THE EFFECTIVENESS OF PREGNANCY EXERCISE WITH KINESIO TAPING ON LOWER BACK PAIN IN PREGNANT WOMEN IN THE THIRD TRIMESTER

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ABSTRACT

Lower back pain is common for pregnant women. The back pain was caused by the shift of the center of gravity towards the front as the uterus enlarges. This study aims to determine the effectiveness of pregnancy exercise with the addition of Kinesio taping on low back pain in pregnant mother at third trimester. The study used a quasi-experimental method and it was conducted in a rural area under the coverage area of a puskesmas in Kebumen District. The population in this study was pregnant women in the area with a total of 247 pregnant women. This study involved 36 pregnant women in the third trimester selected using a purposive sampling technique with the criteria of primiparous and multiparous, 28-36 weeks of gestation, experiencing low back pain, and no history of comorbidities and complications during pregnancy. Data were analyzed using the Wilcoxon Signed Rank Test. The results showed that pregnancy exercise with the addition of Kinesio taping had a significant effect on reducing low back pain in pregnant mother in the third trimester indicated by a P-value of 0.001. Pregnancy exercise with the addition of Kinesio taping can reduce low back pain in pregnant women in the third trimester.

Keywords: kinesio taping, low back pain, pregnancy exercise

低于腰痛是怀孕期间的常见问题。腰痛是由子宫增大时重心向前进移动所引起的。本研究旨在确定怀孕期间的运动加上Kinesio贴带用于减轻孕早期腰痛的有效性。该研究采用准实验法，并在库本地区的一个农村地区进行。研究对象是在该地区内活动的247名孕妇。本研究选择了36名在第三孕期的孕妇，她们符合初产妇和多产妇的条件，妊娠28-36周，有腰痛经历，且在怀孕期间没有并发症和合并症。数据使用Wilcoxon Signed Rank Test分析。结果显示，怀孕期间的运动加上Kinesio贴带显著降低了孕早期腰痛，P值为0.001。怀孕期间的运动加上Kinesio贴带可以减轻怀孕早期腰痛。

关键词：Kinesio贴带，低背痛，怀孕期间的运动

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Introduction

Lower back pain is one of the discomforts or complaints in pregnant women with a prevalence of 35%-61%.1 This complaint is increasingly felt at the 5-7 months of gestation (47%-60%).2 Clinical symptoms due to lower back pain are increasingly felt in the third trimester.3 Lower back pain occurs as the center of gravity in pregnant women moves to the front due to the enlargement of the uterus and the fetus so that pregnant women must adjust themselves.4 One of the adjustments is the standing position.5 Additional stretching and fatigue, especially on the back will occur if the standing position is not correct.6 Lower back pain is also caused by hormonal changes during pregnancy which also change the helping and connecting tissues that result in muscle elasticity and flexibility.7

Lower back pain can be a serious complaint that can cause pregnant women to feel physically and emotionally tired and it also disturbs activities of daily living, rest or sleep, appetite, and concentration.8 Lower back pain during pregnancy can be at risk of becoming chronic back pain that is difficult to cure if it is not immediately handled after the delivery.9 Lower back pain on pregnant mother is influenced by some factors.2 They are weight gain during pregnancy and spinal physiology, spinal curvature, and changes in body posture at the end of pregnancy, and an imbalance between the erector spine and lumbar spine muscles.1 The enlargement of the uterus along with gestational age increases the degree of lordosis causing complaints of pain in the waist and lower back pain.10 Complaints of lower back pain can be caused by musculoskeletal problems or a problem in the pelvis such as infection.7 The complaint can be reduced pharmacologically and non-pharmacologically.11 Pharmacological therapy can use non-steroidal anti-inflammatory drugs, muscle relaxants and analgesics, while non-pharmacological therapy can use some techniques such as relaxation, back exercise, physical exercise such as pregnancy exercise, and the use of Kinesio taping.12

Pregnancy exercise is a physical exercise to put pregnant women physically and mentally to have quick, spontaneous delivery and safety.13 Pregnant women should do pregnancy exercise after the sixth month of gestational.14 Pregnancy exercise is considered a good physical exercise for pregnant women in which the movements are adjusted to the changes that occur in the abdomen, pelvis, and genital organs during the pregnancy.15 Pregnancy exercise can maintain and strengthen and the elasticity of the abdominal wall muscles, pelvic floor muscles and the last ligaments, which are closely related to the birth process.16 The exercise also serves to maintain spinal health so that the risk of spine trauma due to pregnancy can be minimized states that pregnancy exercise is proven effective in reducing low back pain in pregnant women in the third trimester.17
Kinesio taping is a non-pharmacological treatment developed by Dr. Kenzo Tape in Japan.\textsuperscript{18} The characteristics of Kinesio taping are similar to human skin, so they can be used safely and effectively.\textsuperscript{19} Kinesio taping is an elastic rubber band without drugs addition that can overcome musculoskeletal problems.\textsuperscript{20} Seyhmus Kaplan, et all (2016) mentioned that Kinesio taping is effective for reducing lower back pain in pregnant women as indicated by a P-value of <0.001. This study aims to identify the effectiveness of pregnancy exercise with Kinesio taping on low back pain in pregnant women in the third trimester.

**Methods**

Quasi-experimental design used in this research. It was conducted in a rural area in the area of a puskesmas in Kebumen District. The population in this study was all pregnant women in the area with a total of 247 pregnant mothers in December 2020 This study involved 36 pregnant women in the third trimester as participants. They were selected using purposive sampling technique. In intervention group researcher conducted in primary health care with the assistant. In intervention group used 3 times of therapy. Firstly, researcher gave Numeric Rating Scale (NRS) questionaries to the participant in intervention group, afterward pregnancy exercise with kinesio taping and participant will fill the NRS again after intervention. Therapy conducted 3times in respondent. The independent variable was pregnancy exercise with Kinesio taping, while the dependent variable was lower back pain in pregnant women. This study used the pain measurement instrument of the Numeric Rating Scale Instruction (NRS) with a scale of 0-10. The categorization of the scale was based on McCaffery, M., Beebe, A., et al. covering no pain (0), mild pain (1-3), moderate pain (4-6), and severe pain (7-10). The study used univariate analysis with frequency distribution and bivariate analysis with Wilcoxon Signed Rank Test.

This study was ethically approved by Ethics Committee of STIKES Muhammadiyah Gombong (041.6/II.3.AU/F/KEPK/III/2020). Informed consent was obtained from each participant prior to data collection.

**Results**

Based on the results of this study, the majority of the pregnant women’s age was 20-35 years old (66.7%), have primary education level (66.7%), unemployed (75%), and multipara (69.4%).
Table 1. Characteristics of Respondents

| Variable       | n=36 | %  |
|----------------|------|----|
| Age            |      |    |
| 20-35 years old| 24   | 66.7|
| <20 years old or > 35 years old | 12 | 33.3|
| Education level|      |    |
| Primary        | 24   | 66.7|
| Secondary      | 10   | 27.8|
| High           | 2    | 5.6 |
| Occupation     |      |    |
| Unemployed     | 27   | 75.0|
| Employed       | 9    | 25.0|
| Parity         |      |    |
| Primipara      | 11   | 30.6|
| Multipara      | 25   | 69.4|

Table 2 shows that age, education level, and parity of pregnant women affect lower back pain with a p-value of <0.05, while occupation has no effect on back pain as the p-value is 0.493 which is higher than 0.05.

Table 2. Comparison of Variables to Low Back Pain (Post-Test)

| Characteristics | Mild | Moderate | Severe |
|-----------------|------|----------|--------|
| 年龄             |      |          |        |
| 20-35 years old | 11   | 78.6     | 13     | 76.5   | 0   | 0.0    | 0.003  |
| <20 or > 35 years old | 3 | 21.4 | 4 | 23.5 | 5 | 100.0 |
| 教育程度        |      |          |        |
| 高中            | 1    | 7.1      | 1      | 5.9    | 0   | 0.0    | 0.002  |
| 初中            | 9    | 64.3     | 1      | 5.9    | 0   | 0.0    |        |
| 小学            | 4    | 28.6     | 15     | 88.2   | 5   | 100.0  |        |
| 职业            |      |          |        |
| 失业            | 9    | 64.3     | 14     | 82.4   | 4   | 80.0   | 0.493  |
| 就业            | 5    | 35.7     | 3      | 17.6   | 1   | 20.0   |        |
| 婚育            |      |          |        |
| 一胎            | 11   | 78.6     | 0      | 0.0    | 0   | 0.0    | 0.001  |
| 多胎            | 3    | 21.4     | 7      | 100.0  | 5   | 100.0  |        |

Based on table 3, the results of the Wilcoxon Signed Rank Test between the pre-test and the post-test, positive means that after treatment there is 0 respondent who experiences pain. Then, negative means that after the post-test treatment, the pain level decreases by 22 respondents. Zero means that after the post-test treatment, there are no changes with a total of 14 respondents.

Table 3. The Effect of The Application of Pregnancy Exercise on Lower Back Pain Before and After Treatment

| Sign      | Obs | Sum ranks | p-value |
|-----------|-----|-----------|---------|
| Positive  | 0   | 0         | <0.001  |
| Negative  | 22  | 561       |         |
| Zero      | 14  | 105       |         |

|         | 36  | 3916      |

This means that clinically the lower back pain decreases after the treatment with a p-value of <0.001 meaning that it is statistically significant. Based on the practical/clinical results after the
treatment between the pretest and posttest groups, 22 respondents experienced a decrease in lower back pain.

**Discussion**

Based on the results of the study, pregnancy exercise therapy using Kinesio taping can reduce the intensity of lower back pain in pregnant women in the third trimester. The Wilcoxon Signed-Rank Test produces a p-value of <0.001 meaning that there is the smallest decrease in the intensity of lower back pain after pregnancy exercise with the addition of Kinesio taping. Therefore, pregnancy exercise with the addition of Kinesio taping is more effective in reducing the intensity of low back pain, compared to pregnancy exercise only.

Lower back pain is common for pregnant women, but the intensity of pain is relative in each individual and is caused by many factors. Lower back pain often occurs in the second and third trimesters. In the second trimester, there is an increase in intensity along with increasing gestational age due to the shifting of the center of gravity and body posture as the uterus enlarges. It can be overcome by carrying out daily activities carefully and correctly to avoid wrong posture. Meanwhile, in the third trimester, stretched muscles or compressed nerve roots will cause pain, tenderness, tension, or stiffness in the lower back.

Lower back pain is influenced by stress/strain of back muscles, tendons, ligaments which occurs when daily activities are carried out excessively. During pregnancy, the pelvis will experience softening of the joints, collagen tissue, connective tissue, and an increase in sex steroid hormones, so that the joints will become relaxed and there is also be hip joint mobility. Besides, lower back pain in pregnant women can be overcome by pregnancy exercises in accordance with the abilities of pregnant women.

Pregnancy exercise is an exercise aimed at reducing lower back pain in pregnant women due to the increased angle of the curve. Regular pregnancy exercise makes the joints and body tissues flexible and balanced so that lower back pain can be resolved. However, performing exercise exceeding the recommended time will cause harm. The recommended time is 15-60 minutes for all exercises. In this study, pregnancy exercise was carried out for ± 20 minutes and a maximum of 30 minutes considering the fatigue after the exercise can affect the pregnancy.

Doing pregnancy exercise will activate endogenous opioids hormone that functions as morphine. One of the endogenous opioid hormone systems is b-endorphin which will come out and be captured by receptors in the hypothalamus and limbic system which functions to regulate emotions. An increase in b-endorphins has been proven closely related to natural sedatives, memory enhancement, increased appetite, sexual ability, blood pressure, and breathing, creating a sense of comfort, and reducing lower back pain in pregnant women.
Kinesio taping (Kinesio tape) is an adhesive plaster in the form of tape and made of latex material. Some studies explained that Kinesio Taping therapy can also treat lower back pain with pressure on the skin and external load of the Kinesio tape which can stimulate skin mechanoreceptors (myelinated nerve fibers) which inhibit pain transmission according to the theory of gate control. The benefits of Kinesio taping are also explained by researcher in which it can stabilize and support the soft tissue structure of the body (muscles, tendons, ligaments) and joints that are injured/painful so that they can be actively moved without pain. Therefore, the blood flow and Lymphatics remain smooth resulting in a faster proper natural healing process. Besides, it can also increase the range of motion of the joints.

Compared with pregnancy exercise therapy with the addition of Kinesio taping, pregnancy exercise therapy has a quite influential working mechanism in dealing with lower back pain. Regular exercises for ± 20 minutes can stimulate the body to produce endorphins which provide a relaxed and comfortable effect. Explained that pregnancy exercise therapy with the addition of Kinesio taping has a combination of working mechanisms that are directly directed to the hurt part, namely, the lower back. This combination provides double protection. Besides providing a relaxing effect on the body's movement system, it also provides protection from outside the peripheral skin by having a recoil effect that makes the skin lift as the flexibility of the tape will create a wider space between the skin and muscles which result in improving blood circulation and lymphatic fluid drainage and stimulating skin mechanoreceptors (myelinated nerve fibers) which are sent to the hypothalamus which stimulating the pituitary gland to produce endorphin. Therefore, it can inhibit pain transmission based on the theory of gate control. Thus, pregnancy exercise with the addition of Kinesio taping is more effective than pregnancy exercise only.

Conclusion

It can be concluded that the pregnancy exercise affects the reduction of lower back pain in pregnant women and pregnancy exercise with the addition of Kinesio taping can reduce low back pain in pregnant women. So it is necessary for health worker to add Kinesio taping for pregnancy exercise to reduce lower back pain.

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Conflict of Interest

The authors declared that there is no conflict of interest.
References

1. Saptyani PM, Suwondo A, Runjati R. Utilization of Back Movement Technique to Intensity of Low Back Pain in Third Trimester Pregnant Women. Str J Ilm Kesehat. 2020;9(2). doi:10.30994/sjik.v9i2.335

2. Gharaibeh MudA. Prevalence of Low Back Pain in Pregnant Women and the Associated Risk Factors. J Orthop Bone Disord. 2018;2(2). doi:10.23880/jobd-16000157

3. Backhausen MG, Bendix JM, Damm P, Tabor A, Hegaaard HK. Low back pain intensity among childbearing women and associated predictors. A cohort study. Women and Birth. 2019;32(4). doi:10.1016/j.wombi.2018.09.008

4. Öztürk G, Geler Külcü D, Aydol E, Kaspar Ç, Utürel B. Effects of lower back pain on postural equilibrium and fall risk during the third trimester of pregnancy. J Matern Neonatal Med. 2016;29(8). doi:10.3109/14767058.2015.1049148

5. E. K, N. Y. The effect of kinesiotaping on low back pain during pregnancy. Turkiye Fiz Tip ve Rehabil Derg. 2013;59.

6. Kalinowski P, Krawulska A. Kinesio taping vs. placebo in reducing pregnancy-related low back pain: A cross-over study. Med Sci Monit. 2017;23. doi:10.12659/MSM.904766

7. Ramadhania RS, Itha Idhayanti R, Lusiana A. Alexander Technique To Reduce Lower Back Pain In 3rd Trimester of Pregnancy. Midwifery Nurs Res. 2020;2(1). doi:10.31983/manr.v2i1.5606

8. Kalinowski P, Krawulska A. Kinesio Taping Reduces Low Back Pain Among Pregnant Women. Massage Mag. 2018;23(269).

9. TCTR20190105001. Effect of elastic tape on low back pain in pregnancy. http://www.who.int/trialsearch/Trial2.aspx?TrialID=TCTR20190105001. Published online 2019.

10. Chen L, Ferreira ML, Beckenkamp PR, Caputo EL, Feng S, Ferreira PH. Comparative Efficacy and Safety of Conservative Care for Pregnancy-Related Low Back Pain: A Systematic Review and Network Meta-analysis. Phys Ther. 2021;101(2). doi:10.1093/ptj/pzaa200

11. Chen L, Ferreira M, Beckenkamp P, Caputo E, Ferreira P. Comparative efficacy and safety of conservative care for pregnancy-related low back pain: a systematic review and network meta-analysis. Osteoarthr Cartil. 2019;27. doi:10.1016/j.joca.2019.02.496

12. Wahyuni S, Jurusan Kebidanan Poltekkes Kemenkes Riau D. Perbedaan Intensitas Nyeri Punggung Bawah Pada Ibu Hamil Trimester Iii Yang Dilakukan Back Exercise Dengan Dan Tanpa Kinesio Tapping Di Praktik Mandiri Bidan Dince Safrina Kota Pekanbaru Tahun 2019. Vol 7.; 2019.

13. Novyriana E, Rahmadhani W, Zuhroh S. Hubungan Lingkar Lengan Lengan Atas Dengan Kejadian...
Anemia Dalam Kehamilan Di Puskesmas Gombong I. J Ilm Kesehat Keperawatan. 2016;12(2). doi:10.26753/jikk.v12i2.157

14. Rahmadhani W, Laohasiriwong W. Gender of baby and postpartum depression among adolescent mothers in central Java, Indonesia. Int J Child Adolesc Heal. 2020;13(1 PG-43-49).

15. Rahmadhani W. Knowledge Of Postpartum Mothers On Postpartum Care In Healthcare Centers In Kebumen. J Ilm Kesehat Keperawatan. 2020;16(1). doi:10.26753/jikk.v161i1.379

16. Samsuddin SNA, Masroom MN, Yunus WMAWM. Mental health of Muslim unwed pregnant teenagers. Malaysian J Med Heal Sci. 2019;15.

17. Mutoharoh S, Kusumastuti, Indriyani E. The Effectiveness of Birth Ball During Pregnancy in Length of Labor. In: ; 2020. doi:10.2991/ahsr.k.200204.060

18. Gürşen C, İnanoğlu D, Kaya S, Akbayrak T, Baltacı G. Effects of exercise and Kinesio taping on abdominal recovery in women with cesarean section: a pilot randomized controlled trial. Arch Gynecol Obstet. 2016;293(3). doi:10.1007/s00404-015-3862-3

19. Motylewski S, Terka D, Poziomska-Piątkowska E. Assessment of physical activity effectiveness in pain alleviating of the lumbar spine pain during pregnancy. Fizjoterapia Pol. 2017;17(4).

20. Wahyuni S, Raden A, Nurhidayati E. Perbandingan Trancutaneous Electrical Nerve Stimulation Dan Kinesio Taping Terhadap Penurunan Skala Nyeri Punggung Bawah Pada Ibu Hamil Trimester Iii Di Puskesmas Juwiring Kabupaten Klaten.; 2019.

21. Karaman E, Kaplan Ş, Alpayci M, Çetin O, Kolusari A, Şahin HG. Can kinesio taping be a novel treatment option for emesis gravidarum? A randomized preliminary study. East J Med. 2018;23(3). doi:10.5505/ejm.2018.54254

22. Kaplan Ş, Alpayci M, Karaman E,. Short-term effects of kinesio taping in women with pregnancy-related low back pain: A randomized controlled clinical trial. Med Sci Monit. 2016;22. doi:10.12659/MSM.898353

23. Vas J, Cintado MC, Aranda-Regules JM, Aguilar I, Rivas Ruiz F. Effect of ear acupuncture on pregnancy-related pain in the lower back and posterior pelvic girdle: A multicenter randomized clinical trial. Acta Obstet Gynecol Scand. 2019;98(10). doi:10.1111/aogs.13635

24. Dewi Candra Resmi, Soeharyo Hadi Saputro R. Pengaruh Yoga Terhadap Nyeri Punggung Bawah Pada Ibu Hamil Trimester III Di Puskesmas Kalikajar I Kabupaten Wonosobo. J Ilm Kesehat. 2017;8(1).

25. Davies L, Daellenbach R, Kensington M. Sustainability, Midwifery and Birth.; 2010. doi:10.4324/9780203841242

26. Intarti WD, Puspitasari L. Kontribusi Senam Ibu Hamil Trimester III Dalam Pengurangan Nyeri Pinggang Di Wilayah Ekskotatif Cilacap. Ilm Kebidanan. 2017;VII.
27. Susanti NY, Putri NK. Pengembangan senam hamil dan pengaruhnya terhadap pengurangan keluhan nyeri pinggang pada ibu hamil trimester iii. Oksitosin J Ilm Kebidanan. 2019;6(1). doi:10.35316/oksitosin.v6i1.343

28. Humaera S. Pengaruh Senam Hamil terhadap Peningkatan Kualitas Hidup Ibu Hamil di Puskesmas Tegalrejo Yogyakarta. Univ Aisyiyah Yogyakarta. Published online 2019.

29. Inding i. Pengaruh senam hamil terhadap perubahan derajat nyeri pada ibu hamil yang menderita nyeri pinggang bawah (npb). kesehatan. 2016;제13집 1호 (May).

30. Chammankrom M, Manimmanakorn N, Manimmanakorn A, Kongwattanakul K, Hamlin MJ. Effects of elastic tape in pregnant women with low back pain: A randomized controlled trial. J Back Musculoskelet Rehabil. 2021;34(1). doi:10.3233/BMR-200094

31. Koukoulithras I, Stamouli A, Kolokotsios S, Plexousakis M, Mavrogiannopoulou C. The Effectiveness of Non-Pharmaceutical Interventions Upon Pregnancy-Related Low Back Pain: A Systematic Review and Meta-Analysis. Cureus. Published online 2021. doi:10.7759/cureus.13011

32. Elhosary EA, Ewidea MM, Mohamed MA. Efficacy of kinesio tape on neck pain and functional disability in pregnant women: A randomized controlled trial. Clin Exp Obstet Gynecol. 2021;48(1). doi:10.31083/j.ceog.2021.01.2145