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EFFECTIVENESS OF PREGNANCY EXERCISES ON REDUCING BACK PAIN IN THIRD TRIMESTER PREGNANT WOMEN

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ABSTRAK EFEKTIVITAS SENAM HAMIL TERHADAP PENURUNAN NYERI PUNGGUNG PADA IBU HAMIL TRIMESTER III

Latar Belakang: Nyeri punggung merupakan salah satu keluhan umum pada ibu hamil, khususnya trimester III yang dapat menurunkan kualitas hidup dan mengganggu aktivitas sehari – hari. Perubahan anatomi tubuh, peningkatan berat janin, serta perubahan hormonal berperan besar memicu munculnya nyeri ini. Penelitian ini bertujuan menganalisis efektivitas senam hamil terhadap penurunan nyeri punggung pada ibu hamil trimester III.

Metode: Penelitian ini menggunakan desan pre eksperimental, desain one group pretest posttest design dengan jumlah sampe sebanyak 28 ibu hamil trimester III ditentukan berdasarkan Teknik purposive sampling. penelitian ini dilaksanakan di TPMB Asmak Mukhayah pada bulan Juni dan Juli tahun 2024. Instrumen penelitian berupa NRS untuk mengukur nyeri punggung dan SOP senam hamil. Data dianalisis menggunakan uji wilcoxon sign rank test.

Hasil: Hasil penelitian menunjukkan sebelum diberikan intervensi sebagian besar responden mengalami nyeri sedang sebanyak 22 ibu hamil (78,6%), sesudah diberikan intervensi menunjukkan sebagian besar mengalami nyeri sedang sebanyak 16 ibu hamil (57,1%). Hasil uji wilcoxon menunjukkan nilai p = 0,000, yang berarti senam hamil efektif terhadap penurunan nyeri punggung pada ibu hamil trimester III.

Kesimpulan: Senam hamil terbukti efektif dalam menurunkan nyeri punggung pada ibu hamil trimester III.

Saran: Bidan diharapkan mengintegrasikan senam hamil ke dalam program antenatal care secara rutin sebagai upaya promotif dan preventif untuk meningkatkan kenyamanan ibu hamil dan mempersiapkan kondisi fisik menghadapi persalinan.

Kata Kunci: Ibu hamil trimester III, Nyeri punggung, Senam hamil

ABSTRACT

Background: Back pain is one of the most common complaints among pregnant women, particularly in the third trimester, which can reduce quality of life and interfere with daily activities. Anatomical changes in the body, increased fetal weight, and hormonal alterations play a major role in triggering this pain. This study aimed to analyze the effectiveness of pregnancy exercise (*senam hamil*) in reducing back pain among third-trimester pregnant women.

Methods: This study employed a pre-experimental design with a one-group pretest–posttest approach involving 28 third-trimester pregnant women selected using purposive sampling. The research was conducted at TPMB Asmak Mukhayah in June–July 2024. The instrument used was the Numeric Rating Scale (NRS) to measure back pain, and a standardized pregnancy exercise protocol was applied. Data were analyzed using the Wilcoxon signed-rank test.

Results: The findings showed that before the intervention, most respondents experienced moderate pain (22 pregnant women, 78.6%), whereas after the intervention, the majority experienced mild pain (16 pregnant women, 57.1%). The Wilcoxon test results indicated a p-value of 0.000, demonstrating that pregnancy exercise was effective in reducing back pain among third-trimester pregnant women.

Conclusion: Pregnancy exercise is proven effective in reducing back pain in third-trimester pregnant women.

Recommendation: Midwives are encouraged to integrate pregnancy exercise into routine antenatal care programs as a promotive and preventive measure to enhance maternal comfort and prepare the mother's physical condition for childbirth.

Keywords: Third trimester pregnant women, Back pain, Pregnancy exercise

INTRODUCTION

Back pain is one of the most common complaints experienced by pregnant women, particularly in the third trimester, which can reduce quality of life and interfere with daily activities. Changes in body weight, the enlarging position of the uterus, and increased pressure on the spine and pelvis often cause back pain to occur and worsen as pregnancy progresses (Arummega et al., 2022; Ayu & Kusumaninggalih, 2025). Many women consider this complaint as a "normal" part of pregnancy and therefore do not seek proper treatment until the pain becomes more disruptive. This discomfort may interfere with household tasks, work, sleep, and even social relationships. Hence, it is important to identify effective interventions to reduce back pain (Ayu & Kusumaninggalih, 2025).

A meta-analysis conducted by Salari et al. (2023) reported that the global prevalence of back pain in pregnancy is approximately 40.5%, and in the third trimester, the prevalence increases to about 47.8% (Salari et al., 2023). In Indonesia, a study at Kebun Tebu Health Center, West Lampung, reported that 60–80% of pregnant women experience back pain during pregnancy (Widiyastika et al., 2023). Another study at BPM Nurhidayah, Cisarua Bogor, found that pregnancy exercise can effectively reduce back pain in third-trimester pregnant women, showing significant differences in pain scores after the intervention (Nengsih et al., 2021).

The chronology of back pain in third-trimester pregnant women is closely related to anatomical changes in the body. As pregnancy enters the third trimester, the uterus enlarges and presses on surrounding structures, including pelvic muscles and ligaments, which shifts the center of gravity. The lower back muscles must work harder to support the body, resulting in greater mechanical load on the lumbar spine and pelvis (Khairunnisa et al., 2022; Prananingrum, 2022).

In addition, hormonal changes such as increased progesterone and relaxin make ligaments more flexible and pelvic joints looser in preparation for childbirth. A combination of increased fetal weight, pressure on nerves/sacroiliac joints, poor sleeping positions, and poor posture further exacerbate back pain (Wahyuni, 2024). Fatigue and physical activity that is not adapted to pregnancy also accelerate the onset and severity of pain (Karo et al., 2022).

The impact of frequent and severe back pain on pregnant women and the fetus is significant. Mothers may experience difficulty moving, reduced sleep quality, stress and fatigue, and limitations in daily activities. Prolonged pain can also affect the mother's psychological condition, potentially worsening mood or leading to mild depression. For the fetus, maternal stress and sleep disturbances may affect oxygen and nutrient flow, and increase the risk of preterm birth or low birth weight if the mother's condition worsens (Astuti et al., 2023; Lestaluhu, 2022).

One of the recommended interventions is routine pregnancy exercise, which includes back muscle training, stretching, and correct posture. Pregnancy exercise can strengthen back and pelvic support muscles, improve ligament flexibility, and promote better posture to distribute body weight more evenly (Astuti et al., 2023; Fitriani, 2021). Several studies, such as a quasi-experimental study at Nurhidayah Cisarua, demonstrated that pregnancy exercise significantly reduced the intensity of back pain in third-trimester pregnant women (Nengsih et al., 2021). Similarly, research at PMB Yana Permata Sari found that prenatal yoga and pregnancy exercise reduced back pain scores more effectively compared to no intervention (Yuniarsih & Futriani, 2025).

This study aims to analyze the effectiveness of pregnancy exercise in reducing back pain among third-trimester pregnant women.

RESEACRH METHODS

This study employed a pre-experimental design with a one-group pretest–posttest approach. The study population included all third-trimester pregnant women who visited TPMB Asmak Mukhayah in June and July 2024, totaling 28 individuals. The sample consisted of 28 participants selected using purposive sampling. The inclusion criteria were: (1) third-trimester pregnant women (28–40 weeks of gestation); (2) experiencing back pain during pregnancy; (3) singleton pregnancy; and (4) willingness to participate by signing an informed consent form. The exclusion criteria were: (1) pregnancy complications contraindicating exercise; (2) a history of chronic musculoskeletal disorders prior to pregnancy; (3) systemic diseases affecting the ability to exercise; and (4) current use of medication or undergoing physical therapy for back pain during the study period.

The study was conducted at TPMB Asmak Mukhayah in June–July 2024. The research instruments included the Numerical Rating Scale (NRS) to measure the intensity of back pain, which was assessed approximately 15-30 minutes after the pregnancy execise session to evaluate the immediate effect of the intervention on pain reduction (Ariendha et al., 2022; Carvalho, J., 2019)

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and the Standard Operating Procedure (SOP) for pregnancy exercise, administered twice a week for 15 minutes per session, and evaluated after two weeks (Fitriana et al., 2024). Data were analyzed using the Wilcoxon signed-rank test.

RESEARCH RESULTS

The research findings are presented descriptively and inferentially. The descriptive analysis includes maternal age, education, occupation, parity, and current BMI. The results are presented in Table 1 below.

Table 1
Characteristics of Third-Trimester Pregnant Women (n = 28)

Characteristics	Frequency (f)	Percentage (%)
Age		
<20 years	1	3.5
20-35 years	26	92.8
>35 years	1	3.7
Pendidikan		
Elementary School	0	0
Junior High School	6	21.4
Senior High School	18	64.2
Higher Education	4	14.4
Occupation		
Employed	7	25
Unemployed	21	75
Parity		
Primigravida	18	64.2
Multigravida	10	35.8
Grandemultigravida	0	0
Current BMI		
Underweight	2	7.1
Normal	21	75
Overweight	3	10.7
Obese	2	7.2

Table 1 presents the characteristics of third-trimester pregnant women. Based on age, the majority were 20–35 years old, totaling 26 women (92.8%). In terms of education, most had completed senior high school, amounting to 18 women (64.2%). Regarding occupation, the majority were unemployed, totaling 21 women (75%). Based on parity, most were primigravida, totaling 18 women (64.2%). In terms of current BMI, the majority were within the normal range, totaling 21 women (75%).

The bivariate analysis of the effectiveness of pregnancy exercise on reducing back pain in third-trimester pregnant women is presented in Table 2 below.

Table 2
Effectiveness of Pregnancy Exercise on Reducing Back Pain in Third-Trimester Pregnant Women

Back Pain	Pregnancy exercise				*p-value*
	Pretest		Posttest		
	F	%	f	%	
No pain	0	0	3	10.7	
Mild pain	3	10.7	16	57.1	
Moderate pain	22	78.6	9	32.1	0.000*
Severe pain	3	10.7	0	0	
Very severe pain	0	0	0	0	

*uji Wilcoxon sign rank test

Berdasarkan tabel 2 menyajikan hasil tabulasi silang menunjukkan sebelum senam hamil hampir keseluruhan dari responden nyeri sedang sebanyak 22 ibu hamil (78,6%), sedangkan sesudah senam hamil menunjukkan sebagian besar dari responden nyeri ringan sebanyak 16 ibu hamil (57,1%). Hasil uji normalitas menggunakan uji *Shapiro wilk* menunjukkan nilai *p-value* 0,000 (pretest) dan *p-value* 0,000 (posttest) berarti data berdistribusi tidak normal. Hasil analisis menggunakan uji wilcoxon sign rank test menunjukkan nilai p-va;ue sebesar 0,000, berarti senam hamil efektif terhadap penurunan nyeri punggung pada ibu hamil trimester III.

DISCUSSION

Back Pain in Pregnant Women Before Prenatal Exercise

The findings showed that before participating in prenatal exercise, nearly all respondents experienced back pain in the moderate category, totaling 22 pregnant women (78.6%). This was supported by the average pain scores, which ranged between 4–6 on the Numeric Rating Scale (NRS), indicating moderate pain levels. This condition suggests that the majority of third-trimester pregnant women face considerable physical discomfort that interferes with daily activities.

The study by Mulati et al. (2022) revealed that back pain in second- and third-trimester pregnant women is influenced by gestational age, lifting loads over 10 kg, and frequent bending, with bending history being the most dominant risk factor (OR = 13.0). However, regular yoga practice at least three times a week showed a protective effect against back pain (OR = 0.143) (Mulati et al., 2022). Meanwhile, the quasi-experimental study by Lubis & Saragih (2024) demonstrated that antenatal yoga exercises significantly reduced back pain intensity among third-trimester pregnant women (p = 0.000). Both studies highlight that biomechanical factors and physical activities such as yoga play a crucial role in preventing and managing back pain during pregnancy (Lubis & Saragih, 2024).

Etiologically, back pain in third-trimester pregnant women occurs due to biomechanical changes in the body as the fetus grows larger. Weight gain causes a forward shift in the body's center of gravity, resulting in increased lumbar lordosis. Additionally, the rise in relaxin during pregnancy makes ligaments more elastic, which leads to instability of the pelvic joints and spine. Other factors such as poor posture, excessive physical activity, and a history of prior back pain also contribute to the onset of back pain. Thus, back pain in the third trimester is the result of a combination of mechanical and hormonal factors(Lina, 2018; Suryaningsih, 2019).

If not managed properly, back pain can have negative consequences for both the mother and the fetus. For the mother, back pain may cause sleep disturbances, limited physical activity, reduced quality of life, and even psychological problems such as stress or anxiety. This condition can also interfere with birth preparation, as mothers may feel fatigued and uncomfortable. Limited mobility may reduce pelvic muscle readiness and affect the course of normal delivery. Therefore, managing back pain during pregnancy is essential to ensure maternal well-being and support fetal health (Mardalena & Susanti, 2022).

According to the researchers, most pregnant women in this study experienced moderate back pain. This condition is caused by anatomical and hormonal changes in the third trimester, which are closely related to the onset of back pain. If not addressed, back pain can negatively impact both the mother and fetus. Thus, it is necessary to implement interventions to reduce back pain in third-trimester pregnant women in order to maintain maternal well-being and support optimal fetal health.

Back Pain in Pregnant Women After Prenatal Exercise

The findings showed that after participating in prenatal exercise, most respondents experienced a reduction in back pain to the mild category, totaling 16 pregnant women (57.1%). This was supported by pain score measurements using the Numeric Rating Scale (NRS), which indicated that the average score decreased to a range of 1–3, corresponding to mild pain. This reduction suggests that prenatal exercise is effective in relieving muscle tension in the back and improving maternal posture. In addition, respondents reported increased comfort after routinely performing prenatal exercise.

The results of this study align with previous research by Cane and Nurseptiana (2023), which showed that after prenatal exercise intervention, the majority of respondents (59.4%) experienced mild pain (Cane & Nurseptiana, 2023). A similar study by Siahaan et al. (2022) showed a decrease in back pain after prenatal exercise, with a mean score of 3.32 before the intervention and 2.25 after the intervention (Siahaan et al., 2022).

The reduction of back pain in third-trimester pregnant women is not only influenced by prenatal exercise but is also associated with age. The results showed that nearly all respondents were in the

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reproductive age range of 20–35 years, totaling 26 pregnant women (92.8%). At this age, tissue elasticity, muscle capacity, and adaptability to exercise remain relatively good, allowing for more optimal recovery. Being in the reproductive age also makes it easier for mothers to follow prenatal exercise instructions correctly. This supports the evidence that age is an important factor in the success of back pain reduction (Syalfina et al., 2022).

In addition to age, educational level also contributes to the reduction of back pain. Most respondents had completed senior high school, totaling 18 pregnant women (64.2%), which indicates a relatively good ability to understand health information. Higher education influences mothers' positive attitudes in following instructions and applying the exercises taught during prenatal exercise sessions (Prananingrum, 2022). Employment status also plays a role, as most respondents were unemployed, totaling 21 pregnant women (75%). Having more time to rest and consistently participate in prenatal exercise supports optimal results in reducing back pain complaints (Syalfina et al., 2022).

Other influencing factors include parity and body mass index (BMI). Most respondents were primigravida, totaling 18 pregnant women (64.2%), who tend to be more enthusiastic about participating in prenatal exercise programs as this is their first pregnancy experience (Elkhapi et al., 2023). Moreover, most respondents had a normal BMI, totaling 21 pregnant women (75%), which supports flexibility and muscle strength in adapting to exercise. A normal BMI also reduces the additional burden on the spine, which otherwise tends to worsen back pain. The combination of primigravida parity and normal BMI further supports the success of prenatal exercise in reducing back pain (Muawanah, 2023).

According to the researchers, after prenatal exercise, most respondents experienced a decrease in back pain to the mild category. Besides prenatal exercise, the reduction in back pain was influenced by several factors, namely age (mostly 20–35 years), education (mostly senior high school), employment status (mostly unemployed), parity (mostly primigravida), and BMI (mostly normal). These conditions explain why the majority of respondents experienced a reduction in back pain after the intervention. Therefore, prenatal exercise can be recommended as a promotive and preventive effort to enhance comfort in third-trimester pregnant women.

Effectiveness of Prenatal Exercise on Reducing Back Pain in Third-Trimester Pregnant Women

The findings showed that prenatal exercise proved effective in reducing back pain among third-trimester pregnant women. Before the intervention, most respondents experienced moderate pain, while after the intervention the majority shifted to the mild pain category, with an average Numeric Rating Scale (NRS) score reduction of 2–3 points. This finding is consistent with previous studies reporting that muscle-stretching exercises during pregnancy can reduce back muscle tension and improve maternal comfort. The reduction in pain also demonstrates that prenatal exercise plays an important role in improving posture and decreasing spinal pressure. Thus, prenatal exercise can be considered a safe and effective non-pharmacological intervention to address back pain in late pregnancy.

The association between prenatal exercise and back pain reduction is explained through physiological mechanisms. Movements in prenatal exercise that involve stretching the back, abdominal, and pelvic muscles help increase muscle elasticity and improve blood circulation in tense areas. Improved blood flow facilitates the delivery of oxygen and nutrients to muscle tissues, thereby reducing spasms and pain. In addition, deep breathing exercises in prenatal exercise contribute to muscle relaxation, further reducing back tension. In this way, prenatal exercise functions as a complementary therapy that enhances maternal comfort (Flara, 2024).

Beyond physiological mechanisms, prenatal exercise also contributes to psychological aspects that can influence pain perception. Regular physical activity stimulates the release of endorphins, known as natural analgesic hormones, making pregnant women feel more relaxed and comfortable. Prenatal exercise conducted in groups also provides social support, which helps reduce anxiety and stress associated with pain complaints. Therefore, the reduction of back pain in third-trimester pregnant women may be influenced by a combination of physical and psychological factors derived from prenatal exercise. This explains why the intervention is highly recommended in antenatal care (Rahayu et al., 2025).

Prenatal exercise helps mothers stay in optimal condition by training and maintaining the strength of the abdominal wall muscles, pelvic floor muscles, and supporting tissues, which are essential for labor. Prenatal exercise includes several movements that directly engage the back muscles, thereby reducing back pain during

pregnancy (Rahmawati et al., 2016). This is supported by research conducted by Surati and Manurung, which showed the effect of prenatal exercise on reducing back pain in pregnant women at the Eliabeth Midwife Independent Practice in Mandailing Natal Regency in 2022 (Surati & Manurung, 2023).

According to the researchers, prenatal exercise is effective in reducing back pain in third-trimester pregnant women. Prenatal exercise plays an important role not only in maintaining physical fitness but also in alleviating common back pain complaints during late pregnancy. The results of this study support empirical evidence that non-pharmacological interventions based on physical activity are more readily accepted by pregnant women because they are safe, simple, and aligned with the physiological needs of pregnancy. Considering the significant results, the researchers recommend that prenatal exercise be incorporated as a routine program in maternal health services.

CONCLUSION

This study demonstrated that prenatal exercise is effective in reducing back pain among third-trimester pregnant women. Prior to the intervention, most respondents experienced moderate pain, whereas after participating in prenatal exercise the majority shifted to the mild pain category, with a significant reduction in pain scores.

SUGESTION

Midwives are expected to integrate prenatal exercise as part of antenatal care services, particularly for third-trimester pregnant women who frequently experience back pain. Prenatal exercise can be conducted routinely in maternal classes with a regular schedule, accompanied by education on its benefits, proper techniques, and encouragement to continue independent practice at home. Through this approach, midwives not only help reduce pain complaints but also enhance the mother's physical and mental readiness for childbirth.

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