0.018*)		Z=1.890 (p₀=0.059)		

Table (5): comparison of pre and post cupping therapy level of functional disability in the study and control groups Cont'd:

Level of functional disability	Cupping group (n = 25)				Control group (n = 25)				Test of Significance
	Pre cupping		Post cupping		Pre cupping		Post cupping		
Walking									
Total score									
Min. – Max.	1.0 – 5.0		0.00 – 4.00		1.0 – 5.0		1.0 – 5.0		U=156.500* p=0.002*
Mean ± SD.	2.72 ± 1.24		1.88 ± 1.27		2.56 ± 1.26		2.96 ± 1.21		
Test of significance	Z=2.595* (p₀=0.009*)				Z=1.890 (p₀=0.059)				
Sitting									
Total score									
Min. – Max.	0.0 – 3.0		0.0 – 2.0		0.0 – 3.0		0.0 – 3.0		U=269.000 p=0.306
Mean ± SD.	1.24 ± 0.60		0.92 ± 0.66		1.31 ± 0.66		1.39 ± 0.69		
Test of significance	Z=0.660 (p₀=0.509)				Z=0.816 (p₀=0.414)				
Standing									
Total score									
Min. – Max.	0.0 – 5.0		0.0 – 4.0		0.0 – 5.0		1.0 – 5.0		U=197.000* p=0.021*
Mean ± SD.	2.44 ± 1.19		1.84 ± 1.34		2.32 ± 1.28		2.64 ± 1.19		
Test of significance	Z=1.891 (p₀=0.059)				Z=1.604 (p₀=0.109)				
Sleeping									
Total score									
Min. – Max.	0.0 – 3.0		0.0 – 2.0		0.0 – 3.0		0.0 – 3.0		U=227.00 p=0.068
Mean ± SD	1.12 ± 0.78		0.88 ± 0.72		1.24 ± 0.83		1.38 ± 0.89		
Test of significance	Z=0.941 (p₀=0.347)				Z=0.184 (p₀=0.854)				
Social life									
Total score									
Min. – Max.	0.0 – 4.0		0.0 – 4.0		0.0 – 4.0		0.0 – 5.0		U=174.50* p=0.006*
Mean ± SD	2.36 ± 1.22		1.60 ± 1.32		2.28 ± 1.27		2.64 ± 1.86		
Test of significance	Z=2.308* (p₀=0.021*)				Z=1.633 (p₀=0.102)				
Travelling									
Total score									
Min. – Max.	0.0 – 5.0		0.0 – 4.0		0.0 – 5.0		0.0 – 5.0		U=158.00* p=0.002*
Mean ± SD	2.76 ± 1.39		1.76 ± 1.56		2.60 ± 1.52		3.04 ± 1.27		
Test of significance	Z=2.581* (p₀=0.010*)				Z=1.761 (p₀=0.078)				
Employment \ homemaking									
Total score									
Min. – Max.	0.0 – 5.0		0.0 – 4.0		0.0 – 5.0		0.0 – 5.0		U=180.00* p=0.009*
Mean ± SD	2.92 ± 1.29		2.00 ± 1.55		2.84 ± 1.28		3.12 ± 1.24		
Test of significance	Z=2.451* (p₀=0.014*)				Z=1.604 (p₀=0.109)				
Functional disability	No	%	No	%	No	%	No	%	χ ² =15.390* MC p=0.002*
No	2	8.0	5	20.0	3	12.0	1	4.0	
Mild	4	16.0	11	44.0	5	20.0	2	8.0	
Moderate	9	36.0	5	20.0	8	32.0	10	40.0	
Severe	8	32.0	4	16.0	6	24.0	8	32.0	
Completely disabled	2	8.0	0	0.0	3	12.0	4	16.0	
Test of significance	MH =56.50* (p₀=0.001*)				MH =70.500 (p₀=0.145)				

U: Mann Whitney test Z: Wilcoxon signed ranks test MC: Monte Carlo

P: p value for comparing between the both groups in Post interventions

p₀: p value for comparing between Pre cupping and Post cupping in each group

*: Statistically significant at p ≤ 0.05

Table (6): Relation between pain severity and functional disability in the cupping group

Functional disability	Pain severity													
	Pre cupping(n = 25)						Post cupping(n = 25)							
	Mild (n = 7)		Moderate (n = 8)		Severe (n = 10)		No (n = 5)		Mild (n = 12)		Moderate (n = 5)		Severe (n = 3)	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
No	2	28.6	0	0.0	0	0.0	1	20.0	3	25.0	1	20.0	0	0.0
Mild	3	42.9	1	12.5	0	0.0	4	80.0	7	58.3	0	0.0	0	0.0
Moderate	2	28.6	4	50.0	3	30.0	0	0.0	2	16.7	0	0.0	3	100
Severe	0	0.0	3	37.5	5	50.0	0	0.0	0	0.0	4	80.0	0	0.0
Completely disabled	0	0.0	0	0.0	2	20.0	0	0.0	0	0.0	0	0.0	0	0.0
Test of significance	$\chi^2=13.389^*(MCp= 0.028^*)$						$\chi^2=21.430^*(MCp=0.001^*)$							

χ^2 : Chi square test

MC: Monte Carlo

P: p value for comparison between the studied categories

*: Statistically significant at $p \leq 0.05$

Discussion:

LBP is a major musculoskeletal disorder and a leading cause of disability globally as well as a major challenge to functional independence among older adults ^(8, 25). It has been recently recognized by the United Nations as one of the main causes of disability among older adults which is associated with significant limitations of daily living activities as well as high economic and social costs ⁽²⁶⁾.

Cupping therapy is an ancient method for management of LBP that has recently attracted global interest. It contributes to multiple benefits for patients with LBP as it can stimulate circulation, reduce pain, improve tissue perfusion, and enhance healing process. Moreover, cupping therapy relieves painful muscle tension, reduces stiffness, improves tolerance to range of motion exercises, and improve motor output which in turn result in reducing pain severity and maximizing functional abilities ^(13, 14).

In this context, gerontological nurses play a key role in assisting older adults with LBP for managing their pain and empowering their functional abilities in order to prevent pain related disability and promote high quality of life. Moreover, nurses can participate in preparation of the patient for cupping therapy, implementation of cupping sessions, and teaching about post cupping care ^(19, 27).

To the best of our knowledge, this study is the first one in Egypt to address the effect of wet cupping therapy on pain severity and functional abilities among older adults with LBP. The present study results revealed a highly statistically significant reduction in LBP severity among the cupping group pre and post implementation of the cupping therapy with a relative risk reduction of 70% (table 4). Also, there is a statistical significant difference between the cupping and control groups regarding pain severity. On the other hand, no major changes in LBP severity were found among the control group post cupping therapy with no statistically significant difference (table 4). The reduction in pain scores among the cupping group can be explained by the fact that wet cupping therapy stimulates the release of morphine-like substances such as serotonin and endorphins which are released due to suction and small incisions done during wet cupping sessions. Both of these substances play a role in decreasing pain sensation ⁽¹⁴⁾.

This finding is accordance with those of other studies done in Koreaby Kim et al. (2011) ⁽²⁷⁾, in China by Markowski et al. (2014) ⁽²⁸⁾, in Saudi Arabia by Albedah et al. (2015) ⁽²⁹⁾, in India by Imam et al. (2016) ⁽³⁰⁾, in China by Wang et al. (2017) ⁽¹³⁾, and in India by Jain et al. (2022) ⁽³¹⁾ who reported significant effect of wet cupping therapy on reducing LBP severity. In the same line, a systemic review done in Brazil included 611 studies concluded that cupping therapy is effective in treatment of LBP ⁽³²⁾.

Regarding level of functional ability, the present study indicated a significant improvement of functional ability among the cupping group pre and post implementation of the cupping therapy. On the contrary, greater disability was reported by the control subjects. Also, a statistical significant difference regarding functional ability was found between the cupping and control groups post cupping therapy (table5). This may be related to the therapeutic vasodilation effects of wet cupping therapy on muscle tissues. Cupping therapy improves blood flow, increases muscle flexibility, decrease articular stiffness, enhances muscular relaxation, and ultimately leads to improved movement and functional ability⁽³³⁾. The present study results are in agreement with those of other studies done in India by Imam et al. (2016)⁽³⁰⁾, in China by Wang et al. (2017)⁽¹³⁾, in Germany by Teut et al. (2018)⁽³⁴⁾, and in India by Jain et al. (2022)⁽³¹⁾ who found significant improvement in the functional ability among cupping therapy group post cupping treatment period. Recently, a study carried out at Malaysia showed a less post treatment disability among the cupping therapy group when compared with the control group⁽³³⁾.

In relation to functional ability subscales, the present study results revealed a significant improvement among cupping group in most functional disability subscales including pain intensity, personal care, lifting, walking, standing, social life, travelling and employment or home making post cupping therapy compared to the beginning of study (table 5). This can be rationalized by the finding that about three quarter of the cupping group subjects had either moderate or severe LBP (table 4) before applying cupping therapy which may prevent them to engage in routine activities of daily living. Also, LBP forces older adults to avoid visiting others and limit certain activities, causing them to restrict social relationships⁽³⁵⁾. Whereas, the severity of LBP among the cupping group following cupping therapy was reduced (table 4) and this consequently leads to improvement in their functional ability subscales. The result of the present study is in accordance with a study done by Volpato et al. (2020)⁽³⁶⁾ who found that a significant improvement in general activity, work, relationships, walking ability, enjoyment in life were observed post cupping treatment. This contradicts a study done in Brazil by Silva et al. (2021)⁽³⁷⁾ who reported that no major effects of cupping could be confirmed on social life. Another study done in Egypt, Alexandria by Abdel Aziz, Abd El-Rasol & El-Gamal (2017)⁽³⁸⁾ contradicts the result of the present study where it was observed that the walking ability sub scale of functional ability was not affected significantly by the cupping therapy. These contradicting findings may be attributed to the inadequate duration of cupping therapy in previous studies which didn't reflect long term effects of cupping therapy on social life and walking.

Moreover, the current study revealed a statistically significant correlation between LBP severity and functional ability in the cupping group pre and post cupping therapy; as

higher LBP severity before cupping therapy was associated with greater disability. While after cupping therapy, reduced pain severity was linked to less disability levels (table 6). This finding is in a harmony with other studies done in Egypt by Abd El Moniem et al. (2019)⁽¹⁰⁾, in Thailand by Sakulsriprasert et al. (2021)⁽³⁹⁾, and in Japan by Yabe et al. (2022)⁽⁴⁰⁾.

The previously reported effects of the wet cupping therapy in reducing pain severity and improving functional abilities could be attributed to the effective application of the cupping therapy through four sessions over four weeks unlike other studies that may have been overestimated due to inadequate number of cupping sessions and inadequate time of follow up such as a study in which the patient's pain reassessed only one week after a single cupping session⁽³⁶⁾. Furthermore, the researchers perform complete assessment of LBP characteristics including site, radiation, quality, duration, pattern, and aggravating as well as alleviating factors before starting cupping therapy that facilitate awareness of the nature of LBP (table 3). In addition to continuous motivation, support and guidance provided for the cupping group before, during, and after the cupping sessions which could have helped in achieving such results.

A noteworthy strength of the present study is the accurate selection of the cupping therapy points which may enhance success of the cupping sessions; as these points are selected according to the World Health Organization guidelines for cupping therapy point locations as older adults with LBP usually feel discomfort at these points⁽¹²⁾. Also, other acupoints that are reported to improve the painful symptoms and functional disability as supported by other studies were involved^(14, 27).

In fact, the present study has provided greater promise in reducing both the severity of LBP and its associated disability among older adults; as it is evident that the implementation of the wet cupping therapy is successful in decreasing the older adults' pain as well as improving their functional status. Thus, the study hypothesis is supported by the present study results; as community dwelling older adults who received the wet cupping therapy exhibited lower LBP severity and higher functional abilities than those who did not. Thus, it is imperative to integrate cupping therapy in the care of older adults with LBP in order to promote successful aging and independent living.

Conclusion:

It can be concluded from the present study that wet cupping therapy resulted in a highly statistically significant reduction in LBP severity and improvement of functional ability among older adults in the cupping group. Also, most functional ability subscales were affected positively by wet cupping therapy including pain intensity, personal care, lifting, walking ability, standing, social life, travelling and employment or home making.

Recommendations:

The following recommendations are suggested based on the findings of this study:

1. Conducting an educational program for nurses and other health team members at different geriatric health care settings about cupping therapy and its effectiveness in management of LBP.
2. Developing an educational program for community dwelling older adults with LBP and their families about cupping therapy including its action, benefits, and necessary precautions. This is through developing educational materials in the form of printed booklets or colored brochures to help them to control their pain and empower their functional abilities.
3. Coordination with different health care settings and health care team members to facilitate integration of wet cupping therapy in care of older adults with LBP as an effective treatment method.
4. Screening of pain severity and functional abilities of older adults with LBP should be an integral component of the geriatric health assessment, and should be included into the routine care of those patients identify those at risk for disability and provide early preventive interventions.
5. Cupping therapy should be included in Gerontological nursing curriculum to prepare undergraduate and post graduate students to participate effectively in this procedures at different clinical settings.

Recommended future researches:

From the obtained results it can be recommended that the following research is needed:

1. Follow up study of older adults undergoing wet cupping therapy to be carried out for longer period to determine long term clinical effects and to estimate its impact on associated outcomes of LBP.

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الملخص العربي

تأثير العلاج بالحجامة الرطبة على شدة ألم أسفل الظهر والقدرة الوظيفية بين كبار السن بالمجتمع.

المقدمة: يعد ألم أسفل الظهر عرض شائع بين كبار السن وسبب رئيسي للإعاقة الوظيفية وذلك بسبب ارتفاع معدل انتشاره واستمراره. إن الإعاقة الوظيفية المرتبطة بالألم أسفل الظهر تؤثر على الحالة الوظيفية والنفسية الاجتماعية مما يؤدي إلى تدني جودة حياة كبار السن. أصبح العلاج بالحجامة نهجًا شائعًا يستخدم لعلاج ألم أسفل الظهر وله العديد من المزايا ؛ حيث أنه طريقة بسيطة وقليلة التكلفة وآمنة مع آثار جانبية منخفضة مقارنة بالعلاجات الحالية الأخرى.

الهدف من الدراسة: يهدف هذا البحث الى تحديد تأثير العلاج بالحجامة الرطبة على شدة ألم أسفل الظهر والقدرة الوظيفية بين كبار السن في المجتمع.

تصميم البحث: تم استخدام البحث شبه التجريبي في هذه الدراسة. مكان إجراء البحث: عيادة جراحة العظام الخارجية بالمعهد الطبي القومي بدمهور ، محافظة البحيرة ، مصر.

عينة البحث: اشتملت هذه الدراسة على خمسين (50) من كبار السن الذين يعانون من ألم أسفل الظهر المزمن، وتم تقسيمهم بطريقة عشوائية إلى مجموعتين متطابقتين كل مجموعة تكونت من 25 مسن. أدوات البحث: تم استخدام ثلاث أدوات لجمع البيانات كالتالي : 1- استمارة البيانات الاجتماعية والديموغرافية والإكلينيكية لكبار السن الذين يعانون من ألم أسفل الظهر

2- ترمومتر آيوا لقياس الألم، 3-استبيان اسويستري لتقييم درجة الإعاقة الناتجة عن ألم أسفل الظهر. **نتائج الدراسة:** أظهرت مجموعة الحجامة انخفاضًا ذو دلالة إحصائية عالية في شدة الألم ($P= 0.008$) وتحسن ملحوظ في القدرة الوظيفية ($P= 0.001$) بعد تلقى الحجامة الرطبة، مع وجود فروق ذات دلالة إحصائية بين مجموعة الحجامة والمجموعة الضابطة. **الخلاصة:** العلاج بالحجامة الرطبة له أثر إيجابي على شدة ألم أسفل الظهر والقدرة الوظيفية بين كبار السن.

التوصيات: التنسيق مع مؤسسات الرعاية الصحية المختلفة وأعضاء فريق الرعاية الصحية لتسهيل دمج العلاج بالحجامة الرطبة في علاج ألم أسفل الظهر لدى كبار السن كوسيلة علاج فعالة.