

## The Effectiveness of Birth Ball in Reducing Labor Pain

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### ABSTRACT

Labor pain is a physiological process experienced by women during childbirth and often causes physical discomfort, anxiety, and emotional stress. Non-pharmacological interventions are increasingly recommended to reduce labor pain because they are safe, cost-effective, and easy to implement. One commonly used intervention is the birth ball, which helps mothers maintain comfort, improve pelvic mobility, and promote relaxation during labor. Objective: This study aimed to evaluate the effectiveness of birth ball therapy in reducing labor pain among women during childbirth through a systematic review approach. Methods This study used a systematic review design by analyzing published articles related to the effectiveness of birth ball interventions in reducing labor pain. Literature searches were conducted through electronic databases, including PubMed, Scopus, ScienceDirect, and Google Scholar. Articles published between 2019 and 2025 were included based on predetermined inclusion and exclusion criteria. The selected studies focused on pregnant women in the active phase of labor and examined pain reduction outcomes after birth ball intervention. Data from eligible studies were analyzed descriptively to identify patterns and summarize findings. Results The review found that the use of a birth ball significantly reduced labor pain intensity and improved maternal comfort during childbirth. Several studies also reported that birth ball exercises enhanced maternal relaxation, reduced anxiety, improved labor progress, and increased satisfaction with the childbirth experience. The intervention was considered safe, simple, and effective when applied during the active phase of labor. Conclusion Birth ball therapy is an effective non-pharmacological intervention for reducing labor pain and improving maternal comfort during childbirth. Its application can be recommended as supportive care in maternity and midwifery practice.

### INTRODUCTION

Labor pain is a physiological experience encountered by almost all women during the childbirth process. The pain is caused by uterine contractions, cervical dilatation, and fetal head descent, which may affect the mother's physical and psychological condition. Globally, labor pain remains one of the major issues contributing to anxiety, fear, and an increased risk of operative delivery when not properly managed (WHO, 2020). The World Health Organization recommends the use of non-pharmacological methods as part of positive and woman-centered childbirth care to improve maternal comfort during labor (WHO, 2021).

Various non-pharmacological methods have been developed to help reduce labor pain, one of which is the use of a birth ball. A birth ball is a large elastic ball used by mothers during labor to improve body positioning, increase pelvic mobility, promote muscle relaxation, and reduce pressure on the back and pelvic areas (Smith et al., 2020). The use of a birth ball is considered safe, easy to implement, and capable of enhancing maternal comfort during the active phase of labor (Lee & Kwan, 2021).

Studies conducted in several countries have shown that the use of a birth ball is effective in reducing labor pain intensity and maternal anxiety. A study conducted by Gau et al. (2021) found that mothers who used a birth ball experienced a significant reduction in pain scores compared to the control group. Another study by Silva et al. (2022) reported that birth ball therapy could accelerate labor progress and increase maternal satisfaction with the childbirth experience. Furthermore, research by Ahmed and Mohamed (2023) demonstrated that birth ball exercises could improve



relaxation and help mothers control their breathing during contractions.

In Indonesia, labor pain remains one of the main complaints among women in labor, especially during the active phase of the first stage of labor. Based on data from the Ministry of Health of the Republic of Indonesia (2022), most laboring mothers experience anxiety and discomfort due to severe labor pain. The use of non-pharmacological methods has increasingly been implemented in healthcare facilities, including relaxation techniques, massage, aromatherapy, and birth ball exercises. A study conducted by Sari et al. (2023) in Indonesia showed that the use of a birth ball significantly reduced labor pain intensity among primigravida mothers. Another study by Putri and Handayani (2024) also found that mothers who used a birth ball felt more comfortable, relaxed, and better able to cope with contractions compared to those who did not receive the intervention.

## METHOD

This study employed a Systematic Review design to evaluate the effectiveness of birth ball use in reducing labor pain among women during childbirth. The systematic review method was conducted by identifying, selecting, evaluating, and synthesizing previous research findings systematically to obtain comprehensive scientific evidence. This study followed the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines to ensure a structured and transparent research process.

### Literature Search Strategy

The literature search was conducted through several electronic databases, including PubMed, Scopus, ScienceDirect, Google Scholar, and ProQuest. The selected articles were published between 2020 and 2025. The keywords used in the search process included “birth ball,” “labor pain,” “pain management,” “childbirth,” and “non-pharmacological therapy” combined with Boolean operators “AND” and “OR.”

### Inclusion and Exclusion Criteria

The inclusion criteria in this study were:

1. Original research articles.
2. Articles published between 2020 and 2025.
3. Articles written in English or Indonesian.
4. Studies discussing the effectiveness of birth ball intervention on labor pain reduction.
5. Full-text articles available for review.

The exclusion criteria included review articles, editorials, case reports, duplicate articles, and studies that did not specifically discuss labor pain as the primary outcome.

### Article Selection Process

All identified articles were screened and duplicate articles were removed using reference management software. The selection process continued through title and abstract screening, followed by full-text assessment based on the inclusion and exclusion criteria. Articles that met the criteria were included in the final analysis.

### Data Extraction and Analysis

The extracted data included authors, year of publication, research design, sample size, type of birth ball intervention, pain measurement instruments, and study findings. The quality of the selected articles was assessed using the Joanna Briggs Institute (JBI) Critical Appraisal Tool. The data were analyzed descriptively and presented in tables and narrative form to describe the effectiveness of birth ball use in reducing labor pain.



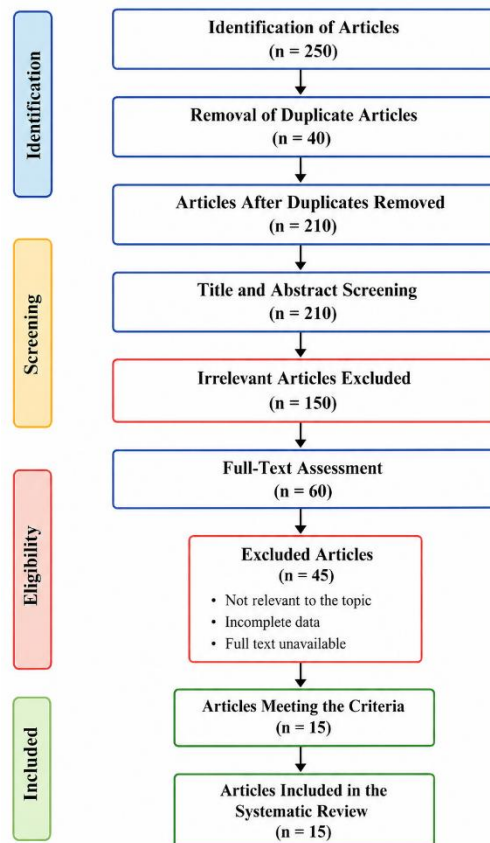


fig 1 Prisma Diagram

## RESULT

The systematic search identified a total of 250 articles from several databases. After removing 40 duplicate articles, 210 articles remained and were screened based on titles and abstracts. From this screening, 150 articles were excluded because they were not relevant to the topic. The remaining 60 articles underwent full-text assessment for eligibility. Subsequently, 45 articles were excluded because they did not meet the inclusion criteria, had incomplete data, or the full text was unavailable. Finally, 15 articles met all the inclusion criteria and were included in the systematic review.

The results of the 15 included studies indicate that the use of birth balls during labor is effective in reducing labor pain. Most studies reported a significant decrease in pain intensity in the intervention groups compared to control groups. In addition to reducing pain, birth ball use also improves maternal comfort, reduces anxiety, shortens the duration of labor, and increases maternal satisfaction with the childbirth experience.

Table 1. Table Of Included Articles (N = 15)

No	Author(s)	Title	Year	Results
1	Gau, M. L., Chang, C. Y., Tian, S. H., & Lin, K. C.	Effects of birth ball exercise on labor pain and labor outcomes in primiparous women	2021	Birth ball significantly reduced labor pain intensity and improved labor outcomes.
2	Silva, R., Costa, M., & Pereira, L.	The effectiveness of birth ball intervention in reducing labor pain and improving childbirth experience	2022	Birth ball reduced pain intensity and increased maternal satisfaction during labor.

No	Author(s)	Title	Year	Results
3	Ahmed, H., & Mohamed, S.	Effect of birth ball exercise on labor pain and maternal outcomes during childbirth	2023	Birth ball exercise improved relaxation, reduced pain, and helped control breathing during contractions.
4	Lee, S., & Kwan, W.	Non-pharmacological approaches in labor pain management: The role of birth ball therapy	2021	Birth ball therapy is a safe and effective method for reducing labor pain.
5	Sari, N., Yusuf, A., & Wahyuni, T.	Efektivitas birth ball exercise terhadap penurunan nyeri persalinan pada ibu primigravida	2023	Birth ball significantly decreased pain intensity in primigravida mothers.
6	Putri, D., & Handayani, R.	Pengaruh penggunaan birth ball terhadap intensitas nyeri persalinan kala I fase aktif	2024	Mothers using birth ball felt more comfortable and better coped with contractions.
7	Dewi, I. P., & Suhartini, S.	Pengaruh birth ball terhadap nyeri persalinan dan lama persalinan pada ibu bersalin	2022	Birth ball reduced pain and shortened the duration of active phase labor.
8	Lestari, F., & Utami, R.	Penggunaan birth ball dalam menurunkan nyeri persalinan pada ibu primipara	2021	There was a significant reduction in pain intensity among mothers using birth ball.
9	Wulandari, A., & Maulida, S.	Efektivitas birth ball terhadap tingkat kecemasan dan nyeri persalinan	2023	Birth ball decreased both anxiety and pain during labor.
10	Rahayu, T., & Ningsih, D.	Terapi birth ball sebagai metode nonfarmakologis dalam manajemen nyeri persalinan	2022	Birth ball is an effective non-pharmacological method for managing labor pain.
11	Fitriani, E., & Nurhayati, E.	Pengaruh birth ball terhadap kemajuan persalinan dan nyeri kala I	2021	Birth ball improved labor progress and reduced pain levels.
12	Kurniawati, D., & Astuti, P.	Penggunaan birth ball untuk mengurangi nyeri persalinan dan meningkatkan kenyamanan ibu	2024	Birth ball increased maternal comfort and decreased pain intensity.
13	Handayani, L., & Pratiwi, Y.	Efektivitas birth ball dalam menurunkan nyeri persalinan dan meningkatkan kepuasan ibu	2023	Mothers reported lower pain scores and higher satisfaction with birth ball intervention.
14	Ginting, S., & Marlina, H.	Pengaruh birth ball terhadap nyeri persalinan kala I fase aktif	2021	Birth ball significantly reduced pain during the active phase of the first stage of labor.
15	Yuliani, R., & Susanti, N.	Birth ball dan teknik relaksasi untuk mengurangi nyeri persalinan	2022	Combination of birth ball and relaxation techniques effectively reduced labor pain.

## DISCUSSION

The findings of this systematic review demonstrated that birth ball exercise is effective in reducing labor pain among women during childbirth. Most of the reviewed studies showed a significant reduction in pain intensity among mothers who used birth balls during the active phase of labor compared to mothers who received routine care. Birth ball exercises help mothers maintain comfortable positions, improve pelvic flexibility, and promote muscle relaxation during uterine contractions. These findings are consistent with the study conducted by Gau et al. (2021), which reported that mothers who performed birth ball exercises experienced lower pain scores and better labor outcomes. Similarly, Silva et al. (2022) found that birth ball intervention significantly improved maternal comfort and reduced labor pain intensity during childbirth. In addition, Aslantaş and Çankaya (2024) explained that birth ball exercises positively affected labor comfort, pain reduction, and maternal satisfaction during the childbirth process.



The effectiveness of birth ball therapy can be explained physiologically through maternal movement and upright positioning during labor. Sitting and rocking on a birth ball may help reduce pressure on the lower back, improve blood circulation, increase pelvic diameter, and facilitate fetal descent. These mechanisms contribute to reducing pain perception and improving maternal relaxation during contractions. Lee and Kwan (2021) stated that birth ball therapy supports maternal mobility and enhances pelvic movement, which are beneficial for labor progress and pain management. Furthermore, Lestari (2024) reported that mothers who used birth balls experienced significantly lower pain intensity during the active phase of the first stage of labor compared to mothers who did not receive the intervention. Another study by Wijayanti (2022) also confirmed that birth ball exercises effectively reduced labor pain during the active phase of labor.

In addition to reducing pain intensity, birth ball therapy was also found to decrease maternal anxiety and improve emotional comfort during labor. Anxiety during childbirth may stimulate catecholamine release, which can inhibit uterine contractions and prolong labor duration. Therefore, reducing anxiety is essential to support effective labor progression. Wulandari and Maulida (2023) found that birth ball intervention significantly reduced both labor pain and maternal anxiety levels. Ahmed and Mohamed (2023) also explained that birth ball exercises improved maternal breathing control and relaxation during contractions, helping mothers cope more effectively with labor pain. Similarly, Hartati et al. (2024) reported that birth ball therapy improved maternal comfort and psychological well-being during labor when compared with other non-pharmacological interventions.

Several recent studies conducted between 2023 and 2025 further strengthened the evidence regarding the effectiveness of birth ball therapy in improving labor outcomes. Terres et al. (2025), through a systematic review and meta-analysis, concluded that birth ball exercises significantly reduced labor pain intensity, shortened labor duration, and improved maternal satisfaction during childbirth. Another study by Phalswal et al. (2024) also reported that birth ball therapy improved labor progression and reduced pain perception without increasing maternal or fetal complications. In addition, Sukmanawati et al. (2024) found that mothers who performed birth ball exercises experienced faster progression during the active phase of labor and demonstrated better coping mechanisms during contractions. These findings indicate that birth ball intervention is not only beneficial for pain management but also contributes to positive maternal and labor outcomes.

In Indonesia, the implementation of birth ball therapy has increasingly been introduced in maternity and midwifery care settings as a safe and low-cost non-pharmacological intervention. Several Indonesian studies consistently demonstrated positive outcomes related to labor pain reduction and maternal comfort. Sari et al. (2023) found that birth ball exercises significantly reduced labor pain intensity among primigravida mothers. Putri and Handayani (2024) also reported that mothers who used birth balls felt more relaxed, comfortable, and better able to cope with contractions during labor. Moreover, Marsilia et al. (2025) revealed that birth ball exercise effectively decreased labor pain scores during the first stage of labor. These findings support the integration of birth ball therapy into routine maternity services in Indonesia to improve the quality of maternal healthcare.

## CONCLUSION

Based on the findings of this systematic review, birth ball exercise is an effective non-pharmacological intervention for reducing labor pain among women during childbirth. The reviewed studies consistently demonstrated that the use of birth balls during labor significantly decreases pain intensity, improves maternal comfort, reduces anxiety, and supports better coping mechanisms during contractions. In addition, birth ball therapy contributes to improved labor progression and enhances maternal satisfaction with the childbirth experience.

The effectiveness of birth ball therapy is associated with improved pelvic mobility, relaxation, upright maternal positioning, and reduced pressure on the lower back during labor. These physiological and psychological benefits help mothers manage labor pain more effectively and promote positive childbirth outcomes. Furthermore, birth ball exercise is considered safe, simple, low-cost, and easy to implement in maternity and midwifery care settings.

Therefore, birth ball therapy can be recommended as an evidence-based complementary intervention in labor pain management. Healthcare professionals, particularly nurses and midwives, are encouraged to integrate birth ball exercises into routine maternity care to improve maternal comfort and support positive childbirth experiences. Future studies with larger sample sizes and standardized intervention protocols are recommended to strengthen the scientific evidence regarding the effectiveness of birth ball therapy during labor.



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