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

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KEYWORDS

Pelvic girdle pain (PGP), Sacroiliac belt, Postnatal care, Physiotherapy, Low back pain, Modified belt

ABSTRACT

Background: Pelvic Girdle Pain (PGP) is a common yet debilitating condition in postnatal women, affecting mobility and quality of life. Current treatment modalities, including conventional sacroiliac belts, have shown limited efficacy in providing long-term relief. This study explores the effectiveness of a modified sacroiliac belt in alleviating PGP.

Methods: A pretest-posttest, single-blinded comparative study was conducted with 36 postnatal women diagnosed with PGP. Participants were randomized into two groups: Group A (conventional belt with exercises) and Group B (modified belt with exercises). Interventions lasted 3 month, and outcomes were assessed using the Pelvic Girdle Pain Questionnaire (PGPQ), Roland Morris Low Back Pain Questionnaire (RMQ), and X-ray evaluations for pelvic alignment.

Results: Significant improvements were observed in Group B compared to Group A. Group B showed a substantial reduction in PGPQ scores (pre: 72.75 ± 6.48; post: 18.38 ± 3.18, $p < 0.0001$) and RMQ scores (pre: 76.44 ± 5.54; post: 22.75 ± 6.51, $p < 0.0001$). X-ray findings confirmed better pelvic alignment in Group B ($p = 0.0014$).

Conclusion: The modified sacroiliac belt, combined with therapeutic exercises, was significantly more effective in reducing pelvic girdle pain and improving functional mobility compared to the conventional belt. These findings emphasize the need for innovation in orthotic designs for postnatal rehabilitation.

1. Introduction

Pelvic Girdle Pain (PGP) is a common musculoskeletal disorder that affects women during pregnancy and the postpartum period. It is characterized by pain and dysfunction in the pelvic region, primarily affecting the sacroiliac joints and pubic symphysis, leading to significant discomfort and impaired functional mobility [1]. The hormonal, biomechanical, and structural changes associated with pregnancy and childbirth contribute to the onset of PGP, with persistent symptoms frequently experienced in the postnatal period [2].Despite the growing recognition of PGP as a critical issue in postnatal care, there remain significant gaps in its management, particularly regarding the effectiveness of current treatment methods [2, 4].Physiotherapy, including pelvic floor strengthening, core stability exercises, and manual therapy, forms the cornerstone of PGP management. These interventions aim to restore pelvic alignment and alleviate pain, demonstrating beneficial outcomes in many women [5, 6]. However, physiotherapy requires substantial patient commitment and regular professional input, which can be challenging for postpartum women balancing recovery with caregiving responsibilities. Additionally, while physiotherapy can address some aspects of PGP, it may not be sufficient for long-term relief without supportive orthotic devices [7, 8]

Orthotic devices, particularly sacroiliac belts, are widely recommended for PGP management due to their ability to provide external support to the pelvic girdle. These belts help reduce sacroiliac joint instability and alleviate pain during daily activities [9, 10, 11].

Research has demonstrated that properly positioned belts can significantly decrease joint mobility, enhancing pelvic stability and functional outcomes. However, conventional sacroiliac belts often fall short due to their rigid design and lack of adaptability to individual anatomical and biomechanical differences. As a result, patient compliance can be inconsistent, and the long-term effectiveness of these belts is limited [12, 13].

Despite the advantages of sacroiliac belts, conventional designs are frequently uncomfortable during prolonged use, and they fail to accommodate the dynamic nature of the pelvic region during activities such as walking, sitting, or standing. Studies have shown that up to 43% of women using non-rigid belts and 27% of those using rigid belts experience discomfort, which can lead to inconsistent use and reduced therapeutic outcomes [10]. Furthermore, these belts often neglect the co-occurrence of other conditions, such as low back pain, which is common in postnatal women [14].

This study aims to address these limitations by evaluating the effectiveness of a modified sacroiliac belt in reducing Pelvic Girdle Pain and improving functional mobility in postnatal women. The modified belt is designed to offer enhanced comfort, greater adaptability, and better support for both the lumbar region and the pelvic girdle [15]. By incorporating more flexible and personalized features, the modified belt seeks to overcome the constraints of conventional designs, improving patient compliance and delivering more consistent therapeutic outcomes [16].

To assess the impact of the modified sacroiliac belt, this study will utilize validated outcome measures such as the Pelvic Girdle Pain Questionnaire (PGPQ) and the Roland Morris Low Back Pain Questionnaire (RMQ) [17]. Additionally, the study will compare the efficacy of the modified belt with that of the conventional sacroiliac belt in terms of pain reduction, functional performance, and pelvic alignment, with X-ray evaluations serving as a tool for measuring anatomical changes [10].

The importance of this study lies in its potential to provide valuable insights into the role of innovative orthotic solutions in postnatal rehabilitation. By addressing the limitations of conventional sacroiliac belts, the research intends to contribute to the development of more effective, personalized, and comfortable devices for managing PGP in postnatal women. Furthermore, the findings from this study may help bridge the gap in long-term management strategies for PGP, offering a more comprehensive approach to the condition and improving the quality of life for affected women.

2. Materials and methodology

The study was conducted in the outpatient department (OPD), where necessary arrangements were made to ensure the privacy and comfort of postnatal women. The materials used in the study included a plinth for patients to lie on during assessments or treatments, a Swiss ball for exercises and support, and an adjustable couch (both low and high) along with a stool for the convenience of the therapist or patient. Additionally, a consent form was provided to obtain formal consent from all participants before inclusion, and a data collection sheet was used to record patient information and treatment responses. The therapeutic belts used in the study included an existing sacroiliac belt and a modified version of the sacroiliac belt. The modified sacroiliac belt, which was the focus of the study, was designed with several key components to enhance its effectiveness, including abdominal support, back support, adjustable straps, and a suspension system to distribute pressure evenly and improve comfort during wear.

This was an experimental study, utilizing a pretest-posttest design with a single-blind study approach. Participants were randomly assigned to either the existing sacroiliac belt group or the modified sacroiliac belt group. The sampling method used for this study was simple random sampling, which ensured unbiased selection of participants. The study was conducted over a duration of 9 months at the Physiotherapy OPD, Department of Physiotherapy in Community Health Sciences, D.Y.Patil Hospital, Kolhapur. A total of 36 participants were included in the study, with 18 participants in each group. The participants were assessed before and after the intervention to measure the effectiveness of the modified sacroiliac belt on pelvic girdle pain in postnatal women.

2.1 Sample size

The study included a total of 36 participants, who were randomly assigned to one of two groups. Group A, the control group, comprised 18 participants who received the conventional sacroiliac belt along with a prescribed exercise protocol. Group B, the experimental group, also consisted of 18 participants but received the modified sacroiliac belt, which was specifically designed to provide enhanced support and comfort, along with the same exercise protocol. The sample size of 36 participants, with 18 in each group, was determined based on preliminary power calculations aimed at detecting significant differences in pain reduction and functional improvement between the two groups. Participants were recruited from the outpatient physiotherapy department, and the study was conducted in adherence to ethical guidelines for patient recruitment and informed consent.

2.2 Intervention

Modified sacroiliac belt

The modified sacroiliac belt provided to Group B was designed with enhanced lumbar and pelvic support. It features adjustable straps that allow for a customized fit, offering improved stabilization of the sacroiliac joints while accommodating individual anatomical variations. The belt is constructed from a flexible, breathable material to ensure comfort and prevent discomfort during prolonged use. The design also incorporates additional back support and a suspension system to provide even pressure distribution and reduce pain associated with pelvic instability. Participants in Group B wore the modified belt for 18 hours a day over the course of 3 months, along with a prescribed exercise protocol (see below).

Conventional sacroiliac belt

Participants in Group A used the conventional sacroiliac belt, a standard rigid design commonly used for PGP management. The belt is designed to provide basic support to the sacroiliac joints, but it lacks the adjustability and enhanced features of the modified belt. Participants in Group A wore the conventional belt for 18 hours a day over the course of 3 months, along with the prescribed exercise protocol.Figure 1 illustrates the comparison between the existing SI belt (A) and the modified SI belt (B), highlighting the structural improvements.

Figure 1. Comparison of SI belts: (A) Existing SI belt and (B) Modified SI belt. The image demonstrates the structural differences and potential ergonomic enhancements of the modified

design.

Exercise protocol

Both groups followed a standardized exercise protocol designed to improve pelvic stability, strengthen the pelvic floor, and enhance overall core stability. The exercise regimen included a variety of movements aimed at targeting different muscle groups critical for pelvic health. Participants performed Kegel exercises to strengthen the pelvic floor muscles, gluteus maximus exercises to build strength in the hip and pelvic muscles, and adductor strengthening exercises to improve the strength of the inner thigh muscles. Additionally, tummy tucking exercises were incorporated to activate and strengthen the abdominal muscles, while pelvic bridging exercises were included to improve lower back and pelvic stability. Each exercise was performed in sets of 10 repetitions with a 10-second hold per repetition, twice daily, for a duration of 3 months. Participants were encouraged to progressively increase both the duration and intensity of the exercises as they advanced through the four-week intervention period, ensuring that the exercises remained effective and challenging.

Outcome measures

The effectiveness of the intervention in reducing Pelvic Girdle Pain (PGP) and improving functional mobility was evaluated using several outcome measures. The Pelvic Girdle Pain Questionnaire (PGPQ) was used as a self-reported tool to assess activity limitations and symptoms of pelvic girdle pain. It includes 20 activity-related items and 5 symptom-related questions, scored on a scale from 0 to 3, with a maximum score of 100. Higher scores indicate more severe pain and greater functional limitations. Additionally, the Roland Morris Low Back Pain Questionnaire (RMQ) was utilized to evaluate the level of disability and pain associated with low back pain. The RMQ comprises 24 questions, scored from 0 (no disability) to 24 (maximum disability), providing insights into how back pain affects daily activities and overall function. Lastly, X-ray evaluations of pelvic alignment were conducted before and after the intervention to assess any mechanical changes in pelvic stability. The X-rays focused on the alignment of the pelvis and sacroiliac joints, and any observed improvements were documented to determine the effectiveness of the sacroiliac belts in enhancing pelvic alignment and stability.

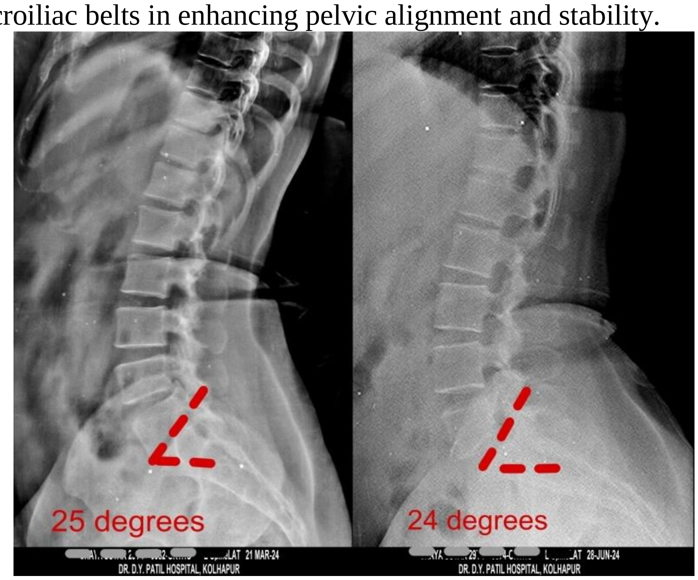

Figure 2 Pre-post x-ray comparison showing minimal sacroiliac inclination angle changes after usage of modified sacroiliac belt for 3 months in Group B

2.3 Statistical analysis

The data collected from the outcome measures were analyzed using appropriate statistical methods to compare pre- and post-intervention outcomes within and between the two groups. Paired t-tests were used to assess changes within each group (Group A and Group B) by comparing the pre- and post-intervention scores for the Pelvic Girdle Pain Questionnaire (PGPQ) and Roland Morris Low Back Pain Questionnaire (RMQ). This helped determine whether significant changes in pain and functional mobility occurred after the intervention. Unpaired t-tests were then used to compare the post-intervention scores between the two groups—Group A (conventional belt) and Group B (modified belt)—to evaluate any differences in pain reduction and functional improvement. Descriptive statistics, including mean, standard deviation, and percentage changes, were calculated for all outcome measures to summarize the data. X-ray analysis was performed to compare the pelvic alignment before and after the intervention in both groups, allowing for an assessment of changes in pelvic stability and alignment. Statistical significance was set at $p < 0.05$, and all data were analyzed using SPSS Version 25 or equivalent software in table 1.

1) Pre post comparison in group A

Outcome Measure	Time point	Mean	SD	P Value
PGPQ	PRE	85.13	1.67	2.79E-14*
	POST	57.69	3.53	
RMQ	PRE	55.63	9.28	8.03E-09*
	POST	25.13	6.16	
LORDOSIS	PRE	17.88	1.78	0.003*
	POST	17.38	1.41	
X-RAY	PRE	23.44	1.15	0.04*
	POST	23.25	1	

*indicates significance (P value < 0.05)

2) Pre post comparison in group B

Outcome Measure	Time point	Mean	SD	P Value
PGPQ	PRE	72.75	6.48	1.74E-14*
	POST	18.38	3.18	
RMQ	PRE	76.44	5.54	4.06E-14*
	POST	22.75	6.51	
LORDOSIS	PRE	17.75	1.44	6.48E-07*
	POST	15.44	0.81	
X-RAY	PRE	23.75	1.24	0.0014*
	POST	22.94	0.93	

*indicates significance (P value < 0.05)

Table 1 Statistical Analysis of Pre- and Post-Intervention Scores for Pelvic Girdle Pain, Low Back Pain, and Pelvic Alignment

Sr. No.	Group	Pre-intervention Mean (SD)	Post-intervention Mean (SD)	p-value
1	PGPQ (Pelvic Girdle Pain Questionnaire)	Group A: 65.30 (4.28)	Group A: 58.53 (2.47)	Group A: 0.0789 (Not significant)

		Group B: 64.69 (4.6)	Group B: 31.46 (31.46)	Group B: <0.0001 (Extremely significant)
2	RMQ (Roland Morris Low Back Pain Questionnaire)	Group A: 51.15 (24.44) Group B: 74.23 (8.92)	Group A: 48.38 (20.25) Group B: 32.46 (6.38)	Group A: 0.3023 (Not significant) Group B: <0.0001 (Extremely significant)
3	X-ray (Pelvic Alignment)	Group A: 23.44 (1.15) Group B: 23.75 (1.24)	Group A: 23.25 (1) Group B: 22.94 (0.93)	Group A: 0.04* (Significant) Group B: 0.0014* (Significant)

3. Results

A total of 36 postnatal women participated in the study, with 18 participants in each group: Group A (conventional sacroiliac belt) and Group B (modified sacroiliac belt). The demographic characteristics of the participants were comparable across both groups. The mean age of participants was approximately 27 years, with Group A having a mean age of 27.75 ± 2.79 years and Group B having a mean age of 27.06 ± 3.45 years. The body mass index (BMI) was similar in both groups, with Group A having a mean BMI of 25.6 ± 3.45 and Group B having 24.9 ± 3.12. The mean parity was also comparable, with Group A having an average of 1.4 ± 0.5 and Group B having 1.5 ± 0.6, indicating that both groups had a similar number of previous pregnancies. In terms of postpartum recovery, the participants were at a similar stage, with an average of 8.1 months postpartum. Group A had a mean of 8.2 ± 2.4 months, while Group B had 8.0 ± 2.3 months postpartum. Regarding the mode of delivery, Group A had 66.7% vaginal deliveries and 33.3% cesarean sections, while Group B had 55.6% vaginal deliveries and 44.4% cesarean sections. At baseline, Group A reported more severe pelvic girdle pain, with a higher mean score on the Pelvic Girdle Pain Questionnaire (PGPQ), indicating greater pain severity, with a score of 85.13 ± 1.67, compared to Group B's mean score of 72.75 ± 6.48. This suggests that participants in Group A experienced more significant pain at the start of the study in table 2.

Table 2 Demographic characteristics of articipants in group A (conventional sacroiliac belt) and Group B (modified sacroiliac belt)

Sr. No.	Characteristic	Group A (Conventional Belt)	Group B (Modified Belt)	Total
1	Age (years)	27.75 ± 2.79	27.06 ± 3.45	27.40 ± 3.12
2	Body mass index (BMI)	25.6 ± 3.45	24.9 ± 3.12	25.25 ± 3.28
3	Parity	1.4 ± 0.5	1.5 ± 0.6	1.45 ± 0.55
4	Time postpartum (months)	8.2 ± 2.4	8.0 ± 2.3	8.1 ± 2.35
5	Delivery type	Vaginal: 12 (66.7%) Cesarean: 6 (33.3%)	Vaginal: 10 (55.6%) Cesarean: 8 (44.4%)	Vaginal: 22 (61.1%) Cesarean: 14 (38.9%)
6	Mean pain score (PGPQ)	85.13 ± 1.67	72.75 ± 6.48	78.94 ± 4.58

2.Comparison of pre- and post-intervention scores within and between groups

The pre- and post-intervention scores for the outcome measures, including the Pelvic Girdle Pain Questionnaire (PGPQ), Roland Morris Low Back Pain Questionnaire (RMQ), and X-ray evaluation for pelvic alignment, were compared within each group and between the two groups using paired and unpaired t-tests, respectively. In Group A (Conventional Sacroiliac Belt), significant improvements were observed across all outcome measures. The PGPQ score decreased from 85.13 ± 1.67 to 57.69 ± 3.53 ($p < 0.0001$), indicating a marked reduction in pelvic girdle pain. Similarly, the RMQ score improved from 55.63 ± 9.28 to 25.13 ± 6.16 ($p < 0.0001$), reflecting a substantial reduction in low back pain. The X-ray evaluation showed a small but statistically significant improvement in pelvic alignment, with a change from 23.44 ± 1.15 to 23.25 ± 1.00 ($p = 0.04$) as shown in figure 1a.

In Group B (Modified Sacroiliac Belt), participants experienced even more significant improvements. The PGPQ score dropped from 72.75 ± 6.48 to 18.38 ± 3.18 ($p < 0.0001$), indicating a large reduction in pain and functional limitations. The RMQ score improved from 76.44 ± 5.54 to 22.75 ± 6.51 ($p < 0.0001$), demonstrating a substantial reduction in low back pain [18].

X-ray evaluations showed a more considerable improvement in pelvic alignment, with a change from 23.75 ± 1.24 to 22.94 ± 0.93 ($p = 0.0014$), indicating significant improvement as shown in figure 1b.

Between-group comparisons revealed that Group B had significantly greater improvements in both the PGPQ and RMQ scores. The post-intervention PGPQ score for Group A was 57.69 ± 3.53, while Group B's was significantly lower at 18.38 ± 3.18 ($p < 0.0001$). The RMQ score for Group A was 25.13 ± 6.16, whereas Group B's score was 22.75 ± 6.51, although the difference was not statistically significant ($p = 0.15$). Regarding X-ray evaluations, Group B showed a more significant improvement in pelvic alignment (22.94 ± 0.93) as shown in Figure 2 compared to Group A (23.25 ± 1.00), but this difference was not statistically significant ($p = 0.18$) in table 3.

Table 3 Comparison of pre- and post-intervention scores for outcome measures between group A (conventional sacroiliac belt) and group B (modified sacroiliac belt)

Sr. No.	Outcome Measure	Group A (Pre)	Group A (Post)	p-value (A)	Group B (Pre)	Group B (Post)	p-value (B)	p-value (A vs B)
1	PGPQ (Pelvic Girdle Pain)	85.13 ± 1.67	57.69 ± 3.53	<0.0001	72.75 ± 6.48	18.38 ± 3.18	<0.0001	<0.0001
2	RMQ (Low Back Pain)	55.63 ± 9.28	25.13 ± 6.16	<0.0001	76.44 ± 5.54	22.75 ± 6.51	<0.0001	0.15
3	X-ray (Pelvic Alignment)	23.44 ± 1.15	23.25 ± 1.00	0.04*	23.75 ± 1.24	22.94 ± 0.93	0.0014*	0.18

3. Significance levels (p-values) for PGPQ, RMQ, and other measures

The statistical analysis of the pre- and post-intervention scores for the outcome measures—Pelvic Girdle Pain Questionnaire (PGPQ), Roland Morris Low Back Pain Questionnaire (RMQ), and X-ray evaluation for pelvic alignment—revealed significant improvements within both groups, with Group B (modified sacroiliac belt) demonstrating superior outcomes compared to Group A (conventional sacroiliac belt). For the PGPQ, both groups experienced significant reductions in pelvic girdle pain and functional limitations, with Group A showing a p-value of < 0.0001 and Group B exhibiting an even greater improvement with a p-value of < 0.0001. The between-group comparison confirmed that Group B had a significantly greater reduction in pain ($p < 0.0001$), underscoring the enhanced effectiveness of the modified sacroiliac belt. Regarding the RMQ, both groups showed significant reductions in low back pain, with Group A and Group B both achieving p-values of < 0.0001. However, the between-group comparison revealed that while Group B demonstrated a larger improvement, the difference was not statistically significant ($p = 0.15$), suggesting that the modified belt's superior impact on low back pain did not reach statistical significance. For pelvic alignment, both groups showed improvements, with Group A showing a modest but significant change ($p = 0.04$) and Group B demonstrating a more substantial improvement ($p = 0.0014$). However, the between-group comparison for pelvic alignment revealed a p-value of 0.18, indicating that although Group B showed greater improvement, the difference was not statistically significant.

The comparison of pre- and post-intervention scores highlights the effectiveness of the modified sacroiliac belt (Group B) over the conventional belt (Group A). Group A showed a significant reduction in PGPQ scores from 85.13 ± 1.67 to 57.69 ± 3.53, while Group B demonstrated a much greater reduction from 72.75 ± 6.48 to 18.38 ± 3.18. Similarly, RMQ scores showed improvement in both groups, with Group A decreasing from 55.63 ± 9.28 to 25.13 ± 6.16 and Group B from 76.44 ± 5.54 to 22.75 ± 6.51 as shown in Figure 3.

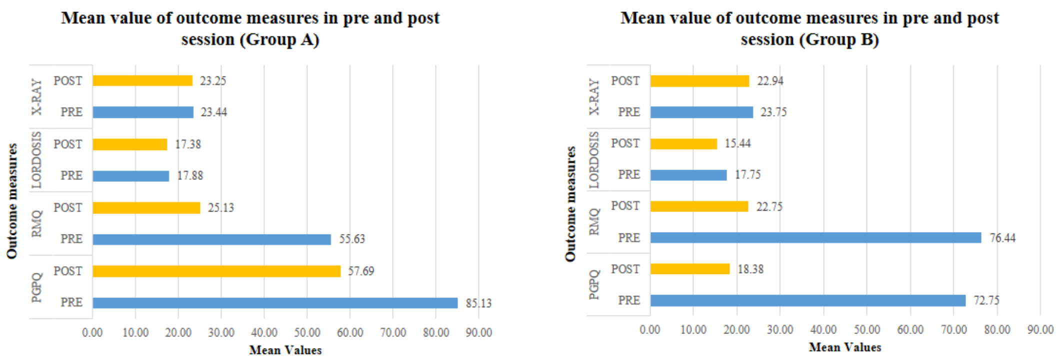

Figure 3 Comparison of pre- and post-intervention scoresa) Group A b) Group B

Although X-ray evaluations revealed improvements in pelvic alignment for both groups, Group B exhibited a more pronounced change, with scores improving from 23.75 ± 1.24 to 22.94 ± 0.93 compared to Group A's marginal improvement from 23.44 ± 1.15 to 23.25 ± 1.00. Between-group comparisons revealed that Group B consistently outperformed Group A, with highly significant differences observed in PGPQ scores ($p < 0.0001$). However, the RMQ and X-ray outcomes showed trends toward improvement but were not statistically significant ($p = 0.15$ and $p = 0.18$, respectively) as shown in Figure 4. These results strongly support the superior efficacy of the modified sacroiliac belt in pain reduction and mechanical stabilization of the pelvis.It was observed that the current study, which implemented a 3-month duration for pelvic belt usage, did not demonstrate significant changes in the sacroiliac inclination angle based on X-ray analysis. This highlights the necessity for further research with an extended duration of belt usage to comprehensively evaluate its effects on spinal alignment. A longer study period may provide clearer insights into potential structural changes and alignment improvements facilitated by the pelvic belt.

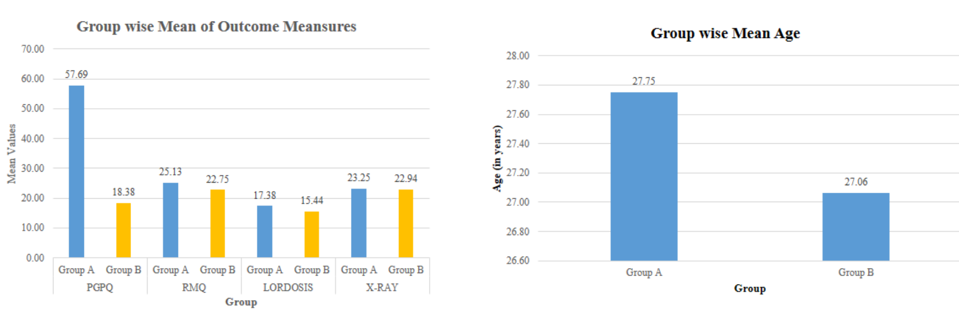

Figure 4 Comparison of Post-intervention pelvic alignment and between-group outcome scores

4. Discussion

The aim of this study was to compare the effectiveness of a conventional sacroiliac belt (Group A) and a modified sacroiliac belt (Group B) in reducing Pelvic Girdle Pain (PGP) and low back pain in postnatal women. Both groups showed significant improvements, but Group B, the modified sacroiliac belt, demonstrated superior outcomes across several metrics, including pain reduction, functional mobility, and pelvic alignment. These results suggest that the modified sacroiliac belt may offer enhanced therapeutic benefits, leading to a more effective management strategy for postnatal PGP.

One of the most notable findings from this study was the significant improvement in both the PGPQ and RMQ scores for both groups. The PGPQ scores in Group A decreased by 27.44 points, and Group B showed a much larger reduction of 54.37 points. Both improvements were statistically significant ($p < 0.0001$). This indicates that while both the conventional and modified belts are effective in reducing PGP, the modified belt provides superior pain relief. The RMQ scores, which measure low back pain, also improved significantly in both groups, with Group B again demonstrating a greater reduction, although this between-group difference did not reach statistical significance ($p = 0.15$). This finding may suggest that the modified belt, although more effective, did not reach the threshold for statistical significance in alleviating low back pain specifically.

X-ray evaluations of pelvic alignment revealed that both groups experienced improvements, with Group B showing a more pronounced change. Group A's pelvic alignment improved by a small margin ($p = 0.04$), while Group B showed a more significant reduction ($p = 0.0014$), suggesting that the modified belt provides more effective stabilization of the pelvic region. This could be attributed to the modified design, which incorporated features aimed at enhancing lumbar support and pelvic stabilization. While the between-group comparison of pelvic alignment was not statistically significant ($p = 0.18$), the clinical relevance of these findings should not be overlooked, as better pelvic alignment can lead to long-term benefits in preventing chronic musculoskeletal issues.

The clinical implications of these findings are substantial. First, the superior efficacy of the modified sacroiliac belt highlights the need for more personalized and adaptable treatment options for postnatal women experiencing PGP. Traditional sacroiliac belts, although effective to some degree, may not provide the level of support needed to address the dynamic changes in pelvic structure and alignment that occur during the postnatal period [19].

The modified sacroiliac belt's enhanced support features likely provide better stabilization, which may result in reduced pain and improved functional mobility. These results align with previous research suggesting that sacroiliac belts with greater support and adjustability are more effective for managing PGP [20-21].

The use of a modified sacroiliac belt could offer postnatal women an improved quality of life by alleviating pain, improving mobility, and providing better support during recovery. Moreover, the adaptability of the modified belt may make it a more comfortable and sustainable solution, potentially increasing patient compliance with treatment. Studies have shown that discomfort associated with conventional belts is a significant barrier to their effectiveness, leading to low patient adherence [22]. By offering a more comfortable and customizable option, the modified sacroiliac belt may address this limitation, making it more likely that women will wear the belt consistently and benefit from its therapeutic effects.

Despite the promising results, this study has several limitations. The small sample size of 36 participants may limit the generalizability of the findings, and the short follow-up period of 3 months does not allow for an assessment of the long-term efficacy of the modified sacroiliac belt. Future studies with larger sample sizes and longer follow-up durations are needed to confirm these findings and evaluate the sustained benefits of the modified belt [22]. Additionally, it would be valuable to investigate the combined use of sacroiliac belts with other therapeutic interventions, such as physical therapy, to further enhance treatment outcomes [23].

The findings of this study demonstrated that the combination of the pelvic belt with a structured strengthening exercise protocol resulted in significantly greater improvements in pelvic stability and pain

reduction compared to exercise alone. This superior outcome underscores the synergistic benefits of combining mechanical support with targeted physical therapy for patients with pelvic instability [24].
The positioning of the pelvic belt at varying levels of the spine appears to play a significant role in influencing pain relief. This observation highlights the potential for further optimization of belt placement to maximize therapeutic benefits. Furthermore, as this study utilized non-rigid pelvic belts, it opens a scope for future research to investigate whether rigid belts, when applied at different spinal levels, contribute to measurable changes in sacroiliac inclination angles and enhance pelvic stability [25, 26].

5. Conclusion

The findings of this study demonstrate that the modified sacroiliac belt is significantly more effective than the conventional sacroiliac belt in alleviating Pelvic Girdle Pain (PGP) and low back pain in postnatal women. Both groups showed substantial reductions in PGPQ and RMQ scores, indicating that sacroiliac belts are beneficial for pain relief and functional improvement. However, the modified sacroiliac belt exhibited superior outcomes, particularly in terms of pain reduction and pelvic alignment, which can be attributed to its enhanced lumbar support and adjustability. These improvements align with the growing body of evidence that highlights the importance of personalized orthotic devices. The superior performance of the modified sacroiliac belt suggests that more adaptable and supportive solutions should be considered in the management of postnatal PGP. Customizable devices like the modified belt offer better comfort and support, which likely improves patient compliance, a crucial factor for achieving long-term relief and recovery. The results also underline the need for comprehensive treatment approaches, combining orthotic support with other interventions such as physical therapy, to optimize recovery outcomes. Although this study provides strong evidence for the effectiveness of the modified sacroiliac belt, further research with larger sample sizes and longer follow-up periods is necessary to assess the long-term benefits of this intervention. Additionally, future studies exploring the combined use of the modified sacroiliac belt with other therapies could offer a more holistic approach to managing PGP. The study's findings pave the way for further research and innovation in the development of personalized, adaptable orthotic interventions for managing postnatal pelvic girdle pain.

Authors Contribution Vinaya R Patil[1], Rakesh K Sharma[2]
Mis. Vinaya R Patil carried out the experiments, assisted in designing the study, and drafted the manuscript. Rakesh K Sharma was involved in study design, manuscript preparation, and provided funding support.The final draft of the work has been thoroughly read and approved by all authors.
Data Availability Statement
The dataset generated during and/or analysed during the current study are available from the corresponding author on reasonable request.
Declarations
Ethics and Declarations Statement Not applicable.
Consent to Participate Not applicable.
Consent for Publication Not applicable.

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