



## Original Article

## Effects of Core Stabilization Exercises and High Velocity Thrust Manipulation on Pelvic Girdle Pain: A Randomized Controlled Trial

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## ABSTRACT

Pelvic-girdle pain is a mechanical disorder is very prevalent that leads the individual to suffer with disability and functional limitations. **Objective:** To determine the effectiveness of core stabilization exercises with thrust manipulation (HVT) on pelvic girdle pain in postpartum women. **Methods:** This randomized, placebo treatment-controlled trial was conducted in Physiotherapy OPD clinic in Jinnah Memorial Trust Hospital Gujranwala, Pakistan. We included 40 post-partum females consecutively aged 18 to 45 years presenting with pelvic girdle pain for over the past 6 to 16 months of the delivery meeting were isolated in two groups using convenient sampling. The control group received stabilization exercises with routine physical therapy treatment and the treatment group received a high velocity thrust manipulations technique (HVTT). The study instruments included Oswestry Disability Index Questionnaire and numeric pain rating scale. Data were analysed using SPSS 21.0. **Results:** The findings indicated demographics age with a mean and S.D score of 31.08 ± 6.36. In participants pain numeric pain and ODI scores in the post-treatment group were significant with a  $p < 0.01$  and general exercise with a  $p < 0.02$ . The pre and post ODI scores in both groups had a  $p$ -value  $< 0.05$  except the within-group score of  $p > 0.068$ . **Conclusions:** The application of high velocity thrust manipulation is effective approach in reducing pelvic girdle pain and discomfort in postpartum women. The HVTT treatment therapy can be deemed superior to core stabilization exercises.

## INTRODUCTION

Pelvic-Girdle Pain (PGP) commonly affects pregnant females in one-third of the population globally, causing severe pain including risk factors in the low-back region due to strenuous work [1]. The Pain can be felt in the region of the posterior iliac crest and the folds of the gluteal region, near the sacroiliac joints [2]. Women that are advancing with the PGP during pregnancy have a prevalence of about 80 % mild complaints of post-partum low-back pain (LBP) whereas 13% showed moderate and 7% reported very serious complaints [3]. The Obstetricians have addressed the PGP in a postpartum period which can

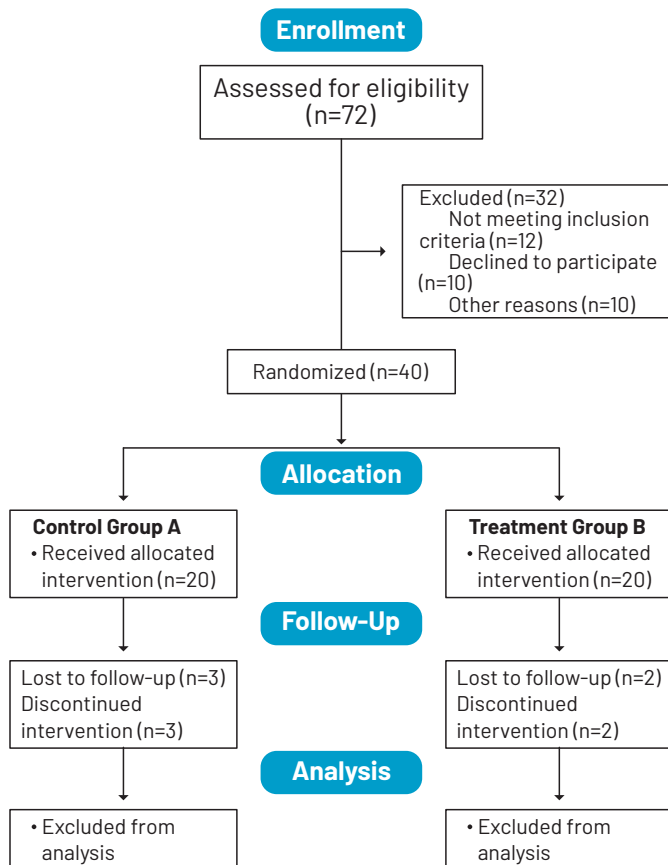
disable the ladies from carrying out activities of daily living (ADL's) and difficulty in maintaining the postures and such as sitting, walking, and standing routinely employment activities [4]. The PGP complaints can also relate to Omitting urological disorders and gynaecological problems, originating from intestines and tissues around the pelvis due to instability of pelvic joints that occurs individually or in junction with LBP [2]. Women can suffer from persistent PGP or LBP with a duration of 6 months to 11 years after giving childbirth [5]. Pregnancy in the woman can have a hindering effect on activities performed in daily

living such as exercise, household work, occupation, recreation, and sexual life in which Physical disability is a prevalent cause that affects the health-related quality in women with PGP [6]. However, the predominant role of the relaxing hormone in combination with other hormones is one of the factors that affect the laxity in the ligaments of the pelvic girdle as well that can slightly decrease the range of motion of the pelvic joints [7]. Physical therapy interventions can reduce the physiological issues and psychological issue strike of pregnancy pain to restore normal motor function, supporting significant components of a healthy post-partum time, especially the physical reestablishment [8, 9]. In contrast to other non-pharmacological treatments which are cost-effective, interdisciplinary coordinated rehabilitation, spinal manipulation techniques, and prenatal physical activities decrease the severity of LBP or pain in the pelvic girdle just during pregnancy or in the postpartum period and the advanced treatment in the pelvic girdle pain comprises of individualized exercises and specified multifactorial therapy for pregnant females and patients [10]. In women with PGP when pregnancy is over, treatment strategy with some really specific physical exercises for stabilizing came out to be more efficacious as compared to other treatments in which no exercises were performed [11]. Using a home training program and patient education of specific stabilization exercises of regional muscles proved efficient in women presenting with discomfort & pelvic-girdle pain and the application of high-velocity thrust manipulation technique (HVTT) that is a low-risk method, time-saving and efficacious has shown remarkable results in 80% of subjects exposed to pelvic-girdle pain & low-back pain post-partum [12]. Amongst all the patients, approximately half had pain in the pelvic girdle that was pregnancy-related (PPP), one out of every third pregnancy-specific low back pain (PLBP), and one of every sixth of both conditions present combined. Summarizing, the very literature reviews reportedly concluded that PPP pains require serious focus from some clinical assessors and other scientific communities, at every time and in whole countries [12]. Thus, the current research is aimed to compare the effectiveness of core stabilization exercises versus thrust manipulation techniques on pelvic girdle pain among postpartum women. These empirical findings can ultimately lead to lower burdens on the health system and health care professionals and also an effective treatment option for patients with pelvic girdle pain. This study will also improve the quality of life in postpartum women.

## METHODS

This was a randomized, placebo treatment-controlled trial was undertaken in the outpatient clinic in Department of Physical Therapy at Jinnah Memorial trust hospital

Gujranwala, Pakistan from (February to July 2020). The study population included 40 post-partum pregnant females with pelvic girdle pain who were recruited using a convenient sampling technique. We divided 20 participants into two groups (Figure 1). The control (placebo) group received stabilization exercises with routine physical therapy treatment and the treatment group received high velocity thrust manipulations technique (HVTT) followed with the routine physical therapy treatment. The exercise sessions were performed under the supervision of senior musculoskeletal physiotherapists and patient caregivers. The patient's inclusion criteria were based on the definite diagnosis for patients with pelvic girdle and sacroiliac joint pain. The participants consecutively aged 18 to 45 years presenting with pain for over the past 6 to 16 months of normal vaginal delivery were included. In the exclusion criteria, the patients with a history of back pain indicating radiculopathy, disc herniation, rheumatologic disease, neurological illness, or recent surgery & women who have undergone C-Section were excluded. We used a numeric pain rating scale to measure the pain intensity and Oswestry low back pain disability questionnaire to measure the functional status of patients. The primary outcome measures were pain and functional status of patients. The randomization was done through computer-generated software, and it was distributed to study participants in sealed envelope. The conventional physical therapy treatment was given in both groups, which comprised of hot packs for 10 minutes, stretching exercises & massage techniques thrice 3x a week. We used blind cursors to assess the posterior pelvic-girdle pain in the woman that is located across the distal or lateral areas to the (L5-S1), onset during the pregnancy or within three weeks after the delivery and the delivery of the foetus within the past 6 to 16 weeks and the 'positive P4' a provocative assessment test was performed on the subjects who were eligible to take part in this study. Furthermore, the patient's measurement data were obtained at the time of entry and after completion of the intervention, each group received the same time. Data were analysed using SPSS version 21.0. We used descriptive statistics with a mean and S.D to represent the study demographics. In the independent variables we included Oswestry Disability Index (ODI) and numeric pain scale for showing the comparison between the control and treatment groups. The p-value  $\leq 0.05$  was considered statistically significant. This study was approved by the ethical committee at the University of Lahore, Pakistan reference no. (IRB-UOL-FAHS/659/2019). The RCT protocol is registered in the *Clinical Trials.gov* database identifier (NCT04818411). Informed consent was obtained from all the individuals in the study.



**Figure 1:** Consort Diagram of the study

## RESULTS

Table 1 presents the average age of the participants as  $31.08 \pm 6.36$  years. The mean age in group 1 was  $32.40 \pm 6.42$  years, while in group 2 it was  $30.75 \pm 6.33$  years. The average age in both groups was found to be statistically similar, with a p-value greater than 0.05.

**Table 1:** Age distribution of patients

Variable	Mean $\pm$ SD	Minimum	Maximum	
Age (years)	Control group	$32.40 \pm 6.42$	22	44
	Treatment Group	$30.75 \pm 6.33$	21	39
	Total	$31.08 \pm 6.36$	21	44

Table 2 depicts the average numeric pain rating scores (pre) for group 1 were  $5.0 \pm 1.79$ , whereas for group 2 they were  $6.50 \pm 1.89$ . There was no significant statistical difference seen between the two groups, as indicated by a p-value greater than 0.05. Pain rating ratings in group 1 were found to be  $2.55 \pm 1.91$ , while in group 2, they were  $1.58 \pm 1.52$ . The pain rating scores in group 1 were found to be considerably lower compared to group 2, with a p-value of less than 0.05.

**Table 2:** Numeric Pain Rating Scores

Variable	Mean $\pm$ SD	Minimum	Maximum	p-value	
Numeric Pain pre	Control group	$5.0 \pm 1.79$	2	8	p<0.068
	Treatment Group	$6.50 \pm 1.89$	4	9	
	Total				

	Total	5.75 $\pm$ 1.45	3	9	
Numeric pain post	Control group	$2.55 \pm 1.91$	1	4	p<0.001
	Treatment Group	$1.58 \pm 1.52$	0	3	
	Total	$2.07 \pm 1.64$	0	4	

Table 3 indicates that the average Oswestry Disability Index (pre) score in group 1 was  $56.82 \pm 10.73$ , whereas in group 2 it was  $60.37 \pm 10.35$ . However, statistical analysis revealed no significant difference between the two groups, as indicated by a p-value greater than 0.05. The average Oswestry disability index in group 1 was  $30.63 \pm 6.62$ , whereas in group 2 it was  $26.70 \pm 12.01$ . The mean Oswestry disability index was found to be substantially higher in group 1 compared to group 2, with a p-value less than 0.05.

**Table 3:** Pre and Post ODI Score

Variable	Mean $\pm$ SD	Minimum	Maximum	p-value	
ODI (pre)	Control Group	$56.82 \pm 10.73$	40	79	p<0.068
	Treatment Group	$60.37 \pm 10.35$	40	80	
	Total	$58.59 \pm 10.65$	40	80	
ODI (Post)	Control group	$30.63 \pm 6.62$	11	40	p<0.001
	Treatment group	$26.70 \pm 12.01$	12	70	
	Total	$28.13 \pm 9.36$	11	70	

## DISCUSSION

The present study has revealed that the average age of females in group 1 ranged from 22 to 44 years. In contrast, the average age of the individuals in group 1 was  $32.40 \pm 6.42$ . In the second treatment group, the highest and lowest ages observed for female participants were 39 and 21, respectively. The average age for this group was calculated to be 30.75 with a standard deviation of 6.33. The average age of all participants in both groups is  $31.08 \pm 6.36$ . Age is considered an independent variable in this study, referring to the age range or the lowest and maximum ages of the subjects, which may change based on the people involved. However, the study specifically focused on post-partum females and did not include individuals who were either below the age of puberty or above the age of menopause. The age results obtained in this investigation were found to be similar to those reported in the previous study [8]. According to the European recommendations for pelvic floor dysfunction, it is advised to provide patients with adequate information and reassurance that the pregnant women should be offered personalized exercises, and a tailored multifactorial care treatment program should be implemented for all patients [7]. The current study aimed to assess the socio-economic level of the participants, specifically focusing on their perceptions towards exercise and home-based cures. Three distinct categories of socio-economic status were established, including the lower class, middle class, and upper class. The findings of this study have revealed that a majority of the female participants are affiliated with the lower socioeconomic class, comprising 52.5% of the sample. The

proportion of responders from the middle class was 22.5%, while the proportion of subjects from the upper class was 25.0%. A significant proportion of the patient population exhibited poorer socio-economic status, potentially influencing patient adherence to the prescribed treatment regimen. The compliance of a patient with the recommended treatment procedures might be significantly influenced by their socio-economic level and the impact of low socio-economic position on compliance and treatment outcomes can be diminished [9, 13]. The present study examined the numeric pain rating ratings of female individuals experiencing post-partum pelvic girdle pain, both before and after the implementation of treatment. The average numeric pain rating scores in group 1 were  $5.0 \pm 1.79$ , but in group 2 they were  $6.50 \pm 1.89$ . There was no statistically significant difference ( $P > 0.05$ ) between the two groups prior to the administration of any treatment. The findings of this study suggest that pelvic girdle pain is a significant contributor to disability and psychological distress among women in the post-partum period. The mean numeric pain rating ratings were found to be substantially higher in group 1 compared to group 2, with a p-value of less than 0.05. The findings indicate that high velocity thrust manipulations resulted in a greater reduction in pain levels compared to stabilizing exercises. The findings of this study indicate that the application of high velocity thrust manipulation had a more pronounced effect on pain reduction in those experiencing post-partum pelvic girdle pain [10]. The study aimed to assess the impact of stabilization exercises versus high velocity thrust manipulations on enhancing the functional status of post-partum females, using the Oswestry disability index as a measurement tool. The initial mean Oswestry Disability Index (ODI) score in group 1 was  $56.82 \pm 10.73$ . In group 2, the ODI scores were  $60.37 \pm 10.35$ , indicating no significant difference between the two groups ( $p$ -value  $> 0.05$ ). This indicates that post-partum pain in females significantly diminishes functional independence, particularly in relation to pelvic girdle problems. On the other hand, a study conducted within a community setting with 257 healthy pregnant women between the ages of 18 and 40 revealed that the implementation of supervised group exercise did not result in a decrease in the occurrence of lower back pain (LBP) or pelvic girdle pain (PGP) during pregnancy [6]. A descriptive study on the Prevalence of LBP The study design on 378 sample of healthy participants using Oswestry questionnaire resulted that 18.7% of individuals who were overweight experienced Low Back Pain (LBP) and among these individuals, 52.4% were identified as males, while 47.6% were identified as females. These findings indicate that overweight individuals may have a higher susceptibility to LBP [14]. In contrast a recent

cross-sectional study using modified Oswestry questionnaire on the prevalence and risk factors of low back pain concluded that Approximately 63% of the male population, are known to encounter recurring episodes of low back pain and this condition often results in chronic impairment and is associated with a range of postural issues in the body, particularly while engaging in activities involving the lifting of high physical loads [15]. In former studies it is evaluated that functional status is due to pelvic girdle pain which can be improved using high velocity thrust manipulations and about 80% of females are benefitted from manual therapy exercises along with the routine treatment as compared to control group who received routine physical therapy treatment [8]. Another study has shown stabilization exercises can reduce pain levels in pelvic girdle pain during and after pregnancy, there were two groups, one received normal treatment protocols whilst the other group received normal treatment and specific stabilization exercises and the results showed that group who received stabilization exercises was benefitted much more [11]. A single-centred experimental study conducted to investigate the effects of spinal mobilization, namely segmental or total spine mobilization, on a sample of 30 aged 51-59 female patients. The findings of the study indicate that Maitland mobilization is a viable intervention for reducing pain and enhancing range of motion [13]. A recent systematic analysis including a sample size of 1407 individuals diagnosed with pelvic girdle pain has indicated that the utilization of motor control exercises in isolation did not provide significant pain reduction in the short-term. Nonetheless, when applied in conjunction with other musculoskeletal therapy, these interventions demonstrated a noteworthy and medically important reduction in pain and impairment, particularly during the peripartum period [16]. In contrast, the efficacy of targeted stabilization exercises aimed at local muscles in reducing the effects of persistent postpartum pelvic girdle pain was found to be comparable to the normal progression of the condition [17]. A results meta-analysis also showed that in prenatal and postnatal women with urine incontinence, core stabilization exercises are safe and helpful for reducing symptoms, enhancing quality of life, strengthening pelvic floor muscles, and enhancing transverse muscle function [18]. Pregnant women in their second trimester may experience a relaxation of the pelvic floor muscles as a result of spinal manipulation because to an increase in the levator hiatal region at rest [19]. The present study findings are consistent with the decrease in pain threshold with a single session of spinal manipulation ( $p < 0.05$ ). The results of the former study have demonstrated that patients with sacroiliac joint pain improved after receiving HVT. Therefore, it may be said that



the treatment approach has positive effects on mobility and pain [20]. Our research also implicated a similar within-group analysis in both treatment group and numeric pain scale with a p-value of <0.01. The present investigation encountered various constraints, including a relatively brief duration of time allocated for the study and a limited treatment period of four weeks for the patients. Consequently, the observed outcomes may be subject to potential attenuation due to the restricted timeframe. The sample size in this study is insufficient to allow for generalization of the findings to the entire population. The questionnaire included self-report metrics, which heavily relied on participants' responses, their comprehension of the questions, and their manner of articulation. Finding suitable volunteers for the study proved challenging because to the stringent inclusion criteria. Many patients with cross-low-back pain were already undergoing various forms of treatment.

## CONCLUSIONS

The present study has shown a decrease in the pain scores, functional limitations, and disability levels with pelvic girdle pain as compared with the core stabilization exercise. HVTT is an effective option in reducing low back pain during and increasing activities of daily living.

## Authors Contribution

Conceptualization: AA, AY

Methodology: AA, SIM

Formal analysis: AF, AY, HS

Writing-review and editing: AF, SIM, HS

All authors have read and agreed to the published version of the manuscript.

## Conflicts of Interest

The authors declare no conflict of interest.

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