Effectiveness of Modified Sacroiliac Belt on Pelvic Girdle Pain in Post Natal Women

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ABSTRACT
Pregnancy-induced pelvic girdle pain (PGP) and low back pain (LBP) is common in post-natal women's. We conducted the study to evaluate the effectiveness of a modified sacroiliac belt on pelvic girdle pain in post-natal women. A total of 26 post-natal women between the age group of 18-35 years were selected and randomized into Group 1 (N=13) received conventional sacroiliac belt, conventional physiotherapy and Group 2 (n=13) received modified sacroiliac belt along with conventional physiotherapy. Pre-assessment of pelvic girdle was assessed by (Pelvic Girdle Pain Questionnaire) PGPQ, and low back pain was assessed by Roland Morris low back pain and disability questionnaire (RMQ) and Post-interventional assessment was taken for the same after three months. Intragroup statistical analysis for PGPQ revealed not significant in post-intervention for Group 1 where P-value 0.3023 and was extremely significant for Group 2 (P value<0.0001). At the same time, the Intergroup intervention analysis showed an extremely significant difference between Group 1 and Group 2 (p<0.0001). The study concluded that Integrating Modified sacroiliac belt with conventional physiotherapy is more effective in reducing pelvic girdle pain in post-natal women with also benefiting to reduce the pregnancy-induced low back pain as compared to the conventional sacroiliac belt and conventional physiotherapy.

INTRODUCTION
Pregnancy-induced Pelvic girdle pain (PGP) and pregnancy-induced low back pain (PLBP) is common in post-natal women's (Kordi et al., 2013). Pain aggravates while standing, sitting walking and other daily activities (Mens et al., 2006). PGP is observed in the posterior region of pelvic; between the posterior iliac crest and gluteal fold also there are chances to affect pubic symphysis (Mens et al., 2006; Bertuit et al., 2018). The study has shown that women's using pelvic belts has shown that 43% of women using the non-rigid belt and 27% of women using rigid belt found the belt to be uncomfortable (Depledge et al., 2005). Low back pain and the pelvic girdle is observed around in 50% pregnant women during pregnancy or the first three months postpartum (Kordi et al., 2013). The intensity of pain may be mild to severe in more than half of cases, i.e. in 25% of cases, pain is severe (Bertuit et al., 2018). Radiating pain towards the lower abdomen, back, groin, perineum and thigh. Pain aggravates while performing daily activities like long-standing,
bending forward, stair climbing, rising from a chair and turning into bed (Bertuit et al., 2018; Howell, 2012). Pain is relieved after rest (Howell, 2012).

Physiological enlargement of pelvis during pregnancy and labor

Imaging studies show an increase in width and mobility of symphysis pubis during pregnancy which returns to following standard delivery (Dutta, 2015). The pubis bones may separate 5-10mm. Similarly, changes occur in sacroiliac joints (Dutta, 2015). There is a gliding movement of symphysis pubis near term (Dutta, 2015). Relaxation of pelvis joints is due to progesterone and relaxin is due to progesterone and relaxin (Dutta, 2015). There is an increase of the anteroposteriordiameter of the inlet during labour by the rotary movement of the sacroiliac joints (Dutta, 2015).

Differential diagnosis of pgp/ symphysis pubis dysfunction

1. Ectopic pregnancy
2. Osteitis pubis
3. Urinary tract infection
4. Sciatica
5. Osteomyelitis
6. Lumbar stenosis
7. Spondylolisthesis (Jain et al., 2006; Vermani et al., 2010)

Management

Clinically, the pelvic support belt is advised to manage pelvic joint pain during pregnancy (Depledge et al., 2005). To restore the pelvic stability, an external force is applied in the form of pelvic belts (Bertuit et al., 2018; Depledge et al., 2005). Studies have proven there is a decrease in PGP by Visual Analog Scale (VAS) by using the pelvic belts. Exercises were recommended of abdominal stabilization, pelvic floor, gluteus maximus muscle, latissimus dorsi muscle and hip adductor muscle (Depledge et al., 2005). Trochanter belt, full pelvic binders are used to stabilize the joint and limit joint translation9. To reduce pain, electrotherapy agents like Transcutaneous electrical nerve stimulation (TENS), Ultrasound and laser are used (Sapsford, 1997). Non-steroidal anti-inflammatory drugs. (NSAIDs) can shrink endometriosis and pelvic veins and is effective in mild cases (Shaw et al., 2015).

In most cases of pelvic relaxation, the symptoms will be reduced spontaneously on conservation management (Mantle et al., 2015). Also, Medroxypregesterone one acetate 30mg daily can relieve pelvic pain (Shaw et al., 2015). PGP should be treated with a multidisciplinary approach, including obstetrics and gynaecology, orthopaedic surgery, physiotherapy, rheumatology and clinical psychiatry (Kanakaris et al., 2011). It is hypothesized that peripartum pelvic pain causes strain over ligaments in the pelvis, hormonal effects, muscle weakness, and the weight of the fetus (Mens et al., 1996).

MATERIALS AND METHODS

Ethical clearance of institutional ethical committee, of KIMSDU, Karad was obtained. This study included 26 post-natal women in-between age group 18-35 years with PGP subjected after pain provocation test as posterior pelvic pain provocation test, active straight leg raise test, modified Trendelenburg test and Patrick’s or Faber’s test. All were divided into two groups. The regional ethical committee approved the study protocol. Exclusion criteria included the presence of PGP or PLBP before pregnancy. Any previous surgeries of spine, Deformity or tumour of spine, Case of rheumatic disease, Traumatic pelvic injury.

After baseline assessment which included Demographic data such as Pelvic girdle pain questionnaire
Figure 3: Parts of a modified sacroiliac belt: a. Conventional SI Belt b. Modified SI Belt

(PGPQ) and Roland Morris low back pain and disability questionnaire (RMQ), they were allocated to respective groups by random sampling method.

The first group (Group 1 n=13) received conventional sacroiliac belt (Figure 1) and conventional physiotherapy. The second group (Group 2=13) modified sacroiliac belt (Figure 2) with conventional physiotherapy.

In Figure 3 we can see that conventional SI belt has a lack of low back and abdominal support.

Both groups were given the following exercises

Conventional physiotherapy for both the group

1. **Kegels Exercise** subjects can do this exercise in sitting, standing or supine. They are told to contract the pelvic floor muscles like

2. **Gluteus Maximus** subjects are told to do the exercises in prone, and told to squeeze the buttocks together.

3. **Adductor Strengthening** Supine with knees flexed, told to keep rolled towel together between your knees. Squeeze the towel roll together.

4. **Tummy Tucking** Subject can do to this in any supine, sitting and standing. Pull in your abdominal muscles together towards the spine.

5. **Pelvic Bridging** subject should be in supine with the knee flexed 900 and should lift hip upwards and maintain the position.

All exercises were performed in sets of 15 repetitions with 10-sec hold; 3 sets of all exercises twice-a-day for 1 month.

**RESULTS AND DISCUSSION**

**Pelvic Girdle Pain Questionnaire (PGPQ)**

Intergroup (between groups) comparison using unpaired t-test. In Figure 4, it shows the comparison of the mean and standard deviation of pre and post values of Group 1 and 2.

In Group 1, the mean PGPQ score on pre-intervention was 65.30±4.2 which was reduced to 58.53±2.47a mean of post-intervention. The P-value by unpaired t-test was 0.0154, which is considered extremely significant.

In Group 2, the mean PGPQ score on pre-intervention was 64.69±4.6, which was reduced to a mean of 31.46±62.7post intervention. The P-value by unpaired t-test was >0.10which is extremely significant.

**Roland Morris Low- Back Pain and Disability (RMQ)**

Intergroup (between groups) comparison using unpaired t-test. Figure 5 shows the comparison of the mean and standard deviation of pre and post values of Group 1 and B.

In Group 1, the mean RMQ score on pre-intervention was 51.15±24.44, which was reduced to 49.38±30.25 a mean of post-intervention. The P-value by unpaired t-test was 0.0772which is not
In Group 2, the mean RMQ score on pre-intervention was $74.23 \pm 8.9$ which was reduced to a mean of $32.46 \pm 6.38$ post-intervention. The P-value by unpaired t-test was $>0.10$, which is extremely significant. Treatment shows a very significant difference ($P<0.0001$).

Figure 4: Comparison of pre and post PGPQ score between group

PGP is standard in post-pregnancy due to late intervention. It leads to severe pain and poor lifestyle. Therefore, early management is essential. Early and effective initiation of movement with the help of supportive belts and exercises should be done in the early days to avoid complication and better prognosis.

The main barriers in these patients are Pain intensity interfering with Activities of daily life, discomfort in resting positions, changing positions, climbing stairs and restriction of moderate & higher intensity activities entirely. If the problem is ignored, it leads to Pelvic floor dysfunction and progressive improper musculoskeletal bio mechanics. So, maximizing comfortable assistance to the pelvic girdle is a need in these patients. Providing continuous pillow supports is practically difficult, and early muscle activity is to be enhanced with safe bio mechanics.

A major concern in women’s health issues starts with Peri-menopausal period with a variety of symptoms bringing down the quality of life. Care of pelvic floor abnormalities and optimizing spinal strength is vital. So the innovative concepts which can add value to improve women’s health issues is a need of the hour.

PGP is standard in post-natal women, but they are discharged after delivery with barriers in recovery related to PGP. Later few patients come with same/repeated complaints when the intensity of pain is unbearable. Existing belts are found inefficient in providing proper support which leads to less stability. So modifications are necessary. Therefore, supporting brace which supports the lumbar, sacroiliac joint and pubis symphysis and besides the possibility of performing isometric exercises with the brace on assists in early management may be beneficial upgrading the corset.

At present women is discharged after 3 to 4 days after normal delivery. Later few women complain of PGP and consult the physician again, which leads to poor quality of life. Therefore, if the women are provided with supportive belts and early initiation of exercises is done, further complications of PGP may be avoided. Also, the pelvic belts existing do not provide enough stability due to its less area as compared to body surface so modifications should be done as per the need. In post-natal women, with PGP, there is also complain of low back pain which is ignored due to high intensity of PGP than low back pain which needs to be also focused. In this study, an attempt was made to analyze the effect of a modified sacroiliac belt on PGP in post-natal women in reducing low back pain and PGP in improving quality of life in postnatal patients. Although the result shows exceptionally significant improvement in Group 2 ($P<0.0001$) which included modified sacroiliac belt and conventional exercises showed the maximum improvement by reduced mean values of RMQ and PGP increased mean value as compared to Group 1. As existing sacroiliac belt has less width, no low back support, which eventually lead to less stability.

Figure 5: Comparison of pre and post RMQ score between group

In the conventional group, despite the duration of belt usage, the low back pain did not show any significant improvement which is found due to lack of lumbosacral support in the conventional sacroiliac belt. Whereas in group 2 with the progression of exercises performed wearing modified sacroiliac belt showed significant improvement in reducing both pelvic girdle pain and low back pain. Exercise strengthening program helps in avoiding further complication after discontinuing the orthotics,
to improve the muscle tone of the affected area, exercises play a vital role.

Symptomatology of patients in groups 1 (control group), lumbosacral stability was the barrier and patients were found not completing the required repetitions of exercises. The whole duration in pelvic bridging was minimal. Low back pain intensity was found higher and instrumental activities were found uncomfortable. When the patients were performing the exercises on supervision, they were found that they were performing with trick movements.

Symptomatology of patients in groups 2 (experimental group), lumbosacral stability was found appreciable, and so patients had reduced back pain within a short duration of the utility of belt. On performing therapeutic exercises, the support provided by a modified belt was helpful in better performance of exercises. They had minimal or no discomfort in daily activities and were able to feed the child without back pain in sitting posture. Daily activities were found comfortable among them.

In this study, an attempt was made to analyze the effect of a modified sacroiliac belt on pelvic girdle pain in postnatal women in reducing low back pain and pelvic girdle pain in improving quality of life in postnatal patients. However, the result shows extremely significant improvement in group 2 (P<0.0001) which included modified sacroiliac belt with regular therapeutic exercises showed the maximum improvement by reduced mean values of RMQ and PGPQ increased mean value as compared to group 1 as the existing sacroiliac belt has less width, no low back support which eventually leads to less stability.

There is a decrease in quality of life in women with symphysis pubis dysfunction leading to a decrease in quality of life. The pain is triggered during weight-bearing activities (Depledge et al., 2005). But the pain may recur after stoppage of the drug and prolong therapy can produce side effect which can increase body weight (Shaw et al., 2015). The combination of a pelvic belt and muscle training enhances pelvic stability (Vleeming et al., 1992). In a study, it is found that in short term lumbopelvic belt and patient education in the treatment of pregnant women with PGP is superior to exercise plus and information or information alone.

CONCLUSIONS

Results show incredibly significant improvement in Group 2 (P<0.0001). Group 2 which included modified sacroiliac belt and conventional exercises showed the maximum improvement by reduced mean values of RMQ and PGPQ and increased mean value of Group 1. thus it can be concluded that modified sacroiliac belt and conventional exercises were more effective in decreasing the low back pain PGP in subjects with post-natal PGP as compared to the control group. Thus, the alternative hypothesis is proved.

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Conflict of Interest
The authors declare that they have no conflict of interest for this study.

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