

## ORIGINAL ARTICLE

IJPHY

## EFFECT OF STABILIZING EXERCISES AND ACUPUNCTURE ON POSTPARTUM SACROILIAC PAIN IN EGYPTIAN FEMALES: A RANDOMIZED CONTROL TRIAL

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## ABSTRACT

**Background:** Postpartum sacroiliac joint pain, is a serious problem for the mother, affect the ability to perform daily activities and minimize health-related quality of life. This study aimed to determine the effect of stabilizing exercises and acupuncture on postpartum sacroiliac pain.

**Methods:** Forty multiparous women with sacroiliac joint pain (SIJP), were included, aged 25 to 35 years, BMI not exceed 30kg/m<sup>2</sup>, parity less than 3 times, and delivered normally, they're assigned into two equal groups. Group (A) performed stabilizing exercises for lumbo-pelvic muscles and acupuncture. Group (B) received only acupuncture, were performed three times per week for two months (24sessions). The assessment throughout the present pain intensity (PPi) and the Oswestery disability questionnaire before and after the treatment.

**Results:** It revealed a significant decrease in the PPi scores and a significant improvement in functional disability in both groups (A,B). Group (A) showed a significant decrease in the PPi scores and significant improvement in functional disability with percentage of improvement was 75%% & 62.5% respectively more than in the group (B) the percentage of improvement was 40% & 46.7% respectively.

**Conclusion:** These results indicate that the lumbo- pelvic stabilizing exercises in conjunction with acupuncture were effective adjunct methods in alleviating postpartum sacroiliac joint pain.

**Keywords:** Postpartum; sacroiliac; pain; stabilizing exercise; Acupuncture; Egyptian females.

Received 23<sup>rd</sup> August 2016, revised 17<sup>th</sup> September 2016, accepted 05<sup>th</sup> October 2016



www.ijphy.org

10.15621/ijphy/2016/v3i5/117446

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## INTRODUCTION

SIJP is a pain from intra-articular structures, for example interosseous ligaments, the anterior sacroiliac ligament, posterior sacroiliac ligament, and articular cartilage in SIJ [1]. It joins torment rising up out of extra-articular structures that encompass the SIJs, for example, the iliolumbar and ligaments sacrotuberous, sacrospinous [2]. The incidence of sacroiliac joint pain between 13-30% [3- 4].

Sacroiliac joint pain (SIJP) is a frequent complaint during pregnancy and postpartum, about one in every five females complaining of some degree of pelvic discomfort. An extent will have thorough rigorous pain into the postnatal period [4]. Successful management to alleviate pain and avoid sever cases. This turns into an issue of significance for all worried with the ladies' wellbeing [5].

During pregnancy, relaxin has a range of effects, including rebuilding of collagen, thus incrementing the elasticity of tendons, muscles, ligaments and tissues of birth canal in view of delivery. Strain of muscle during birth can happen so during pushing strain occurs in the ligaments and muscles in the lumbar area [6-7].

Stabilizing exercise program for postpartum pelvic pain, improved functional ability and minimized pain [5].

The stabilizing sequence the strengthening to the segmental muscles, the neutral spine stabilization and reinforcing the prime movers. Firstly stabilization exercises for these muscles, and control individual segmental mobility. The next phase is the stability training; in form of direct and indirect reinforcing of muscle groups in neutral spine posture. Exercises started intended to find the neutral spine in different body positions as, sitting, prone lying and jumping aiming to improve awareness of pelvic and lumbar motion, and then exercises of extremities by putting up neutral spine and the integration of resistance to the extremities, either manually or by weights. Slowly performed exercises are with the accentuation on exact pelvic control. So enhance neuromuscular coordination, strength, improve endurance. Furthermore underlines the smaller postural stabilizer [8].

Finally, the prime movers and the larger and more superficial muscles of the trunk strengthening. These muscles are responsible for transferring load between the thoracic cage and the pelvis during movement of the spine. The function of these muscles is the equalization of the outside burdens over the storage compartment so the remaining powers exchanged to the lumbar spine can be taken care of by the neighborhood muscles [9].

The goals of stabilization exercises are in focusing training on special muscles that are important for stability, to represent the full range of potential levels of difficulty and increasing moment to the muscles stabilizing the lumbar spine. Lumbar stabilization exercise mainly act through transverses abdominis and multifidus, which mainly stabilize the spine [10].

Acupuncture a collection of procedures as penetration of the skin with needles so stimulates certain points on the

body. This should be possible in the typical path with needles, yet professionals might, likewise, utilize heat, pressure, impulse of magnetic energy, burning by a preparation of the herb (*Artemia vulgaris*), and electrical stimulation [11]. Acupuncture can have impacts through various mechanisms, as acupuncture points have electrical characteristics that, when activated change the level of chemical neurotransmitters in the body, as endorphins are released because of activation of the hypothalamus. The effects of needle therapy have furthermore been attributed to alterations in the standard electrical streams or electromagnetic fields in the body [12].

Needle therapy can have impacts through various systems, as needle therapy focuses have electrical qualities that, when invigorated conform the level of compound neurotransmitters in the body, as endorphins are released because of activation of the hypothalamus.

Acupuncture is said to restore the imbalance of energy and emotions due to sickness, overwork, stress, diet or injuries. The stimulation of acupuncture points on the body can discharge certain hormones and chemicals that can decrease pain, control the endocrine system, and calm the nervous system. Acupuncture regulates serotonin in the brain, increased T-cell count, which reduces of muscle spasm and improves the immune system. It moreover invigorates nerves, which conduct signals to the hypothalamic-pituitary system at the base of the brain [13].

## Objective

This study aimed to estimate the effect of stabilizing exercises and acupuncture on postpartum sacroiliac pain.

## METHODS

### 2.1. PATIENTS

Randomized controlled trial design was used for the current study. Forty volunteers multiparous postpartum women diagnosed with SIJP were referred by a doctor. Selected from the Outpatient Clinic of Obstetrics and Gynecology at EI Monira General Hospital.

Their ages ranged between (20-35) years and BMI ranged between (25-30) kg/ m<sup>2</sup> and the number of parity from (1 to 3) times, were house wives with a medium level of education and after normal vaginal delivery using local anesthesia. All patients were referred from orthopedist after examination within 6 to 16 weeks since last delivery. The medical and gynecological history for each patient was taken, including parity from (1 to 3) time, age, weight and history of neurological disorder. Subjects were randomized to group (A) and (B) by using the envelope method. "Lumbo-Pelvic Stabilizing Exercises (LPSE) and acupuncture" or "acupuncture only" written on it, was given to a staff physical therapist unrelated to the study; she/he picked one envelope after subjects agreed to take part in the study and sign a written approval consent form before the study. Group (A): received lumbo-pelvic stabilizing exercises in addition to acupuncture and Group (B) received only acupuncture. Both groups received same acupuncture as well as continued their ordinary daily living activities.

All subjects were instructed not to receive any drugs during the duration of the study. All subjects were not participating in any previous training program. Patients with other pain conditions (e.g. Cancer pain, neurological irritative conditions of the pelvis), patients with system disorders such as cardiovascular disorders and patients with contraindications to treatment (e.g., hemophilia, advanced liver disease, psychosis) were excluded from the study.

## 2.2. METHODS

### Interventions:

**Exercise procedures:** group (A) performed lumbo-pelvic stabilizing exercises three times per week for two successive months. Written regimen could be followed at home and work.

Lumbo- pelvic stabilizing exercise was done by all patients in the group (A): depending on exercising of transverse abdominal in addition to coactivation of lumbar multifidus muscles at the lumbosacral area [14], exercising of oblique abdominal, gluteus maximus, latissimus dorsi muscles [15], quadratus lumborum, erector spinae, also, hip abductors and adductors. The stress was on exercising of transverse abdominal muscles, in form of bridging exercise, posterior pelvic rocking exercise, bilateral hip abduction and adduction exercise, hip shrugging, and bilateral knees elevation.

The patient lying on the side, kneeling, four points, sitting, and standing. The subjects were encouraged to activate the transversely oriented abdominal muscles regularly during daily activities. They performed two sets of exercise from 10-15 times (firstly 10 times in the 12 sessions after that 15 times, for the others 12 sessions). Rest for 30-second to one minute between each set. Home program session performed for 10 minutes twice a day. Each session lasted 45 minutes.

1) Posterior pelvic tilting: from the crock lying the subject asked to contract glutei, abdominal muscles and press lumbar region down against the plinth, hold, then relax. Sustained muscle contraction maintained for 5 seconds, followed by 10 seconds of relaxation and repeated 10 times/session [16].

2) Bridging exercise: From the crock lying position with arms beside the body and palms facing the plinth, then the participant raises her pelvis up from the plinth, holds for 5 seconds and relaxes for 10 seconds. This exercise was repeated 5 times each session [17].

3- Bilateral hip abduction (adduction): From the crock lying position, the participant was asked to abduct (adduct) her lower limbs against the therapist hand, hold for 5 seconds then, relax for 10 seconds. This exercise was repeated 5 times each session. This exercise could be performed in other positions as from side lying and a pillow between legs [18].

4- Bilateral knees raise exercise: From the supine lying position, the participant was asked to raise her lower limbs against the therapist hand, hold for 5 seconds then, and re-

lax for 10 seconds. This exercise was repeated 5 times each session [17].

5- Hip shrugging exercise: From the half crock lying, the subject contracted the abdominal muscles, draw the straight leg up towards the ribs to seem shorter then push down to seem longer, then relax and return to starting position [19].

All exercises instructed individually, and performed at home-exercises on a daily basis.

**Acupuncture technique:** It was performed for all subjects in both groups (A&B) three times per week for 2 successive months (24sessions).

**Acupuncture needles:** are made of stainless steel wire, must be disinfected between uses and disposable. The length between 13 to 130 millimeters (0.51 to 5.1 in), the shorter needles utilized close to eyes and the face, and the long in more fleshy zones; The diameters from 0.16 mm (0.006 in) to 0.46 mm (0.018 in), with thicker needles utilized on more robust patients. Thinner needles may need tubes for insertion and are flexible and. The tip of the needle ought not to be made too sharp to prevent breakage, although blunt needles because the more pain [20].

Aside from the typical fusiform needle, there are likewise other needle sorts, which can be used, for example, three-edged needles and the Nine Ancient Needles. Japanese acupuncturists utilize to a great degree flimsy needles that are utilized externally, now and then without entering the skin, and encompassed by an aide tube (a method embraced in China and the West). Korean needle therapy utilizes copper needles and has a more prominent spotlight on the hand [21].

### Needles insertion

The needles are inserted after the skin were sterilized with alcohol. Needles manipulated in different ways, for example, flicked, spun, or moved up and down relative to the skin. As pain felted in the superficial layers of the skin, a rapid insertion of the needle must done.

**Tools:** the following tools were used for both groups.

- Plinth: It was used for the application of treatment.
- Cotton and Alcohol: It was used to clean the treated areas before application of acupuncture in both groups (A&B).

### Position of the patient:

#### Procedures of Acupuncture application:

Each patient in both groups (A&B) was instructed briefly and clearly about the values of acupuncture in decreasing sacroiliac joint pain to gain her confidence and cooperation.

**Application of acupuncture:** Was done for both groups (A&B) for three sessions of per week, for 30 minutes for eight weeks, patients instructed to avoid other interventions during the treatment period, and a total of 4 segmental points will be used (LI4, BL26, GB30 and BL54). The disinfected needles inserted intramuscularly in the area of treatment to a profundity of 15-70 mm to elicit needle

sensation, depicted as tingling, pressure, and frequently a transmitting sensation from the area of insertion, inducing activation of muscle-nerve afferents. The needles maintained in place for 30 minutes and activated by hands at consistent intervals every 10 minutes. Maternal heart rate and blood pressure were noticed pre and post treatments.

**Position of the patient:**

The patient lay in a comfortable side lying position.

Anatomical position of Acupuncture:

- LI4- This point is situated on the hand dorsal surface, in between the 1<sup>st</sup> and the 2<sup>nd</sup> metacarpal bones (Fig.1).
- BL26-This point is situated on 1.5 cun laterally to the midline surface with L5 spinous process (Fig.2).
- GB30-This point is situated on the connection of the medial 2/3 and lateral 1/3 of the area between the hiatus of the sacrum and greater trochanter (Fig.2).
- BL54-This point is situated on the middle zone of transverse crease of the popliteal fossa between the semitendinosus tendon and biceps femoris (Fig.3).

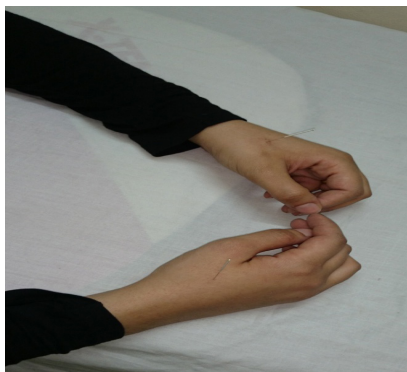


Figure 1: LI4 point

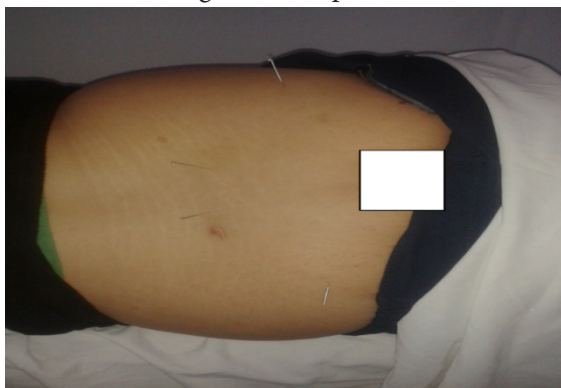


Figure 2: BL26&GB30 points

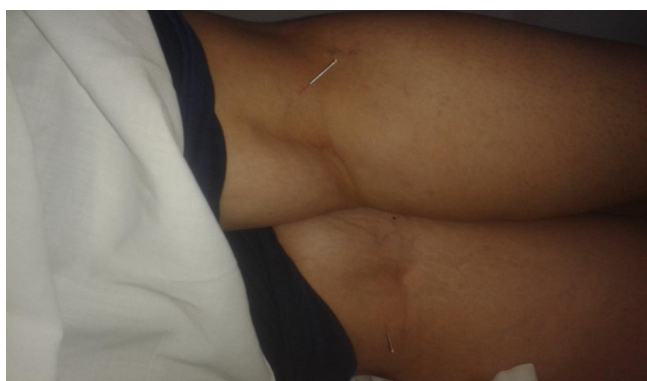


Figure 3: BL54 point

**2.3. Methods of Subject Evaluation:** All subjects in both groups were evaluated before and after 2 months of program through:

**1) Present pain intensity (PPI) scale:** Measure pain intensity scored as: no pain=0, mild pain=1, moderate pain=2, severe pain=3, unbearable pain=4 [22].

**2) Oswestry disability questionnaire for measuring functional disability:** Assess functional disability. It divided in to 10 questions (multiple choice); subject can select one sentence out of six describing her pain, the higher scores meant the great pain [23].

**2.4. STATISTICAL ANALYSIS:**

Descriptive statistics including mean ± standard deviation (SD). T-test for comparison between the two studied groups (A&B). Mann-Whitney U test for comparison between not normally distributed variables in the two groups (A&B). Wilcoxon Signed Ranks test for comparison between before and after assessment within the same group. For data analysis we used SPSS computer program (version 16 windows). The P value < 0.01 was considered a highly significant result and less than or equal to 0.05 was considered significant result [24].

**RESULTS**

**3.1. General characteristics of the subjects in both groups (A&B):**

There was no statistical significant difference in the mean values of age and BMI among two groups (A and B) at the beginning of the study as p value= 0.668 and p value= 0.640, respectively (Table1).

**Table 1: General characteristics of the subjects in two groups (A&B)**

Variables	Group A (n= 20)	Group B (n= 20)	t value	P value
Age (years.)	25.85 ± 3.01	25.50 ± 2.01	0.432	0.668 (NS)
Height (kg.)	161.65 ± 4.64	160.15 ± 4.04	1.090	0.282 (NS)
weight (cm.)	74.6 ± 5.07	73.85 ± 3.91	0.524	0.604 (NS)
BMI (Kg/m <sup>2</sup> )	28.51 ± 1.39	28.73 ± 1.53	-0.472	0.640 (NS)

**3.2. Sacroiliac joint pain intensity assessed by PPI scale pre and post treatment program for two groups (A&B):**

As shown in Table (2) we used Mann Whitney test to compare among the median values of PPS in the two groups (A&B). Pre treatment, there was no statistical significant difference between group A [2.0 (2.0-4.0)] and group B [2.5 (1.0-4.0)] as p value was (0.689). On the other hand, post treatment findings recorded a significant reduction of the median values of PPS in group A [0.5 (0.0-3.0)] when compared with its corresponding values in group B [1.5 (0.0-4.0)] as p value was (0.036).

**Table 2:** Median values of the present pain intensity (PPI) in two groups (A&B) pre & post treatment

Variables	Pain intensity (score)		Z value	P value
	Group A (n= 20)	Group B (n= 20)		
Before	2.0 (2.0-4.0)	2.5 (1.0-4.0)	-0.401	0.689 (NS)
After	0.5 (0.0-3.0)	1.5 (0.0-4.0)	-2.093	0.036*(S)

As shown in Table (3) Wilcoxon sign rank test was used to compare among pre and post treatment of (PPI) within the same group.

Regarding the group A, there was a statistically highly significant reduction of the median value of PPI measured post treatment [0.5 (0.0-3.0)] when compared with its corresponding value in pre treatment [2.0 (2.0-4.0)] as p value was (0.001).

Also in the group B, there was statistically highly significant reduction of the median value of PPI measured post treatment [1.5 (0.0-4.0)] when compared with its corresponding value in pre treatment [2.5 (1.0-4.0)] as p was (0.001). The percentage of improvement in PPI was higher in group A (75%) than in group B (40%).

**Table 3:** Median values of the present pain intensity (PPI) measured pre and post treatment in two groups (A&B).

Variables	Pain intensity (score)	
	Group A (n= 20)	Group B (n= 20)
Before treatment	2.0 (2.0-4.0)	2.5 (1.0-4.0)
After treatment	0.5 (0.0-3.0)	1.5 (0.0-4.0)
<b>Difference</b>	1.5	1
Percentage of reduction	75%	40%
<b>Z value</b>	-4.179	-4.123
<b>P value</b>	0.001(HS)**	0.001(HS)**

Data are expressed as median (minimum-maximum). \*\*HS= highly significant.

Regarding the group (A) pre treatment, the majority of females had unbearable pain [4(20.0%)], severe pain [25(25.0%)] and moderate pain [11(55.0%)] were improved post treatment where these females had no pain and mild pain, which are increased to [10(50.0%)] & [5(25.0%)], respectively, as shown in table (4).

**Table 4:** The PPI severity in group A measured pre and post the treatment.

	Pre	Post
<b>No pain</b>	0 (0.0%)	10 (50.0%)
<b>Mild pain</b>	0 (0.0%)	5 (25.0%)
<b>Moderate pain</b>	11 (55.0%)	3 (15.0%)
<b>Severe pain</b>	5 (25.0%)	2 (10.0%)
<b>Unbearable pain</b>	4 (20.0%)	0 (0.0%)

Data are expressed as the number of (%).

While in the group (B): pre treatment, the majority of females had unbearable pain [4(20.0%)], severe pain [6(30.0%)] and moderate pain [6(30.0%)] were improved

post treatment where these females had moderate pain, mild pain and no pain which are increased to [5(25.0%)] & [6(30.0%)], and [4(20.0%)] respectively, as shown in table (5).

**Table 5:** The PPI in group B measured pre and post treatment.

	Before	After
<b>No pain</b>	0 (0.0%)	4 (20.0%)
<b>Mild pain</b>	4 (20.0%)	6 (30.0%)
<b>Moderate pain</b>	6 (30.0%)	5 (25.0%)
<b>Severe pain</b>	6 (30.0%)	3 (15.0%)
<b>Unbearable pain</b>	4 (20.0%)	2 (10.0%)

Data are expressed as number (%).

### 3.3. Functional Disability assessed by Oswestry disability questionnaire pre and post treatment program for two groups (A&B):

As shown in Table (6) we used Mann Whitney test to compare among the median values of Oswestry disability questionnaire in two groups (A&B). Pretreatment, there was no statistical significant difference between the median value in group A (40.0 (25.0-80.0)) and group B (37.5 (20.0-65.0)) as z value was -0.611 and p value was 0.541. On the other hand, post treatment, there was a statistical significant difference between median value in group A (15.0 (10.0-45.0)) and group B (20.0 (10.0-60.0)) as z value was -2.026 and p value was 0.043.

**Table 6:** Comparison between the median values of Oswestry disability questionnaire in the two studied groups measured pre- and post-assessment.

	Group A (n= 20)	Group B (n= 20)	Z value	P value
Before treatment	40.0 (25.0-80.0)	37.5 (20.0-65.0)	-0.611	0.541 (NS)
After treatment	15.0 (10.0-45.0)	20.0 (10.0-60.0)	-2.026	0.043*

Data are expressed as median (minimum-maximum). NS= p> 0.05= not significant; \*p< 0.05= significant.

As shown in Table (7) Wilcoxon sign rank test was used to compare among pre and post treatment of Oswestry disability questionnaire within the same group.

Regarding the group A, there was a statistical significant reduction of the median value of Oswestry disability questionnaire measured post treatment (15.0 (10.0-45.0)) when compared with its corresponding value in pre-assessment (40.0 (25.0-80.0)) as z value was -3.924 and p value was 0.001.

Also in the group B, there was a statistical significant reduction of the median value of Oswestry disability questionnaire measured post treatment (20.0 (10.0-60.0)) when compared with its corresponding value in pre treatment (37.5 (20.0-65.0)) as z value was -3.731 and p value was

0.001). The percentage of improvement in Oswestry disability questionnaire was higher in group A (62.5%) than in group B (46.7%).

**Table 7:** Comparison between the median values of Oswestry disability questionnaire measured pre and post treatment in two groups (A&B).

	Group A (n= 20)	Group B (n= 20)
Before treatment	40.0 (25.0-80.0)	37.5 (20.0-65.0)
After treatment	15.0 (10.0-45.0)	20.0 (10.0-60.0)
Difference	25.0	17.5
Percentage of reduction	62.5	46.7
Z value	-3.924	-3.731
P value	0.001(HS)**	0.001(HS)**

Data are expressed as median (minimum-maximum). \*\*p< 0.01= highly significant.

## DISCUSSION

Postpartum sacroiliac joint pain is a serious issue for the ladies, as it affects their execution of living activities and it affects her family and society [25].

Lumbo pelvic stabilization exercises of the local muscle system have been upheld by physiotherapists as a powerful method for enhancing so as to treat endless low back agony the stability of the lumbar spine [26].

The results revealed that treatment program containing lumbo-pelvic stabilizing exercise in addition to acupuncture (group (A) produced a significant decrease of pain intensity score and significant improving functional status compared to using acupuncture alone (group (B) after two months of treatment, which indicated that performing lumbo-pelvic stabilizing exercise and using acupuncture is more effective in reducing sacroiliac joint pain than using acupuncture alone.

Many studies supported the role of core stabilization in protecting the spine from excess shifting and shearing of vertebral structure the core stability model comprises of passive and active stabilization structures as well as a third, frequently slighted subsystem, called the neuromotor system. This fundamental system is important for the active structures, for example, muscles to give preemptive or rather fast reactions to the body's needs [27].

Stabilization training can be done from numerous body positions. 4-point kneeling, with the trunk in horizontal position and hands and knees touching the ground. These exercises prepared the recruitment pattern of specific trunk muscles and decreased spinal loads [19].

The muscular and ligamentous relationships composing the lumbosacral connection are of great significance in stabilizing the lumbar vertebrae with sacroiliac joint and arrangement has been termed a self-bracing mechanism. The trunk muscles, the abdominals have been accounted for to build the stability of the lumbosacral and sacroiliac joint, further controls excessive anterior tilt of the pelvis [28, 29]. Studies have shown that part of core, i.e. transverse ab-

dominal contraction diminishes the laxity of the sacroiliac joint. It was revealed that all core is required for ideal stabilization and performance in sacroiliac mechanics [30, 31].

“CORE” is considered as a box with the paraspinals and gluteus in the back, the abdominals in the front, the pelvic floor and hip girdle musculature as the bottom and the diaphragm as the roof. It considered as a muscular corset that works as a unit to control the body and spine, at rest and during limb movement [28].

Carolyn et. al.(2002) demonstrated that there is noteworthy reduction in the joint laxity in the sacroiliac joint when the transverse abdominal muscles were trained [30].

The results agree with those of in the study of Barr et al. (2005) they assessed the advantages of the lumbar stabilization program to improve low back pain proved their point that the core muscles strengthening have an important role in the lumbar stabilization and diminish low back pain [31].

These results are in concurrence with Christopher et al. (2008) revealed that the incorporated back stability program, including core strengthening along with the other trunk stabilizing exercises incorporated the patients complaining from chronic low back pain by lessening pain and disability [32].

Additionally, Fabio Renovato et. al. (2010) performed a study wherein they took two groups where one group was trained with segmental stabilization exercises and the other with only superficial strengthening regime and in which he proved that both do reduce the pain, but segmental stabilization of the core muscles was better than the superficial strengthening regime in alleviating pain and disability in patients complaining from chronic back pain, and the superficial strengthening does not enhance transverses abdominis activation capacity [33].

Felipe Pivetta et. al. (2008) recommended that the recruitment of trunk strength and stability has a beneficial outcome on the low back and pelvis pain and kinematics and in addition on body balance [34].

Craig Leibenson et. al. (2004) studied the relationship between the sacroiliac joint musculature with lumbo pelvic instability and showed that the exercises of the key stabilizers of the lumbo pelvic region do re-establish the pain [35].

Paulo et al. (2006) expressed that particular stabilization exercise was valuable in diminishing inability and pain in pelvic and spinal pain [36].

Richardson and Jull (1995) concluded that the particular sub maximal exercises of the lumbar stabilizers muscles of lumbar region and including of this exercises into functional activities reduced both functional inability and degree of pain in low back pain patients [26].

The results were furthermore bolstered by study [37] that utilized the Oswestry disability questionnaire to evaluate the patient's level of functional inability; they reported decline in functional inability in the stabilizing training

group.

Stuge et al. (2004) inferred that certain stabilizing exercises seems to be more viable than physical therapy without stabilizing training for pelvic girdle pain after pregnancy. Following labor by 1 year, the specific stabilizing exercise group exhibited statistically significant decreased in lower disability, pain level, and improve quality of life when compared with the control group. Significant differences were, likewise, recorded for physical tests, in favor of the specific exercise group. Disability was reduced by more than 50% in the exercise group; changes were negligible in the control group. [5].

Besides, Noren et al. (2002) reported from a 3-year follow-up study of pregnant women with PGP and LBP is probably achieved by deficiency in the dorsal muscles and pelvic [38]. With duration of exercising for 5 months, the musculoskeletal system to the point of activating the muscle-tendon-fascia system that controls force closure of the pelvis [39].

Besides, Noren et al. (2002) reported from a 3-year line up investigation of pregnant women with LBP and PGP [38]. The musculoskeletal framework to the point of initiating the muscle-ligament sash framework that controls power conclusion of the pelvis. This, with length of practicing for 5 months

Most likely added to the long-term effects. The maintained improvements may also be explicated by the essence of integrating the stabilizing exercises into everyday activities. The aims of the exercises were to get an improved ability to dynamically stabilize the lumbopelvic region during functional tasks and to change automatic patterns of muscle recruitment within the trunk musculature. As in the study [37] reported that the coactivation of the multifidus and transverse abdominal muscles, particularly in conditions where they experienced pain. This is a key to strengthen the muscles, to such an extent that the examples of coactivation would over the long times occur actually, without a prerequisite for cognizant control in the midst of activities and regular positions of ordinary living. The noteworthiness of muscle control to prepare the muscle recruitment between the small intrinsic spine muscles and the large muscles to gain strength in the daily living activities is moreover presented in the study [40].

The contraction of the transversus abdominis has been appeared to reduce the laxity of the SI joint. This decline in laxity is more than that brought on by a bracing action using all the lateral abdominal muscles. These discoveries are in accordance with the authors' biomechanical model expectations and support the utilization of independent transversus abdominis contractions for the treatment of low back pain. Stabilizing exercises can be utilized to adjust muscular imbalances in strength and enhance force transfer, diminishing stress on the pelvis and lumbar spine [41]. Acupuncture was advanced more than 2000 years ago in China. It incorporates the inclusion of fine needles into specific points appropriated over the body surface which

improve a systemic and local healing process [42]. It relies on the possibility that vital energy (qi) courses through the body along particular meridians or pathways, when, which imbalanced results in disease symptoms [43]. Needling of different points along these meridians can decrease side effects through restoring the harmony in the body. There are no clinical trials assessing the usage of acupuncture for the management of SI joint pain in the general population, much has been written investigating the efficacy of this modality in the low back pain patients. Acupuncture has been provided to be efficacious for alleviation of side effect [44,45].

Regarding group (B) the reduction of SIJ pain through the application of acupuncture has been determined that acupuncture application increments endomorphin-1, beta endorphin, enkephalin, and serotonin levels in plasma and brain tissue. It has been reported that the increases of endomorphin-1, beta endorphin, enkephalin, serotonin, and dopamine cause analgesia, sedation, and recovery in motor functions. They, likewise, have immunomodulation effects on the immune system and lipolytic effects on metabolism. Because of these effects, acupuncture is used in the treatment of pain syndrome illnesses [46].

It can be concluded that stabilizing exercises for lumbo-pelvic muscles in addition to using acupuncture decrease of postpartum sacroiliac joint pain and improve the function disability in Egyptian females.

#### **Study limitations**

The study has some limitations; the main limitation was the individual variation between the patients and their ability to bear the pain, also the psychological condition of the patients during the postpartum period. And the small sample size.

#### **CONCLUSION**

Our study findings showed that performing the lumbo-pelvic stabilizing exercise in addition to using of acupuncture were very effective methods in the reduction of postpartum sacroiliac joint pain and improving the functional status than using acupuncture alone.

#### **ACKNOWLEDGMENTS**

We are grateful for the support and cooperation of all patients who participated in this study.

**Financial support and sponsorship** Nil.

#### **Conflicts of interest**

There are no conflicts of interest.

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#### **Citation**

Embaby, H. M., El Refaye, G. E., & Abdel Aziz, G. F. (2016). EFFECT OF STABILIZING EXERCISES AND ACUPUNCTURE ON POSTPARTUM SACROILIAC PAIN IN EGYPTIAN FEMALES: A RANDOMIZED CONTROL TRIAL. *International Journal of Physiotherapy*, 3(5), 594-602.