



## **Birthing Ball Gymnastics Technique to Reduce Labor Pain**

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### **Abstract**

**Background:** Labor pain is a major concern for women, especially during the first stage, which is often intense and long. It is caused by both physical and emotional factors, like anxiety and fear. Proper pain management can improve the birth experience. A birthing ball is a non-drug method that helps reduce pain, support cervical dilation, and widen the pelvis, making labor shorter and aiding vaginal delivery. It also helps women feel more in control during labor. This study aims to examine the effect of using a birthing ball on pain intensity during the active phase of the first stage of labor.

**Method:** This study is quantitative research using a quasi-experimental approach with a one-group pre-test-post-test design. The sample consisted of 30 respondents selected through purposive sampling, using the Visual Analogue Scale (VAS) observation sheet. Data analysis was conducted using the paired t-test.

**Results:** The study found that the average pain intensity during the active phase of the first stage of labor before using the birthing ball was 7.29 (severe pain), and after using the birthing ball, it was 6.06 (moderate pain). The paired t-test showed that there is a significant effect of using a birthing ball on labor pain intensity during the active phase of the first stage of labor with a p-value of 0.000 ( $p < 0.005$ ).

**Conclusion:** There is an effect of using birthing ball on labor pain intensity in active phase of the first stage of labor. Therefore, we need to encourage collaboration between midwives and doctors in the use of birthing balls to ensure a holistic and comprehensive approach to labor pain management.

**Keywords:** *gymnastics technique, birthing ball, morbidity and mortality*

## INTRODUCTION

Labor is a physiological process for humans. The process of labor is often perceived as frightening and painful and can even lead to negative responses, especially for primigravida mothers. The fear experienced by mothers during the active phase of labor contributes to pain levels and the duration of labor. According to the World Health Organization (WHO), the pain experienced during childbirth is a very intense and unique experience for women. More than 90% of mothers experience high levels of tension and stress during labor <sup>(1)</sup>.

The first stage of labor in Indonesia showed that as many as 60% of primiparous mothers described experiencing severe pain due to uterine contractions, while 30% felt a moderate level of pain. Meanwhile, in multiparous mothers, around 45% experienced severe pain, 30% felt moderate pain, and 25% faced mild pain <sup>(2)</sup>. According to data from the Lampung Provincial Health Office, around 37,264 mothers experienced labor pain, which reached around 30.0%. In Bandar Lampung City, the percentage was around 20.0% <sup>(3)</sup>.

For primigravida women, the first stage of labor lasts 12 hours, with the active phase lasting 6 hours, while for multiparous women, the first stage lasts 8 hours. In primigravida, cervical dilation progresses by 1 cm per hour, and in multiparous women, it progresses by 2 cm per hour <sup>(4)</sup>. The progress of labor is influenced by cervical dilation and the descent of the fetal head into the pelvic floor. Progress during the active phase is the most exhausting and challenging, with most mothers beginning to feel pain during this phase. Most mothers experience severe pain because the uterus becomes more active. Prolonged durations of the first and second stages of labor increase the risk of fetal mortality, necessitating immediate action to complete the delivery <sup>(5,6,7)</sup>.

Labor pain can be stressful, causing excessive release of stress hormones such as catecholamine and steroids. These hormones can cause smooth muscle tension and vasoconstriction, resulting in decreased uterine contractions. Labor pain also causes an increase in blood pressure, pulse rate, respiratory frequency, excessive sweat metabolism, pupil dilation and muscle tension <sup>(8,9)</sup>.

The emotional tension felt by the mother due to labor pain can cause the release of adrenaline and catecholamine hormones which cause contractions to be more painful because the uterus becomes stiff which causes reduced blood flow and oxygen to the muscles which causes a longer labor time <sup>(10)</sup>. Various pharmacological and non-pharmacological measures are taken to prevent prolonged labor and labor pain <sup>(11)</sup>. Pharmacological techniques include analgesics, inhalation, spinal and epidural anesthesia. Analgesics are more effective than non-pharmacological methods, but pharmacology is more expensive and potentially harmful <sup>(12,13)</sup>. Non-pharmacological techniques such as pregnancy exercises, deep breathing techniques, warm compresses, cold compresses, hydrotherapy, counterpressure, knee compresses, positioning, relaxation, back or abdominal rubs, urinary emptying, use of aromatherapy, music therapy, hypnotherapy, acupuncture and use of birthing balls <sup>(14,15,16)</sup>.

Birthing ball is one of the non-pharmacological methods during labor that is used to reduce pain and accelerate the duration of labor <sup>(17,18)</sup>. The benefits of birthing ball during labor can reduce pain, anxiety, reduce the use of analgesics, make it easier for the fetal head to descend into the pelvis and rotation, accelerate the duration of the first stage of labor and can improve body balance. Birthing ball is an effective way to relax for the lower body, especially the

pelvis. This techniques aims to increase the size of the pelvic cavity by shaking movements by moving the pelvis right to left, back and forth and rotating. Squatting is an exercise with a squatting position. Leaning on the ball / squatting with a backward position is leaning on the ball while doing 5-10 minutes of breathing. Bouncing ball is a movement action with ball. While standing leaning on the ball is an exercise with a standing position leaning on the ball doing up and down movements. This exercise is useful for toning the pelvic muscles, relieving low back pain and accelerating the descent of the fetal head. In addition, this technique can increase comfort in the mother during labor because it can increase the release of endorphin hormone in the body <sup>(19,20,21)</sup>.

## METHODS

The research design used in this study was Quasi Experimental (pseudo experiment). The approach taken in this study was one group pretest posttest design. The population in this study includes all mothers in the active phase of the first stage of labor. The sampling method used in this research is total sampling, with a total sample size of 30 respondents who met the inclusion criteria: in the active phase of labor, term pregnancy, intact membranes, and willingness to participate as respondents. The exclusion criteria included: mothers with fetal distress, complications during labor, indications for operative delivery, history of diseases or pregnancy complications, and those receiving analgesic therapy or induction during labor. Data collection was carried out using the Visual Analogue Scale (VAS) observation sheet. Data analysis in this study was conducted using univariate analysis with descriptive tests and bivariate analysis using the paired t-test. The study received ethical approval from the Health Research Ethics Committee of Malahayati University with the

approval number 4539/EC/KEP-UNMAL/VIII/2024.

## RESULTS

In this study, the respondent's characteristics include the frequency distribution of age, parity, and labor companions.

**Table 1** Frequency distribution of characteristics

Characteristics	Frequency	Presentation
<b>Occupation</b>		
Housewives (IRT)	24	80
Merchants	2	6,7
Farmers	4	13,3
<b>Education</b>		
Elementary School (SD)	4	13,3
Middle School (SMP)	0	0
High School (SMA/SMK)	26	86,7
<b>Parity</b>		
Low Risk	22	73,3
High Risk	8	26,7
<b>Labor companion</b>		
Husband	21	70
Birth mother	9	30

Based on the results of the study in table 1, it was found that of the 30 respondents based on occupation, the largest percentage was housewives (*IRT*) as many as 24 people (80%). The majority of respondents' education level was high school (SMA/SMK), with 26 individuals (86.7%). Regarding parity, the majority of respondents were at low risk, with 22 individuals (73.3%). Concerning labor companions, the majority were accompanied by their husbands, accounting for 21 individuals (70%).

**Table 2** The effect of using a birthing ball on labor pain intensity during the active phase

Pain Intensity	Mean	SD	p-value	n
before intervention	7,267	1,4126	0,000	30
after intervention	6,067	1,0483		

The statistical test results obtained a  $p$ -value of  $0.000 < \alpha (0.05)$ , thus it can be said that there is an effect of using birthing balls on reducing labor pain intensity during the active phase of the first stage of labor at Independent Midwifery Practice (PMB) Wirahayu. The average pain scale before using birthing ball was 7.267 while the average pain scale after using birthing ball was 6.067.

## DISCUSSION

### 1. Occupation

The results of this study showed that of the 30 respondents at PMB Wirahayu, the majority were housewives, with 24 individuals (80%). The type of occupation can affect the high level of physical activity in mothers during pregnancy. Physical activity in low-moderate vulnerability can cause a sense of comfort in the mother because it helps in facing labor. Working mothers tend to walk more around the workplace and try not to sit or stand for extended periods, which helps to train the muscles around the pelvis to become flexible. In contrast, pregnant women who do not work are more likely to have lower levels of activity, which can lead to less trained joint and pelvic muscles, causing stiffness and less physical preparation for labor <sup>(22,23)</sup>.

### 2. Education

The results showed that of the 30 respondents at PMB Wirahayu, the majority were high school (SMA/SMK), namely 26 people (86.7%). Education plays an important role in determining human quality. The level of education of the community is associated with the ability to absorb and receive information

in the field of health and family. Higher education levels provide sufficient knowledge about various risks, such as the pain experienced during childbirth, allowing mothers to prepare psychologically and minimize anxiety <sup>(25,26)</sup>.

### 3. Parity

The results showed that of the 30 respondents at PMB Wirahayu, the majority were not at risk, namely 22 people (73.3%). Primigravida experience a different labor process compared to multigravida. This is because multigravida experience effacement (cervical thinning) along with cervical dilatation, whereas in primigravida the effacement process usually occurs before cervical dilatation. This process causes the intensity of contractions felt by primigravida to be more severe than multigravida, especially in the first stage of labor. Pain perception is also highly variable in women and is subjective. Some factors that can affect the perception of pain felt by laboring women are the environment, personal experience, family support, culture, and psychological conditions such as fear and anxiety <sup>(27)</sup>. Afroh, et al (2017) state that emotions can increase maternal stress or fear, which physiologically can increase uterine contractions thereby increasing perceived pain <sup>(28)</sup>. In primigravida who have never experienced this before, the anxiety is higher than that of multigravida, so the pain felt is also higher than that of multigravida <sup>(29)</sup>.

### 4. Labor companion

The results of this study indicate that of the 30 respondents at PMB Wirahayu, the majority were accompanied by their husbands, with 21 individuals (70%). birth attendants should be people

who care and are desired by the birth mother to accompany her during the delivery process, good and continuous support can provide significant clinical benefits to birth mothers and new babies. Laboring mothers need support, help, and protection from other family members or close friends. The presence of a close person will help lighten the burden and anxiety when facing the labor process. The presence of her husband as the closest person who provides psychological assistance will divert the mother's attention to the pain she feels and reduce the level of stressors that stimulate pain during labor.

The presence of the husband beside his wife in labor will make the atmosphere safer, more comfortable, and less tense and reduce the wife's anxiety during labor. Accompanying the mother during labor can cause a sense of pleasure and comfort in the mother, these impulses transmit neurotransmitters to the limbic system, then forwarded to the amygdala, then to the hypothalamus, thus stimulating the inner core and the area around the uterus can produce a sense of calm, safety, and comfort and reduce a little anxiety mother. The content of catecholamine in the blood will relax smooth muscles, relax blood vessels, and increase the supply of blood and oxygen to the uterus, so that the pain felt by the mother can be reduced and will accelerate the process of childbirth<sup>(30)</sup>.

##### 5. The Effect of Using a Birthing Ball on Reducing Labor Pain During the Active Phase of the First Stage of Labor

The statistical test results obtained a  $p$  value of  $0.000 < \alpha$  (0.05), thus it can be said that there is an effect of using birthing balls on reducing active phase I labor pain

at PMB Wirahayu. Labor pain is experienced by all laboring mothers. When laboring women focus their attention on the pain they feel, it will affect their perception of pain which will make the pain they feel increase so as not to cause trauma and complications that interfere with the delivery process<sup>(31)</sup>.

Using a birth ball during labor prevents the mother from being continuously in a supine position and contributes to increasing the mother's self-efficacy during labor, as well as reducing pain.

Birthing balls can increase blood flow to the uterus, placenta and baby, relieve pressure and can increase the pelvic outlet, provide counter pressure on the perineum and thighs, work with gravity to push the baby down so that it accelerates the process of labor. Using a birthing ball by sitting relaxed and swaying on the ball or hugging the ball during contractions has the benefit of helping the mother feel relaxed and as a distraction from labor pain, accelerating the process of cervical dilatation, supporting an upright posture will facilitate the birth process and help the fetal position to be in an optimal position so as to facilitate normal childbirth. Some of the benefits of birthing ball are: 1) Helps the mother in an upright position, which allows the uterus to work as efficiently as possible by making the pelvic area wider and more open. This can stimulate dilation and widen the pelvic outlet. Sitting straight on the ball will help the fetus or the lowest part of the fetus to immediately descend into the pelvis due to the force of gravity. 2) Supports, balances and strengthens the pelvis because its shape can adjust to the shape of the body

so as to reduce the risk of back injury. Sitting on the birthing ball can reduce stress on the feet and ankles. 3) Distraction, its movement can distract during labor. With positions that can be controlled by the mother and some light movements can reduce anxiety and pain in labor. Birthing balls can facilitate position changes and be used as a comfort tool for mothers entering labor. 4) Relaxation, with a sitting position and the shape of the ball that can adjust the shape of the body, it will make it easier to rest and stay in an upright position. This position can keep the mother relaxed and keep the ligaments and muscles relaxed and tight so that it will help the body to adapt to the dramatic changes that occur during labor.

This position can reduce pressure on the ligaments and muscles, especially those in the pelvic area, become loose, thereby reducing pressure on the sacroiliac joints, blood vessels in the area around the uterus, and pressure on the bladder, back, waist, tailbone and reduce perineal pressure as well as relax the pelvic muscles<sup>(32,33)</sup>. Based on this theory, the use of Birth Ball is one of the interventions to relieve pain during labor. In addition to relieving pain during the opening of the first stage, Birth Ball can also be used to reduce the incidence of prolonged first stage by reopening the opening of the cervix, accelerating uterine contractions, enlarging the diameter of the pelvis, and

rotating the descent of the fetal head. Therefore, pregnant women are encouraged to use a birthing ball during labor<sup>(34)</sup>. This is consistent with research conducted by Sahara (2019), which states that the use of birthing ball can reduce labor pain after use for 20-90 minutes<sup>(35)</sup>. Setiani (2023) also argues that birthing ball therapy is effective in reducing the intensity of pain in mothers who give birth spontaneously<sup>36</sup>.

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## CONCLUSIONS

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Based on the results of the analysis using the paired t test, it was concluded that the significance value of  $0.000 < \alpha = 0.05$ , so that  $H_a$  was accepted, which means that there is an effect of using birthing ball on reducing labor pain intensity during the active phase of the first stage of labor.

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## ACKNOWLEDGEMENTS

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This research was funded through the Affirmation Beginner Lecturer Research Grant from the Directorate General of Higher Education, Ministry of Education and Culture. We would like to express our gratitude to Malahayati University and PMB Wirahayu for facilitating and assisting in this research.

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