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The effect of gymball use on pain intensity during the active phase of the first stage of labor among women

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Abstract

Background: Labor pain arises from uterine muscle stretching, which can affect overall physiological functions, including increased oxygen demand, elevated respiratory rate, higher blood pressure, and disturbances in the digestive system. The intensity of pain experienced may also influence the mother's preference for a delivery method. Therefore, effective pain management during labor is essential for maternal comfort and safety.

Purpose: To analyze the effect of gym ball use on pain intensity during the active phase of the first stage of labor among women delivering.

Method: A quasi-experimental design with a one-group pretest–posttest approach was employed. The sample consisted of 30 mothers in the active phase of the first stage of labor who experienced labor pain. Purposive sampling was used, and data were collected through observational sheets.

Results: Before the intervention, the majority of respondents experienced very severe labor pain (24 mothers; 80%). After the gym ball intervention, most respondents reported moderate pain intensity (22 mothers; 73.3%). The statistical analysis yielded a p-value of 0.000 ($p < 0.05$), indicating that H_0 was rejected and H_a was accepted, thereby confirming a significant effect of gym ball use on pain intensity during the active phase of the first stage of labor.

Conclusion: Gym ball use significantly reduces pain intensity among mothers in the active phase of the first stage of labor.

Suggestion: Mothers preparing for childbirth are encouraged to understand and utilize gym balls as a non-pharmacological method to reduce labor pain.

Keywords: Gymball; Labor Pain; Mother in Labor.

INTRODUCTION

According to the World Health Organization (WHO), more than 85% of childbirths occur normally, while 15–20% of maternal deaths result from pregnancy-related complications. Of the 295,000 maternal deaths recorded globally, the majority (94%) occur in developing countries. Data from the Ministry of Health of the Republic of Indonesia reported that the number of women giving birth in 2022 reached 5,043,078, with 23.2% experiencing labor complications (Ministry of Health of the Republic of Indonesia, 2021).

Data from the 2018 Basic Health Research indicates that approximately 65% of pregnant women in West Java experience pain during labor. In Cianjur Regency, between 60–80% of women reportedly experience labor pain (Isnaeni, 2021). Data obtained from PMB Ny. T showed that between December 2024 and February 2025, 31 women gave birth, and 15 of them experienced significant labor pain.

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Labor pain is caused by uterine muscle contractions and is often exacerbated by anxiety, fear, and tension, which stimulate the release of stress hormones such as catecholamines, steroids, and adrenaline. These hormonal changes reduce blood and oxygen flow to the uterus, ultimately intensifying pain. Prolonged labor pain increases the risk of maternal fatigue, prolongs the labor process, and contributes to emotional stress (Sulfianti, Indryani, Purba, & Sitorus, 2020). Primiparous mothers are at higher risk of prolonged labor (partus lama) than multiparous women. Therefore, pain management is an important component of midwifery care aimed at reducing complications during labor.

Various pharmacological and non-pharmacological methods exist to reduce labor pain. Pharmacological therapy often carries side effects due to its chemical components. Meanwhile, non-pharmacological approaches offer many practical and effective alternatives, such as massage therapy, which has been shown to reduce pain during labor (Kaffah, 2018). Labor pain begins to appear in the first stage, originating from uterine contractions and cervical dilation. Labor pain can lead to labor complications, one of which is prolonged labor. Prolonged labor is the most commonly reported complication (41%). One technique for reducing labor pain is SP6 acupressure (Ariesty, Mariza, Evrianasari, & Isnaini, 2021).

Mothers in the first stage of labor to assume positions that facilitate labor progress, such as pelvic rocking movements. The benefits of using a gym ball include improving blood flow to the uterus, placenta, and fetus; reducing pressure; increasing pelvic outlet capacity by up to 30%; providing comfort to the knees and ankles; offering counter-pressure to the perineum and thighs; and promoting gravitational support that helps the baby descend more effectively (Apriani, Yulianti, & Murwati, 2023).

Gym ball significantly reduced labor pain intensity during the active phase of the first stage of labor, with a p-value of 0.000 ($p < 0.05$). Combining gym ball exercises with herbal compress therapy significantly reduced labor pain (Andarwulan, Hubaedah, & Hakiki, 2022). Labor pain is one of the factors that can hinder the progress of the labor process. The mother's inability to manage pain during labor has the potential to cause uterine contractions to become uncoordinated, which has an impact on prolonging the duration of the first stage and increasing the risk of disruption to the fetal condition. Various nonpharmacological methods have been applied to accelerate labor and reduce pain intensity, including the use of gym ball and rebozo (pelvic rocking) techniques (Komariah, Lisca, & Rini, 2025).

RESEARCH METHOD

This quantitative study utilized a quasi-experimental design with a one-group pretest-posttest approach. The population included all mothers in the active phase of the first stage of labor who delivered at PMB Ny. T between June and August 2025, totaling 30 women. Total sampling was used, where all members of the population served as research subjects. Inclusion criteria: 1) Primigravida or multigravida mothers with gestational age 37–42 weeks, single fetus, cephalic presentation; 2) In the active phase of the first stage of labor with 4–8 cm cervical dilation; 3) Not undergoing labor induction.

The research instrument used was the Numeric Rating Scale (NRS) observation sheet to measure pain intensity. The gym ball intervention was performed during the active phase of the first stage of labor, with changes in movement every 5–10 minutes.

This study obtained ethical approval from the Research Ethics Committee, Universitas Indonesia Maju, with protocol number 2485/Sket/Ka-Dept/RE/UIMA/II/2025.

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RESEARCH RESULT

Table 1. Characteristics of Respondents ((N=30)

Variable	Result
Pain Intensity (Pre-test) (n/%)	
Moderate Pain	4/13.3
Severe Pain	24/80.0
Very Severe Pain	2/6.7
Pain Intensity (Post-test) (n/%)	
Moderate Pain	2/6.7
Severe Pain	22/73.3
Very Severe Pain	6/20.0

According of table 1 Before the intervention, most respondents experienced severe pain (24 women; 80%). After the gym ball intervention, most respondents reported moderate pain (22 women; 73.3%).

Table 2. Paired T-test

Variable	Value			P-value
	Mean	Standar Deviasi	Min - Max	
Pre-test Pain Intensity	6.5	0.513	6-7	0.000
Post-test Pain Intensity	5.4	0.598	4-6	

Table 2. show the p-value of 0.000 ($p < 0.05$) indicates a significant difference in pain intensity before and after gym ball use. Pre-test pain scores ranged from 6–7 (moderate–severe), while post-test scores ranged from 4–6 (moderate).

DISCUSSION

Based on Table 1, the results before the intervention (pre-test) using the gym ball showed that most respondents experienced very severe labor pain, totaling 24 women (80%) during the active phase of the first stage of labor. From the findings of this study, it was observed that the pain experienced by respondents fell into the category of severe pain. This is consistent with the theory stating that labor pain tends to be sharp and colicky, usually felt in the suprapubic area. Pain can also involve the lumbosacral region and the inner and anterior thighs areas innervated by ovarian and uterine nerves that are projected to the body surface.

Labor in a woman begins when the uterus contracts with increasing frequency. Gym balls and herbal

compression balls are physical therapies used during the first active phase of labor. They play a significant role in advancing labor, lowering the fetal head or head-down position, and reducing pain (Wulandary, Cristian, & Ardiani, 2024). Prolonged labor is a leading cause of increased maternal and fetal mortality and morbidity. Several factors contribute to prolonged labor, including birth canal abnormalities, malpresentation, inadequate contractions, multiple pregnancies, and anemia. One technique that can be used to speed up labor is using a gym ball (Wahyuni, 2024).

A Gym Ball is a physiotherapy ball that helps mothers in the first stage of labor and can be used in various positions. The ball's elasticity and curvature stimulate receptors in the pelvis, so by applying gravity while increasing the release of endorphins, the movement of sitting on the ball and stones provides a feeling of comfort and encourages labor to progress (Mahrunnisa, 2023). Another study showed that the average duration of the active phase of labor progress in the group not given a gym ball was 298 minutes,

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with a sd of 29.30. Meanwhile, the average duration of the active phase of labor progress in the group given a gym ball was 207 minutes, with a sd of 27.97. The statistical test results obtained $p = 0.000 < 0.05$, indicating a difference in the duration of the active phase of labor progress between the control and intervention groups. Therefore, it can be concluded that gym ball guidance has an effect on labor progress (Intiyaswati & Tono, 2023).

Gym ball therapy used by laboring mothers in a kneeling position while hugging the ball during contractions also provides several benefits, including helping the mother feel more relaxed and serving as a distraction from labor pain, accelerating cervical dilation, supporting an upright posture that facilitates the birth process, and helping the fetus achieve an optimal position for easier normal delivery. Laboring mothers hug the ball comfortably, and the rounded shape of the ball that adapts to the mother's body stimulates receptors in the pelvis that are responsible for secreting endorphins, helping the mother relax more easily. In addition, the ligaments and muscles, especially in the pelvic area, become looser, reducing pressure on the sacroiliac joints, blood vessels around the uterus, and pressure on the bladder, back, waist, tailbone, and also helping to reduce perineal pressure (Maryani, Respati, & Astirin, 2016).

Previous research has shown that guidance using a Gymball can accelerate labor progress, with primigravidas having an average of 5.86 ± 2.116 and multigravidas reaching an average of 3.53 ± 1.302 . It can be concluded that there is a significant effect of Gymball guidance on labor progress (Zayani, Zanah, & At-Thariq, 2025). Previous researchers revealed that exercise with a birth ball (gymball) is believed to be able to strengthen the pelvic floor muscles, increase the diameter of the pelvis, help the fetus descend into the pelvis so that it can speed up the labor process and further research is needed for more optimal results (Rakizah, Rahmawati, & Kadarsih, 2023).

The results of this study are consistent with previous research entitled "The Effect of the Gymnastics Ball Method on Pain Intensity in the First Active Phase of Labor at the TPMB in the Working Area of the Singkawang Tengah Health Center, Singkawang City, 2024," reporting that analysis of 30 respondents before the intervention using the gymnastics ball method showed that the average pain intensity

experienced by respondents was 6.87, with a median value of 7. This indicates that the level of pain felt by respondents is included in the category of severe pain (Akbarini, Nur'izzati, & Dianna, 2025).

Discomfort, fear, and pain are common concerns for women in labor. Pain in the first stage of labor is severe and lasts longer, so it's important to pay attention to pain management during the first stage of labor (Kartini, 2017).

The results of this study are consistent with previous research it was stated that among 32 respondents before the gym ball intervention, most experienced severe pain intensity (16 respondents; 50%). After the gym ball intervention, most experienced moderate pain intensity (17 respondents; 53.1%) (Sari, 2024). Based on Table 1, after the intervention (post-test) using the gym ball, the majority of respondents experienced moderate pain intensity, totaling 22 women (73.3%) during the active phase of the first stage of labor.

Gym ball therapy performed by laboring mothers in a kneeling and hugging position during contractions has several benefits, including helping mothers feel more relaxed, providing distraction from labor pain, accelerating cervical dilation, supporting an upright posture that smoothens the birth process, and optimizing fetal positioning to facilitate normal delivery. Laboring mothers hug the ball as comfortably as possible, and the curvature of the ball which can conform to the mother's body shape stimulates pelvic receptors responsible for endorphin secretion, helping mothers relax more easily. In addition, pelvic ligaments and muscles loosen, reducing pressure on the sacroiliac joint, blood vessels around the uterus, and relieving pressure on the bladder, back, waist, and coccyx, as well as reducing perineal pressure (Maryani et al., 2016).

Gym ball exercise is a simple physical activity using a ball that can be performed at any time during pregnancy, labor, and postpartum, with the aim of reducing pain and enhancing emotional and psychological care.

The results of this study are consistent with previous research entitled "The Effectiveness of Gym Ball in Reducing Labor Pain and Anxiety Among Mothers in the First Stage of Labor at Yayasan Bumi Sehat, Gianyar Regency," reported that before the gym ball intervention, most respondents experienced severe labor pain (16 respondents; 50%). After the gym

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ball intervention, most experienced moderate labor pain (17 respondents; 53.1%) (Sari, 2024).

Pain levels vary among women because pain is subjective. Several factors may influence the pain experienced by laboring mothers, including environment, personal experience, family support, culture, and psychological conditions such as emotions, fear, and anxiety (Akbarini et al., 2025).

Table 2 shows a p-value of 0.000 ($p < 0.05$), indicating that H_0 is rejected and H_a accepted, meaning that there is a significant effect of gym ball use on labor pain intensity during the active phase of the first stage of labor. Pain intensity before intervention ranged from 6–7, corresponding to moderate-to-severe pain, while pain intensity after gym ball use ranged from 4–6, corresponding to moderate pain.

Using a gym ball also helps manage uterine contractions and accelerates the descent of the fetal head through the pelvis, ensuring that the pressure exerted by the fetal head on the cervix remains constant. When the mother maintains an upright position, cervical dilation becomes faster. This upright position allows pelvic ligaments to relax and widens the pelvic diameter, helping the fetal head descend more easily into the pelvic floor. Gym ball exercises are beneficial in reducing pain and anxiety, especially for mothers in the third trimester, and can help optimize fetal positioning for an easier normal birth. Additionally, gym ball use reduces contraction pain and overall labor pain. a significant difference in pain intensity before and after the gym ball intervention based on Wilcoxon analysis. The p-value of 0.000 indicates a significant effect ($p < 0.05$). This influence may serve as a potential solution in reducing pain and managing maternal conditions during labor (Akbarini et al., 2025). Which demonstrated significant reductions in anxiety and pain, with p-values of 0.001 for both variables, concluding that gym ball exercises are effective in reducing labor pain and anxiety (Sari, 2024).

During pregnancy, exercising with a gym ball can improve posture reflexes and maintain the strength of the muscles that support the spine. Sitting on a gym ball has a similar effect to squatting, which can help open the pelvis and speed up labor. If the ball is placed on a mat and used for exercises in a bent-over position, with the body supported by the ball while performing pelvic thrusts, this can help the baby move into an optimal position. This exercise has the potential to speed up labor (Raidanti & Mujiyanti, 2021).

Based on the researcher's assumption, gym ball use has a significant impact on labor pain because it serves as an effective pain-relief system. Furthermore, the ability of healthcare providers to give suggestions, explanations, and counseling to help mothers accept labor as a natural process is crucial in supporting the effectiveness of gym ball use. Family participation is also essential, particularly because gym balls are not widely used, and many mothers and families may be unfamiliar with their benefits. For most respondents, gym ball use was a new and interesting experience, although some initially felt uncomfortable. It is important to reassure mothers about the benefits of gym ball use and to emphasize that this method is a simple pain-relief technique that has been proven effective in previous cases.

CONCLUSION

There was a significant difference in labor pain before and after gym ball use during the active phase of the first stage of labor ($p = 0.000$).

SUGGESTION

Others preparing for labor are encouraged to understand and use gym balls to reduce pain. Midwives are suggested to implement gym ball therapy as a non-pharmacological pain-relief method.

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