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RESEARCH ARTICLE
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COMPARISON OF THE EFFECT OF GUIDED IMAGERY TECHNIQUE WITH PILATES AND CONVENTIONAL INTERVENTION ON PAIN, FATIGUE, KINESIOPHOBIA, MUSCLE ENDURANCE AND FLEXIBILITY IN POSTPARTUM LUMBOPELVIC PAIN

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ABSTRACT

AIM: To compare the effect of guided imagery technique, Pilates, and conventional intervention on postpartum lumbopelvic pain.

Background:

Objective: To find out the effect of the guided imagery technique with Pilates on postpartum lumbopelvic pain. Setting: Physiotherapy Department Santosh Hospital, Ghaziabad. Participants: 30 participants were recruited. Interventions: Participants were randomly assigned into 3 groups: Group A (N=10) - Pilates Group B (N=10) - Guided imagery technique with Pilates Training, Group C (N=10)- Conventional treatment (duration – 30-40minutes for 3 weeks).Outcome Measures: NPRS, MAF, The Tampa Scale. Results: The study experimented with three procedures before treatment and after 3 weeks. Then, clinical measures were computed in the three groups. In the present study ($p<0.05$), there is significant improvement in Pain, fatigue, and flexibility. The findings suggest that Pilates training, guided imagery technique with Pilates, and Conventional therapy would be equally effective in treating lumbopelvic pain in postpartum. Also, in terms of flexion and extension circuit training would be more helpful compared to other exercises Conclusion: The study findings revealed that training exercises like Circuit training, Pilates training, and conventional therapy were equally effective in improving lumbopelvic pain in postpartum

Keywords: Postpartum Lumbopelvic Pain, Pilates, Guided Imagery

INTRODUCTION

A postpartum period or postnatal period is the period beginning immediately after the birth of a child and extending for about six weeks. Less frequently used are the terms puerperium or puerperal period. The World Health Organization (WHO) describes the postnatal period as the most critical and yet the most neglected phase in the lives of mothers and babies.[1]Postpartum back pain in women who just gave birth usually happens when the abdominal muscles are weakened and the stability of the lumbar spine is compromised with inability to support the weight of her body. Back pain is considered a normal consequence of pregnancy and is expected to disappear shortly after delivery. The postpartum period has been termed the “fourth stage of labor”, and has three distinct but continuous phases. The

initial or acute period involves the first 6–12 hours postpartum. This is a time of rapid change with a potential for immediate crises such as postpartum hemorrhage, uterine inversion, amniotic fluid embolism, and eclampsia. The second phase is the subacute postpartum period, which lasts 2–6 weeks. During this phase, the body is undergoing major changes in terms of hemodynamics, genitourinary recovery, metabolism, and emotional status. Nonetheless, the changes are less rapid than in the acute postpartum phase and the patient is generally capable of self-identifying problems.The third phase is the delayed postpartum period, which can last up to 6 months. Changes during this phase are extremely gradual, and pathology is rare. This is the time of restoration of muscle tone and connective tissue to the prepregnant state. Although change is subtle during this phase, it behooves caregivers to remember that a woman's body is nonetheless not fully restored to prepregnant physiology until about 6 months postdelivery.[4].

Postpartum back pain in women who just gave birth usually happens when the abdominal muscles are weakened and the stability of the lumbar spine is compromised with the inability to support the weight of her body. Pregnancy-related lumbopelvic pain is defined as a pain of unclear etiology and pathophysiology that affects almost half of pregnant women and is felt in the pelvic girdle and/or lumbar vertebral region.[2]Pregnancy-related lumbopelvic pain may persist in the postpartum period. The majority of women recover from pregnancy-related lumbopelvic pain within 3 months of delivery. The pain usually decreases in the first 6 months of the postpartum period but it was also reported that it may persist for up to 3 years postpartum[3]. Its prevalence for the 1 month of following delivery was reported to be 35%[2, 1]. Pregnancy is a period during which certain physical and hormonal changes occur. All of these physiological changes are believed to contribute to musculoskeletal system pains. It was reported that psychological factors such as stress may also be influential on the development of pregnancy-related lumbopelvic pain, in addition to physical and hormonal factors [1]Biomechanical and hormonal changes from pregnancy are largely reversed by 3 months postpartum; consequently, it is assumed that other factors might interfere with recovery and explain the disability level postpartum.[3] The majority of women recover from pregnancy-related lumbopelvic pain within 3 months of delivery however; postpartum follow-up studies have shown that about 8–20% of women still have persistent non-specific lumbopelvic pain 2–3 years after delivery that interferes with daily activities Since few women recover from lumbopelvic pain later than 3 months after delivery, women still in pain at 3 months are considered at risk for persistent pain.[3,2]This pain could be induced due to various factors some of them are muscle strain, coccyx pain, sedentary lifestyle, bad posture and hormonal factor[11].

Postpartum rehabilitation of the associated lumbopelvic musculature with specific stabilization on exercises is recommended to reduce pain, improve long-term outcomes, and prevent chronicity. [3 It] may even compensate for weakness in ligament function.[10] Many resources have been used to treat lower back pain, such as laser, massage, spinal manipulation, TENS (transcutaneous electrical nerve stimulation), hydrotherapy, acupuncture, and ultrasound, however, few of these show significant improvement and/or have sound scientific evidence at their basis. An exception is therapeutic exercise, which has shown good results.

Subject and Methods

Study design: Experimental Study design. A randomized sampling method was used for the selection of patients and divided into 3 groups. The sample size was kept to 30 based on inclusion and exclusion criteria and it was further divided into 3 groups of 10 each. We kept the inclusion criteria 1) Individuals with postpartum lumbopelvic pain, 2) Age group 25-35, 3) Normal as well as Caesarean delivery, 3) only primiparous, 4) Delivered a child within the past 3 to 15 months, 5) At least 3 months of non specific LBP, 6) Two or more Positive Posterior Pelvic pain provocation test. Exclusion Criteria were kept 1) Severe trauma, 2) fractures to the spine, pelvis, and lower extremity, 3) Autoimmune disorders, 4) Radiculopathy, 5) Primary neoplasm, metastases, 6) any contraindication to exercise therapy, 7) Pregnancy, 8) with thyroid disorders. **Study Duration** was

kept to 4 weeks. **Instruments and tools** required to perform this were: Stopwatch, Measuring Tape and Flashcards.

Procedure

We included 30 patients with postpartum lumbopelvic pain who fulfilled the inclusive criteria and were divided into three groups, 10 subjects in each group. An informed consent was signed by all subjects before including in the study. All subjects were assessed and pre-reading was taken for pain by NPRS, for fatigue by MAF, for kinesiophobia by TSK, for muscle endurance by curl-up test, and for flexibility of lumbar by original schober's test. After 2 weeks reading was taken then, After 4 weeks reading was again taken. Treatment protocol -30 min session was given. After giving the treatment all subjects were reassessed and the data was subjected to statistical analysis.

Statistical Analysis

Data were summarized as Mean ± SD (standard deviation). Groups were compared by repeated measures two-way analysis of variance (ANOVA) and the significance of mean difference within (intra) and between (inter) the groups was done by Tukey's post hoc test after ascertaining normality by Shapiro-Wilk's test and homogeneity of variance between groups by Levene's test. A two-tailed p-value less than 0.05 ($p<0.05$) was considered statistically significant. Analyses were performed on SPSS software (windows version 17.0)

RESULTS

The present study compares the effect of guided imagery technique with Pilates and conventional intervention on pain, muscle endurance, kinesiophobia, flexibility & fatigue in postpartum lumbopelvic pain. A total 30 symptomatic patients of either sex were recruited and randomized equally into three groups and treated with Pilates (Group A), guided imagery technique with Pilates (Group B), and conventional treatment (Group C). The outcome measures of the study were NPRS, MAF, TAMPA SCALE (TS), ORIGINAL SCHOBER'S TEST (OST), and ONE MINUTE CURL-UP TEST (CUT) assessed for pain, fatigue, kinesiophobia, flexibility, and muscle endurance respectively. The outcome measures were assessed at pretreatment (0 week) and post-treatment (2 week and 4 week).

The comparative outcome measures (NPRS, MAF, TS, OST, and CUT) of three groups (Group A, Group B, and Group C) over the periods (0 wk, 2 wk and 4 wk) are summarized below in sections I to V, respectively.

NPRS: The pre (0wk) and post (2wk and 4wk) NPRS scores of the three groups are summarized in Table 1 and also shown in Fig. 1. Table 1 and Fig. 1 both showed that the mean NPRS score in all three groups decreased (improve) after the treatments and the decrease (improvement) was evident highest in Group B followed by Group A and Group C the least. Comparing the effect of groups (treatment) and periods (time) on NPRS scores, ANOVA revealed the insignificant effect of groups ($F=1.75$, $p=0.193$) while the significant effect of periods ($F=102.54$, $p<0.001$) on NPRS scores. Further, the interaction of both groups and periods (groups x periods) on NPRS score was also found significant ($F=8.22$, $p<0.001$). For each group, comparing the mean NPRS score between the periods (Table 2 and Fig. 2), the Tukey test showed a significant ($p<0.05$ or $p<0.001$) decrease in the NPRS score of all three groups at both 2wk and 4wk as compared to 0wk except Group C between 0wk and 2 wk. Further, the mean NPRS score in all three groups also decreased significantly ($p<0.05$ or $p<0.001$) at 4wk as compared to 2 wk. Similarly, for each period, comparing the mean NPRS score between the groups (Table 3 and Fig. 3), the Tukey test showed a similar ($p>0.05$) NPRS score between the groups at all periods except 4 wk. At 4wk, the mean NPRS score decreased significantly ($p<0.01$) in Group B as compared to Group C. At the end of the final evaluation, the net improvement (i.e. mean change from 0 to 4 wk) in pain was found highest in Group B (51.3%) followed by Group A (31.4%) and Group C (21.1%) the least. In conclusion, all three interventions is effective in the

management of pain in patients with postpartum lumbopelvic pain but Group B was found to be the most effective followed by Group A and then Group C.

Table 8.1: Pre and post-NPRS score (Mean ± SD, n=10) of three groups

Group	0 week	2 week	4 week	Net change (%)
Group A	7.00 ± 1.25	5.90 ± 0.99	4.80 ± 1.03	31.4
Group B	7.60 ± 0.97	5.70 ± 0.95	3.70 ± 1.42	51.3
Group C	7.10 ± 1.37	6.60 ± 0.70	5.60 ± 0.97	21.1

Table 2: For each group, comparison (p value) of mean NPRS score between the periods by Tukey test

Periods	Group A	Group B	Group C
0 week vs. 2 week	0.019	<0.001	0.784
0 week vs. 4 week	<0.001	<0.001	<0.001
2 week vs. 4 week	0.019	<0.001	0.046

Table 3: For each period, comparison (p-value) of mean NPRS score between the groups by Tukey test

Groups	0 week	2 week	4 week
Group A vs. Group B	0.946	1.000	0.392
Group A vs. Group C	1.000	0.880	1.000
Group B vs. Group C	0.982	0.656	0.009

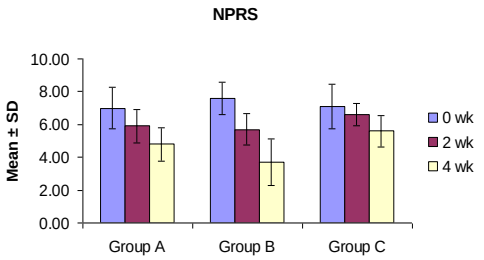

Fig 8.2. Mean NPRS score within the group's

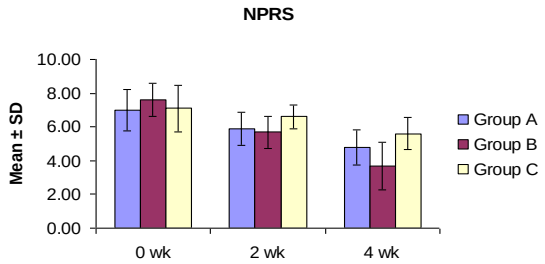

Fig 8.3. Mean NPRS score between the groups

MAF: The pre (0wk) and post (2wk and 4wk) MAF scores of the three groups are summarized in Table 4 and also shown in Fig. 4. Table 4 and Fig. 4 both showed that the mean MAF score in all three groups decreased (improve) after the treatments but the decrease (improvement) was evident similar among the groups. Comparing the effect of groups (treatment) and periods (time) on MAF scores, ANOVA revealed the insignificant effect of groups ($F=2.46$, $p=0.106$) while the significant effect of periods ($F=291.96$, $p<0.001$) on MAF scores. Further, the interaction of both groups and periods (groups x periods) on MAF score was also found significant ($F=6.35$, $p<0.001$). For each group, comparing the mean MAF score between the periods (Table 5 and Fig. 5), the Tukey test showed a significant ($p<0.01$ or $p<0.001$) decrease in MAF score at both 2 wk and 4wk as compared to 0wk in all three groups. Further, the mean MAF score in all three groups also decreased significantly ($p<0.001$) at 4wk as compared to 2 wk. Similarly, for each period, comparing the mean MAF score between the groups (Table 6 and Fig. 6), the Tukey test showed similar ($p>0.05$) MAF scores between the groups at all periods i.e. did not differ significantly. At the end of the final evaluation, the net improvement (i.e. mean change from 0 to 4 wk) in fatigue was found highest in Group B (37.3%) followed by Group A (33.1%) and Group C (22.7%) the least. In conclusion, all the three interventions is effective in the management of fatigue in patients with postpartum lumbopelvic pain but the effect was similar among the group

Table 10: Pre and post-OST score (Mean ± SD, n=10) of three groups

Group	0 week	2 week	4 week	Net change (%)
Group A	3.06 ± 0.66	4.08 ± 0.53	5.03 ± 0.55	39.2
Group B	2.51 ± 0.42	4.15 ± 0.31	4.99 ± 0.57	49.7
Group C	2.68 ± 0.74	4.07 ± 0.27	4.20 ± 0.54	36.2

Table 11: For each group, comparison (p-value) of mean OST score between the periods by Tukey test

Periods	Group A	Group B	Group C
0 week vs. 2 week	<0.001	<0.001	<0.001
0 week vs. 4 week	<0.001	<0.001	<0.001
2-week vs. 4 week	<0.001	0.001	0.999

Table 12: For each period, comparison (p-value) of mean OST score between the groups by Tukey test

Groups	0 week	2 week	4 week
Group A vs. Group B	1.000	1.000	1.000
Group A vs. Group C	1.000	0.024	0.959
Group B vs. Group C	1.000	0.038	0.999

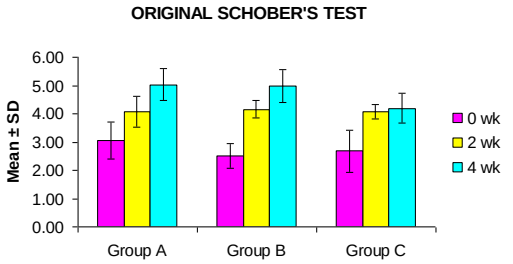

Fig 8.11. Mean OST score within the group's

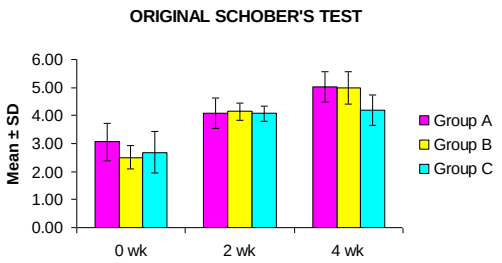

Fig 8.12. Mean OST score between the groups

ONE MINUTE CURL-UP TEST: The pre (0wk) and post (2wk and 4wk) ONE MINUTE CURL-UP TEST (CUT) scores of three groups are summarized in Table 13 and also shown in Fig. 13. Table 13 and Fig. 13 both showed that the mean CUT score in all three groups increase (improve) after the treatment and the increase (improvement) was evident highest in Group B followed by Group C and Group A the least. Comparing the effect of groups (treatment) and periods (time) on CUT scores, ANOVA revealed the insignificant effect of groups ($F=2.12$, $p=0.139$) while the significant effect of periods ($F=122.64$, $p<0.001$) on CUT scores. However, the interaction of both groups and periods (groups x periods) on CUT score was found insignificant ($F=1.81$, $p=0.140$). For each group, comparing the mean CUT score between the periods (Table 14 and Fig. 14), the Tukey test showed a significant ($p<0.01$ or $p<0.001$) increase in the CUT score of all three groups at both 2wk and 4wk as compared to 0 wk. Further, the mean CUT score in all three groups also increased significantly ($p<0.01$ or $p<0.001$) at 4wk as compared to 2 wk.. Similarly, for each period, comparing the mean CUT score between the groups (Table 15 and Fig. 15), the Tukey test showed similar ($p>0.05$) CUT scores between the groups at all periods i.e. did not differ significantly. At the end of the final evaluation, the net improvement (i.e. mean change from 0 to 4wk) in muscle endurance was found highest in Group B (45.9%) followed by Group C (39.7%) and Group A (36.8%) the least. In conclusion, all the three interventions is effective in the management of muscle endurance in patients with postpartum lumbopelvic pain but the effect was similar among the groups

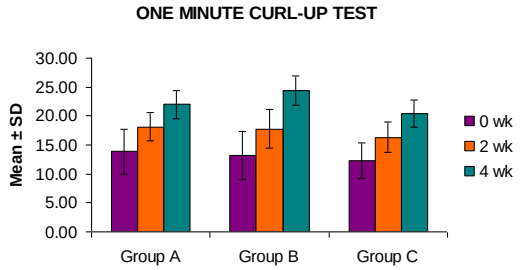

Fig 8. 14. Mean CUT score within the groups

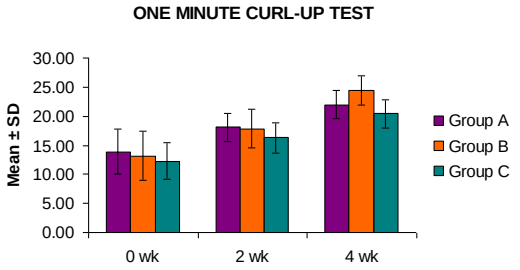

Fig 8. 15. Mean CUT score between the groups

DISCUSSION: The primary purpose of the study was to find out whether "Comparison of the effect of guided imagery technique with Pilates and conventional intervention on pain, fatigue, kinesiophobia, muscle endurance and flexibility in postpartum lumbopelvic pain''. The result of the study demonstrated that there was a significant difference found in the GMI with Pilates (Group B) as compared to Pilates and a difference is found in the Pilates group as compared to the conventional group.

NPRS: The study shows there was a significant difference in group B and insignificant in groups A and C between the period 0 to 2 wk. All the groups are significant between 0 to 4 weeks and group b is significant, group A and group C are insignificant in 2 to 4 wk. For each period, compare the mean NPRS score between the groups NPRS score between the groups at all periods except 4 wk. At 4wk, the mean NPRS score decreased significantly in Group B as compared to Group C.

MAF: The study shows there was a significant difference in groups A and B from 0 to 2 week, all the groups are significant from the period 0 to 4 wk and 2 to 4 wk. For each period, the mean MAF score between the groups. MAF score between the groups at all periods i.e. did not differ significantly.

TAMPA SCALE: The study shows no group was significant from any period. For each period, comparing the mean TS score between the groups showed similar TS scores between the groups at all periods i.e. did not differ significantly

ORIGINAL SCHOBER'S TEST: The study shows there was a significant difference in groups A, B, and C between the periods. For each period, comparing the mean OST score between the groups showed significantly different and higher OST of Group B as compared to both Group A and Group C at 2 wk. However, at other periods, it did not differ among the groups i.e. found to be statistically the same.

ONE MINUTE CURL-UP TEST: The study shows there was in between the period no group was significant from 0 to 2wk, all the groups were significant in 0 to 4wk, group B was significant, groups A and C were insignificant from 2 to 4wk, For each period, comparing the mean CUT score between the groups, the test showed similar score between the groups at all periods i.e. did not differ significantly

PHYSIOLOGICAL CHANGES AND THERAPEUTICALLY CHANGES: Guided imagery is hypothesized to alleviate pain by modifying the negative cognitive processes that maintain these affective states, thereby contributing to an improvement in feelings about oneself and the world. Indeed, guided imagery intervention. With regard to pain, the alleviating effects of guided imagery have been explained by Gate Theory. According to Gate Theory, only one impulse can travel up the spinal cord to the central nervous system at a time. Thus, if the route is blocked by pleasant stimuli, the perception of pain is decreased and the amount of painful stimuli sent to the brain is diminished.

Moreover, positive cognitions and relaxation are known to facilitate the release of endorphins, which bind to opioid receptor sites in the central nervous system and block the transmission of painful impulses.[24]Imagery influences an individual's physiology, mental state, and behavior maintained that reality is recreated and modified through the use of imagery. Imagery procedures produce a feeling of control through monitoring and rehearsing various images.

Physically, imagery has the ability to directly influence the autonomic nervous system, and the power of imagination can be recruited to promote specific physiological changes as an aid to healing. In addition, many studies indicate that certain imagery techniques may stimulate physiologic processes including immune, nervous, and endocrine responses which can accelerate the healing process. With respect to producing specific physiological changes that can promote healing, guided imagery represents an important alternative to pharmacotherapy with much greater safety and far fewer complications, precautions, and contra-help themselves. Pilates exercises develop a strong core and create a balance of strength and flexibility. Exercise can serve as a technique to mobilize the nervous system and its surrounding connective tissues, as described by the practitioner. Neurophysiological properties of contractile tissues respond to stretching exercise. When the Pilates stretching position is applied, slow stretch to soft tissues (i.e., skin, tendon, joint capsule) and muscles activate Golgi tendon organ. This sensory receptor detects differences in the tension generated by either passive stretch or active muscle contraction. Golgi tendon organ inhibits alpha motor neuron activity as a result of decreased tension in muscles, permitting sarcomeres to lengthen.

Pilates evolved muscle conditioning focuses on the recruitment of the most effective motor units. Physiologically, most muscle recruitment during day-to-day activities occurs in postural muscles, which contain predominately type I fibers. Type I fibers contain plentiful mitochondria, a high amount of oxidative enzymes, and a high density of capillaries. These characteristics make them well adapted for endurance activities 12 size or cross-sectional area of type I muscles increases as a result of increasing mitochondria, membranous, and muscle filaments within the fibers. Thereby, the strength and endurance of the fibers occur showing improvement. Pilates is beneficial for back pain as it uses functional static-dynamic resistance exercise to aid ‘’core muscle’’ strengthening and endurance and to improve sensory-motor control of the trunk and additional limb movement.[12]Exercises increase the confidence of the patients to use their spine and provide them with experimental evidence to help overcome the fear of physical activity after a treatment as they are more effective than general medical. Correction of the load transfer in the lumbopelvic region and improvement pattern of the local stabilizing muscles result in endurance improvement.

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