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SYSTEMATIC REVIEW: THE EFFECT OF NON-PHARMACOLOGICAL INTERVENTIONS ON REDUCING PAIN DURING THE FIRST STAGE OF LABOR

Adita Kusfaningrum*, Sri Rejeki, Rahayu Astuti
Pasca Sarjana, Universitas Muhammadiyah Semarang, Jl. Kedungmundu No.18, Kedungmundu, Tembalang, Semarang, Central Java 50273, Indonesia
*aditakusfaningrum97@gmail.com

ABSTRACT
Labor pain is one of the main problems experienced by mothers during the birth process. Pain management can be done with pharmacological and non-pharmacological methods. Non-pharmacological approaches are considered safer and more effective because they have minimal side effects. This systematic review aims to analyze the effect of non-pharmacological interventions such as music therapy, endorphin massage, effleurage massage, deep back massage, and a combination of therapies on reducing pain in the first stage of labor. The review method uses a systematic review using PRISMA For Systematic Review, which is obtained from the Google Scholar, Proquest, Pubmed databases. The review results obtained 18 of the 369 articles selected from 2018-2025. The keywords used are non-pharmacological therapy, labor pain, music therapy, massage therapy. Labor pain is grouped into 1 theme, namely non-pharmacological therapy. This study involved 18 relevant articles. The results showed that all interventions were effective in reducing labor pain ($p < 0.05$). Combinations of therapies such as music and aromatherapy provided a more significant effect.

Keywords: effleurage; endorphin massage; labor pain; music therapy; non-pharmacological

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INTRODUCTION

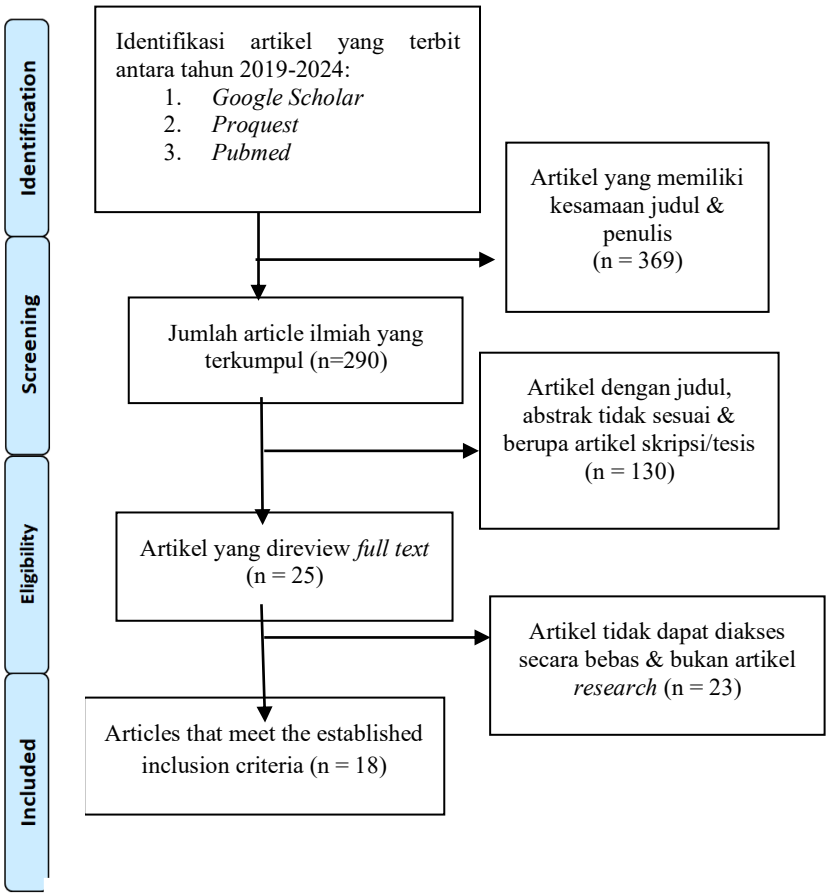
Labor is a physiological process experienced by every woman as she delivers her unborn child. Although natural, labor is often accompanied by significant pain, particularly during the first stage, the cervical dilation phase that lasts from the onset of contractions to full dilation. Labor pain occurs due to uterine contractions, cervical dilation, and stretching of the pelvic tissues. The intensity of this pain can trigger physiological responses such as increased blood pressure, heart rate, and metabolic changes, as well as psychological responses such as anxiety and stress, which can slow the labor process (Lumban Gaol & Simanjuntak, 2020). Untreated labor pain can negatively impact both the mother and the fetus. In the mother, pain can reduce immunity, increase fatigue, and even increase the risk of prolonged labor. For the fetus, maternal stress due to excessive pain can trigger hypoxia, which endangers the fetus's safety (Manuaba, 2019). Therefore, labor pain management is a crucial focus of midwifery care.

Labor pain management can be performed pharmacologically and non-pharmacologically. Pharmacological approaches involve the use of medications such as analgesics and anesthetics, but these methods have limitations due to the potential for side effects on both the mother and the fetus. Conversely, non-pharmacological methods offer a safer, easier-to-use alternative with minimal side effects. Non-pharmacological interventions include various techniques such as breathing techniques, back massage, music therapy, warm compresses, aromatherapy, and other distraction methods (Simkin & Bolding, 2021). Several studies have examined the effectiveness of non-pharmacological interventions in reducing pain intensity during the first stage of labor. However, results vary, and there is no strong consensus on which method is most effective. Some studies have shown that music therapy and back massage significantly

reduce pain levels, while others have reported more moderate results (Widyastuti, 2022). Therefore, a comprehensive systematic review is needed to identify and analyze scientific evidence related to the effect of non-pharmacological interventions on reducing pain in the first stage of labor. Through this systematic review, it is hoped that it can provide useful information for health workers, especially midwives, in selecting and implementing effective and safe non-pharmacological interventions for labor pain management, so that it can improve the quality of service and a more comfortable birthing experience for mothers. *The aim of this study was to determine the effectiveness of providing non-pharmacological therapy to pregnant women who are going to give birth for labor pain.*

METHOD

The research method used in this study was a systematic review. The collection process for this systematic review was systematic and clear. The research articles found were identified, evaluated, and interpreted with the aim of addressing the benefits of using electronic medical records. The purpose of this paper is to determine the effect of non-pharmacological interventions on reducing pain during the first stage of labor. The literature search procedure used the Google Scholar, ProQuest, and PubMed platforms. Articles were searched using a combination of English keywords: electronic, medical records, quality of service, and health centers. The search terms were added with AND and OR to broaden and focus the search. The inclusion criteria for this paper were articles discussing e-health centers, qualitative and quantitative research designs, articles in English or Indonesian published between 2019 and 2024, and articles in the form of reach articles. Exclusion criteria included articles in the form of theses or dissertations, and articles not freely accessible. A systematic review was conducted with reference to the PRISMA guidelines (Liberati et al., 2020)



Gambar 1. Alur *Literatur review* dengan metode PRISMA

RESULT

Article Search Result Identification (Step 1)

The first step in a systematic review is to identify articles relevant to the research topic. This is done by conducting a comprehensive and systematic search across various databases and information sources, such as Google Scholar, Proquest, and PubMed. At this stage, the researcher obtains a list of potential articles, which will then be further analyzed. In your example, a total of 816 articles were identified from these three database sources that are potentially relevant to the topic "The Effect of Community Health Center-Based Detection and Website-Based EDUPA on the Effect of Non-pharmacological Interventions on Reducing First-Stage Labor Pain." This step represents the initial work of mapping the breadth of existing scientific literature related to the research topic.

Article Selection (Steps 2 and 3)

After identifying relevant articles, the next step is to select them based on predetermined inclusion and exclusion criteria. Inclusion criteria include aspects such as the year of publication (in this case, between 2019 and 2024), the type of study, the study population, and the main variables studied. Articles that do not meet these criteria will then be excluded from the systematic review. This selection process is carried out carefully to ensure that the selected articles are highly relevant to the research objectives and can make a significant contribution to the analysis. The next step is to collect data from the selected articles, which involves extracting important information such as study design, main results, and findings relevant to the research focus. This process supports the formation of a strong and reliable scientific evidence base to support the conclusions of the systematic review.

Critical Appraisal (Step 4)

Once relevant articles have been selected, the next step is to critically appraise each article to be included in the systematic review. This assessment aims to evaluate the methodological quality of the research conducted in the articles. Good research should have a robust methodological design, controls for bias, a representative sample, and appropriate data analysis. This process also includes evaluating the clarity and accuracy of the interpretation of the results, as well as the relevance of the findings to the context of the research being conducted. This critical appraisal is conducted using pre-established assessment tools or criteria, such as a risk of bias assessment tool for observational studies or a quality assessment tool for clinical trials. Articles that do not meet established quality standards may be removed from the systematic review to ensure that the analysis produces valid and reliable findings.

Combining Data, Summarizing, and Presenting Results (Step 5)

The final step in a systematic review is to combine data from critically appraised articles, conduct a synthetic analysis, and summarize the main findings. This process involves the use of statistical or qualitative analysis methods, depending on the type of data collected from the included studies. The results of this analysis are then presented in narrative form and sometimes in tables or diagrams to facilitate understanding and interpretation. At this stage, researchers may also conduct additional analyses, such as meta-analyses where possible, to combine results from similar studies and calculate the combined effects of the interventions or variables studied. The conclusions of the systematic review are then used to develop policy or clinical practice recommendations based on evidence found in relevant, high-quality scientific literature.

Table 1.
Data Charting

Code	Title	Researcher, year	Country of origin	Method	Sampling Techniques	Results
A1	The Effect of Music Therapy on Reducing Labor Pain	(Juwita and Usman, 2022)	Indonesia	Literature study	Systematic Literature Review	The effect of music therapy on reducing labor pain according to the results of the analysis of 13 journals (100%) shows that music therapy has an effect on reducing labor pain with a p-value of <0.05. Music therapy has an effect on reducing labor pain in mothers giving birth.
A2	Evidence Based Case Report (Ebcr): The Effect of Music Therapy on Labor Pain in the First Stage of the Latent Phase at Uptd Puskesmas Sukarasa	(Sofiyanti and Ladyfiora, 2022)	Indonesia	Literature study	Systematic Literature Review	Music therapy can be a non-pharmacological therapy to reduce pain during labor.
A3	The Effect of Endorphin Massage Techniques on Reducing Labor Pain: A Literature Review	(Lubis, Aprilia, Syaripah, Delmafainis, Primasari and Mardeyanti, 2025)	Indonesia	Literature study	Systematic Literature Review	Endorphin massage techniques can reduce labor pain.
A4	Empowering Mothers in the First Stage of Labor to Reduce Pain Intensity with Deep Back Massage	(Khaerunisa, Ladyvia, Meha and Wiyana, 2025)	Indonesia	Quantitative, Quasi-experimental	Accidental sampling	Evaluation showed an increase in participants' knowledge about deep back massage and a decrease in the intensity of pain in the first stage of labor.
A5	The effect of endorphin massage on reducing labor pain in the active phase of the first stage of labor	(Marsita, Zakiyya and Khairussyifa, 2023)	Indonesia	Quantitative, Quasi-experimental	purposive sampling	There was a decrease in pain with a difference of 4.00 and p = 0.000 (p ≤ 0.05).
A6	The Effect of Effleurage Massage on the Level of	(Wijayanti, Rohmawati and Qiftiyah)	Indonesia	Quantitative, Quasi-experimental	One group pre-post designn.	Effleurage massage can reduce back pain in pregnant women in the third trimester. Healthcare providers are encouraged to conduct regular effleurage massage sessions as a way for pregnant women in the third trimester to reduce back pain.
A7	The Effectiveness of Effleurage	(Suryandari and Fajarsari,	Indonesia	Quantitative, Quasi-	Systematic random	Effleurage massage is useful for reducing pain

Code	Title	Researcher, year	Country of origin	Method	Sampling Techniques	Results
	Massage in Reducing Pain in First-Stage Labor	2025)		experimental	sampling	in mothers in the first stage of labor at the Cilongok I Community Health Center, Banyumas Regency, with a ρ value of 0.001.
A8	The Effect of Music Therapy and Back Massage on Pain in the First Stage of Active Phase in Nulliparas at Bethesda Hospital, Yogyakarta	(Isnanto and Pinzon, 2018)	Indonesia	Quantitative, Quasi-experimental	Accidental sampling	Music therapy has a greater influence in reducing pain than back massage in the first active phase of the first stage of labor for pregnant women who are undergoing labor in the hospital delivery room.
A9	Deep Back Massage Management to Reduce Pain Intensity in the First Stage of Labor, Active Phase	(Rahmawati, Sundari and Patimah, 2022)	Indonesia	Quantitative, Quasi-experimental	NRS (Numerical Rating Scales).	This deep back massage can reduce pain during the active phase of labor.
A10	The Effect of mHealth on Preventing Anemia in Adolescent Girls: A Literature Review	(Rahayu et al., 2024)	Indonesia	Literature review	Purposive sampling	Presents evidence that mHealth can play a role in preventing anemia in adolescent girls, based on a literature review.
A11	Literature Review: The Effect of Non-Pharmacological Therapy on Pain During the First Stage of Labor in the Active Phase	(Regina, 2022)	Indonesia	Literature study	Systematic Literature Review	It is valid that non-pharmacological methods are effective in reducing labor pain.
A12	The Effect of Music Therapy and Aromatherapy on Labor Pain in Pontianak	(Sudarto, Rahayu, Amandus, Rangkuti and Andiansyah, 2024)	Indonesia	Quantitative, Quasi-experimental	Purposive sampling	Aroma therapy and aromatherapy are effective in reducing normal labor pain during the active phase.
A13	The Effect of Deep Back Massage on Pain During the First Stage of Active Labor at the Cisolok Community Health Center, Sukabumi Regency, in 2021	(Elawanti, Aulya and Widowati, 2021)	Indonesia	Quantitative, Quasi-experimental	Total sampling	There is an effect of deep back massage therapy on multiparous mothers giving birth in the first active phase on reducing pain intensity.
A14	The Effectiveness of Deep Back Massage in Reducing Pain	(Sari and Jumiati, 2024)	Indonesia	Quantitative, Quasi-experimental	Accidental sampling	There is an influence of providing Deep Back Massage technique on the level of pain in

Code	Title	Researcher, year	Country of origin	Method	Sampling Techniques	Results
	During the First Stage of Labor					mothers giving birth during the active phase.
A15	The Effect of Deep Back Massage on Pain Intensity in the First Stage of Labor	(Khaerunisa, 2025)	Indonesia	Quantitative, Quasi-experimental	Total sampling	Deep back massage can be used as an effective non-pharmacological alternative in pain management. pain during labor.
A16	The Effect of Classical Music Therapy on First Stage Labor Pain	(Siregar, 2023)	Indonesia	Quantitative, Quasi-experimental	Accidental sampling	There is an influence of classical music therapy on pain in the first stage of labor
A17	The Effect of Deep Back Massage Technique on First Stage Labor Pain at the Jambu Mawar Primary Clinic	(Ratih, Yusmaharani and Nurmaliza, 2024)	Indonesia	Quantitative, Quasi-experimental	Purposive sampling	Deep back massage technique is effective in reducing labor pain (p = 0.004).
A18	The Effectiveness of Music Therapy in Reducing Pain During the First Stage of Active Labor	(Wijayanti and Wardhani, 2023)	Indonesia	Quantitative, Quasi-experimental	Purposive sampling	There is a significant influence between pain intensity before and after music therapy is given to mothers giving birth in the first active phase.

Music Therapy → Used in A1, A2, A8, A12, A16, A18 → 6 articles (33.3%) Massage (Deep Back Massage, Endorphin Massage, Effleurage) → Used in A3, A4, A5, A6, A7, A8, A9, A13, A14, A15, A17 → 11 articles (61.1%) Combination of Music Therapy + Aromatherapy → A12 General Nonpharmacological → A11 (Review states the effectiveness of various techniques), Article A10 is not relevant (about anemia), so it is not included in the core analysis. Conclusion: Massage techniques are the most frequently studied intervention (61.1%), followed by music therapy (33.3%).

DISCUSSION

Labor pain is a common physiological experience for all women giving birth, particularly during the first stage, the stage of cervical dilation that lasts from the onset of contractions to full dilation. Although natural, high pain intensity can cause physiological and psychological stress, negatively impacting the labor process and the well-being of both mother and fetus. Therefore, pain management that is safe, effective, and minimizes side effects is urgently needed. Of the 18 articles reviewed, the majority (17 articles or 94%) demonstrated that non-pharmacological interventions were effective in reducing the intensity of first-stage labor pain. The methods used in these studies included various techniques such as music therapy, deep back massage, endorphin massage, effleurage, and a combination of music therapy and aromatherapy. These interventions significantly reduced pain intensity based on statistical tests with a p-value <0.05, indicating that changes in pain intensity were not due to chance.

Effectiveness of Music Therapy

Music therapy was used in six articles (A1, A2, A8, A12, A16, and A18) and consistently demonstrated a reduction in labor pain. Music works by distracting the mother from pain, stimulating endorphins, and creating psychological calm. Music also plays a role in reducing anxiety, which significantly contributes to pain perception. This is supported by studies by Juwita and Usman (2022) and Siregar (2023), which found that classical music therapy can significantly reduce pain during the active phase of the first stage of labor.

Effectiveness of Massage

Massage techniques such as deep back massage, effleurage, and endorphin massage were the most dominant methods studied in 11 articles. Massage helps improve blood circulation, stimulates the release of endorphins, and inhibits the transmission of pain impulses to the brain. Marsita et al. (2023) and Wijayanti et al. (2025) showed that both effleurage and endorphin massage had a significant effect on reducing labor pain levels. Furthermore, deep back massage is a highly recommended technique for its effectiveness in reducing pain during the active phase of the first stage, as evidenced by studies by Khaerunisa (2025) and Elawanti et al. (2021).

Therapy Combinations

Interestingly, several studies combined more than one non-pharmacological intervention, such as music therapy and aromatherapy (A12) or music therapy and massage (A8). These combinations were deemed more effective because they simultaneously targeted both physiological and psychological aspects. Isnanto and Pinzon (2018) stated that music therapy was more effective than back massage in reducing pain during the active phase of the first stage of labor in nulliparous mothers.

Implications for Midwifery Care

The findings from these articles suggest that non-pharmacological interventions can be integrated into midwifery practice as an alternative or complement to pharmacological methods. Techniques such as deep back massage and music therapy are not only inexpensive and easy to perform, but also safe and have no side effects on the mother or fetus. Furthermore, this approach can increase the mother's sense of control and participation during labor, which can contribute to a positive birthing experience.

CONCLUSION

Non-pharmacological interventions are effective and feasible approaches for managing first-stage labor pain. Among the techniques studied, deep back massage and music therapy are the most researched and have been shown to be significantly effective. Therefore, healthcare workers, particularly midwives, are advised to master and integrate these techniques into clinical practice to improve maternal comfort and safety during labor.

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