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Effect of acupuncture-like tens on back pain after delivery

Ahmed Abdullah Bakr[1*], Azza Barmoud Nashed[2], Adel Farook El Bigawy[3], Mai Mohamed Ali[4]
[1] Physical Therapist, Sheikh Zayed Specialist Hospital, Giza, Egypt
[2] Professor of Physical Therapy for Women's Health, Faculty of Physical Therapy, Cairo University, Giza, Egypt
[3] Professor of Obstetrics and Gynecology, Faculty of Medicine, Cairo University, Giza, Egypt
[4] Lecturer of Physical Therapy for Women's Health, Faculty of Physical Therapy, Cairo University, Giza, Egypt

Abstract
Background: Postpartum back pain, is a major public health problem worldwide. It is associated with low quality of life, high morbidity and mortality rates, and huge socio-economic burden.
Purpose of this study: was to investigate the effect of acupuncture-like TENS on back pain after delivery.
Methods: Thirty postpartum women with back pain, aged 25-40 years, with BMI ranged from 25 to 30 kg/m^2, were selected from Gynecology Department in Zayed Specialized Hospital Giza, Egypt. They were divided randomly into two groups equal in number. Group (A) (study group) (n=15) received acupuncture-like TENS for 20 minutes and strengthening exercises for core muscles for 60 minutes 3 times / week for 4 weeks, while group (B) (control group) (n=15) received strengthening exercises for core muscles only for 4 weeks as in group (A). Pain intensity was assessed through measuring serum cortisol level and using visual analogue scale pre and post treatment for both groups (A & B).
Results: the results showed that there was a statistical significant decrease in cortisol level and pain intensity post treatment compared to pre treatment values between both groups with (p value) (0.012) and (0.001) respectively in favor to group (A).
Conclusion: It could be concluded that acupuncture-like TENS was effective in management of low back pain after delivery.

Keywords: postpartum back pain, acupuncture-like tens therapy, serum cortisol level, pain intensity

Introduction

Low back pain (LBP) is a leading global cause of disability [1]. It becomes more common after giving birth [2]. It is defined as pain and discomfort, localized below the costal margin and above the inferior gluteal folds. Back pain is a symptom that occurs in a wide variety of medical, musculoskeletal, and neurological conditions [3].

Almost 50 percent of women suffer from low back pain in the first few months after labor due to postural changes and the elevation of pregnancy hormones. During pregnancy, the body releases relaxin, a hormone that relaxes the joints and ligaments in pelvis to make it easier for the baby to pass through the birth canal [4].

Absence of post-natal exercises particularly strengthening back and abdominal muscles, correcting posture play an important role in persisting low back pain after delivery. Poor posture from weakness of the abdominal or back muscles increases risk of back pain [5].

Core stability exercise is a training method that uses the motor learning principle to promote coordination of the deep trunk musculature [6]. Recent studies have shown that it has various effects in patients with LBP. It has been shown to have a positive effect on muscle coordination [7].

Transcutaneus electrical nerve stimulation (TENS) is widely used in the treatment of acute and chronic low back pain after delivery. The use of conventional (high frequency) TENS was originally based on gate control theory of pain, which suggested that counter stimulation of the nervous system could modify the perception of pain [8]. Later studies suggested that with low frequency, high amplitude ("acupuncture-like") stimulation, TENS could also raise endorphin levels in the spinal fluid [9].

However, up to date, no studies have evaluated the impact of low acupuncture-like TENS on back pain after delivery. Therefore, the current study was the first one aiming to investigate the effect of low acupuncture-like TENS on back pain and quality of life after delivery. This study might expand the role of physiotherapy in women's health [10].

Subjects, Materials and Methods

The aim of this study was to investigate the effect of acupuncture-like TENS on back pain after delivery. The practical part lasted for 14 months from April 2020 to June 2021. It was approved by Research Ethical Committee of Faculty of Physical Therapy, Cairo University in April 2020. (No:p.T.Rec/012/002464).

1. Subjects

Thirty multiparous women suffering from postpartum low back pain (6 weeks after delivery), were participated in this study. They were selected from Gynecological Outpatient Clinic of Zayed Specialized Hospital, Giza, Egypt. They were randomly divided into two groups equal in number, group (A) (study group) (n=15) received acupuncture-like TENS on the point (UB23 and UB 25) for 20 minutes, and performed abdominal strengthening exercises in the form of posterior pelvic tilting and postural correction exercises for 60 minutes, 3 times/week for 4 weeks. Their mean SD age 32.2 years and BMI were 26.5 kg /m² respectively. Group (B) (control group) (n=15) received abdominal strengthening exercises in the form of posterior pelvic tilting and postural correction exercises only for 60 minutes, 3 times/week for 4 weeks. Their SD age 32.2 years and BMI were 26.2 kg /m² respectively. All participants read and signed informed consent from before initiation of the study.

Inclusion criteria
Thirty multiparous women with low back pain, their age ranged from 25 to 40 years. Their body mass index ranged from 25 to 30 kg/m², number of pariety ranged between 2-4 children.

Exclusion criteria
Participants were excluded from this study if they had: History of gynecological diseases (uterine prolapse, retroversion flexion of the uterus or chronic pelvic pain), Neurological diseases (lumbar disc prolapse, lumbar spondylosis or spondylolisthesis), Leukemia or tumor (spinal or pelvic tumor). Diabetes mellitus, hypertension, heart diseases, and skin diseases.

2. Instrumentations
Evaluative Instrumentations
Recording data sheet: was used to record data of each participant including personal, past and menstrual history and number of parity.

Weight-height scale: It was used to measure weight and height of each participant in order to calculate their BMI before starting the study.

$$\text{BMI} = \frac{\text{Weight (kg)}}{\text{Height (m)}^2} = \text{kg/m}^2$$ **(Fryar et al 2018).**

Present pain intensity (PPI) scale:
It is a graphic rating scale with numerical values placed equidistantly along a 10 cm line. It was used to measure level of pain on the line (0-5) before and after the study [10].
No. 0: represent no pain,
No. 1: represents mild pain
No. 2: represents moderate pain
No. 3: represent severe pain
No 4: represents very severe pain
No. 5: represents worst or intolerable pain**.**

Test tubes, Syringes, cotton and alcohol: were used to collect blood samples to measure blood cortisol level for each participant before and after the end of the study

Treatment instrumentation
1. Acupuncture- like TENS device: This device was used to provide a pulsating current to the acupuncture electrodes through cables attatched to the device. So, a stimulating current was delivered to acupoints via the electrodes

2. Description: the Chattanooga intellect mobile stim is a s 2 channel electrotherapy device. Stimulation includes 2 pole interferential, 4 pole interference, Galvanic, High Voltage pulsed current, and micro current, Russian, Trabert, Monophasic Triangular, monophasic Rectangular, Diadynamic, VMS and TENS, Standard Accessories: Nylatex Wrap 6x8cm carbon electrodes (4x), 6x8 cm sponges (4x), Model No. CHA 2777, Frequency of the electrical current:1-5 hz, Wave form: Rectangular waveform, Pulse duration:100-150 msec, Intensity: according to patient tolerance

3. Mirror: it was used during postural correction exercises

3. Procedures
Evaluative Procedures
1. History taking: A full history was taken from each participant in both groups (A&B) before starting the study and data was recorded in a data sheet (Appendix II).

2. Weight and height measurement: the weight and height of each participant in both groups (A&B) have been measured before starting the study. The weight-height scale was calibarated and measurement was taken while wearing light clothes and bare feet, to calculate their BMI before the study according to the following equation:

$$\text{BMI} = \frac{\text{Weight (kg)}}{\text{Height (m)}^2} = \text{kg/m}^2$$ **(Fryar et al 2018).**

3. Plasma cortisol level: The test was done for each participant before starting and after the end of the study.
Venous blood sample: of 3 cm was collected via vein puncture of an antecubital vein in the forearm from each woman in both groups (A&B) before and after treatment course. Each woman was asked to sit on armchair. The antecubital area was cleaned with a piece of cotton immersed in alcohol. Blood sample was drawn from the antecubital vein from each participant by disposable sterile syringe.
All sample were collected in the morning before breakfast for all cases and were sent to the laboratory center for analysis Also, each participant in both groups (A&B) was asked to put a mark on present pain intensity scale (PPI) to detect her level of pain. This was done before and after the treatment course (4 weeks).

Treatment Procedure
1. Study group (group A)
- Consisted of 15 multiparous women, they received acupuncture-like TENS on the point (UB23 and UB 25) for 20 minutes, 3 times/week for 4 weeks, and performed abdominal strengthening exercises in the form of posterior pelvic tilting and postural correction exercises for 60 minutes, 3 times/week for 4 weeks.
- Each participant in this group was asked to lie on the plinth in prone lying position, covered by a white sheet except the treated area. Then, the acupuncture points for LBP (UB 23, UB 25) were detected as the following:
- **UB 23:** Located one and a half cun lateral to the lower border of the spinous process of the second lumbar vertebra (at the level of the lower border of the rib cage in the renal angle)**.**
- **UB 25:** Located one and a half cun lateral to the lower border of the spinous process of the fourth lumbar vertebra (at the level of the upper border of the iliac crest)**.**

At first, the skin of these points was cleaned with a piece of cotton immersed in alcohol; the four sterilized electrodes were applied perfectly on these points and attached to the electrical device by two cables, After that, the electrical stimulation was adjusted with the following parameters frequency of the electrical current:1-5 hz (to stimulate small diameter C nerve fibers and close the pain gate), Wave form: Rectangular waveform, Pulse duration:100-150 msec, Intensity: according to patient tolerance, after adjusting the

parameter, the electrical stimulation device was switched on and the intensity of the electrical current was increased slowly up to a tolerable non painful sensation level. The treatment session lasted for 20 minutes. After that, the electrical stimulation device was switched off and the electrodes were removed and sterilized. After finishing the acupuncture-like TENS session, each participant in this group was asked to perform abdominal strengthening exercises in the form of posterior pelvic tilting and postural correction exercises for 60 minutes/3 times per week for 4 weeks as the following: Control group (Group B): Each participant in this group was asked to perform abdominal strengthening exercise, posterior pelvic tilting exercise and postural correction exercises for 60 minutes 3 times/week for 4 weeks, as in group (A).

1. Abdominal strengthening exercises

a. Isometric abdominal exercises: The mother was asked to lie in crock lying position. The therapist was stride standing beside her, the inner hand of the therapist under the back of the mother while outer hand above the abdomen. Then the therapist asked the mother to contract the abdominal muscles firmly and press the lumbar region down on his hand, hold then relax. This exercise was repeated for several times [11]
b. Hip shrugging exercise: Each participant in this group was asked to lie in half crock lying position. The therapist was stride standing beside her, the inner hand of the therapist was on the anterolateral aspect of the knee of the extended limb, while the outer hand above the ankle joint of the mother. The therapist asked the participant to contract her abdominal muscles and draw the extended limb toward her ribs to seem shorter then push it down to seem longer, return to starting position then relax. This exercise was repeated to the other leg and done from standing position and from sitting on outstretched hand for several times.
c. Lateral flexion of the trunk: Each participant was asked to lie in supine lying position, while the therapist was stride standing beside her, then the therapist asked the participant to contract her abdominal muscles and touch with her tips of fingers the farthest point of her leg while her head follow the movement and her eyes looking behind her shoulder, hold then relax. This exercise was repeated to the other side and also was done from sitting position, stride standing and from side lying position.
d. Pelvic rotation exercise: Each participant was asked to lie in crock lying position, while the therapist was stride standing beside her, the inner hand was on the lateral aspect of the right knee of the participant while his outer hand was on ankle joint of the participant, then the therapist asked the participant to contract her abdominal muscles and try to touch the left side of the plinth with her flexed knees, hold then return to the starting position and relax. This exercise was repeated to the other side and also was done from half crock lying position [12].
e. Trunk rotation exercise: Each participant was asked to sit on a stool putting her hands around her waist while the therapist was stride standing in front of the mother, then the therapist asked the participant to contract her abdominal muscles and turn her trunk to the right side as much as she can while her head follow the movement and her eyes looking behind the shoulder, hold then return to the starting position and relax [13].
f. The antero-posterior flexion of the trunk: Each participant was asked to lie in supine lying position, while the therapist was stride standing beside her, then the therapist asked her to do the following: Contract abdominal muscles and raise her head and look at her feet, hold then relax, Contract abdominal muscles and raise her head, her shoulders and look at her feet, hold then relax; Contract abdominal muscles and raise her head, shoulder and come to sitting position with outstretched hands, hold then relax.

Contract abdominal muscles and come to sitting position while her hands crossed on her chest, hold then relax; Contract abdominal muscles and come to sitting while her hands under her head then put them in u shape; Contract abdominal muscles and raise one lower limb up, hold then relax. This exercise was repeated to the other lower limb then to both lower limbs, hold then relax; The last step of this exercise was asking the participant to contract abdominal muscles and come to sitting position with outstretched hands while raising both lower limbs up, hold then relax [14].

2. Posterior pelvic tilting exercise: This exercise was done from crock lying, standing against wall and from prone kneeling position.

a. from crock lying position:- The participant was asked to lie in crock lying position while the therapist was stride standing beside her. His thumbs were on the anterior superior iliac spine of the participant and other fingers were fanning on the lateral aspect of her pelvis. Then the therapist asked the mother to contract her gluti, contract her abdominal muscles and press her lumbar region on the plinth, hold then relax.
b. From standing against the wall: The participant was stride standing against the wall, her shoulder and pelvis were rested on the wall while her legs were separated from each other to increase base of support. Her thumbs on the anterior superior iliac spines and other fingers were fanning on the lateral aspect of her pelvis. The therapist was stride standing infront of the participant asking her to contract her abdominal muscles and press her lumbar region against the wall, hold then relax.
c. From prone kneeling position: The participant was asked to lie in the prone kneeling position, keeping her eyes looking forward, her back straight parallel to the floor, her hands were fully extended and her feet were outside the table while the therapist was stride standing beside her, putting her inner hand on the mother's back just to guide the movement. Then, the mother was asked to tighten the buttok muscles, draw in the abdominal muscles and try to make her back like a hump. Hold in this position for five counts then gently relax and return to the starting position.

3. Posture correction exercise: This exercise was done from crock lying position, supine lying position, and from standing in front of mirror as the following:-

a. From crock lying position: The participant was asked to lie in crock lying position while the therapist was stride standing beside her. The mother was asked to make chin in, then take deep breath from her nose and open her chest, contract abdominal muscles, contract glutei, hold then relax.

b. From supine lying position: The participant was asked to lie in supine lying position while the therapist was stride standing beside her. The participant was asked to make chin in, then take deep breath from her nose and open her chest, contract her abdominal muscles, contract glutei, press her knees down against the bed and dorsiflex her feet, hold then relax.

c. From standing position in front of mirror: The participant was asked to stand erect in front of mirror while the therapist was in stride standing beside her. The participant was asked to make chin in, then take deep breath from her nose and open her chest, then contract her abdominal muscles, contract glutei, extend her knees, feel that her body weight is transmitted to the lateral malleolus, to the lateral border of the foot, then to the ball of the big toe, hold then relax.

2. Control group (group B)

Each participant in this group was asked to perform abdominal strengthening exercise, posterior pelvic tilting exercise and postural correction exercises for 60 minutes 3 times/week for 4 weeks, as in group (A).

Statistical Analysis

The collected data were statistically analyzed using:

- Descriptive statistics (mean and standard deviations).
- Inferential statistics; T-test was used to compare between subjects characteristics of both groups. MANOVA was used to compare all dependent variable within and between groups.
- Statistical significance was set at the ($p < 0.05$).

Results

General characteristics of the participants in both group (A&B)

Group A: The mean ± SD of age, weight, height and BMI of participants in this group were 32.2 ± 2years, 71.9 ± 5.8 kg, 164.5 ± 5.2 cm and 26.5 ± 2kg/m² respectively, as shown in table (1). **Group B:** The mean ± SD of age, weight, height and BMI of participants in this group were 33.2 ± 3 years, 72.4 ± 6 kg, 166 ± 5 cm and 26.2 ± 1.6 kg/m² respectively as shown in table (1) and figure (17, 18,19.20). Comparing the general characteristics of the participants of both groups (A & B) revealed that there was no statistical significant difference between the two groups in the mean age, weight, height, and BMI ($p > 0.05$).

Table 1: Mean values of physical characteristics of both groups (A and B)

	Group A	Group B	t- value	p-value	Significance
	$\bar{X}$ ±SD	$\bar{X}$ ±SD			
Age (years)	32.2 ± 2	33.2 ± 3	-0.83	0.284	NS
Weight (kgs)	71.9 ± 5.8	72.4 ± 6	-0.345	0.832	NS
Height (cms)	164.5 ± 5.2	166 ± 5	0.013	0.430	NS
BMI (kg/m²)	26.5 ± 2	26.2 ± 1.6	-0.421	0.602	NS

$\bar{X}$: Mean SD: Standard deviation
P value: Probability value NS: Non-significant

1. Measurement of cortisol level

Within group comparison

Group A: The mean ± SD of cortisol level pre-treatment was 8.9 ± 1.9 mg/dl, while post-treatment it was 5.6 ± 1.3 mg/dl. The mean difference was 3.3 and the percentage of change was 37%. There was a statistical significant decrease in cortisol level in group A post-treatment compared with that of pre-treatment value ($p = 0.009$) (Table 2).

Group B: The mean ± SD of cortisol pre-treatment of group B was 10.5 ± 4 mg/dl, while post-treatment it was 8.9 ± 3.2 mg/dl. The mean difference was 1.6 and the percentage of change was 15%. There was no statistical significant decrease in cortisol level in group B post treatment compared with that of pre-treatment value ($p = 0.232$) (Table 2).

Between groups comparison

There was no statistical significant difference in the mean values of cortisol level pre-treatment between both groups A and B ($p = 0.218$), while there was a statistical significant decrease of cortisol level post-treatment between both groups ($p = 0.012$) in favor to group A (Table 2).

Table 2: Mean values of cortisol level pre and post treatment between and within both groups (A&B)

Measurement of Cortisol level (mg/dl)	Pre	Post	MD	% of age	P-value
	$\bar{X}$ ±SD	$\bar{X}$ ±SD			
Group A	8.9 ± 1.9	5.6 ± 1.3	3.3	37%	0.009*
Group B	10.5 ± 4	8.9 ± 3.2	1.6	15%	0.232
f-value	1.5	6.7			
P-value	0.218	0.012*			

$\bar{X}$: Mean SD: Standard deviation MD: Mean difference
p value: Probability value S: Significant NS: Non significant

2. Measurement of pain intensity

Within group comparison

Group A: The mean ± SD of pain intensity pre-treatment was 7.9 ± 0.8, while post treatment it was 3 ± 1.6. The mean difference was 4.9 and the percentage of change was 62%. There was a statistical significant decrease in pain intensity in group A post treatment compared with that of pre-treatment value ($p = 0.001$) (Table 3, figure 30,31).

Group B: The mean ± SD of pain intensity pre-treatment was 7.1 ± 0.9, while post treatment it was 6.8 ± 1.2. The mean difference was 0.3 and the percentage of change was 4%. There was no statistical significant decrease in pain intensity in group B post treatment compared with that of pre-treatment value ($p = 0.627$) (Table 3).

Between groups comparison

There was no statistical significant difference in the mean values of pain intensity pre-treatment between both groups A and B ($p = 0.151$), while there was statistical significant decrease of pain intensity post treatment between the two groups ($p = 0.001$) in favor to group A (Table 3).

Table 3: Mean values of pain intensity pre and post treatment between and within both groups (A&B)

Measurement of pain intensity	Pre	Post	MD	% of change	P-value
	$\bar{X}$ ±SD	$\bar{X}$ ±SD			
Group A	7.9 ± 0.8	3 ± 1.6	4.9	62%	0.001
Group B	7.1 ± 0.9	6.8 ± 1.2	0.3	4%	0.627
f-value	3.9	76			
P-value	0.151	0.001			

$\bar{X}$: Mean SD: Standard deviation MD: Mean difference
p value: Probability value S: Significant NS: Non significant

Discussion

Low-back pain is a common complaint during pregnancy and postpartum period, and it may be due to a variety of conditions. Most women report low back pain (LBP) or pelvic pain (PP) or both during and after pregnancy. LBP in pregnancy is associated with health care costs and recurrent symptoms in recurrent pregnancies [15].

Almost 50 percent of women suffer from low back pain in the first few months after labor due to postural changes and the elevation of pregnancy hormones. During pregnancy, the body releases relaxin, a hormone that relaxes the joints and ligaments in pelvis to make it easier for the baby to pass through the birth canal [16].

A separation of the two rectus abdominis muscle along with linea alba (diastasis recti abdominis) is common in postpartum females causes low back pain. [17].

Transcutaneous electrical nerve stimulation (TENS) therapy is an effective non-opioid modality for treating pain. TENS works by a phenomenon called "gate control theory" [18].

There are multiple receptors in the periphery – pain, vibration, temperature, etc. All of which transmit information to the brain via the spinal cord. TENS units, by providing a low-dose electrical current, stimulate vibration receptors, which when applied to an area having pain, reduces the transmission of painful stimuli. As such, they are useful for the management of both acute and chronic pain [19].

Therefore, the current study aimed to investigate the effect of Acupuncture-like TENS on back pain after delivery.

This study was carried out on thirty multiparous women suffering from severe back pain for at least 3 months after delivery. They were randomly distributed into two groups, equal in number (A&B). Group (A) (n=15) received acupuncture- like TENS on the point (UB23 and UB 25) for 20 minutes, and performed abdominal strengthening exercises in the form of posterior pelvic tilting and postural correction exercises for 60 minutes, 3 times/week for 4 weeks, group (B) (n=15) was asked to perform abdominal strengthening exercise in the form of posterior pelvic tilting exercise and postural correction exercises for 60 minutes 3 times/week for 4 weeks, as in group (A).

The findings of the present study revealed that there was a statistical significant decrease in cortisol level in (group A) post-treatment compared with that pre-treatment ($p = 0.009$), while there was no statistical significant decrease in cortisol level in (group B) post treatment compared with that pre-treatment ($p = 0.232$). Also, There was a statistical significant decrease in pain intensity in (group A) post treatment compared with that pre-treatment ($p = 0.001$), while there was no statistical significant decrease in pain intensity in (group B) post treatment compared with that pre-treatment ($p = 0.627$).

Also, there was a non statistical significant difference in the mean values of cortisol level pre-treatment between both groups (A and B) ($p = 0.218$), while there was a statistical significant decrease of cortisol level post-treatment between both groups ($p = 0.012$) in favor to group A.

As for pain intensity, there was a non statistical significant difference in the mean values of pain intensity pre-treatment between both groups (A and B) ($p = 0.151$), while there was a statistical significant decrease of pain intensity post treatment between the two groups ($p = 0.001$) in favor to group A.

The improvement of pain intensity could be explained by the gate control theory that was proposed by Melzack and Wall who proposed that signals from nociceptors and touch receptors in the skin are transmitted to synapses in the dorsal horn of the spinal cord. They proposed that a "gate" exists in this area of synapse which modulates the transmission of sensory information from peripheral nociceptors to central pain centers in the spinal cord and brain [20].

The result of the current study was consistant with that of Van Middelkoop *et al*., [21] who reported the effectiveness of combined TENS with exercise in decreasing postpartum back pain.

Also, it was consistant with that of Akhtar *et al* [22] who reported that combining acupuncture-like TENS with exercise is of a great benefit in decreasing postpartum back pain.

Moreover, Şahin *et al*. [23] revealed the efficacy of combining acupuncture- like TENS with exercise in treating postpartum back pain.

Also, the results of this study agreed with that of Johnson *et al*. [24] who reported that TENS and exercise have a beneficial impact on postpartum back pain. In addition, Zerish *et al*. [25] concluded that TENS and abdominal strengthening exercises have a great effect on reducing postpartum back pain.

Regarding group (A), the results of the current study showed a statistical significant decrease in back pain post-treatment compared to pre-treatment, indicating that the combination of exercise and TENS therapy for 4 weeks had a positive effect on postpartum back pain. These findings could be supported by Ali *et al*., (2019) who recommended performing abdominal exercises for postpartum back pain.

Also, the result of the present study agreed with that of Kasapoglu *et al*., 2020 who reported that TENS is an effective and safe non-invasive, non-pharmacological treatment modality.

Most of the studies revealed an analgesic effect in various painful conditions, confirming the usefulness of TENS in clinical practice [26].

The result of the present study was supported also by wu *et al*. [27] who found that TENS improves symptoms of lower back pain,and may offer short-term improvement of functional disability.

Electroacupuncture is more effective in reducing pain and improving functional status by decreasing disability of patients with post natal low back pain. (Awad *et al* 2019) [28].

On the other hand, the result of the current study was inconsistent with that of Leite *et al*., (2018) [29] who reported that, although ten sessions of electroacupuncture have diminished pain intensity in both resting and movement, it could not change significantly quantitative sensory testing and diminish central sensitization in patients with chronic nonspecific low back pain. The implications of this study involved the fact that, maybe, in chronic nonspecific low back pain, electroacupuncture should be associated with other treatments that target central sensitization.

Also, the results of the present study were contradicted with that of Elserty *et al*., (2016) [30] who found that there was non statistical significant difference in pain level in patients with chronic low back pain when using adjusted TENS amplitude versus fixed TENS amplitude.

Conclusion

It could be concluded that Acupuncture-like TENS was effective in management of low back pain after delivery.

References

1. Ha VVA, Zhao Y, Pham MN, Binns CW, Nguyen CL, Nguyen PTH, *et al*. Physical Activity During Pregnancy and Postpartum Low Back Pain: A Prospective Cohort Study in Vietnam. Asia Pacific Journal of Public Health,2019:31(8):701-709.
2. Cooklin AR, Amir LH, Jarman J, Cullinane M, Donath, SM; Castle. Study Team Maternal physical health symptoms in the first 8 weeks postpartum among primiparous Australian women. Birth,2015:42(3):254-260.
3. Vrbanić TS. Krizobolja--od definicije do dijagnoze. [Low back pain--from definition to diagnosis]. Reumatizam,2011:58(2):105-7.
4. Aldabe D, Ribeiro DC, Milosavljevic S, Dawn Bussey M. Pregnancy-related pelvic girdle pain and its relationship with relaxin levels during pregnancy: a systematic review. Eur Spine J. Sep,2012:21(9):1769-76.
5. Kato S, Murakami H, Demura S, Yoshioka K, Shinmura K, Yokogawa N, *et al*. Abdominal trunk muscle weakness and its association with chronic low back pain and risk of falling in older women. BMC musculoskeletal disorders,2019:20(1):273.
6. Huxel Bliven KC, Anderson BE. Core stability training for injury prevention. Sports health,2013:5(6):514-522.
7. Pourahmadi, Mohammad Reza, Taghipour M, Ebrahimi Takamjani I, Sanjari MA, Mohseni-Bandpei MA, *et al*. "Motor control exercise for symptomatic lumbar disc herniation: protocol for a systematic review and meta-analysis." BMJ open,2016:27:6(9):e012426.
8. Richard A, Deyo Khadilkar A, Milne S, Brosseau L, Robinson V, Saginur M, *et al*. "A controlled trial of transcutaneous electrical nerve stimulation (TENS) and exercise for chronic low back pain." New England Journal of Medicine,2020:322(23):1627-1634.
9. Yakşi E, Ketenci A, Baslo MB, Orhan EK. Does transcutaneous electrical nerve stimulation affect pain, neuropathic pain, and sympathetic skin responses in the treatment of chronic low back pain? A randomized, placebo-controlled study. Korean J Pain,2021:34(2):217-228.
10. Gibson W, Wand BM, Meads C, Catley MJ, O'Connell NE. Transcutaneous electrical nerve stimulation (TENS) for chronic pain - an overview of Cochrane Reviews. Cochrane Database Syst Rev.,2019:3(4):4.
11. Sancho MF, Pascoal AG, Mota P, Bø K. Abdominal exercises affect inter-rectus distance in postpartum women: a two-dimensional ultrasound study. Physiotherapy,2015:101(3):286-291.
12. Provenzano SG, Hafer JF, Peacock J, Kempner S, Zendler JD, Agresta CE. Restriction in pelvis and trunk motion in postpartum runners compared with Pre-pregnancy. Journal of Women's Health Physical Therapy,2019:43(3):119-126.
13. Litos K. Progressive therapeutic exercise program for successful treatment of a postpartum woman with a severe diastasis recti abdominis. Journal of Women's Health Physical Therapy,2014:38(2):58-73.
14. Oliva-Lozano JM, Muyor JM. Core Muscle Activity During Physical Fitness Exercises: A Systematic Review. Int J Environ Res Public Health,2020:17(12):4306.
15. George RB, Chorney J, Snelgrove-Clarke E, Rosen NO. "Prevalence and predictors of chronic pain in pregnancy and postpartum." Journal of obstetrics and gynaecology Canada,2017:39(9):734-741.
16. Aldabe D, Ribeiro DC, Milosavljevic S, Dawn Bussey M. Pregnancy-related pelvic girdle pain and its relationship with relaxin levels during pregnancy: a systematic review. Eur Spine J.,2012:21(9):1769-76.
17. Gandhi, Bhavna, Shalaka Dhankar. "Impact of Diastasis Recti Abdominis and Low Back Pain on Quality of Life in Post-Partum Female." Indian Journal of Forensic Medicine & Toxicology,2021:15(1):887.
18. Grover CA, McKernan MP, Close RJH. Transcutaneous Electrical Nerve Stimulation (TENS) in the Emergency Department for Pain Relief: A Preliminary Study of Feasibility and Efficacy. West J Emerg Med.,2018:19(5):872-876.
19. Zhu Y, Feng Y, Peng L. Effect of transcutaneous electrical nerve stimulation for pain control after total knee arthroplasty: A systematic review and meta-analysis. Journal of Rehabilitation Medicine,2017:49(9):700-704.
20. Shaparin Naum, Snyder Max. "Stimulation-Produced Analgesia (TENS and Acupuncture)." Academic Pain Medicine. Springer, Cham, 2019, 153-157.
21. Van Middelkoop, Marienke, Rubinsten SM, Kuijpers T, Verhagen AP, Ostelo R, *et al*. "A systematic review on the effectiveness of physical and rehabilitation interventions for chronic non-specific low back pain." European Spine Journal,2011:20(1):19-39.
22. Akhtar, Muhammad Waseem, Hossein Karimi, Syed Amir Gilani. "Effectiveness of core stabilization exercises and routine exercise therapy in management of pain in chronic non-specific low back pain: A randomized controlled clinical trial." Pakistan journal of medical sciences,2017:33(4):1002-1006.
23. Şahin, Nilay, Ali Yavuz Karahan, İlknur Albayrak. "Effectiveness of physical therapy and exercise on pain and functional status in patients with chronic low back pain: a randomized-controlled trial." Turkish journal of physical medicine and rehabilitation,2018:64(1):52-58.
24. Johnson Mark I. "Resolving long-standing uncertainty about the clinical efficacy of transcutaneous electrical nerve stimulation (TENS) to relieve pain: A comprehensive review of factors influencing outcome." Medicina,2021:57(4):378.
25. Zerish, Zermeen, Zahra Jabeen "Comparison Of Effectiveness Of Exercise Therapy Versus Transcutaneous Electrical Nerve Stimulation In Pain Management For Non-Specific Low Back Pain." Journal Of University Medical & Dental College,2017:8(3):34-37.
26. Naka, Asami, Bjordal JM, Marchand S, Rakel BA. "Does transcutaneous electrical nerve stimulation (TENS) have a clinically relevant analgesic effect on different pain conditions? A literature review." European Journal of Translational Myology,2013:23(3):95-104.
27. Wu LC, Weng PW, Chen CH, Huang YY, Tsuang YH, Chiang CJ. Literature review and meta-analysis of

transcutaneous electrical nerve stimulation in treating chronic back pain. Regional Anesthesia & Pain Medicine,2018:43(4):425-433.
28. Awad Mohamed A, Abdel Hamid A. Atta Allah. (2019). "Effect of Electroacupuncture Versus Low Level Laser Therapy on Post Natal Low Back Pain." The 20th International Scientific Conference Faculty of Physical Therapy Cairo, 2018, 6-7.
29. Leite P, Mendonça AR, Maciel L, Poderoso-Neto ML, Araujo CC., *et al*. Does electroacupuncture treatment reduce pain and change quantitative sensory testing responses in patients with chronic nonspecific low back pain? A randomized controlled clinical trial. Evidence-Based Complementary and Alternative Medicine,2018:8.
30. Elserty N, Kattabei O, Elhafez H. Effect of fixed versus adjusted transcutaneous electrical nerve stimulation amplitude on chronic mechanical low back pain. Journal of Alternative & Complementary Medicine,2016:22(7):557-562.