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The Effect of Peanut Ball on the Duration of Labor in Mothers in the First Stage of Active Labor

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A B S T R A C T

Indonesia's maternal mortality rate (MMR) and infant mortality rate (IMR) remain relatively high, partly due to prolonged labor that is not managed effectively managed. The peanut ball technique is a non-pharmacological alternative to accelerate labor. This study aims to assess the effect of the peanut ball on labor duration among mothers delivering in the active phase of the first stage. The study employed a quasi-experimental pretest–posttest control-group design. Sixty participants were split into two groups: 30 in the intervention group and 30 in the control group. The intervention group used the peanut ball technique for 120 minutes, while the control group received standard delivery care. Consecutive sampling was used. The study was conducted at Aura Syifa Hospital, Baptist Hospital, and Nirmala Hospital in Kediri. Data were analyzed using the Mann–Whitney test. The results showed that the average labor duration in the intervention group was 150.2±60.779 minutes, and the control group was 199.5±76.191 minutes, with a p-value of 0.000 ($p < 0.05$). The peanut ball technique has been proven effective in accelerating labor. This technique can be implemented as a non-pharmacological intervention in obstetric care.

Introduction

High maternal mortality rates (MMR) and infant mortality rates (IMR) are serious problems in global public health, including in Indonesia. The WHO reports that in 2020, approximately 287,000 women died from pregnancy-related complications and childbirth. (World Health Organization, 2025). In Indonesia, the number of maternal deaths reached 7,389 cases in 2021, an increase of 56.69% compared to the previous year. One of the leading causes of the high MMR is the prolonged duration of childbirth that is not managed correctly. In Kediri City, there were 107 cases of prolonged labor in 2021 (Dinas Kesehatan Kota Kediri, 2018).

The length of the labor process is an essential indicator in ensuring safe and effective childbirth. If it lasts too long, especially during the active phase of the first stage, childbirth can lead to various complications such as fatigue, infection, bleeding, or fetal distress. These complications directly contribute to increased morbidity and mortality rates among mothers and newborns. (Kadek SEP et al., 2023). The active phase of labor is characterized by the acceleration of cervical dilation from 4 cm to 10 cm. Failure to achieve adequate dilation within a specific timeframe can be classified as prolonged labor or dystocia, which often serves as the primary reason for obstetric interventions such as induction or cesarean section (Neal et al., 2015).

The efforts in this study focused on the application of non-pharmacological interventions, specifically a peanut ball, to shorten the duration of the first stage of active labor. This intervention was chosen because it is simple, non-invasive, and can be applied by healthcare workers in maternity care facilities without requiring complex medical equipment. Through this approach, the study aims to support the principles of midwifery care that are friendly, safe, and evidence-based, as mandated by the Ministry of Health Regulation No. 21 of 2021 (Kementerian Kesehatan Republik Indonesia, 2021)).

One study found that using a peanut ball can maintain optimal pelvic position, thereby facilitating fetal head descent and accelerating cervical dilation. This effort is expected to improve the quality of maternal care and reduce the risk of complications associated with prolonged labor (A. Delgado et al., 2025).

This study's uniqueness stems from its specific focus on examining how using a peanut ball affects the length of the active labor phase in women delivering at hospitals in Kediri City area. Unlike most previous studies, which have primarily addressed labor pain or a combination of pain and duration, this study makes a significant contribution by filling a research gap that has previously focused solely on labor duration. The results of this study are expected to strengthen the scientific evidence regarding the effectiveness of peanut balls as a non-pharmacological method to support the labor process. Additionally, these findings can serve as a reference for evidence-based midwifery practice and as a consideration in developing clinical guidelines and educating pregnant women about the benefits of proper positioning during labor.

Methods

This study used a quasi-experimental control-group design with pretest and posttest measures design, enabling comparison of outcomes before and after the intervention between two groups: the intervention group, which used the peanut ball technique, and the control group, which received standard childbirth care. This design was chosen because it could show the direct effect of non-pharmacological interventions on labor duration.

The study was conducted from March to July 2025 at three hospitals in Kediri: Aura Syifa Hospital, Baptist Hospital, and Nirmala Hospital. The study population consisted of all mothers who underwent active phase I labor and gave birth at the three hospitals where the study was conducted. The sample comprised 60 participants selected via accidental sampling, then divided into two groups: the intervention group (n=30), who would receive the peanut ball technique, and the control group (n=30), who would receive standard childbirth care.

The inclusion criteria for this study included women in the active phase of the first stage of labor with a term pregnancy, a single fetus in cephalic presentation, and willingness to participate. Exclusion criteria included pregnancy complications such as preeclampsia, bleeding, or indications for immediate surgical intervention.

The primary instrument used in this study was the partogram, which was used to record the duration of the active phase of the first stage of labor. Recording began at 4–6 cm dilation and continued

until complete dilation of 10 cm was achieved. The partogram was chosen because it is a standard WHO clinical recording tool that accurately documents the progress of labor, including cervical dilation, contraction frequency, and the condition of the mother and fetus.

The intervention consisted of administering the peanut ball technique in four positions. Each position was performed for 20 minutes with a 10-minute rest interval, for a total time of 120 minutes (Çankaya et al., 2025). The duration of labor was recorded from the beginning of the active phase (4–6 cm dilation) until complete dilation. The entire data processing and analysis were conducted in SPSS version 26.0 at a significance level of 0.05. The data were initially tested for normality using the Kolmogorov–Smirnov test and for homogeneity of variances with Levene's Test. The results showed that the data were not normally distributed, although they were homogeneous. Therefore, the analysis of differences in labor duration between groups was performed using the non-parametric Mann–Whitney test.

This research was approved ethically by the Health Research Ethics Committee of Poltekkes Kemenkes Malang under letter number 800/032/KEPK/II/2025. Before the intervention, each respondent received a comprehensive explanation of the study's purpose and procedures and was then asked to sign a written consent form (informed consent). The entire research process was conducted in accordance with ethical principles, such as respecting participants' autonomy, maintaining the confidentiality of information, and ensuring that the intervention provided did not harm participants.

Results

This study aims to determine the effect of the peanut ball technique on labor duration in women in the active phase of labor. A total of 60 participants were evenly divided into two groups: the intervention group (receiving the peanut ball technique) and the control group (receiving standard care). The duration of labor was measured from the active phase (cervical dilation ≥4 cm) to complete dilation (10 cm).

Table 1. Characteristics of Participants in the Intervention Group and Control Group

		Intervention Group (n=30)		Control Group (n=30)		
	Characteristics	**F**	**%**	**F**	**%**	***P value***
		(means ± sd)		**(means ± sd)**		
Age	Adolescent	0	0	0	0	0.242[a]
	Reproductive Age	29	96.7	28	93.3	
	Advanced Maternal Age	1	3.3	2	6.7	
Education	Low	0	0	0	0	0.424[a]
	Mid	15	50	10	33,3	
	High	15	50	20	66,7	
Work	Housewife	15	50	13	43.3	0.554[a]
	Merchant	5	16.7	3	10	
	Non-government employed	5	16.7	7	23.3	
	Government employed	2	6..7	3	10	
	Others	2	6.7	4	13.3	
Parity	Primiparous	26	86,7	25	83.3	0,478[a]
	Multiparous	4	13.3	5	16.7	

Description: a. Homogeneity Test (Levene Test), b: Shapiro-Wilk Test

Based on Table 1, both groups had similar basic characteristics. The results of the homogeneity test using Levene's Test showed that age, education, occupation, and parity did not differ significantly between groups ($p > 0.05$). This suggests that participants' characteristics did not confound the relationship between labor duration and the study variables.

Table 2. Differences in Delivery Duration between the Control Group and the Intervention Group

Variable	Group		*P value*
	Intervention (n=30) Mean ±SD	**Control (n=30) Mean ±SD**	
Active phase (min)	109.96 ± 87.65	142.66 ± 77.75	0,000
Transitional phase (min)	40.24 ± 26.49	56.84 ± 36.79	
Total (min)	150,2±60,779	199,5±76,191	

Description: Mann-Whitney test

The Mann–Whitney test revealed a highly significant difference in labor duration between the two groups. The intervention group's average labor duration was 150.2 ± 60.779 minutes, whereas the control group's was 199.5 ± 76.191 minutes, with a p-value of 0.000 ($p < 0.05$). Labor duration in the intervention group was shorter than in the control group, with an average difference of 49.3 minutes, indicating that the peanut ball technique effectively accelerates labor.

The use of the peanut ball technique was statistically and clinically proven to accelerate the duration of active phase I labor. The majority of mothers in the intervention group experienced normal labor in ≤2 hours, a difference that was significantly greater than in the control group. These results demonstrate the effectiveness of the peanut ball as a non-pharmacological intervention for accelerating labor.

Discussion

This study shows that the use of peanut balls significantly affects the duration of labor in women in active phase I. The average duration of labor in the intervention group that received peanut balls was 150,2±60,779 minutes, and the control group was 199,5±76,191 minutes, a difference of 49.3 minutes. This time difference indicates that the peanut ball can significantly accelerate the labor process (p-value < 0.05). The use of the peanut ball effectively shortens labor duration during the active phase of the first stage. This difference in duration confirms that non-pharmacological interventions, such as the peanut ball, can be an important strategy for supporting the physiological labor process.

The peanut ball technique maximizes pelvic alignment, particularly in the lateral and semi-sitting positions, thereby promoting faster fetal rotation and descent through the birth canal. This is supported by research showing that maternal body position during labor significantly influences the efficiency of uterine contractions and labor progress. Biomechanically, the use of a peanut ball during labor can increase pelvic diameter, thereby optimizing fetal position as it passes through the birth canal and accelerating cervical dilation (A. M. Delgado et al., 2022). When the mother is in certain body positions, such as lying on her side, semi-sitting, squatting, or leaning forward with the peanut ball technique, it creates more space in the pelvis, making it easier for the baby to move down toward the birth canal. Therefore, the peanut ball effectively helps the mother maintain a favorable position for the baby to descend more quickly, thereby accelerating the opening of the birth canal (Suwarnisih et al., 2025).

The study also showed that mothers who used peanut balls had significantly shorter labor durations than the control group. In this study, peanut balls were considered a safe, easy-to-use, and effective non-pharmacological tool for accelerating labor, especially during the active phase. These results align with this study's findings, which showed that the intervention group had an average labor duration of 307.2 minutes, significantly shorter than the control group's 412.2 minutes (Ahmadpour et al., 2021). The use of peanut balls consistently accelerates labor. This indicates that peanut balls can be widely used because they have been proven to be effective and safe in various situations (Grenvik et al., 2023).

Additionally, clinical trials found that the majority of mothers who used peanut balls experienced the first stage of labor in less than 6 hours. This data supports the findings of this study, which showed a high proportion (83.3%) of mothers giving birth with a normal duration (≤ 2 hours) in the intervention group. This indicates that the peanut ball has a significant effect in accelerating the active phase of labor (Trihartiningsih & Munanadia, 2023). Most mothers who used peanut balls experienced faster and normal labor. This data reinforces the idea that peanut balls are very helpful, especially for accelerating the active phase of labor, which is usually the most stressful for mothers. Peanut balls can be a solution for mothers who must remain in bed during labor. This tool still helps accelerate the birth process even if the mother is not actively moving, as it supports a body position that is in line with the natural process of giving birth (Farida et al., 2024).

Evidence from randomized clinical trials further supports these results. For instance, a study with 198 women undergoing epidural analgesia, including 107 using a peanut ball and 91 in a control group, found that peanut ball use significantly shortened the durations of the first and second labor stages and reduced cesarean rates compared to standard care. These results imply that the peanut ball can enhance labor progress and increase the chances of vaginal delivery, especially in women with limited mobility from epidurals. In another study with 343 participants, 164 women were assigned to the peanut ball group, while the rest received standard care. Women using the peanut ball were 50% less likely to have a cesarean. For women with cervical dilation ≤ 4 cm, the vaginal delivery rate was 61% in the peanut ball group. Multivariate analysis using a multiple linear regression indicated that, after controlling for other factors, placing a peanut ball did not significantly reduce labor duration ($p = 0.4684$).ion ($p = 0.4684$) (Hickey & Savage, 2019).

A pilot randomized clinical trial protocol has been published to assess the feasibility and clinical effects of peanut ball use compared with no peanut ball use in laboring women with epidurals, to establish a baseline for a larger clinical trial and a future definitive randomized study. The study targeted a minimum of 50 participants, 25 women in each arm, who received epidural analgesia during labor at two hospitals in New South Wales (NSW) over one year. Participants were then randomly allocated to either the intervention (peanut ball) or control (no peanut ball) group (Stulz et al., 2018). Another randomized clinical trial evaluated a labor protocol combining peanut ball use with specific positioning techniques and pelvic mobility in 100 women in active labor without analgesia. The results showed that the intervention group experienced a significant reduction in the duration of the active phase, the

expulsive phase, and the total time of labor compared to standard care, with mean differences of 82, 8, and 89 minutes, respectively. Furthermore, women in the peanut ball protocol group reported higher maternal satisfaction scores on a 10-point scale than the control group (mean difference = 1.1), indicating not only improved physiological labor progress but also a better subjective birth experience. These findings indicate that a labor protocol combining peanut ball positioning with pelvic mobility exercises can effectively reduce labor duration and enhance maternal satisfaction. (De Sena Fraga et al., 2024).

A large-scale, prospective, randomized clinical trial protocol has also been developed to evaluate the effectiveness of peanut ball use on various maternal and neonatal outcomes in low-risk primigravida women. In this study protocol, 768 participants were planned to be randomized into the intervention group (peanut ball positioning) and the standard care group, allowing for a more robust comparison between the groups. This study aimed to assess maternal outcomes, including duration of the active and second stages of labor, pain perception, behavioral responses during active labor, delivery method, and serum cortisol levels as an indicator of stress. The results of this study are that the use of peanut balls can help widen the pelvic outlet, thereby supporting the natural progress of labor by increasing maternal-fetal circulation, reducing labor pain and stress (Kamath et al., 2022). A recent meta-analysis including eight clinical studies with over 1,300 laboring women showed that in mothers receiving epidural analgesia, peanut ball use was associated with a significant reduction in the duration of the first stage of labor (an average reduction of approximately 53 minutes), a reduced risk of cesarean delivery, and improved maternal satisfaction scores compared to standard care (Makvandi et al., 2025).

However, some studies have not observed a notable improvement in labor progress with peanut ball use. A randomized clinical trial involving nulliparous women receiving epidural analgesia during the active labor stage found no significant difference in the rate of cervical dilation or the duration of the active stage between the group using the peanut ball and those receiving standard care.rcier & Kwan, 2018).

Therefore, the peanut ball technique during the active phase of the first stage of labor effectively sped up labor. The intervention group experienced a 36-minute shorter labor duration compared to the control group. This indicates that the technique can be a valuable non-pharmacological method in obstetric care to help accelerate labor. The peanut ball is a simple yet effective tool that has been shown to provide tangible benefits in obstetric practice, particularly for mothers who are unable to move much during labor, contributing to a calmer, more positive birth experience.

A strength of this study is that data collection was conducted at three hospitals, and there were no dropouts. A weakness of this study is the relatively small sample, which calls for a larger sample in future research.

Conclusion

The study results indicated that women using the peanut ball experienced shorter labor durations compared to those who did not. This suggests that the peanut ball technique is effective at accelerating

labor by facilitating pelvic dilation, improving fetal position, and facilitating faster descent into the birth canal.

Based on these results, it is recommended that the peanut ball be considered a non-pharmacological intervention for active labor management in health facilities. Health workers, particularly midwives, are encouraged to regularly implement this technique and make it part of the hospital's standard operating procedures.

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