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Effectiveness of Global Postural Re-education on Upper Back Pain and Postural Alignment Among Postpartum Women

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Abstract:

- ***Background:***
  Upper back pain and postural deviations are common musculoskeletal problems among postpartum women, primarily resulting from prolonged incorrect posture, breastfeeding ergonomics, and repetitive childcare activities. These dysfunctions may negatively affect daily activities and quality of life.

- ***Objective:***
  To determine the effectiveness of Global Postural Re-education on Upper back pain and postural alignment among postpartum women.

- ***Methods:***
  A total of 56 postpartum women aged 20-40 years with upper back pain were recruited. Participants were randomly divided into two groups; Group A received GPR, and Group B received Conventional management, including ergonomic and postural education, with 28 participants each. Outcome measures included NPRS, NDI, and CVA. Both groups received treatment sessions 3 times per week for a duration of 4 weeks.

- ***Results:***
  Both groups showed significant improvement in NPRS, NDI, and CVA post-intervention ($p < 0.001$). However, Group A showed significant improvement between group analysis.

- ***Conclusion:***
  Global Postural Re-education was effective in reducing upper back pain and improving postural alignment among postpartum women. GPR may be considered an effective physiotherapy intervention for musculoskeletal dysfunction.

Keywords: *Postpartum Women, Global Postural Re-Education, Upper Back Pain, Postural Alignment, Craniovertebral Angle, Physiotherapy.*

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I. INTRODUCTION

The time immediately following childbirth until a woman's body adjusts to its non-pregnant state through physiological, hormonal, and psychological changes is referred to as the postpartum period.[1] Musculoskeletal pain among postpartum women is common but undertreated, especially in initial months after delivery. During and after pregnancy, there is increase in ligament laxity, decreased joint stability, and changed load transmission due to elevated levels of progesterone and relaxin.[2]

Forward head posture and rounded shoulders are the most common postural adaptations, which increase the load on the musculature of upper back region.[3]

Due to structural changes in thoracolumbar fascia during pregnancy, the mechanical demand on postural muscles increases, resulting in poor postural control.[4]

The major factor of postural dysfunction is breastfeeding postures. Women mostly attain poor posture during breastfeeding, which results in fatigue that causes pain and postural dysfunction.[5]

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With an increase in a baby's weight, the mothers work hard to carry them, resulting in hunch back posture and due to excessive use of muscles, increased lactic acid accumulation contributes to fatigue and ultimately pain.[6]

Global Postural Re-education (GPR) is a physiotherapy intervention which emphasizes sustained global stretching postures combined with breathing control, and active postural correction. It aims to improve postural control and restore muscle function to reduce postural changes.[7]

GPR can be useful in postpartum women with poor posture and upper back pain due to repetitive infant care and breastfeeding, which compromises spinal and scapular stability.[8]

Ergonomic counseling also plays a key role in educating mothers on safe lifting techniques, breastfeeding postures, and correct body ergonomics for household activities.[9]

Physiotherapy interventions, such as GPR, have helped reduce pain and improve posture in other studies. But still, there is limited literature on postpartum women with upper back pain. This study will compare GPR with a control group to determine the effectiveness in terms of pain, disability, and posture.

II. MATERIALS AND METHODS

➢ *Study Design, Setting and Population*

A randomized controlled trial. This study was conducted in various hospitals in Amritsar providing outpatient services to postpartum women. The population was postpartum women from 6 weeks to 12 months who presented with upper back pain and postural deviations.

➢ *Sampling*

The convenience sampling method was used to recruit participants. The sample size was calculated using G*Power (version 3.1) and the minimum sample size obtained was 55, which was rounded to 56 to ensure equal group allocation.

➢ *Methodology*

The inclusion criteria for recruitment were women aged 20-40 years, a 6-week to 12-month postpartum duration, a complaint of upper back pain ≥ 3 on the Numeric Pain Rating Scale (NPRS), and a Neck Disability Index (NDI) having a 5-24 score, which is mild-moderate disability. The exclusion criteria were history of major spinal deformities, neurological disorders affecting the spine or upper limb, previous cervical or shoulder surgery, and severe postpartum complications. The 56 postpartum women were randomly divided into two groups, Group A receiving GPR and Group B receiving conventional management, 28 participants each.

➢ *Outcome Measures*

The outcome measures included Numeric Pain Rating Scale, an 11-point rating scale with 0 representing no pain and 10 representing the worst pain imaginable. The Neck Disability Index (NDI) measures the level of neck disability, including 10 items: pain, lifting, personal care, reading, concentration, headaches, work, recreation, driving, and sleeping, scoring on a 0 to 5 rating scale. Postural assessment was measured through determination of the craniovertebral angle by photogrammetry using the MB-Ruler program from lateral photographs. Smaller CV angles were indicative of forward head posture, while larger CV angles were indicative of good neck posture.

➢ *Procedure*

Participants fulfilling the inclusion criteria were recruited after obtaining written informed consent. A baseline assessment was conducted prior to intervention.

Participants received GPR in Group A with sessions 3 times per week for 4 weeks. The intervention consisted of sustained global stretching postures targeting shortened anterior muscle chains, thoracic extension exercises, scapular retraction correction, and diaphragmatic breathing exercises.

Each posture was maintained for approximately 15-20 minutes under therapist supervision.

Group B received conventional management in the form of ergonomic counseling and posture education related to breastfeeding and infant care activities. There was one educational session, which lasted about 15-20 minutes. After that, there was weekly follow-up through phone calls.

Post-intervention assessment was done after 4 weeks using the same outcome measures, NPRS, NDI, and CVA.

➢ *Statistical Analysis*

Data were analyzed using SPSS software. Pre- and post-intervention comparisons were performed to determine the significance level. Paired t-tests were done for group analysis. A p-value < 0.05 was considered statistically significant.

III. RESULTS

The present study included 56 female participants who fulfilled the inclusion and exclusion criteria and were diagnosed with upper back pain. They were randomly allocated into two groups: Group A (GPR) and Group B (Control), with 28 participants each. The outcome measures assessed were NPRS, NDI, and CVA.

Baseline demographic and clinical characteristics of the participants are presented in Table 1. There was no statistically significant difference among groups for NPRS and NDI ($p > 0.05$), indicating homogeneity. However, craniovertebral angle (CVA) showed a significant difference at baseline ($p < 0.05$).

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Table 1 Baseline Characteristics of Participants (Mean ± SD)

Variable	Group A (n=28) Mean ± SD	Group B (n=28) Mean ± SD
Age (years)	30.00 ± 4.23	28.96 ± 3.11
Postpartum Duration (weeks)	25.36 ± 12.91	22.21 ± 10.47
NPRS	6.61 ± 1.44	5.89 ± 1.13
NDI	19.57 ± 3.76	20.36 ± 3.69
CVA	41.68 ± 3.15	43.46 ± 2.20

Both groups demonstrated statistically significant improvements in all outcome measures following the intervention ($p < 0.001$).

In Group A (GPR), a marked reduction in pain (NPRS) was observed, along with improvement in disability (NDI) and postural alignment (CVA). Group B (control) demonstrated improvements as well. However, the magnitude of change was comparatively smaller. Within-group comparison of outcome measures before and after intervention is presented in Table 2.

Overall, both interventions were effective in improving pain, function, and posture. Group A (GPR) consistently showed better outcomes compared to Group B.

IV. DISCUSSION

The primary objective of this study was to evaluate the effectiveness of GPR and compare it with the control group on pain intensity, neck disability, and craniovertebral angle in postpartum women. The results of statistical analysis revealed that while both groups demonstrated significant within-group improvements across all outcome measures, Group A emerged as the most effective intervention for reducing neck disability and improving craniovertebral angle.

The findings of the study indicated a significant reduction in pain intensity across both groups, as measured by NPRS, suggesting that providing ergonomic intervention is as effective as a specific protocol for managing moderate levels of pain typically experienced by postpartum women. According to Algabbani et al. (2025), postpartum musculoskeletal discomfort, frequently localized in the neck, responds well to conservative therapy, which is consistent with this study.[10] Mahmoud et al. (2019) found a strong connection between forward head posture and neck pain while stating that correcting posture can significantly reduce nociceptive input and make symptoms better.[11]

The Neck Disability Index yielded the most significant differentiating results between the groups. This may be attributed to improved activation of deep cervical flexor muscles, enhanced neuromuscular control, and correction of forward head posture. Yang et al. (2023) highlighted that improvements in musculoskeletal health not only reduce physical discomfort but also significantly enhance functional ability.[12] Sheikhhoseini et al. (2018) reported that therapeutic exercises significantly improve the craniovertebral angle and reduce disability by enhancing muscle performance and posture. Improved neuromuscular control leads to better load distribution across cervical structures, thereby reducing strain and functional limitations.[13]

A critical finding of this study was the significant improvement in the craniovertebral angle in both groups, with Group A showing the most significant correction of postural abnormalities such as forward head posture and rounded shoulders. The results in Group A are probably because they took a more holistic approach to fixing their posture. Bahat et al. highlighted that forward head posture is closely linked with functional limitations and that interventions focusing on correcting posture can lead to better clinical outcomes.[14] The significant gain in Group A's CVA suggests that their protocol effectively addressed the muscular imbalance (such as tightness in the pectorals and weakness in the scapular stabilizers) that contributes to the "upper cross syndrome" often seen in new mothers (Chen et al., 2024).[15]

The findings indicate that postpartum women experience moderate levels of pain and disability and that early physical therapy can lead to significant improvements in both. Exercise-based interventions have shown significant reduction in pain intensity, improved posture, and enhanced functional outcomes in individuals with forward-head posture. However, the majority of studies have focused on the general population, whereas the present study specifically evaluated postpartum women, thereby contributing to the limited body of literature in this area.

These findings emphasize the importance of incorporating postural correction and neuromuscular training into physiotherapy programs to achieve optimal rehabilitation outcomes among postpartum women.

Limitations in this study are limited sample size, which may restrict the generalizability of the findings; the study covered a limited scope of research, focusing only on specific interventions and outcomes, and the study focused only on the upper body, thereby limiting the applicability of the findings to other regions of the body.

Future studies with larger sample sizes can be conducted; long-term follow-up studies are recommended to assess the sustainability of improvements in pain, disability, and postural alignment. Future research can include both upper and lower body assessment to evaluate overall musculoskeletal function in postpartum women.

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Table 2 Within-Group Comparison of Outcome Measures (Pre vs Post) Using Paired t-Test

Outcome	Group	Pre (Mean ± SD)	Post (Mean ± SD)	t-value	p-value
NPRS	A	6.61 ± 1.44	2.04 ± 1.10	19.664	<0.001
	B	5.89 ± 1.13	2.25 ± 1.29	31.016	<0.001
NDI	A	19.57 ± 3.76	4.36 ± 2.18	25.908	<0.001
	B	20.36 ± 3.69	8.86 ± 4.68	21.977	<0.001
CVA	A	41.68 ± 3.15	49.39 ± 3.67	-10.428	<0.001
	B	43.46 ± 2.20	46.82 ± 2.17	-21.502	<0.001

V. CONCLUSION

The current study concluded that both groups were effective in reducing pain, decreasing disability, and improving postural alignment in postpartum women with upper back pain, as evidenced by significant improvements in NPRS, NDI, and CVA. However, the intervention utilized in Group A showed greater effectiveness, especially in terms of improving postural parameters and functional disability, indicating that methods combining neuromuscular control and postural correction are more successful than traditional interventions.

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