

ORIGINAL RESEARCH ARTICLE

The effect of peanut ball in straddling positions on reducing labor pain: A quasi-experimental study

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Abstract

Labor contractions play an important role in childbirth but can also cause severe pain in the lower back and abdominal area, radiating to the thighs. Appropriate efforts are needed to reduce the pain caused by these contractions. This quasi-experimental study aimed to determine the effect of using a peanut ball in a straddling position on pain levels during the first stage of labor. Before the intervention, most respondents experienced severe pain, whereas after the intervention, most reported a decrease in pain levels. The results showed a p-value of 0.001, which means that the use of a peanut ball in a straddling position is effective in reducing contraction pain during the first stage of labor. (*Afr J Reprod Health* 2026; 30 [9]:100-105).

Keywords: Labor Contractions, Pain, Peanut Ball, Straddling Position

Résumé

Les contractions utérines jouent un rôle important lors de l'accouchement, mais peuvent également provoquer des douleurs intenses dans le bas du dos et l'abdomen, irradiant parfois vers les cuisses. Il est donc nécessaire de prendre des mesures appropriées pour atténuer ces douleurs. Cette étude quasi-expérimentale visait à déterminer l'effet de l'utilisation d'un ballon de grossesse (type ballon d'allaitement) en position à califourchon sur la douleur ressentie pendant la première phase du travail. Avant l'intervention, la plupart des participantes ressentaient des douleurs intenses, tandis qu'après l'intervention, la plupart ont rapporté une diminution de la douleur. Les résultats ont montré une valeur p de 0,001, ce qui signifie que l'utilisation d'un ballon de grossesse en position à califourchon est efficace pour réduire la douleur des contractions pendant la première phase du travail. (*Afr J Reprod Health* 2026; 30 [9]: 100-105).

Mots-clés: Contractions utérines, Douleur, Ballon de grossesse, Position à califourchon

Introduction

The World Health Organization (WHO) has set the recommended rate for Cesarean sections (C-sections) at 5-15% of total births globally. However, WHO data from 2021 indicate that the rate of C-sections continues to rise worldwide, with approximately 21% of all births now delivered this way.¹ In China, for instance, the rate of C-sections surged dramatically from 3.4% to 39.3% in 2018. Similarly, according to the 2021 Basic Health Research (*Riskesdas*), the C-section rate in Indonesia was 17.6%. *Riskesdas* also reported that, in East Java Province, C-sections accounted for 22.36% of births. Among these C-section

deliveries, 4.6% were requested by patients, often due to an inability to cope with contraction pain.² The WHO reports that labor pain accompanies 90% of deliveries, with most mothers perceiving this pain as severe.² According to the Indonesian Ministry of Health's 2020 labor pain data, 85-90% of women in Indonesia who face labor report severe pain, while 7-15% do not experience pain. Pain levels among laboring mothers are classified by the Ministry of Health (2018) into four categories: 15% experience mild pain, 35% experience moderate pain, 30% experience severe pain, and 20% endure very severe pain. Labor pain is a natural experience involving both physical and psychological aspects of the mother.³ This pain results from uterine

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muscle contractions, which cause discomfort in the waist, abdomen, and thighs as they facilitate cervical dilation. Labor pain is a subjective experience tied to uterine contractions, cervical dilation and effacement, and fetal descent.⁴ Pain is a multifaceted phenomenon influenced by personal, psychological, biological, socio-cultural, and economic factors.³ In laboring mothers, this pain can lead to fatigue, fear, anxiety, and stress.⁵ Labor pain management includes both pharmacological and non-pharmacological approaches.⁶ Pharmacological methods often involve analgesics to reduce pain or anesthetics to block sensation in parts or the entirety of the body.⁶ Non-pharmacological techniques include warm compresses⁷, aromatherapy⁸, breathing techniques⁹, hypnobirthing¹⁰, massage¹¹, and the use of birthing balls. Deep-breathing relaxation techniques are recommended for pain management during labor.¹² Birthing balls, which are therapy balls with soft surfaces, help ease labor pain intensity during the active phase of labor by increasing pelvic mobility and enhancing fetal positioning. There are two main types of birthing balls: the peanut ball and the gym ball.¹³ Using a peanut ball in a straddling position may reduce pain caused by labor contractions, promote labor progress, widen pelvic muscles, and lessen labor pain. A peanut ball is an inflatable, peanut-shaped exercise ball placed between a laboring woman's legs to encourage pelvic opening, facilitate fetal descent, make the pelvis open and muscles more relaxed, thereby potentially reducing the duration of labor.¹⁴ This study focuses on the peanut ball in straddling position: between the legs to widen the pelvic muscles, thereby promoting labor progression and aiding in fetal descent. Despite its potential, peanut ball use is not widely implemented by labor support staff in many healthcare settings. Given these gaps, this study aims to explore the effects of using a peanut ball as a non-pharmacological intervention to manage labor pain in the first stage of labor.

Methods

Design study

This research was a quantitative study with a quasi-experimental design with a one group pretest

posttest approach. This design was used to evaluate the effect of peanut ball on labor pain intensity during the first stage of labor by comparing pain levels before and after the intervention within the same group of participants.

Population, sample size, and sampling techniques

The population consisted of women undergoing physiological labor in the first stage at the study site. Sampling was carried out using consecutive sampling techniques. The inclusion criteria are willingness to be respondents, single pregnancy in normal presentation, gestational age 37 to 42 weeks, there are already contractions and opening of the cervix. The sample in this research was 30 respondents. Previous references recommended a minimum sample size of 10–30 respondents.¹⁵ This study was conducted from March to July 2024.

Intervention

Respondents received an intervention involving the use of a peanut ball in a straddling position during the first stage of labor. The intervention was administered by a trained and competent nurse or midwife. The procedure is as follows: place the peanut ball on the floor, sit on it in a comfortable, straddling position, and hold onto the end of the bed or ask for assistance from a husband/partner. Gently rock and bounce the ball back and forth while performing gentle hip rotations to facilitate pelvic mobility and relaxation.

The intervention was conducted for 20 minutes and repeated twice, with a 5-minute rest interval between sessions. Throughout the intervention, maternal comfort and safety were continuously monitored.

Instruments

Labor pain intensity was measured using the Numerical Rating Scale (NRS), a validated and widely used tool for assessing subjective pain intensity. The NRS scale ranges from 0 to 10, where 0 indicates no pain and 10 represents the worst pain imaginable. According to established guidelines, pain intensity was categorized as mild (1–3), moderate (4–6), and severe (7–10).¹⁶ Prior to the

intervention, baseline pain intensity was assessed during the active phase of the first stage of labor. Following completion of the intervention, pain intensity was measured again using the same scale to evaluate changes in pain levels.

Data analysis

Data were analyzed using Statistical Package for the Social Sciences (SPSS). Descriptive statistics were used to measure frequencies of characteristic of respondents. The effect of the peanut ball intervention on labor pain was analyzed using a paired samples *t*-test to compare mean pain scores before and after the intervention. Statistical significance was set at $p < 0.05$.

Research ethics

The research procedures obtained ethical clearance from the research ethics commission of the Health Research Ethics Committee (KEPK) Nahdlatul Ulama University Surabaya Institute No. Certificate 0262/EC/KEPK/UNUSA/2024.

Results

Table 1 presents the characteristics of respondents experiencing labor pain. Most respondents were aged 20–35 years, were not working, had secondary (high school) education, and were multiparous.

Table 2 shows that the paired samples *t*-test analysis resulted in a *p*-value of 0.001, indicating a statistically significant effect of the peanut ball in a straddling position on the level of contraction pain during the first stage of labor. Figure 1 illustrates a decrease in the number of respondents experiencing severe pain, from 22 respondents during the pretest to seven respondents in the posttest. Conversely, the number of respondents reporting mild and moderate pain increased after the intervention. These findings indicate a reduction in pain intensity following the peanut ball intervention.

Discussion

This study aimed to evaluate the effect of using a peanut ball on pain levels during the first stage of labor. Pre-test results showed that most (73.3%) mothers experienced severe pain, while nearly one-

Table 1: Frequences of respondents characteristics

Respondents characteristics	Frequency (n)	(%)
Age		
< 20 Years	7	23.3
20-35 Years	21	70.0
>35 Years	2	6.7
Education		
Elementary (Elementary – Middle school)	12	40.0
Intermediate (High School)	13	43.3
High (Diploma-Bachelor)	5	16.7
Job		
Not Working	17	56.7
Work	13	43.3
Parity		
Primipara	17	56.7
Multiparous		
Total	30	100.0

third (26.7%) reported moderate pain before using the peanut ball. Pain is a normal physiological response in early labor, often triggered by a combination of lower uterine stretching and uterine muscle ischemia as contraction strength increases. These contractions reduce oxygen flow to the uterus, causing ischemic pain that maybe exacerbated by fatigue, tension, and anxiety.^{17, 18}

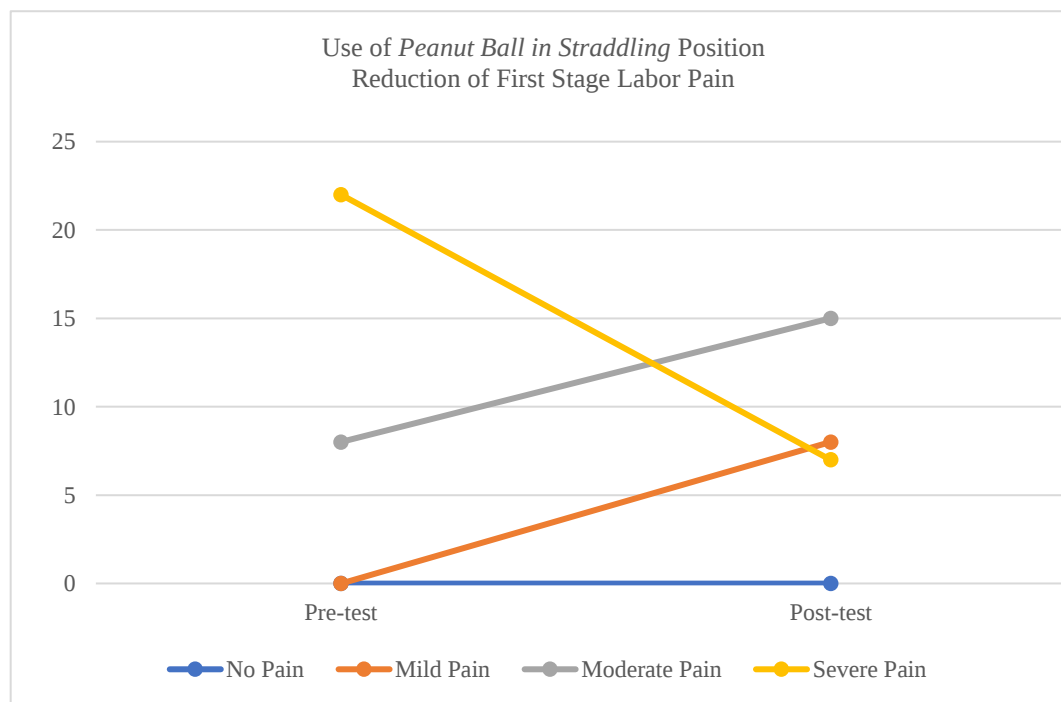
Non-pharmacological methods of pain management are preferred due to their safety, as they minimize side effects associated with pharmacological interventions. Previous studies mentioned the effectiveness of non-pharmacological techniques in reducing labor pain and facilitating fetal descent during the first stage of labor.¹⁹ These findings support the use of simple, safe, and non-invasive interventions in woman-centered intrapartum care

Pain level after using peanut ball in a straddling position

After the intervention, a small percentage (23.3%) of mothers reported severe pain, half (50%) experienced moderate pain, and nearly one-third (26.7%) reported mild pain. These results suggest a clinically meaningful reduction in pain levels,

Table 2: Paired samples T- Test results

Use Peanut balls	No Pain	Mild Pain: n (%)	Moderate Pain: n (%)	Severe Pain: n (%)	Total: n (%)	Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference	
Pre-test	-	-	8 (26.7)	22 (73.3)	30 (100)	2.83	1.44	0.26	Lower	Upper
Post-Test	-	8 (26.7)	15 (50)	7 (23.3)	30 (100)				2.29	3.37

Paired t-test *p-value* = 0.001**Figure 1:** Distribution of respondents based on a pain scale before (pretest) and after being given intervention (post test)

indicating that the peanut ball is effective in reducing contraction-related pain during the first stage of labor. The peanut ball, a peanut-shaped silicone device placed between the knees in a side-lying position, encourages an open pelvis, allowing for frequent, effective position changes.¹³ Peanut balls support labor progression by easing pain and reducing discomfort, which can lower anxiety and enhance the overall birthing experience.²⁰ This study is in line with previous studies showing the peanut ball with proper positioning and pelvic movements can reduce both pain and labor duration, improving maternal satisfaction.^{20, 21}

The effect of peanut ball on pain level during the first stage of labor

This study showed that the peanut ball in a straddling position significantly reduces contraction pain in early labor. The peanut ball allows mothers to find comfortable, supportive positions that reduce body tension, facilitating pelvic opening, effective contractions, and reduced pressure on the back and hips.^{22, 23} Additionally, the peanut ball can stimulate endorphin release, which acts as a natural analgesic to reduce pain and enhance maternal well-being.^{24, 25}

This mechanism may also contribute to improved maternal relaxation and coping during contractions. Unlike gym balls, which lack structured support, the peanut ball's unique shape provides stability and comfort, reducing the fear of movement and supporting optimal positioning during labor. This design also improves blood flow and oxygenation to the uterus, contributing to a smoother labor process and further reducing pain through positive hormonal responses.²⁶

Strengths, limitations and implications

Peanut balls are effective in reducing the level of pain due to contractions in mothers in the first stage of labor. These findings may contribute to improving maternal health services by supporting the use of peanut ball interventions in a straddling position as part of intrapartum care. However, several limitations should be considered. The quasi-experimental one-group pretest–posttest design without a control group limits causal interpretation, and the relatively small sample size may affect the generalizability of the findings. Despite these limitations, this study has notable strengths, including the use of a standardized pain assessment tool and a clearly defined intervention protocol administered by trained health professionals. Overall, the results suggest that the peanut ball is a practical, low-cost, and non-pharmacological option that may be integrated into routine midwifery practice for labor pain management.

Conclusion

This study provides evidence that the use of a peanut ball in a straddling position effectively reduces labor pain during the first stage of labor and may be applied as a non-pharmacological strategy in maternity care.

Authors' contribution

Conceptualization: FDA, NP, NM, Methodology: NZ, MFormal analysis and interpretation of data: FDA, NP, MInvestigation: FDA, NZ
Writing-original draft: FDA, NP, NM
Review and editing: FDA, NP, NM, M

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