RESEARCH PAPER

Impact of Kinesio taping application on pelvic girdle pain in pregnant women

Walaa Ibrahim Mohamed[1], Samar Hosni Abdul Latif hussen [2], Amal Mohamed Yousef [3], Dalia Mohamed Kamel[4] Amir Arabi[5] and Shymaa Mohammed Abdo Mohammed[6]

[1]*Department of Women's Health, 6 October University, Giza, Egypt*
[2]*Department of Basic Sciences and Biomechanics, Suez Canal University, Ismailia, Egypt*
[3]*Department of Women's Health, Faculty of physical Therapy, Cairo University, Cairo \, Egypt;*
[4] *Faculty of Physiotherapy, The British University in Cairo, Egypt*
[5]*Department of Obstetrics and Gynecology, Faculty of Medicine, Cairo University, ,Kasr Al-Ainy, Egypt*
[6]*Department of Women's Health, Mayo University, Cairo, Egypt*

Received: 16th Dec, 2025; Revised: 8th Feb 2026; Accepted: 24th Feb, 2026; Available Online: 30th March, 2026

ABSTRACT

Background: Pelvic girdle pain (PGP) is a common musculoskeletal complaint during pregnancy and is often confused with low back pain due to overlapping clinical features. Hormonal, biomechanical, and postural changes during pregnancy contribute to its development and may negatively affect functional ability and quality of life. **Objective:** To investigate the effect of Kinesio taping on pain intensity, pain pressure threshold, and functional disability in pregnant women with pelvic girdle pain. **Methods:** Seventy-two pregnant women with pelvic girdle pain, aged 18–36 years, were recruited from the Department of Obstetrics and Gynecology at Dar El-Sallam General Hospital, Cairo, Egypt. Participants were randomly assigned into three equal groups. Group A received core exercises only, Group B received Kinesio taping in addition to core exercises, and Group C received placebo taping with core exercises. Tape was applied for 5 days per week over two consecutive weeks. Outcome measures included the Visual Analogue Scale (VAS), pressure algometer, and Oswestry Disability Index (ODI). Assessments were conducted at baseline, after 5 days, and after 10 days. **Results:** Significant improvements were observed within all groups in pain intensity, pain pressure threshold, and functional disability after treatment compared with baseline ($p = 0.001$). Group B showed slightly greater percentage improvement in pain intensity (37.5%) compared to Group A (31%) and Group C (34.4%). A similar trend was observed in functional disability (ODI), with improvements of 26%, 22%, and 21% for Groups B, A, and C, respectively. However, no statistically significant differences were found between the three groups in any outcome measures at post-treatment assessments ($p > 0.05$). **Conclusion:** Although all groups demonstrated significant improvement over time, Kinesio taping did not provide additional benefit compared to core exercise alone or placebo taping. Therefore, its use may be considered as an adjunctive supportive modality rather than a superior treatment approach

Keywords: *Kinesio taping, core exercises, pelvic girdle pain, pregnancy.*

How to cite this article: Ibrahim WM, Hussen SHAL, Yousef AM, Kamel DM, Arabi A, Mohammed SMA, Impact of Kinesio taping application on pelvic girdle pain in pregnant women. Int J Drug Deliv Technol. . 2026;16(24s): 458-468. DOI: 10.25258/ijddt.16.24s.51

Source of support: Nil.

Conflict of interest: None

1-INTRODUCTION

Pregnancy-related pelvic girdle pain (PPGP) typically emerges towards the end of the first trimester and may persist up to one month postpartum (1). It is frequently associated with lumbosacral instability resulting from altered ligamentous laxity and stiffness, which can increase joint mobility and stress on pelvic structures (2). The severity of PPGP often increases with subsequent pregnancies. Clinically, PPGP has been classified into five categories based on the site of pain: anterior pain at the symphysis pubis, posterior pain at either sacroiliac joint (SIJ), bilateral SIJ pain, mixed patterns, and complete pelvic girdle syndrome (3). Pelvic girdle pain is typically more severe during pregnancy than postpartum and may significantly limit physical activity (4).

Management of pelvic girdle pain includes a range of conservative interventions aimed at reducing pain and improving function. These include activity modification, pelvic stabilization exercises, aquatic therapy, and avoiding aggravating movements. Additional therapeutic options include acupuncture, manual therapy, thermotherapy, and pelvic support belts to enhance stability (3).

Stabilization exercises aim to improve lumbopelvic control through coordinated activation of the pelvic floor muscles, diaphragm, transversus abdominis, and multifidus muscles (5). During pregnancy, postural adaptations may compromise the strength and stability of the lumbopelvic region (6). These exercises have

**Author for Correspondence: Walaa Ibrahim Mohamed*

demonstrated effectiveness in managing pelvic girdle pain during pregnancy and postpartum (7).

Pelvic floor muscles play a fundamental role in lumbopelvic stability and are essential for supporting abdominopelvic organs and maintaining intra-abdominal pressure (4,5). Spinal stability depends not only on muscular strength but also on appropriate sensory input, which enables continuous modulation of movement patterns. Therefore, effective rehabilitation programs should integrate both motor and sensory components to optimize lumbopelvic stability (8).

Kinesio Taping (KT) has been widely used as a non-invasive treatment for reducing musculoskeletal pain and improving function in various clinical conditions (9,11,13,21). The tape is latex-free, with acrylic adhesive activated by body heat, and is composed of elastic polymer strands wrapped in cotton fibers (100%) (10). KT is proposed to exert multiple therapeutic effects, including improving muscle function, enhancing circulation, reducing pain, and providing sensory stimulation that may influence movement and proprioception (11,12,20). Additionally, KT may facilitate lymphatic drainage, support joint alignment, and modulate pain through neurophysiological mechanisms (12,13).

Kinesio tape is thought to stimulate cutaneous mechanoreceptors and indirectly influence muscles, fascia, and the lymphatic system, which may contribute to pain reduction and functional improvement (13). Elastic therapeutic taping is generally considered a safe, non-invasive intervention with minimal reported adverse effects. Therefore, it has been widely used as an adjunctive method in the management of musculoskeletal conditions, including pelvic girdle pain during pregnancy (10)

2-MATERIALS AND METHODS

Participants:
The study was performed at department of Obstetrics and gynecology in Dar El- Sallam General Hospital, Cairo, Egypt from June,2024 to December ,2024. The study has been granted approval from the Ethical Committee of the Faculty of Physical Therapy, Cairo University, with approval no.:P.T.REC/012/005903. Also, this study protocol was registered on Clinicaltrial.gov with ID NCT07292701. Participants were fully informed regarding the study's nature and purpose, treatment procedures, and given opportunities to ask questions before providing written informed consent.

Inclusion criteria:
Seventy –two women were enrolled in this study based on the following criteria; age from 18 to 36 years old, gestational age between 10 th–34th weeks, while experienced low back pain anywhere from T12 to the gluteal fold without leg pain, and at least moderate pain intensity (scoring ≥4 on VAS). Furthermore, each participant had at least one positive clinical test, including the long dorsal ligament test (LDSL), posterior pelvic pain provocation test (4P), or modified Trendelenburg test (4).

Exclusion criteria; were history of abortion, pregnancy of twins, previous pelvic injury, skin disease in the lumbosacral area, positive straight leg Raise test, negative diagnostic tests for pelvic girdle pain, chronic pelvic diseases, and history of allergies to material of Kinesio tape.

Assessment procedures:
Each patient assessed 3 times, the assessment measurements were taken before the beginning of the study (pre-study) and after 5 days of application (post study 1) then after more 5 days for each patient (post study 2) over 2 consecutive weeks. So, every patient has three readings by using the following:

-Visual analogue scale (VAS):
It is a validated, subjective scale, used for measuring pain intensity from acute to chronic pain. Scores were recorded by making a handwritten mark on a 10-cm line that represents a continuum between "no pain" and "worst pain" (14).

-pressure algometer:
A handheld device used to quantify pain sensitivity by measuring the pressure pain threshold (PPT) the minimum force that induces pain on muscles, joints, or tendons (15).

Pressure algometer is valid and reliable tool , for measuring (PPT) (16)

-The Oswestry Disability Index (ODI):
it was used to measure patient's permanent functional disability. ODI has been considered the 'gold standard' of low back pain functional outcome tools. It was easy administer and score, objectify patients' complaints, and monitors effects of therapy (17,18).

It is a self-administered questionnaire divided into ten sections designed to assess limitations of different activities of daily living. Each section is scored on a 0–5 scale, 5 representing the greatest disability. The index is calculated by dividing the summed score by the total possible score, which is then multiplied by 100 and expressed as a percentage. Thus, for every question not answered, the denominator is reduced by 5. If a patient marks more than one statement in a question, record the highest scoring which indicates true disability.(10)

Score interpretation: 0 - 4 No disability, 5 - 14 Mild disability ,15 - 24 Moderate disability 25 – 34, Severe disability 35 - 50 Completely disabled, No disability (10).

ODI is a valid, reliable assessment tool that was suitable for use in clinical practice.

The validated Arabic version of the Oswestry Disability Index (ODI) was utilized for outcome assessment in this study.(19)

Treatment procedure:
The 72 women eligible participants were divided into three groups equal in numbers as 24 each (A & B&C).

Group (A) (control group): received core exercise, **Group (B)** (study group): received Kinesio taping for 5 days for two consecutive weeks with core exercises **Figure1**, while **Group (C) (**placebo KT**):** received adhesive tape for 5 days, for two consecutive weeks along with core exercises. **Figure 2**

A-KT application (kinesiology tape):

Prior to the intervention, a patch test was performed by applying a small patch on the back for 24 hours to detect any potential allergic reaction. Participants showing signs of irritation or hypersensitivity were excluded from the intervention. No participants dropped out during the study period.

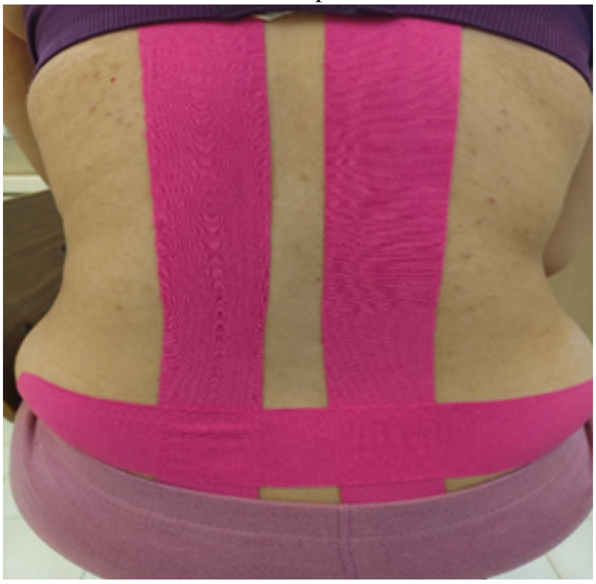


Figure1: KT application for PGP

Figure 2: placebo KT

Three I-strips of Kinesio tape were applied. Two I-strips (40 cm in length each) were applied bilaterally over the lumbar paraspinal muscles using a muscle facilitation technique, which aims to enhance neuromuscular activation and support weakened or inhibited muscles. The distal anchor of each strip was positioned approximately 5 cm below the posterior superior iliac spine (PSIS). With the participant in trunk flexion to place the lumbar extensors under stretch, the tape was applied along the paraspinal muscles toward the upper lumbar region with approximately 10% stretch. This level of tension was selected to provide proprioceptive input without restricting movement. After the participant returned to the upright position, characteristic skin convolutions may be observed. The resulting lifting effect is proposed to improve local circulation and augment sensory feedback, thereby contributing to enhanced postural control and muscle endurance. The application was performed according to previously published protocols (21).

Although pain reduction may be observed clinically, it is considered a secondary effect resulting from improved muscular support, enhanced proprioceptive input, and decreased mechanical stress on passive structures, rather than from direct muscle inhibition. In addition to the bilateral paraspinal facilitation strips, one transverse I-strip (20 cm in length) was applied over the posterior superior iliac spine (PSIS) region using a ligament correction technique. The tape was applied perpendicular to the previously placed strips at the level of the sacroiliac joints, with approximately 50% stretch from its baseline length while the participant maintained an upright standing position. This ligamentous application aimed to provide mechanical support to the sacroiliac ligaments and augment sensory stimulation in the region. The transverse application is intended to enhance joint stability by increasing cutaneous and ligamentous afferent input, thereby improving proprioceptive awareness and reducing excessive sacroiliac joint strain. By reinforcing passive structures and optimizing neuromuscular control, this technique may contribute to improved load transfer across the lumbopelvic region.The tape remained in place for five days and was subsequently removed and reapplied for an additional five days, repeated over two consecutive weeks.

The patients were instructed to remove the tape in case of any sense of burning or itching at the site of application.

B-Core exercise:
All participants performed a structured core stabilization exercise program targeting the deep lumbopelvic muscles, including the transversus abdominis, multifidus, diaphragm, and pelvic floor muscles.

The program included diaphragmatic breathing, pelvic floor muscle training, pelvic tilting exercises, cat–cow exercise, and clamshell exercise.

Each exercise was performed for 10–15 repetitions, in three sets, with a 2-minute rest interval between sets. The program was individualized and progressively adjusted according to each participant's tolerance and performance.

Participants were also instructed to perform the exercises regularly as part of their daily routine(22).

1) Breathing training: pelvic clock exercise (core stability control):
Participants performed the exercise in a crook-lying position (supine with knees flexed and feet supported), with the upper limbs relaxed alongside the body. Controlled diaphragmatic breathing was maintained throughout the procedure.

The exercise consisted of two sequential components First, during inhalation, participants were instructed to perform an anterior pelvic tilt, followed by a posterior pelvic tilt during exhalation, emphasizing coordinated lumbopelvic movement with respiratory control second, pelvic rotation was incorporated. Participants rotated the pelvis toward the right side during inhalation and returned to the neutral position during exhalation. The same sequence was then repeated toward the left side with the subsequent breath cycle.

All movements were performed slowly and rhythmically to enhance neuromuscular control and facilitate synchronization between diaphragmatic activation and lumbopelvic mobility.(24)

2) Pelvic floor contractions :((Endurance and Power Components)
Pelvic floor muscle training incorporated both endurance (long-hold) and power (short, rapid) contraction components to address different functional aspects of muscle performance.

Endurance Contractions (Long Holds):
Participants were instructed to perform a sustained pelvic floor muscle contraction by gently lifting the musculature surrounding the urethral, vaginal, and anal openings. The contraction was maintained for 3–10 seconds according to individual tolerance and strength level, followed by a relaxation phase of equal duration to ensure complete muscle recovery. Ten repetitions constituted one set.

Power Contractions (Short Holds):
Participants were then instructed to perform rapid maximal voluntary contractions of the pelvic floor muscles, holding each contraction for approximately 1 second, followed by a 1–2 second relaxation period. Ten consecutive repetitions constituted one set.

All contractions were performed while maintaining normal breathing and avoiding compensatory activation of surrounding musculature. Verbal cueing and corrective feedback were provided during supervised sessions to ensure proper technique and neuromuscular control.(26)


3) Cat Cow Technique:
-Starting Position: Get on your hands and knees in a tabletop position.

Place hands directly under your shoulders and knees under your hips.

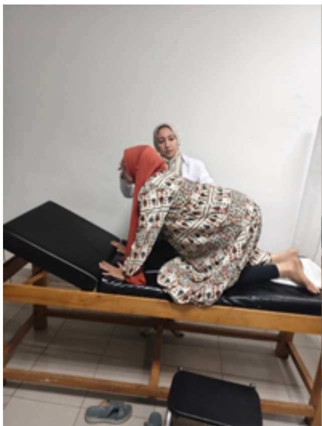
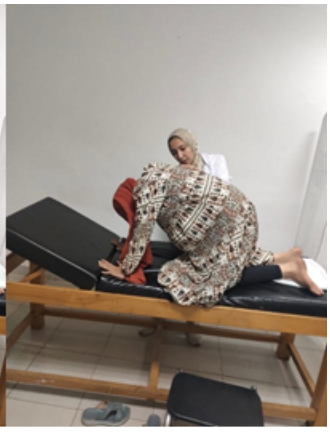
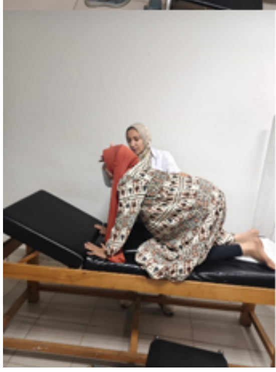
Keep your neck in line with your spine, looking at the floor.

-Widen your knees slightly if needed to create space for your belly.

-Cow Pose (Inhale):
Gently tilt your pelvis by lifting your tailbone upward to create a soft curve in the lower back.

Cat Pose (Exhale):
Gently draw your tailbone down and Round your back toward the ceiling, allowing your head and pelvis to tilt down naturally.

Focus on stretching the sacral area (the base of your spine) to relieve pelvic pressure.(27)

4)clampshell exercise :
participants were positioned in side-lying with the pelvis and spine maintained in a neutral alignment. The hips were flexed to approximately 45°, and the knees were flexed to 90°. From this position, the superior (upper) hip was abducted while keeping the heels in contact, ensuring that trunk rotation or pelvic compensation was avoided.(28)

The abducted position was sustained for 5 seconds before the limb was slowly returned to the starting position under controlled movement.

The exercise was performed bilaterally, with 10 repetitions completed on each side. A one-minute rest interval was provided between sets to reduce muscle fatigue and maintain proper movement quality.(29)

Sampile size

Sample size calculation was done using pain, as reported in Kuciel, with 80% power at α = 0.05 level, number of measurements 2, for 3 groups and effect size = 0.51 using F-test MANOVA repeated measures within and between interaction. The minimum proper sample size is 64 subjects, adding 8 subjects (12% as drop out). Total sample size is 72 subjects, 24 subjects in each group. The sample size was calculated using the G*Power software (version 3.0.10).

Data analysis and statistical design

Data were expressed as mean± SD. ANOVA was used to compare between subjects characteristics of the three groups. Shapiro-Wlik test was used for testing normality of data distribution. Repeated measure MANOVA was performed to compare within and between groups' effects for measured variables. Statistical package for the social sciences computer program (version 20 for Windows; SPSS Inc., Chicago, Illinois, USA) was used for data analysis. P less than or equal to 0.05 was considered significant.

RESULTS

General characteristics of the subjects:

There was no significant difference between three groups in the mean values of age, weight, height, BMI and pregnancy week (p>0.05).

With a p-value greater than 0.05, the Shapiro-Wlik test demonstrated that all three groups' outcome measures followed a normal distribution. **(table 1)**

Table 1. General characteristics of subjects of three groups

Subject characteristic	Group A (n=24)	Group B (n=24)	Group C (n=24)	f-value	p-value
Age (years)	26.58 ± 3.9	28.58 ± 3.12	28.63 ± 3.39	2.69	0.075
Weight (kg)	62.88 ± 5.15	63.08 ± 6.26	61.75 ± 5.43	0.389	0.679
Height (cm)	162.08 ± 3.45	161.54 ± 4.01	161.04 ± 4.47	0.376	0.688
BMI (kg/m^2)	23.93 ± 1.89	24.24 ± 2.87	23.85 ± 2.6	0.162	0.851
Pregnancy week	21.42 ± 6.54	22.87 ± 6.05	22.2 ± 6.64	0.311	0.734

Data was expressed as mean ± standard deviation

I- VAS for pain intensity:

Within-group comparison showed significant improvement in pain intensity in all three groups after the two weeks of intervention (p = 0.001). The greatest improvement was observed at post-study 2 compared to pre-study and post-study 1 (Table 2).

Between-group comparison showed no statistically significant differences in pain intensity among the three groups at pre-study (p = 0.701), post-study 1 (p = 0.368), and post-study 2 (p = 0.519) (Table 2).

Table (2): Comparison between pre- and post-study mean values of pain between and within groups

Pain by VAS (cm)	Group A	Group B	Group C	P value	η2
Pre-study	7.92 ± 0.97	8.13 ± 1.03	8.13 ± 0.95	0.701	0.01
Post-study 1	6.63 ± 1.06	6.42 ± 1.02	6.83 ± 0.96	0.368	0.029

Post-study 2	5.45 ± 1.06	5.08 ± 1.18	5.33 ± 1.2	0.519	0.019
% of change between pre-study and post-study2	31%	37.5%	34.4%		
(P-value)	0.001*	0.001*	0.001*		

Between the three measures comparison in each group			
	Group A	**Group B**	**Group C**
	MD (p-value)	**MD (p-value)**	**MD (p-value)**
Pre versus post-study 1	1.29 (0.001*)	1.7 (0.001*)	1.3 (0.001*)
Pre versus post-study 2	2.47 (0.001*)	3.05 (0.001*)	2.8 (0.001*)
Post-study 1 versus post-study 2	1.17 (0.001*)	1.34 (0.001*)	1.5 (0.001*)

Data is represented as mean ±SD, *: significant, η2: partial eta square, MD: mean difference, post-study 1: after 5 days; post-study 2: after 10 days (10)

II- Pain pressure threshold:
Within-group comparison showed significant improvement in pain pressure threshold in all three groups after the two weeks of intervention (p = 0.001). The greatest improvement was observed at post-study 2 compared to pre-study and post-study 1 (Table 3).

Between-group comparison showed no statistically significant differences in pain pressure threshold among the three groups at pre-study (p = 0.216), post-study 1 (p = 0.082), and post-study 2 (p = 0.280) (Table 3)

Table (3): Comparison between pre- and post-study mean values of pain pressure threshold between and within groups

Pain pressure threshold (kg/cm^2)	**Group A**	**Group B**	**Group C**	**P value**	**η2**
Pre-study	5.33 ± 0.72	5.18 ± 0.83	5.59 ± 0.89	0.216	0.043
Post-study 1	5.89 ± 0.65	5.65 ± 0.74	6.15 ± 0.89	0.082	0.07
Post-study 2	6.44 ± 0.71	6.33 ± 0.76	6.68 ± 0.85	0.280	0.036
% of change between pre-study and post-study2	20.8%	22.2%	19.5%		
(P-value)	0.001*	0.001*	0.001*		

Between the three measures comparison in each group			
	Group A	**Group B**	**Group C**
	MD (p-value)	**MD (p-value)**	**MD (p-value)**
Pre versus post-study 1	-0.56 (0.001*)	-0.48 (0.001*)	-0.57 (0.001*)
Pre versus post-study 2	-1.11 (0.001*)	-1.15 (0.001*)	-1.09 (0.001*)
Post-study 1 versus post-study 2	-0.55 (0.001*)	-0.68 (0.001*)	-0.53 (0.001*)

Data is represented as mean ±SD, *: significant, η2: partial eta square, MD: mean difference , post-study 1: after 5 days; post-study 2: after 10 days (10)

III- Functional disability (ODI):
Within-group comparison showed significant improvement in functional disability in all three groups after the two weeks of intervention (p = 0.001). The greatest improvement was observed at post-study 2 compared to pre-study and post-study 1 (Table 4).

Between-group comparison showed no statistically significant differences in ODI scores among the three groups at pre-study (p = 0.062), post-study 1 (p = 0.114), and post-study 2 (p = 0.174) (Table 4).

Table (4): Comparison between pre- and post-study mean values of ODI between and within groups

Oswestry disability index score	**Group A**	**Group B**	**Group C**	**P value**	**η2**
Pre-study	30.75 ± 4.75	33.58 ± 3.87	33.08 ± 4.41	0.062	0.077
Post-study 1	27.42 ± 4.06	29.08 ± 3.96	29.83 ± 4.12	0.114	0.061

Post-study 2	24 ± 3.28	24.83 ± 3.48	26.17 ± 5	0.174	0.049
% of change between pre-study and post-study2	22%	26%	21%		
(P-value)	0.001*	0.001*	0.001*		

Between the three measures comparison in each group			
	Group A	**Group B**	**Group C**
	MD (p-value)	**MD (p-value)**	**MD (p-value)**
Pre versus post-study 1	3.33 (0.001*)	4.5 (0.001*)	3.25 (0.001*)
Pre versus post-study 2	6.75 (0.001*)	8.75 (0.001*)	6.92 (0.001*)
Post-study 1 versus post-study 2	3.42 (0.001*)	4.25 (0.001*)	3.67 (0.001*)

Data is represented as mean ±SD, *: significant, η2: partial eta square, MD: mean difference, post-study 1: after 5 days; post-study 2: after 10 days (10)

DISCUSSION

This study was conducted to determine the effect of Kinesio taping in relieving pelvic girdle pain during pregnancy. The results of the study demonstrated that within-group comparisons revealed statistically significant differences between pre- and post-intervention measurements in all three groups. However, between-group comparisons showed no statistically significant differences among the groups. Although Group B showed slightly greater clinical improvement compared to Groups A and C, this difference was not statistically significant.

Asghari et al., (2024) reported that PGP lowers expectant women's quality of life, making it difficult for them to perform activities such as bending, lifting, sitting, sleeping, walking long distances, and standing for prolonged periods (as reported by the ODI) (30). Because of the potential risks to the mother and the fetus, there are very few pain treatment alternatives available for pregnant women. Especially when used for an extended period of time, the majority of commonly prescribed medications may have negative effects on the fetus. However, physical therapy provides various conservative modalities for managing pregnancy-related back and pelvic girdle pain. One of these interventions is Kinesio tape (KT), which is considered a non-invasive modality that may provide both support and pain relief without medication (31). KT involves the application of elastic therapeutic tape to the skin, which is thought to promote physiological movement and support affected muscles and joints (21).

There are a number of studies in the literature that are in agreement with our study. Asghari et al. found that KT intervention effectively reduces functional impairment and pain intensity in women with PGP during and after pregnancy (32). Kinesiology taping is used to relieve musculoskeletal pain, and the goal of treatment is to provide support to an injured or overused muscle. For that purpose, kinesiology tape is applied with medium to full stretch (50–75% approximately) while the individual maintains a functional joint position during application to stimulate mechanoreceptors and improve proprioception (33). Kuciel et al. found that K-Taping relieves pain through changes in muscle activation, reduction of joint repositioning, and reduction of abnormal muscle tension (10).

However, these findings are not fully consistent with the results of the present study, where no significant differences were found between groups.

Kelle et al. reported that Kinesio taping significantly improves pain and disability of patients suffering from pregnancy-related back pain and commented that it can be used as a complementary method (35). As Kaplan et al. reported, the effectiveness of Kinesio taping application on pain and disability in patients with pregnancy-related back pain may be due to supporting lumbosacral structures, increasing stability, reducing paraspinal stress, and stimulating connective tissues, resulting in pain relief (21).

The improvement obtained from the application of core exercises can be attributed to strengthening the paraspinal and abdominal muscles controlling lumbopelvic stability. Contraction of the transversus abdominis muscle leads to stabilization of the lumbar spine, significantly reduces laxity of the sacroiliac joints, decreases pain level, and improves quality of life (36).

Conversely, some studies were in disagreement with our study. Mamipour et al. reported that core stability exercises were more effective than usual care alone in relieving pain, improving disability, and quality of life of pregnant women with PG pain (4). Mahmoud et al. demonstrated that combining clamshell exercises with abdominal bracing improved lumbopelvic stability, reduced low back pain intensity, and enhanced functional outcomes in women with postpartum low back pain and lumbopelvic instability. However, the study noted that no single intervention was clearly superior to the others regarding the measured outcomes. This may support the findings of the current study

LIMITATIONS

The present study has some limitations. The duration of the intervention was relatively short, which may not reflect the long-term effects of Kinesio taping. In addition, pain assessment using the Visual Analogue Scale (VAS) is subjective in nature. Variations in participants' daily activities and individual responses to treatment may have also influenced the results.

CONCLUSION

Core exercise is effective in reducing pelvic girdle pain and improving functional disability in pregnant women. The addition of Kinesio taping did not show statistically significant additional benefit compared to core exercise alone. However, it may still be used as an adjunctive supportive modality.

Conflict of interest: The authors stated no conflict of interest.

Funding: No external funding was provided to the authors for their research, authorship, or publication.

Data access: Original data can be accessed upon request

REFERENCES

1- Burani, E., Marruganti, S., Giglioni, G., Bonetti, F., Ceron, D., & Cozzi Lepri, A. (2023). Predictive factors for pregnancy-related persistent pelvic girdle pain (PPGP): a systematic review. *Medicina*, *59*(12), 2123.

2- Verstraete, E. H., Vanderstraeten, G., & Parewijck, W. (2013). Pelvic Girdle Pain during or after Pregnancy: a review of recent evidence and a clinical care path proposal. *Facts, views & vision in ObGyn*, *5*(1), 33.

3- Xu, L., Li, Y., He, Y., Chen, M., Zhang, Y., Liu, C., & Zhang, L. (2024). Knowledge mapping analysis of research on pregnancy-related pelvic girdle pain (PPGP) from 2002 to 2022 using bibliometrics. *Journal of Pain Research*, 643-666.

4- Mamipour, H., Farazmehr, S., Negahban, H., Nazary-Moghadam, S., Dehghan-Manshadi, F., Nezhad, M. N., ... & Sharifzadeh, M. (2023). Effect of core stabilization exercises on pain, functional disability, and quality of life in pregnant women with lumbar and pelvic girdle pain: A randomized controlled trial. *Journal of Manipulative and Physiological Therapeutics*, *46*(1), 27-36.

5- Stuge, B. (2019). Evidence of stabilizing exercises for low back-and pelvic girdle pain–a critical review. *Brazilian journal of physical therapy*, *23*(2), 181-186.

6- Carvalho, A. F., Dufresne, S. S., De Oliveira, M. R., Furlanetto, K. C., Dubois, M., Dallaire, M., ... & da SILVA, R. A. (2020). Effects of lumbar stabilization and muscular stretching on pain, disabilities, postural control and muscle activation in pregnant woman with low back pain. *Eur J Phys Rehabil Med*, *56*(3), 297-306.

7- Gomes-Neto, M., Lopes, J. M., Conceicao, C. S., Araujo, A., Brasileiro, A., Sousa, C., ... & Arcanjo, F. L. (2017). Stabilization exercise compared to general exercises or manual therapy for the management of low back pain: A systematic review and meta-analysis. Physical therapy in Sport, 23, 136-142.

8- Zhang, A., Li, J., He, T., Xie, H., Mou, X., Yeung, T. C., ... & Li, L. (2024). Efficacy and safety of acupuncture in treating low back and pelvic girdle pain during pregnancy: A systematic review and meta-analysis of randomized controlled trials. Acupuncture and Herbal Medicine, 4(3), 346-357.

9- Tran, L., Makram, A. M., Makram, O. M., Elfaituri, M. K., Morsy, S., Ghozy, S., ... & Huy, N. T. (2023). Efficacy of kinesio taping compared to other treatment modalities in musculoskeletal disorders: a systematic review and meta-analysis. *Research in Sports Medicine*, *31*(4), 416-439.

10- Kuciel, N., Sutkowska, E., Cienska, A., Markowska, D., & Wrzosek, Z. (2017). Impact of Kinesio Taping application on pregnant women suffering from pregnancy-related pelvic girdle pain—preliminary study. Ginekologia polska, 88(11), 620-625.

11- Paoloni M, Bernetti A, Fratocchi G, Mangone M, Parrinelo L, Del Pilar Cooper M, et al. Kinesio Taping applied to lumber muscles influences clinical and electromyographic characteristics in chronic low back pain patients. Eur J Phys Rehabil Med. 2011;47(2):237-44.

12- Bagheri, R., Pourahmadi, M. R., Sarmadi, A. R., Takamjani, I. E., Torkaman, G., & Fazeli, S. H. (2018). What is the effect and mechanism of kinesiology tape on muscle activity?. Journal of Bodywork and Movement Therapies, 22(2), 266-275.

13- Reyhan AÇ, Dereli EE, Çolak TK. Low back pain during pregnancy and kinesio tape application J Back Musculoskelet Rehabil. 2017;30:609–13

14- hiarotto A, Maxwell LJ, Ostelo RW, Boers M, Tugwell P, Terwee CB. Measurement properties of visual analogue scale, numeric rating scale, and pain severity subscale of the brief pain inventory in patients with low back pain: a systematic review. J Pain 2019; 20(3):245-63. doi: 10.1016/j.jpain.2018.07.009)

15- Amiri, M., Alavinia, M., Singh, M., & Kumbhare, D. (2021). Pressure pain threshold in patients with chronic pain: a systematic review and meta-analysis. American Journal of Physical Medicine & Rehabilitation, 100(7), 656-674.

16- Ibrahim, M. M., El-Gendy, M. H., Helmy, E. S., A. Hamada, H. & Neamat Allah, N. H. (2022). Validity and reliability of the Egyptian algometer in patients with bruxism. Physiotherapy Quarterly, 30(1), 24–26. https://doi.org/10.5114/pq.2020.102162

17- Fairbank J. Why are there different versions of the Oswestry disability index? J Neurosurg Spine. 2014;20(1):83–6.

18- Chiarotto, A., Ostelo, R. W., Boers, M., & Terwee, C. B. (2018). A systematic review highlights the need to investigate the content validity of patient-reported outcome measures for physical functioning in patients with low back pain. Journal of clinical epidemiology, 95, 73-93.

19- Algarni, A. S., Ghorbel, S., Jones, J. G., & Guermazi, M. (2014). Validation of an Arabic version of the Oswestry index in Saudi Arabia. Annals of physical and rehabilitation medicine, 57(9-10), 653-663.

20- iseljak D, Medved V. Effects of Kinesio Taping® on muscle interplay within the lumbo–pelvic–hip complex: a randomized placebo-controlled trial. Sports (Basel). 2023;11(3):70.Discusses different KT techniques including facilitation vs inhibition method

21- Kaplan, Ş., Alpayci, M., Karaman, E., Çetin, O., Özkan, Y., İlter, S., ... & Şahin, H. G. (2016). Short-term effects of kinesio taping in women with pregnancy-related low back pain: a randomized controlled clinical trial. Medical science monitor: international medical journal of experimental and clinical research, 22, 1297.

22- Kelle B, Güzel R, Sakallı H. The effect of Kinesio taping application for acute non-specific low back pain: A randomized controlled clinical trial. Clin Rehabil. (2015) doi: 10.1177/0269215515603218.

23- Franks J, Thwaites C, Morris ME. Pilates to improve core muscle activation in chronic low back pain: A systematic review. Healthcare (Basel). 2023;11(10):1404. 10.3390/healthcare11101404

24- Owen PJ, Miller CT, Mundell NL, Verswijveren SJJM, Tagliaferri SD, Brisby H, et al. Which specific modes of exercise training are most effective for treating low back pain? Network meta-analysis. Br J Sports Med. 2020;54(21):1279–87. 10.1136/bjsports-2019-100886

25- Kang JI, Jeong DK, Choi H. Effect of exhalation exercise on trunk muscle activity and oswestry disability index of patients with chronic low back pain. J Phys Ther Sci. 2016;28(6):1738–42. 10.1589/jpts.28.1738

26- Curillo-Aguirre, C. A., & Gea-Izquierdo, E. (2023). Effectiveness of pelvic floor muscle training on quality of life in women with urinary incontinence: a systematic review and meta-analysis. Medicina, 59(6), 1004.

27- Belogolovsky, I., Katzman, W., Christopherson, N., Rivera, M., & Allen, D. D. (2015). The effectiveness of exercise in treatment of pregnancy-related lumbar and pelvic girdle pain: a meta-analysis and evidence-based review. The Journal of Women's & Pelvic Health Physical Therapy, 39(2), 53-64.

28- Willcox, E. L., & Burden, A. M. (2013). The influence of varying hip angle and pelvis position on muscle recruitment patterns of the hip abductor muscles during the clam exercise. journal of orthopaedic & sports physical therapy, 43(5), 325-331.

29- Park, J. (2020). The Effects of Clam Exercise on the Trunk Control and Balance of Stroke Patients. The Journal of Korean Physical Therapy, 32(6), 372-377.

30- Asghari, K. M., Toopchizadeh, V., Mirzazadeh, Y., Jamali, F., & Dolatkhah, N. (2024). The Effectiveness of Kinesio Taping in Pregnancy-Related Back and Pelvic Girdle Pain: A Systematic Review and Meta-Analysis. Biomedical Research Bulletin, 2(2), 87-95.

31- Maia LB, Amarante LG, Vitorino DF, Mascarenhas RO, Lacerda ACR, Lourenço BM. Effectiveness of conservative therapy on pain, disability and quality of life for low back pain in pregnancy: a systematic review of randomized controlled trials. Braz J Phys Ther 2021; 25(6):676-87. doi: 10.1016/j.bjpt.2021.06.007

32- Annamalai, S., Jayakumar, S., & Nirmala, J. G. (2024). Effectiveness of Swiss Ball Exercise Compared to Mat Exercise on Pelvic Girdle Pain in Antenatal Women. Indian Journal of Physiotherapy & Occupational Therapy, 18.

33- Rocktape: Sport Taping Applications and PowerTaping™ Performance Applications; c2008/2016.Availablefrom: https://www.rocktape.com/wpcontent/uploads/2014/12/RockTape-Rehab-Taping-Instructions.pdf. [Last cited on 2016 Apr 05].

34- Bano, B., Nigam, A., Malhotra, D., & Rais, Z. (2025). Impact of Kinesio Taping on Pregnancy related Pelvic Girdle Pain and Disability. The Journal of Obstetrics and Gynecology of India, 1-8.

35- Kelle B, Güzel R, Sakallı H. The effect of Kinesio taping application for acute non-specific low back pain: A randomized controlled clinical trial. Clin Rehabil. (2015) doi: 10.1177/0269215515603218.

36- Kluge, J., Hall, D., Louw, Q., Theron, G., & Grové, D. (2011). Specific exercises to treat pregnancy-related low back pain in a South African population. International Journal of Gynecology & Obstetrics, 113(3), 187-191.

37- Mahmoud, E. M., Mahmoud, A. M., Kamel, H. E. D. H., & Yosri, M. M. (2025, July). Effect of clamshell exercise on postpartum lumbo-pelvic stability and low back pain: a randomized controlled trial. In International Physical Therapy Conference-Cairo University (Vol. 4, No. 1, pp. 124-137). Cairo University, Faculty of Physical Therapy.

*Author for Correspondence: Walaa Ibrahim Mohamed