

Review

The effect of kinesiотaping on lumbar pain during pregnancy – a narrative review

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Abstract

Background: The lower back pain (LBP) during and after pregnancy is a very common issue that most pregnant women experience and interestingly, many of them do not mention it because they consider it an inherent element of pregnancy. A number of changes that occur during pregnancy are reflected in a woman's wellbeing. Low-back pain interferes with normal daytime functioning and pain relief with analgesics is not always possible due to contraindications to their use during pregnancy. Exercise and kinesiотaping (KT) are alternative methods of taking care of pain. The aim of this paper was to review the existing scientific publications and demonstrate the current scientific position on the effectiveness of kinescoping in pregnancy for the prevention and relief of lumbar pain. **Materials and methods:** The study includes a literature analysis conducted up to February 2024. Analysis of the databases made it possible to select 166 records, from which, after excluding duplicates and works without full access and not meeting other inclusion criteria, 13 papers were selected. **Results and conclusions:** Kinesiотaping can be used both in isolation and together with exercises, which multiplies its analgesic effect. Additional benefits of KT therapy include low cost, the possibility of long-term tape application with a high safety profile, and multidirectional effects that are not only relieving and analgesic but also corrective, anti-edematous, movement-activating, muscle-strengthening and many others.

Keywords: kinesiотaping, pregnancy, low-back pain, lumbar pain

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Introduction

Pregnancy, characterized by myriad physiological changes, represents a profound journey during which the mother's body undergoes extraordinary adaptations to meet the growing needs of fetal growth and development [1]. Among the array of changes occurring during this period of transition, biomechanical changes emerge as key mechanisms by which the maternal body adapts to the changing demands of pregnancy while protecting the health and wellbeing of the mother. The most important of these biomechanical adaptations is the transformation of posture and body alignment. As the uterus

enlarges to accommodate the growing fetus, there is a consequent shift in the center of gravity, resulting in an accentuated curvature of the lumbar spine known as lumbar lordosis. This anatomical adjustment places increased pressure on the muscles and ligamentous structures of the lower back, accelerating the onset of the common lower back pain experienced by a significant group of pregnant women. Furthermore, changes in the hormonal environment, characterized primarily by an increase in relaxing levels, promote ligamentous laxity and joint instability [2]. While this hormonal modulation facilitates pelvic expansion in preparation for childbirth, it simultaneously predisposes pregnant women to an increased susceptibility to musculoskeletal injuries, covering a spectrum of complaints ranging from discomfort to sprains and strains, particularly evident in weight-bearing joints such as the hips and knees [3]. Furthermore, the biomechanical consequences of pregnancy extend to the lower limbs, manifesting themselves in a range of physiological disorders. The simultaneous increase in weight gain and fluid retention accelerates the onset of peripheral oedema, culminating in swelling of the ankles and feet [4]. This exacerbates discomfort and impaired gait mechanics, further exacerbating the biomechanical challenges faced by pregnant women. In addition, the enlarging uterus exerts compressive forces on the vascular structures, impeding venous return from the lower limbs and promoting the development of varicose veins and oedema. Despite the various biomechanical challenges encountered during pregnancy, the human body shows a remarkable capacity for adaptation and resilience. Pregnant people instinctively modify their movements and postures to alleviate discomfort and maintain stability.

Lumbar pain, commonly known as lower back pain (LBP), is a frequent musculoskeletal problem occurring among pregnant women [5]. Extensive research has highlighted the prevalence of this condition, with studies consistently showing a significant prevalence among pregnant women. Lumbar pain is recognized as one of the most common discomforts reported by expectant mothers, affecting a significant proportion of pregnancies. Studies on the prevalence of lumbar pain during pregnancy consistently reveal a high percentage of women facing this problem, highlighting the importance of the topic. Studies suggest that approximately 50% to 70% of pregnant women experience some degree of lumbar pain, highlighting the ubiquitous nature of this phenomenon across different populations and settings [6]. This spectrum of occurrence covers a range of severity, from mild discomfort to debilitating pain, with a significant subgroup of pregnant women reporting moderate to severe symptoms. Anatomical studies consistently identify the lumbar spine as the main site of discomfort in pregnant women experiencing musculoskeletal pain [7]. The lumbar region, which includes the lower back, is the most commonly affected area. This observation highlights the pronounced vulnerability of the lumbar spine to the physiological changes and biomechanical stresses of pregnancy.

Several factors contribute to the development of lumbar pain during pregnancy. It is believed that hormonal changes, particularly increased relaxing levels, lead to ligamentous laxity and pelvic instability, making the lumbar spine more susceptible to stress and discomfort. Nevertheless, scientists debate the validity of this thesis [8]. Additionally, the biomechanical demands placed on the lumbar region due to changes in posture and weight distribution increase the risk of lumbar pain in pregnant women.

LBP during pregnancy can have a significant impact on maternal wellbeing and pregnancy outcomes. It can affect daily functioning, sleep quality and overall quality of life for pregnant women. Furthermore, untreated or inadequately treated lumbar pain can lead to complications such as increased stress levels, reduced physical activity and impaired adherence to prenatal care.

Management of lumbar pain during pregnancy is therefore essential to optimize maternal comfort, functional capacity and pregnancy outcomes. Overall, LBP is a common and significant musculoskeletal problem occurring in pregnant women. Understanding its prevalence, anatomical manifestations, contributing factors and implications for

maternal health is critical to developing effective management strategies and providing comprehensive care to pregnant women experiencing lumbar pain.

Kinesiotaping (KT) is a therapeutic technique that involves the application of elastic adhesive tape to the skin with the aim of providing support and stability to muscles and joints, as well as facilitating the body's natural healing process [9]. Developed in the 1973 by Dr. Kenzo Kase, a Japanese chiropractor, kinesiotaping has gained popularity as a non-invasive intervention used by healthcare professionals, athletes, and individuals seeking pain relief and enhanced performance. The distinctive feature of kinesiotape lies in its elastic properties, which allow it to stretch and recoil in a manner similar to human skin. This elasticity enables the tape to provide dynamic support while allowing for a full range of motion, distinguishing it from traditional rigid tapes or bandages. Kinesiotape is typically made of cotton or synthetic fibers with an acrylic adhesive that is hypoallergenic and latex-free, making it suitable for individuals with sensitive skin. The application of kinesiotape involves precise techniques tailored to the specific anatomical location and therapeutic goals. Healthcare professionals trained in KT techniques employ various taping patterns and tension levels to achieve desired outcomes, such as:

- pain relief: kinesiotape may help alleviate pain by reducing pressure on pain receptors, improving blood circulation, and modulating the perception of pain through sensory feedback mechanisms;
- muscle support and activation: the elastic properties of kinesiotape allow it to provide support to weakened or injured muscles, promoting proper alignment and facilitating muscle activation during movement;
- joint stability: by enhancing proprioception and providing external support, kinesiotape can help stabilize joints and reduce the risk of injury or excessive movement;
- swelling reduction: kinesiotape applied with a specialized technique known as "fan taping" or "lymphatic taping" may assist in reducing localized swelling and promoting lymphatic drainage by lifting the skin and facilitating fluid movement;
- postural correction: kinesiotape applied strategically along specific muscle groups or fascial lines may help improve posture by providing tactile feedback and encouraging optimal alignment of the body.

KT is employed across various healthcare disciplines, including physical therapy, sports medicine, chiropractic care, cosmetology and orthopedics, to address a wide range of musculoskeletal conditions, sports injuries, and rehabilitation goals. While research on the efficacy of KT is ongoing and findings are mixed, many individuals report subjective benefits such as pain relief, improved function, and enhanced athletic performance following kinesiotape application. However, to be able to recommend a particular therapeutic method with conviction, one must be supported by scientific data. Therefore, the purpose of this study was to analyze the available scientific literature on the effectiveness of KT in leveling LBP in pregnant women.

Material and Methods

Research for this narrative review was conducted up to February 2024, using three databases such as PubMed and Google Scholar. The following keywords and their combinations were used: low back pain, biomechanical changes during pregnancy, kinesiotaping, lumbar pain, pregnancy. In order to maintain the comprehensiveness of the article, the authors did apply restrictions on the year of publication of the articles, starting from 2012. Publications that are research papers, to which full access was possible, written in Polish and English were analyzed. The flowchart presented in Figure 1 shows the process of screening, identifying, and assessment of acceptability for research inclusion. An electronic search through the database resulted in 153 results and 13 additional records. Later on, duplicates in number of 18 were removed. In further screening, 108 records were

excluded due to following reasons: outdated methods, restricted research group or no original result (Figure 1).

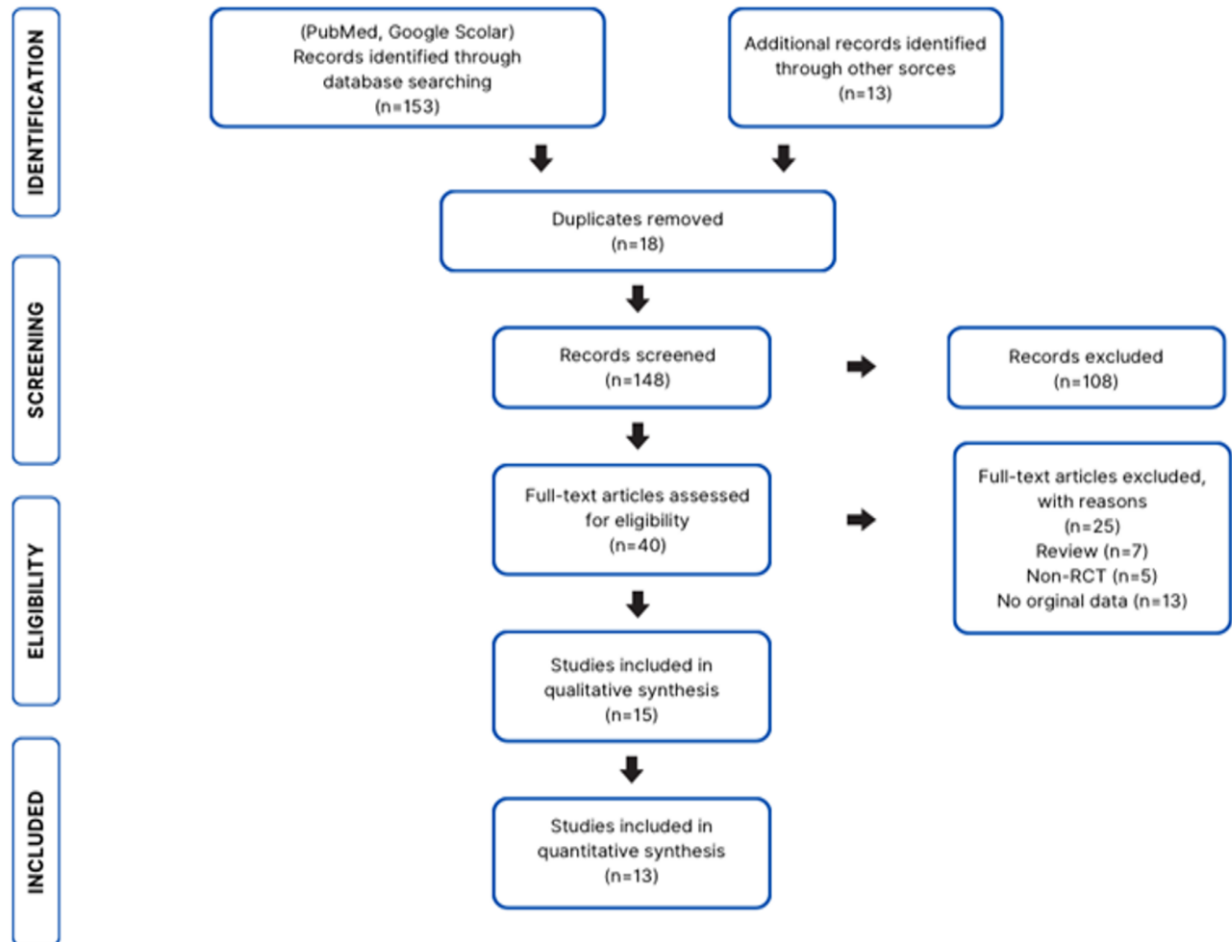


Figure 1. Diagram for searching and selecting publications for analysis

Literature review results

Kaplan et al. [10] conducted a short-term study, that tested the effect of KT on the efficacy of pregnancy-related back pain. The VAS (visual analog scale) and the results of the Turkish version of the Roland-Morris Disability Questionnaire (RMDQ) were used as evaluation criteria. VAS measurements were collected during rest and movement. Data were collected after 5 days and compared with baseline results. A total of 71 women participated in the study. There were 36 in the research group. There were no significant differences between them in the form of body mass index, gestational week or age. In both groups, each woman was administered paracetamol (1500mg/day) for five days. The control group did not receive any additional intervention. The study group received an additional five days of KT (the same KT technique for applying the patches performed by one person). In the research group, two women developed a local allergy resulting from the application of kinesio-patches. In addition, one participant in the study group and 3 participants in the control group were unable to come to the measurement on day 5. For this reason, the final study group consisted of 65 women.

Analyzing data on LBP severity in selected groups there were no significant differences. After the 2nd measurement, an improvement was noted in both groups, comparing to the baseline values, but the study group had a noticeably better improvement

compared to the control group. The author notes the positive effect of KT on LBP in pregnant women, while stressing that his study was short-lived, and that it should be followed by other studies in the future [10].

Polish researchers have also looked at the effect of KT on back pain in women caused by pregnancy [11]. The study was mainly aimed at analyzing individual muscles stabilizing the sacroiliac joint. The electromyography (sEMG) was used as an evaluation criterion. Electrodes were placed at 4 muscle sites: ipsilateral erector spinae muscle, ipsilateral gluteus maximus muscle, ipsilateral biceps femoris muscle, contralateral erector spinae muscle. The study included 37 pregnant women, 17 of them complained of pain and constituted the study group, and these women had KT applied for 5 days. In this group, sEMG was measured before KT, immediately after KT, 3 days after KT, and on day 5 after KT was removed. The other women did not report any complaints of pain. They were part of the control group, in which sEMG was measured only once. The women were asked to perform a hip extension of the lower limb from a supported kneeling position. During this time, resting muscle tension, the amplitude of work of the given muscles during the straightening of the limb, and the order of activation of the given muscles during the movement were measured. It was shown that women suffering from lower back pain caused by pregnancy have increased resting tension of the gluteus maximus muscle. The applied taping lowered the threshold of this tension, and improved the activation of the ipsilateral erector spinae muscle. The authors confirm that KT helps for this type of condition, while stressing that this study was conducted on a small number of probands. However, an important observation made by the authors is the potential mechanism that leads to increased pain and that can be abolished by the use of KT.

However, the patho-mechanism is not so simple and obvious. Studies shown that pathophysiological mechanisms causing LBP during pregnancy are not clear. As it was already mentioned before, changes in hormone levels may be the reason [2]. KT is known for its non-invasiveness. This is extremely important when applied to pregnant women. Its mechanism of action is most likely as described in the introduction: by improving stability and postural control. Kinesiotaping tapes conform perfectly to the skin and have a significant effect on improving blood and lymph circulation. In addition, due to their pressure and stimulation, they can affect the nervous system and skin receptors, which also has a positive effect on pain elimination. Although KT is not a substitute for movement therapy, learning correct movement patterns (proper staying, standing, sitting or lying down, getting up from a chair), it can make a significant contribution to pain therapy. What is important is the use of appropriate positions, the level of tension of the tape and the timing of its application on the skin [12].

Another study screening the effect of KT in women who suffer from LBP caused by pregnancy was taking into consideration two types of tapes. The one whose effect was tested was Kinesio Tex Gold tape. The Polovis Plus tape was responsible for the placebo effect. During the study, information was collected on the VAS scale. In addition, the Polish version of the Roland-Morris Disability Questionnaire (RMDQ- 2004) was used, which consisted of 24 questions to which the study participants were asked to answer "yes" or "no". Each answer to "yes" corresponded to 1 point. The more of points obtained, the greater the degree of disability in the particular area studied. The study involved 106 women, all of whom were in their second or third trimester of pregnancy. They were randomly divided into two groups – A and B, with 53 women in each. In both groups, VAS and RMDQ scale data were collected before the taping was applied. Kinesio Tex Gold tapes were then applied in group A, and Polovis Plus tapes in group B. There was no difference between the groups or between the patch application techniques, the only difference was the type of tapes. After application, the women were allowed to go home. Two days after the application of the tapes, VAS scale data were collected again. On day five, the women were told to remove the taping, and on day seven, the RMDQ test was

conducted again and VAS scale data was collected. This day was followed by a break in the study, which lasted 3-4 weeks (wash out period). After this break, the exact same study was conducted again, but this time Polovis Plus taping was applied to group A, and Kinesio Tex Gold taping was applied to group B. Results were collected in the same manner as for the first part of the study. After analyzing the results on the VAS scale, the researcher concluded that the results comparing day 2 with day 7 were significantly lower in the group that received taping with Kinesio Tex Gold tape on both occasions. Also, significant effects were noted when analyzing the RMDQ scale, in which a significant improvement was noted between the scores, in the group where Kinesio Tex Gold taping was applied – in both trials. Unfortunately, in the case of two women, side effects of wearing the kinesiotape were observed, which manifested with itching of the skin around the area where the tape was applied. In conclusion, the researcher noted that the positive effect of the kinesiotapes, could be observed as early as day 2 after application. There were side effects, but they were not serious enough to discontinue the study [13].

In another study conducted by Wahyuni et al.[14], the effects of transcutaneous electrical nerve stimulation (TENS) and Kinsey on LBP in pregnant women were compared, and the results showed that TENS was more effective than KT in reducing LBP during pregnancy.

Aalishahi et al [15] examined the effect of longer than previously indicated 2-week KT. Pain intensity was measured on days 1, 2, 7 and 14 in 80 pregnant women (age: 18-40). The subjects were 18-32 weeks pregnant at the time. When qualifying participants for the present project, the presence of intervertebral discopathy, spinal anomalies, LBP before pregnancy and dependence on non-steroidal anti-inflammatory drugs (NSAIDs) were excluded. Four patients were excluded during the course of the project. Therefore, of the eligible women, 76 patients completed the study and their data were included in the statistical analysis. In both the intervention and control groups, pain intensity was significantly different at different times. Functional disability was assessed in both groups. The results showed that the effect of time was significant, and the trend of disability decreased in the KT group. However, the interaction between time and group was not significant. Moreover, there were no differences in disability between the KT group and the control group. In summary, disability significantly decreased in both groups, but there was no statistically significant difference between the groups.

In Chamnankrom et al. [16] study, 40 pregnant women were randomly allocated to groups of 20 individuals: the elastic tape group (Group A) and the placebo group (Group B). Group A participants received elastic tape therapy applied to the lower back according to a standardized method, while Group B participants received identical tape therapy without stretching. Pregnant women with mechanical back pain between 28-38 weeks of gestation were included, with VAS back pain rating of at least 1, able to walk at least 20 meters, and no contraindications to tape application. They had no history of LBP before pregnancy, no serious lumbar spine conditions such as hernias, and were not at high risk during pregnancy. Two tapes in the shape of the letter "I" were applied along the spine from the sacroiliac joint to the twelfth rib in a standing position with 50% tension, as well as two additional tapes horizontally from the iliac crest with 50% tension in the frontal plane at the level of L4/L5 and the last rib. In the placebo group, tapes were applied in the same shape but without tension. All participants were evaluated for the degree of back pain using the VAS, physical function using RMDQ, and the time taken to walk 20 meters in a straight line before tape application. Statistical analysis showed that in both groups, there was a reduction in pain immediately after KT application, with a 29.4% reduction in pain (VAS decreased from 5.7 to 4.0) in the tension tape group and a 15% reduction in pain in the placebo tape group ($p=0.04$) one week later. One week after application, disability scores decreased in both groups, with a significant decrease in disability in the tension tape group (from 13.5 to 4.6) compared to the placebo group (from 11.9 to 8.1).

Mutoharoh and colleagues [17] investigated the combined effects of KT therapy and exercises in pregnant women. The study included 36 pregnant women in the third trimester as participants, selected using purposive sampling technique. Numerical Rating Scale (NRS) questionnaires in the range of 1 -10 where no pain was coded as (0), mild pain (1-3), moderate pain (4-6) and severe pain (7-10). was used to assess the effects achieved. Scale categorization was based on McCaffery et al. including no pain (0), mild pain (1-3), moderate pain (4-6) and severe pain (7-10). The results indicated that clinically lower back pain significantly decreased after therapy. The results confirmed that combining KT with physical activity is a valid choice in leveling LBP in pregnant women.

The literature on the subject also includes case studies. Shahbazia et al. [18] also addressed the issue of conservative treatment options for LBP. They conducted KT on a 33-year-old woman who had been experiencing continuous lower back pain radiating to the lower extremities, including the feet, with sensations of burning and tingling, for two months prior to her due date. The patient had no history of lumbar spine injury. The pain was most severe at night, disrupting the patient's sleep and limiting her daily activities. The application involved star-shaped taping, utilizing 4 tapes applied around the lower thoracic spine area. The therapy outcomes were assessed using the VAS and Oswestry Disability Index (ODI). Prior to the first taping, the patient reported pain levels at 6.5/10 on the VAS scale. A significant reduction in lower back pain symptoms and lower extremity pain was noted on the VAS scale from the time of application until 1 month postpartum, ranging from 0-3/10. Additionally, a significant reduction in the ODI score was observed after kinesiotaping, initially decreasing from 50% to 20%, and eventually to 14% by the end of the treatment period. However, the sensation of burning in the sole of the foot was not alleviated.

It should be pointed out that KT can be used both in alleviating back pain in pregnant women and in caring for women after delivery. Mahmoud et al. [19] compared the effectiveness of treating postpartum LBP using KT and acupressure. The study involved 30 women experiencing LBP after childbirth (15 days postpartum to ensure complete uterine involution). The age of the women ranged from 20 to 35 years, with a body mass index not exceeding 30 kg/m². Furthermore, only women without previous spinal pathologies or neurological disorders were included in the study. They were randomly assigned to two equal groups: Group A (KT group), and Group B (acupressure group). In Group A, women received kinesiotaping on the back from S2 to L1 three times a week for 4 weeks, with the tape remaining on the skin until the next session and removed two hours before the next session. In contrast, in Group B, women received acupressure therapy by thumb pressure for one minute followed by relaxation for one minute, on the skin surface at four points (B22, B23, B25, B27) three times for each point, three times a week for 4 weeks. The session lasted 24 minutes. VAS was used to assess the degree of back pain, and the range of lumbar joint motion (flexion, extension, and lateral flexion) was measured for all women in both groups. Statistical analysis showed that after treatment, there was a significant increase in lumbar range of motion in Group A compared to Group B. Group A also demonstrated a significant decrease in the degree of back pain compared to Group B after treatment.

Rishi at al. [20] conducted a study involving 40 postpartum women (6-12 months after delivery) using two tapes applied to the abdomen at least 9 mm from the abdominal line 2 cm below the umbilicus, divided into two groups of 20 individuals each, excluding previous spinal issues or anomalies. Participants were randomly assigned to either the experimental group (Group A) or the control group (Group B). Group A received KT at 50% tension in the supine position combined with exercises and warm compresses for six weeks, while Group B underwent conventional treatment consisting of exercises and warm compresses. Tape therapy was applied for three days, removed, and reapplied for another three days. Significant reduction in LBP associated with KT was observed.

Additionally, a reduction in the degree of abdominal muscle separation (IRD) was observed in this group.

The issues discussed in this paper have been meta-analyzed before. Xue et al. [21] conducted a meta-analysis showing promising results. Meta-analysis of 7 randomized controlled trials indicated that compared to the control group, KT intervention significantly improved both pain reduction and function improvement, as assessed by the VAS and RMDQ. It's worth noting that the effectiveness of KT intervention was observed in both short-term and long-term applications. Data supporting this observation are also presented in this review. Subgroup analysis showed that improvement in LBP was particularly noticeable after interventions lasting less than or equal to 1 week. However, even after longer application of KT, a significant improvement was observed, although it was not always as pronounced when assessing function using RMDQ. Additionally, meta-analysis showed that KT intervention was effective in various stages of pregnancy, especially in the second and third trimesters.

Fifty-eight consecutive pregnant women with LBP participated in a study conducted by Dağ Tüzmen H et al. [22] They were randomly divided into two groups: a Kinesio tape group and a control group. Both groups received exercises as part of a home program. The protocol was approved by the Ethics Committee of Necmettin Erbakan University. The study included an assessment of pain levels using a visual analog scale (VAS) and an assessment of functional capacity and disability using the Turkish version of the Roland-Morris Disability Questionnaire (RMDQ) and the Pelvic Rim Questionnaire (PGQ). At the beginning of the study, there were no significant differences between the groups in terms of age, parity, pregnancy, gestational week and body mass index. After 5 weeks, the Kinesio tape group showed significant improvement in all parameters ($p < 0.05$), while the control group showed no significant differences in VAS, RMDQ or PGQ scores.

LBP during and after pregnancy is a very common issue that most pregnant women experience and interestingly, many of them do not mention it because they consider it an inherent element of pregnancy. Very often they have no idea about other than pharmacological options for dealing with this pain. The physiological changes that occur during pregnancy, such as weight gain, pelvic anteversion, hip flexor contractions, lumbar hyperlordosis, softening, elongation, and stretching of muscles, tendons, intervertebral discs, sacroiliac joints, and the pubic symphysis, directly predispose women to LBP. It is important to make women aware that, in addition to relieving the spine, staying in a resting position, and unfortunately often using painkillers, there are commonly available, non-invasive, and well-tolerated methods aimed at reducing LBP. The availability of techniques to manage lower back pain is limited and usually focuses on exercises, kinesiotherapy, physiotherapy, and pharmacotherapy. Many pregnant women have contraindications to exercising during pregnancy or were already physically inactive before pregnancy, so despite the undeniable positive impact of exercise on reducing LBP this is not always a well-tolerated way of dealing with lower back pain. Pregnant women should be made aware of the possibility of using the most available, least invasive and quick to apply method of dealing with lower back pain, which is kinesio taping. This method can be used both in isolation and together with exercises, which multiplies its analgesic effect. Additional benefits of KT therapy include low cost, the possibility of long-term tape application with a high safety profile, and multidirectional effects that are not only relieving and analgesic but also corrective, anti-edematous, movement-activating, muscle-strengthening and many others [23].

Conclusions

KT is a form of therapy with a high safety profile. The very fact that it is used in pregnant women shows its safety and low invasiveness. The results presented in this paper confirm the effectiveness of KT in leveling LBP both in a group of pregnant women

and in a group with postpartum pain. KT in the presented studies was combined or compared with other forms such as pharmacotherapy, acupuncture or physical activity. The possibility of combining these forms to achieve stronger or faster analgesic effects is indicated. The vast majority of studies reported here used a subjective scale to evaluate the effectiveness of the proposed therapy. And this may not seem like a very accurate tool. However, it should be emphasized that pain is, according to its definition, an unpleasant sensory and emotional experience. It is associated with currently occurring or potential tissue damage. Pain is always a personal experience, influenced to varying degrees by biological, psychological and social factors. Hence, a subjective tool for assessing it is a good choice, and the research presented here highlights that in the subjective assessment of female participants, KT has an analgesic effect.

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