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Implementation of Prenatal Exercise to Reduce Back Pain in Third Trimester Pregnant Women

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Abstract

Background: Pregnancy is a physiological process that induces various bodily changes in women, including hormonal, postural, and biomechanical adaptations. Back pain is a common complaint among pregnant women, particularly during the third trimester. Prenatal exercise serves as a non-pharmacological intervention designed to enhance physical fitness, strengthen muscles, and alleviate pregnancy-related discomfort.
Objective: This case study examines the implementation of prenatal exercise to reduce back pain in Mrs. Y, a third-trimester pregnant woman in Banjarsari District, Ciamis Regency.
Method: Using a qualitative descriptive methodology with a maternity nursing care process approach (assessment, nursing diagnosis, planning, implementation, and evaluation), data were collected through interviews, physical examinations, observations, and documentation review.
Result: Initial assessment revealed Mrs. Y experienced intermittent back pain described as "heavy pressure" with radiating characteristics, aggravated by activity and relieved by rest. The intervention involved three consecutive days of guided prenatal exercises, with pain intensity monitored using the Numeric Rating Scale (NRS). Results demonstrated reduced pain intensity (from moderate to mild), improved sleep quality, better posture, and enhanced overall comfort. Additionally, the subject showed increased readiness for childbirth.
Conclusion: This study concludes that prenatal exercise is a safe and effective method for mitigating back pain and should be integrated as a promotive-preventive strategy in maternity nursing care. The author recommends incorporating prenatal exercises into standard antenatal class programs at primary healthcare facilities

Keywords: back pain, third trimester, pregnancy exercises, pregnant women

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Introduction

Pregnancy is a physiological process that brings significant changes to a woman's body, both physically, psychologically, and emotionally. These changes include weight gain, shifts in body balance due to changes in the center of gravity, and ligament relaxation as a response to the hormone relaxin, which prepares the body for childbirth (Gultom, 2024). These changes significantly contribute to the onset of musculoskeletal complaints, particularly low back pain (LBP), which is very common among pregnant women in the third trimester. This pain not only reduces the mother's comfort in performing daily activities but can also affect sleep quality, psychological well-being, and readiness for childbirth (Ida, 2025).

According to data from the World Health Organization (WHO), over 619 million people worldwide experienced back pain in 2020, and this number is projected to rise to 843 million cases by 2050 (Pratiwi & Dina, 2025). Pregnant women are a high-risk group due to additional biomechanical stress on the spine. The WHO also recommends that the management of back pain, including during pregnancy, should involve safe and effective non-pharmacological approaches, such as regular physical exercise, physical therapy, and relaxation interventions (Akobundu et al., 2025).

At the national level, approximately 373,000 pregnant women in Indonesia experience back pain (Sipayung, 2024). Kuswati's research indicates that 70% of pregnant women in their third trimester in Indonesia experience back pain. In West Java, the prevalence reaches 17.5%, and in Ciamis Regency, it was found that nearly 80% of pregnant women in their final trimester complain of lower back pain, particularly in rural areas such as Banjarsari District (Indriayani et al., 2024). However, there are still limited standardized efforts to address this issue systematically and comprehensively at the primary care level, such as community health centers or midwife practices (Yuliastuti & Khairiyah, 2024).

Management of back pain in pregnant women can be approached through pharmacological and non-pharmacological methods. Pharmacological approaches typically involve the use of mild analgesics like paracetamol, which is relatively safe during pregnancy (Azizah & Sinaga, 2024). However, its use must be limited due to the risk of side effects on the fetus, especially if used long-term. Therefore, non-pharmacological approaches are more recommended by many medical professionals, especially in the context of uncomplicated pregnancies. One form of non-pharmacological intervention that has proven effective is prenatal exercise (Intari et al., 2025).

Prenatal exercise is a light physical activity specifically designed for pregnant women, combining stretching, breathing, and relaxation exercises aimed at improving flexibility, strengthening pelvic and back muscles, and improving posture. According to (Ridawati et al., 2024), prenatal exercise significantly reduced back pain intensity from an average score of 7.95 to 3.75 among third-trimester pregnant women at Ciawi General Hospital. Meanwhile, research by (Muzayyana et al., 2024) shows that pregnant women who regularly perform prenatal exercise experience a reduction in musculoskeletal complaints and have better physical preparation for childbirth.

Physiologically, prenatal exercise works by increasing blood flow to tense muscles, stimulating the release of endorphins that act as natural analgesics, and enhancing the strength

and endurance of the muscles supporting the spine (Sa'diah et al., 2024). The American College of Obstetricians and Gynecologists (ACOG) recommends that pregnant women without pregnancy complications continue to engage in regular light physical activity, including prenatal exercise, as it has been proven to reduce pain, improve mood, and enhance stamina in preparation for childbirth. Unfortunately, despite the proven effectiveness of prenatal exercise through various studies, its implementation in the community, particularly in rural areas like Banjarsari Subdistrict, remains low (Alfianti et al., 2024). Many pregnant women are unaware of the benefits of prenatal exercise, hesitate to move due to fears of harming the fetus, or lack access to healthcare providers capable of facilitating such activities regularly and safely (Kumalasari et al., 2024).

Considering both medical and nursing aspects, conducting a case study on the implementation of prenatal exercise as an effort to reduce back pain in third-trimester pregnant women in Banjarsari Subdistrict, Ciamis Regency, is important. This study is expected to provide a realistic picture of the effectiveness of prenatal exercise as part of non-pharmacological management that can serve as a reference in maternal nursing practice in primary care

Objective

This case study aims to determine the implementation of prenatal exercise in reducing back pain in pregnant women in the third trimester in Banjarsari Subdistrict, Ciamis Regency.

Method

This study uses a qualitative descriptive method with a case study approach, aiming to explore the implementation of prenatal exercise in reducing back pain in pregnant women in the third trimester. This approach was chosen because it allows researchers to deeply understand the client's subjective experience of the nursing intervention provided, as well as to describe the real phenomenon in the field holistically. This case study focuses on one participant who experienced back pain during the third trimester of pregnancy and received an intervention in the form of prenatal exercises conducted directly in her living environment. The selection of a descriptive qualitative design was based on its relevance in exploring information about what, who, and how an event occurred, as stated by (Oktavia et al., 2024) and because this approach is commonly used in social phenomenological studies (Sopiatun & Solehah, 2025).

This study was conducted at the participant's home located in Mekarsari Village, RT 26, RW 06, Banjarsari Subdistrict, Ciamis Regency, West Java Province, from June 7 to 9, 2025. The location was selected purposefully, considering that conducting the intervention at home would provide comfort for the participant and allow direct observation of the client's responses in a natural context. The participant in this study was a pregnant woman in her third trimester who met the inclusion criteria, namely pregnancy age above 28 weeks, experiencing lower back pain, no history of pregnancy complications or severe musculoskeletal disorders, and willing to participate in the intervention program and become a research respondent.

The intervention was carried out through a nursing process consisting of assessment, nursing diagnosis, planning, implementation, and evaluation. The main intervention in this study was pregnancy exercises as a non-pharmacological therapy to reduce back pain. The prenatal

exercise procedure was conducted over three consecutive days, with each session lasting approximately 30-40 minutes, and was carried out directly by the researcher following guidelines based on standards set by the Indonesian Ministry of Health. The exercise session began with a 5-10-minute warm-up involving light movements and deep breathing exercises, followed by a 20-25-minute core exercise session that included back and pelvic stretching movements, pelvic tilts, cat-cow stretches, and pelvic floor muscle exercises. The session concludes with a 5-10 minute cool-down and relaxation period to reduce heart rate intensity and provide physical and mental relaxation for the participants.

Researchers also conducted direct observations of participants during the intervention, recording pain levels before and after the exercise using the Numerical Rating Scale (NRS), and providing education on the benefits and safety of prenatal exercise. The implementation of this prenatal exercise intervention is not only aimed at reducing back pain intensity but also as part of efforts to promote health and empower pregnant women to experience their pregnancy more comfortably and actively. The results of this study are expected to contribute meaningfully to maternal nursing practice, particularly in the application of community and family based non pharmacological interventions.

Result and Discussion

Assessment

The assessment of Mrs. Y, who was 34 weeks pregnant, revealed complaints of back pain, stable general condition, and no contraindications for prenatal exercise. The primary complaint of radiating back pain, feeling heavy, and worsening during activity aligns with the biomechanical theory of third-trimester pregnancy. According to (Febrida et al., 2024) in the final trimester of pregnancy, uterine enlargement causes shifts in the mother's center of gravity and increased pressure on the spine. These changes disrupt posture and cause strain on the back muscles and ligaments. These findings are supported by data showing Mrs. Y's weight increased from 51 kg to 62.5 kg, and her waist circumference reached 119 cm, indicating mechanical pressure on the body's supportive structures.

The client reported a pain scale of 7 out of 10, indicating moderate to severe pain. This aligns with the definition of pain according to the IASP (International Association for the Study of Pain), which states that pain is an unpleasant sensory and emotional experience associated with actual or potential tissue damage. In the context of pregnancy, this pain is primarily caused by the body's physiological and hormonal adaptations to fetal development.

Based on vital signs within normal limits (BP: 120/90 mmHg, HR: 82 bpm, RR: 21 bpm, T: 36.2°C), the condition supports the implementation of non-pharmacological interventions such as prenatal exercise. According to ACOG (2019), pregnant women with normal pregnancies and stable vital signs can engage in regular physical exercise as it is safe and beneficial for reducing discomfort, including back pain. Musculoskeletal system examination showing back pain also supports the hormonal theory proposed by (Khairiah et al., 2024), which explains that increased levels of relaxin and progesterone in the third trimester cause ligament and joint softening, making pregnant women more susceptible to musculoskeletal pain. This complaint is commonly experienced by pregnant women, with a national prevalence of 60-70% as explained by (Sari &

Perbawati, 2024), so the symptoms experienced by Mrs. Y are considered common and physiological.

From a psychological and spiritual perspective, the client appears calm and has strong hopes for a normal delivery. This aligns with the holistic approach in maternity nursing, where psychological and spiritual factors play a significant role in preparing for childbirth. The client's belief and motivation to participate in prenatal exercises also indicate psychological readiness for intervention. The client's sleep disturbances and decreased personal hygiene reflect the real impact of back pain on her daily quality of life, which is consistent with the theory from the Indonesian Ministry of Health (2021) that pain and discomfort during the third trimester can cause sleep disturbances, fatigue, and decreased daily activity (Torres et al., 2024). This emphasizes the importance of physical interventions such as prenatal exercises to help overcome these disturbances.

Edema in the lower extremities is a physiological condition that is also mentioned in the literature on normal pregnancy. Pressure from the enlarged uterus can inhibit venous return and cause fluid accumulation in the lower extremities (Rahmah & Azlina, 2025). Although not the main cause of back pain, this edema adds to the physical burden and has the potential to exacerbate discomfort.

Figure 1. First Ultrasound Examination on November 20, 2024

The results of the first ultrasound examination on November 20, 2024 showed no abnormalities in the fetus, so prenatal exercise was deemed safe to perform. According to recommendations from the American College of Obstetricians and Gynecologists (ACOG), physical activities such as prenatal exercise are safe for pregnant women without complications and have been proven to reduce back pain, improve blood circulation, and enhance posture.

Nursing Diagnosis

Based on the assessment of Mrs. Y, who is 34 weeks pregnant, subjective data includes complaints of pain in the upper and lower back, described as feeling like being struck by a heavy object, occurring intermittently, and worsening during activities. Objective data supporting this

include: the client appears to be grimacing, frequently holding the back area, pain scale of 7 out of 10, and vital signs within normal limits (BP: 120/90 mmHg, Pulse: 82 beats per minute, RR: 21 breaths per minute, Temperature: 36.2°C). Current weight is 62.5 kg, height is 155 cm, and waist circumference is 119 cm, all indicating significant changes in the mother's body.

Based on the data, the author established the primary nursing diagnosis as Acute Pain (D.0077) related to physiological agents (postural changes, mechanical pressure, and pregnancy hormones such as relaxin and prostaglandin), characterized by complaints of pain in the upper and lower back, a pain scale of 7, and verbal and nonverbal expressions of pain.

According to the Indonesian Nursing Diagnosis Standards (SDKI, 2021), acute pain is an unpleasant sensory and emotional experience resulting from actual or potential tissue damage with sudden onset and short duration, typically associated with biological or physiological processes, such as those occurring in pregnant women due to weight gain and uterine pressure on musculoskeletal structures.

Physiologically, pressure on the ligaments and back muscles due to uterine enlargement causes tissue stretching and stimulation of nociceptors that transmit pain signals to the central nervous system. Additionally, increased levels of the hormone relaxin during pregnancy cause relaxation of pelvic ligaments and joints, contributing to joint instability and back pain. This aligns with the theory proposed by (Raditya & Yuliani, 2024), which states that pregnancy hormones cause ligaments to become more lax and susceptible to mechanical stress.

From a psychological perspective, clients experiencing anxiety, fatigue, or stress also have a lower pain threshold. This is supported by the theory of (Rahmah & Azlina, 2025), which states that emotional factors can intensify pain perception, making complaints feel more severe even with mild stimuli.

Based on all the data reviewed, the diagnosis of Acute Pain in this case is appropriate and consistent with the client's actual condition, both based on clinical manifestations and theories of pregnancy physiology and maternal nursing. The interventions to be provided, including non-pharmacological approaches such as prenatal exercises, are highly relevant for reducing pain perception and improving posture and blood circulation.

Nursing Interventions

Table 1. Nursing Interventions

Diagnosis	Goals and Outcome Criteria	Interventions
Acute pain (D.0077) related to physiological agents characterized by pain in the back area due to	**Pain Level** Goal: After nursing interventions, it is expected that the pain level will decrease. Outcome Criteria: 1. Reduced pain complaints 2. Reduced grimacing	**Pain Management** Observation: 1. Identify the location, characteristics, duration, frequency, quality, and intensity of pain 2. Identify the pain scale 3. Identify non-verbal pain responses 4. Identify factors that exacerbate and alleviate pain

hormonal/postural changes.	3. Reduced restlessness 4. Improved sleep difficulties	Therapeutic: 5. Provide non-pharmacological techniques to reduce pain 6. Facilitate rest and sleep 7. Control the environment that exacerbates pain Education: 8. Explain the causes and triggers of pain 9. Explain pain relief strategies 10. Teach non-pharmacological techniques to reduce pain. Collaboration: 11. Collaborate on analgesic administration

Interventions are systematically organized to include observation, therapeutic actions, education, and collaboration. During the observation phase, nurses conduct a comprehensive assessment of pain characteristics, including location, duration, intensity, and nonverbal responses such as changes in body position and facial expressions. This is important for establishing a baseline for evaluating the effectiveness of interventions.

During therapeutic interventions, nurses provide safe non-pharmacological measures for pregnant women, such as prenatal exercises, relaxation techniques, and creating a comfortable environment. Pregnancy exercises have been proven effective in improving posture, strengthening pelvic and back muscles, and relieving mechanical pressure from the enlarging uterus. This intervention aligns with the recommendations of the American College of Obstetricians and Gynecologists (ACOG), which states that light exercise during pregnancy is safe and effective for alleviating pain complaints. Recent studies have demonstrated the effectiveness of nursing interventions such as prenatal exercise in managing back pain in pregnant women. research according to (Sandy & Mariana, 2025), found in their study of 20 participants that regular implementation of prenatal exercise three times a week for 30 minutes significantly reduced pain levels (p-value 0.000). also reported that prenatal exercise interventions, including pelvic tilt exercises, stretching, and relaxation techniques, were proven to reduce acute pain intensity (p-value 0.000). research according to (Rasti et al., 2025) added that this intervention is most effective when administered in the third trimester with a minimum duration of four weeks for optimal results.

Health education is an important component to enhance clients' understanding of the causes of pain and strategies to manage it. Clients are also trained to identify pain triggers and apply pain management techniques independently. Finally, collaboration with healthcare professionals is conducted if appropriate and safe analgesics are needed during pregnancy.

Nursing Implementation

Nursing implementation is designed with the primary goal of enabling clients to enhance their independence in self-care for their condition, particularly back pain in pregnant women. This effort aims to help clients achieve optimal recovery through effective and appropriate nursing interventions. The implementation is based on previously designed interventions, specifically non-pharmacological measures such as prenatal exercises using a birth ball. These exercises were chosen because they have been proven to help reduce muscle tension, improve posture, and provide comfort and safety for pregnant women experiencing back pain.

During the session, clients are encouraged to relax and fully engage in each movement to maximize the benefits of the intervention. The activity is conducted for 30 minutes per session, with a frequency of once daily over three consecutive days, from June 7 to June 9, 2025. This implementation aligns with the established intervention plan, including the type of intervention, duration, and frequency of implementation. Thus, nursing care not only focuses on reducing physical pain symptoms but also supports the client's psychological well-being by creating a calming experience. The hope is that through this intervention, the mother's level of independence in self-care will increase, and back pain complaints will decrease significantly.

Nursing Evaluation

The nursing evaluation of the Acute Pain diagnosis (D.0077) in pregnant clients was conducted for three consecutive days, namely on June 7, 8, and 9, 2025. The client's back pain is a common complaint during pregnancy, caused by physiological and biomechanical changes, such as increased fetal weight, changes in body posture, and joint laxity due to the hormone relaxin. The client's pain is located in the upper and lower back areas, characterized by a sensation of being weighed down by a heavy object, intermittent pain, and worsening during activity. During the evaluation period, the intervention involved prenatal exercise using a birth ball as a non-pharmacological technique aimed at reducing pain, improving comfort, and promoting muscle relaxation. The exercise was conducted for 30 minutes daily, with the client guided to perform the movements slowly while focusing on breathing and body position.

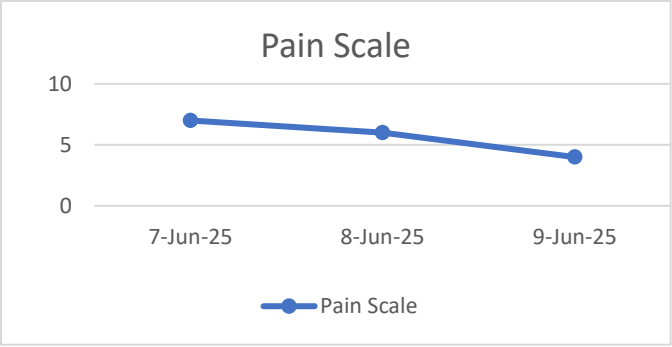

Figure 2. Pain Scale Graph

Nursing evaluation of the Acute Pain diagnosis (D.0077) in a pregnant woman with back pain complaints was conducted over three consecutive days, from June 7 to 9, 2025. The pain experienced by the client was located in the upper and lower back areas, characterized as feeling

like being struck by a heavy object, worsening during activity. The pain scale on the first day was 7 out of 10, accompanied by grimacing expressions and limited body movement. The nursing intervention provided was prenatal exercise using a birth ball for 30 minutes, performed once daily. After implementation on the second day, the pain scale decreased to 5-6, and the client reported feeling more comfortable. On the third day, the pain further decreased to a scale of 4, and the client appeared more relaxed and cooperative in participating in the exercises. Based on these results, it can be concluded that the acute pain issue has been partially resolved, and the intervention provided demonstrated positive effectiveness.

Prenatal exercises using a birth ball work through various physiological mechanisms. Light movements such as sitting upright, rocking the pelvis, and rotating the body using a birth ball help relax the tense back and hip muscles caused by postural changes during pregnancy. Additionally, this exercise improves blood circulation, enhances body balance, and stimulates the release of endorphins, which act as natural pain relievers. The birth ball also helps guide fetal positioning and maintain pelvic joint flexibility. Therefore, this method is not only beneficial for reducing pain but also for enhancing the mother's readiness for the birthing process.

The effectiveness of prenatal exercise as a non-pharmacological intervention in reducing back pain has been supported by various studies. Research according to (Meilanda & Azlina, 2025) found in their study of 20 pregnant women that prenatal exercise using a birth ball, performed three times a week for 30 minutes, significantly reduced pain (p-value 0.000). Another study by (Akobundu et al., 2025) showed that providing prenatal exercise for two weeks could reduce lower back pain scores and improve the sleep quality of pregnant women. Meanwhile, (Pratiwi & Dina, 2025) compared prenatal exercise with warm compresses and found that the exercise group experienced faster pain relief that lasted longer. Research according to (Sipayung, 2024) also noted that the combination of prenatal exercise and breathing exercises not only reduced pain but also decreased anxiety and improved emotional comfort in pregnant women. These four studies reinforce the finding that prenatal exercise with a birth ball is an effective, measurable, and safe method in maternal nursing practice.

From a nursing theory perspective, this approach aligns with Dorothea Orem's Self-Care Deficit Nursing Theory, which emphasizes that nurses play a crucial role in helping clients meet their self-care needs, especially when clients face limitations. In this case, pregnant women experience discomfort due to back pain, and through education and support for prenatal exercise practices, nurses act as facilitators who encourage clients to develop self-care agency in managing their condition. Additionally, this approach aligns with the principles of holistic nursing, as it encompasses the biological, psychological, educational, and social aspects of the client. The client's active participation in prenatal exercises demonstrates an increase in self-control over the symptoms experienced, which is one of the indicators of the success of nursing interventions.

Thus, it can be concluded that the implementation of prenatal exercise with a birth ball is an effective intervention in reducing the intensity of back pain in pregnant women. This intervention not only helps reduce physical discomfort but also enhances independence, emotional comfort, and the mother's readiness to face the pregnancy and childbirth process. This intervention is recommended in maternity nursing practice as a safe and evidence-based non-pharmacological strategy.

Conclusion

Based on the evaluation and discussion conducted, it can be concluded that the implementation of the nursing intervention involving prenatal exercise using a birth ball over three consecutive days has proven effective in reducing the intensity of back pain in pregnant women. Clients showed a decrease in pain scale from 7 to 4 during the intervention period and appeared more cooperative and comfortable throughout the process.

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