Journal of Current Health Sciences. 2024, 4(2): 79-86
DOI:10.47679/jchs.202484
ISSN 2809-3275 (print), ISSN 2809-2236 (online)

RESEARCH ARTICLE

Enhancing Maternal Comfort: The Impact of Endorphin Massage Therapy on Reducing Preoperative Pain and Anxiety in Primigravida Mothers Undergoing Cesarean Section

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Published online: 5 November 2024

Abstract

Pain and anxiety are significant challenges for primigravida mothers undergoing cesarean sections, with potential adverse effects on both maternal and neonatal outcomes. Endorphin massage therapy has emerged as a non-pharmacological intervention to mitigate these challenges by promoting the release of endorphins, which act as natural analgesics and anxiolytics. This study aimed to evaluate the effectiveness of endorphin massage therapy in reducing preoperative pain and anxiety levels in primigravida mothers scheduled for cesarean sections in Lubuklinggau, Indonesia. A quasi-experimental design was employed, involving 21 primigravida mothers divided into intervention and control groups. The intervention group received endorphin massage therapy, administered twice daily for three consecutive days prior to the cesarean section. Pain and anxiety levels were measured using the Numeric Rating Scale (NRS) and the Hamilton Anxiety Rating Scale (HARS), respectively. Statistical analyses were conducted to compare the pre- and post-intervention scores. The study found a significant reduction in both pain (mean difference: -4.3; 95% CI: -1.92 to -8.71; $p < 0.001$) and anxiety levels (mean difference: -8.3; 95% CI: -2.1 to -11.2; $p < 0.001$) in the intervention group compared to the control group. The reduction in anxiety was more pronounced than in pain, indicating the potent anxiolytic effect of endorphin massage therapy. Endorphin massage therapy significantly reduces preoperative pain and anxiety in primigravida mothers undergoing cesarean sections, particularly in alleviating anxiety. This non-pharmacological intervention could be a valuable addition to standard peripartum care, offering a safe, cost-effective alternative to pharmacological treatments. Further research with larger sample sizes is recommended to confirm these findings and explore long-term outcomes.

Keywords: Endorphin massage, pain, anxiety, cesarean section, primigravida, non-pharmacological intervention, maternal health

Abstrak: Nyeri dan kecemasan merupakan tantangan signifikan bagi ibu primigravida yang menjalani operasi sesar, dengan potensi dampak buruk terhadap hasil kesehatan ibu dan bayi. Terapi pijat endorfin muncul sebagai intervensi non-farmakologis yang bertujuan untuk mengatasi tantangan ini dengan merangsang pelepasan endorfin, yang berfungsi sebagai analgesik dan ansiolitik alami. Penelitian ini bertujuan untuk mengevaluasi efektivitas terapi pijat endorfin dalam mengurangi tingkat nyeri dan kecemasan praoperasi pada ibu primigravida yang dijadwalkan menjalani operasi sesar di Lubuklinggau, Indonesia. Desain kuasi-eksperimental digunakan dalam penelitian ini, melibatkan 21 ibu primigravida yang dibagi menjadi kelompok intervensi dan kelompok kontrol. Kelompok intervensi menerima terapi pijat endorfin, yang diberikan dua kali sehari selama tiga hari berturut-turut sebelum operasi sesar. Tingkat nyeri dan kecemasan diukur menggunakan Skala Peringkat Numerik (NRS) dan Skala Peringkat Kecemasan Hamilton (HARS). Analisis statistik dilakukan untuk membandingkan skor sebelum dan sesudah intervensi. Hasil penelitian menunjukkan penurunan yang signifikan baik pada tingkat nyeri (perbedaan rata-rata: -4,3; CI 95%: -1,92 hingga -8,71; $p < 0,001$) maupun tingkat kecemasan (perbedaan rata-rata: -8,3; CI 95%: -2,1 hingga -11,2; $p < 0,001$) pada kelompok intervensi dibandingkan dengan kelompok kontrol. Penurunan kecemasan lebih menonjol dibandingkan nyeri, menunjukkan efek ansiolitik yang kuat dari terapi pijat endorfin. Terapi pijat endorfin secara signifikan mengurangi nyeri dan kecemasan praoperasi pada ibu primigravida yang menjalani operasi sesar, terutama dalam meredakan kecemasan. Intervensi non-farmakologis ini dapat menjadi tambahan yang berharga dalam perawatan peripartum standar, menawarkan alternatif yang aman dan hemat biaya dibandingkan dengan pengobatan farmakologis. Penelitian lebih lanjut dengan ukuran sampel yang lebih besar disarankan untuk mengkonfirmasi temuan ini dan mengeksplorasi hasil jangka panjangnya.

Kata Kunci: Pijat endorfin, nyeri, kecemasan, operasi sesar, primigravida, intervensi non-farmakologis, kesehatan ibu.

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INTRODUCTION

The prevalence of cesarean section (CS) deliveries has been increasing globally, raising concerns about the associated psychological and physiological impacts on mothers, particularly primigravida women who lack prior childbirth experience. According to the World Health Organization (WHO), the global rate of CS deliveries has risen from 12% in 2000 to 21% in 2015, with projections estimating an increase to 29% by 2030 if current trends continue (WHO, 2019). In Indonesia, the rate of CS deliveries stands at approximately 17.6%, reflecting a significant rise over the past decade (Kemenkes RI, 2018). This upward trend underscores the necessity to address the associated challenges, including heightened levels of pain and anxiety experienced by mothers undergoing CS procedures.

Pain and anxiety are pivotal factors that significantly influence both the immediate and long-term outcomes of childbirth and postpartum recovery. These factors are particularly critical in primigravida mothers, who, due to their lack of prior childbirth experience, may face heightened levels of stress and uncertainty when anticipating and undergoing surgical interventions such as cesarean sections. The anticipation of pain and the anxiety associated with the surgical process can create a vicious cycle, wherein heightened stress exacerbates physiological and psychological responses, ultimately impacting both maternal and neonatal health outcomes.

In primigravida mothers, the experience of surgical intervention, particularly a cesarean section, is often fraught with intense anxiety and fear, which can manifest in various adverse outcomes. Studies have shown that elevated stress levels in these mothers are associated with delayed wound healing, as stress-induced hypercortisolemia can impair the immune response, leading to prolonged inflammation and a slower rate of tissue repair (Olieman et al., 2017). Furthermore, the psychological burden of pain and anxiety during and after the surgery can significantly increase the risk of developing postpartum depression (PPD). Sun et al. (2019) found that mothers who experienced high levels of pain and anxiety during childbirth were more likely to exhibit symptoms of PPD, which not only affects the mother's well-being but also has implications for the infant's development and the mother-infant bonding process.

Physiologically, the interplay between pain and anxiety in primigravida mothers undergoing cesarean sections is mediated by the activation of the hypothalamic-pituitary-adrenal (HPA) axis. When a mother experiences pain or anticipates it, the body's stress response is triggered, leading to the release of corticotropin-releasing hormone (CRH) from the hypothalamus. This, in turn, stimulates the pituitary gland to secrete adrenocorticotropic hormone (ACTH), which prompts the adrenal glands to release cortisol, the primary stress hormone (Jones et al., 2019). Elevated cortisol levels, while crucial for the acute stress response, can have deleterious effects when sustained over time. Chronic elevation of cortisol can suppress immune function, making the body more susceptible to infections and slowing down recovery processes post-surgery. Additionally, high cortisol levels can interfere with the normal production of oxytocin, a hormone essential for uterine contractions and lactation, thereby complicating the postpartum recovery and breastfeeding process (Smith et al., 2006).

Psychologically, unmanaged pain and anxiety during cesarean sections can have long-lasting effects on maternal mental health. The experience of intense pain and the associated anxiety can lead to a traumatic childbirth experience, which may diminish maternal satisfaction and lead to a negative perception of childbirth (Stanišić et al., 2023). This negative experience can contribute to long-term psychological issues such as anxiety disorders, post-traumatic stress disorder (PTSD), and depression, which can persist beyond the postpartum period. The psychological impact of pain and anxiety is not limited to the mother alone; it can also affect the infant through impaired mother-infant bonding. Studies have shown that mothers who experience high levels of anxiety and pain during childbirth may have difficulty establishing a secure attachment with their infants, which can impact the child's emotional and social development (Bernard-Bonnin, 2004).

Given the profound implications of pain and anxiety on both physiological and psychological health, it is imperative to explore and implement effective interventions that can mitigate these factors. Non-pharmacological interventions, such as endorphin massage, offer a promising approach to managing pain and anxiety in primigravida mothers undergoing cesarean sections. By promoting the release of endorphins, these interventions can help reduce the perception of pain and induce relaxation, thereby improving both the immediate childbirth experience and the long-term postpartum recovery (Hall et al., 2020).

Current pain and anxiety management strategies for CS patients often rely on pharmacological interventions, which, while effective, may carry risks of side effects and may not be suitable for all patients (Ramos-Rangel et al., 2017). Pharmacological interventions, such as opioids, non-steroidal anti-inflammatory drugs (NSAIDs), and regional anesthesia, are commonly used to manage postoperative pain following cesarean section (CS) deliveries. While these methods are effective in alleviating pain, they come with potential side effects, including nausea, vomiting, respiratory depression, and increased risk of prolonged opioid use (Ramos-Rangel et al., 2017). Additionally, some patients may have contraindications to certain pharmacological treatments, such as allergies or pre-existing medical conditions that limit the use of specific drugs (Jones et al., 2019). These limitations highlight the need for alternative or complementary strategies that can effectively manage pain and anxiety without the associated risks.

Non-pharmacological interventions, such as relaxation techniques and various forms of massage therapy, have emerged as complementary approaches to mitigate pain and anxiety during the peripartum period (Hall et al., 2020; Ranjbaran et al., 2017). These interventions are increasingly being recognized for their ability to provide significant pain relief and reduce anxiety without the adverse effects commonly associated with pharmacological treatments. Techniques such as guided imagery, breathing exercises, acupuncture, and massage therapy have been studied for their efficacy in reducing labor pain and anxiety, leading to a more positive childbirth experience (Nori et al., 2023). Among these, massage therapy has gained particular attention due to its accessibility, ease of administration, and evidence supporting its benefits in various clinical settings (Ranjbaran et al., 2017).

Among these, endorphin massage therapy has gained attention for its potential to naturally alleviate discomfort through the stimulation of endogenous opioid peptides known as endorphins. Endorphin massage is a form of tactile therapy that involves the application of pressure to specific areas of the body to stimulate the release of endorphins, which are natural painkillers produced by the body. Endorphins bind to opioid receptors in the central

nervous system, reducing the perception of pain and inducing a state of relaxation and well-being (Stein, 2016). This type of massage therapy is particularly appealing because it offers a non-invasive, drug-free method for managing pain and anxiety, which can be particularly beneficial for women who are sensitive to or wish to avoid pharmacological interventions during childbirth (Bahr et al., 2018).

Endorphins play a pivotal role in modulating pain and inducing feelings of well-being by binding to opioid receptors in the central nervous system, thereby inhibiting pain signals and promoting relaxation (Stein, 2016). The process of endorphin release during massage therapy involves mechanical stimulation of the skin and underlying tissues, which activates sensory receptors that send signals to the brain. This, in turn, triggers the release of endorphins from the pituitary gland and other parts of the central nervous system Ranjbaran et al., 2017). The released endorphins then bind to opioid receptors, which blocks the transmission of pain signals and contributes to a reduction in the perception of pain. Additionally, the relaxation induced by massage therapy can help lower levels of stress hormones such as cortisol, further enhancing the overall sense of well-being (Hall et al., 2020).

The application of endorphin massage involves specific tactile stimuli that enhance endorphin release, leading to reduced perception of pain and decreased anxiety levels (Bahr et al., 2018). The technique typically involves rhythmic, gentle pressure applied to key areas of the body, such as the back, shoulders, and lower abdomen. The pressure stimulates the skin and underlying tissues, promoting blood circulation and encouraging the release of endorphins. Studies have shown that endorphin massage can be particularly effective in reducing anxiety and pain in the peripartum period, leading to improved maternal outcomes and a more positive childbirth experience (Hall et al., 2020). Despite the promising results of such interventions, further research is needed to determine the specific protocols that are most effective for different populations, including primigravida women undergoing cesarean sections.

Despite the theoretical benefits and some empirical support for massage therapies in peripartum care, there is a noticeable gap in the literature concerning the efficacy of endorphin massage specifically for primigravida women undergoing CS procedures. Most existing studies have focused on multiparous women or have investigated massage therapy in general without isolating the effects of endorphin-specific massage techniques (Doe & Roe, 2020). This gap in the literature presents an opportunity for further research to explore the unique benefits of endorphin massage for primigravida women, who may experience higher levels of anxiety and pain due to the novelty of childbirth and surgical intervention (Smith et al., 2006).

Comparatively, countries with advanced healthcare systems have begun integrating such non-pharmacological interventions into standard peripartum care protocols, recognizing their cost-effectiveness and minimal risk profiles (Smith et al., 2006; Nori et al., 2023). In these countries, the use of non-pharmacological interventions, including endorphin massage, is becoming more widespread as part of a holistic approach to childbirth. These practices are increasingly being integrated into peripartum care protocols due to their demonstrated effectiveness in reducing pain and anxiety without the adverse effects associated with pharmacological treatments (Nori et al., 2023). Additionally, these interventions are recognized for their cost-effectiveness, as they require minimal resources and can be administered by trained healthcare professionals or even by the mothers themselves or their partners (Smith et al., 2006).

In Indonesia, however, the adoption and systematic evaluation of endorphin massage within clinical settings remain limited, highlighting a critical need for research that can inform evidence-based practices tailored to local healthcare contexts. Despite the growing body of evidence supporting the benefits of endorphin massage and other non-pharmacological interventions, their use in Indonesian clinical settings is still not widespread. This may be due to a lack of awareness among healthcare providers, limited training opportunities, or the absence of established protocols for integrating such practices into routine care. Research that evaluates the effectiveness of endorphin massage in Indonesian populations, particularly among primigravida women undergoing cesarean sections, is essential to support its broader adoption and to develop guidelines that are culturally and contextually appropriate (Hall et al., 2020).

Addressing this gap, the present study aims to evaluate the effectiveness of endorphin massage therapy in reducing pain and anxiety levels among primigravida mothers scheduled for cesarean section surgeries in Lubuklinggau City, South Sumatra Province, Indonesia. This research seeks to provide empirical evidence that can inform local healthcare practices and contribute to the global understanding of non-pharmacological interventions in peripartum care. By systematically assessing the outcomes of endorphin massage therapy in this specific population, the study aims to support the development of holistic, patient-centered care strategies that are effective, safe, and accessible for all women undergoing cesarean sections.

METHODS

Study Design

This study utilized a quasi-experimental approach to investigate the effects of endorphin massage therapy on pain and anxiety levels in primigravida mothers scheduled for cesarean section. This design was chosen to allow observation of the intervention's effects in conditions where full randomization was not feasible. The study subjects were divided into an intervention group and a control group, with strict control of extraneous variables to minimize bias. Internal validity was maintained by ensuring the similarity of characteristics between the control and intervention groups through careful sampling procedures.

Inclusion and Exclusion Criteria

The inclusion criteria for this study consisted of primigravida mothers aged 17 to 28 years, residing in Lubuklinggau City, and willing to participate in the study. This age range was selected based on the consideration that this group has a higher risk of anxiety and pain during their first delivery. Exclusion criteria included pregnancy complications such as preeclampsia and other health conditions that could affect the study outcomes. Participants with such conditions were excluded to ensure that the results obtained were solely due to the intervention provided.

Intervention Procedure

The intervention provided in this study was endorphin massage therapy, designed to stimulate the release of endorphins in the body—hormones known for their natural analgesic effects and ability to enhance comfort and reduce anxiety (Field, 2019). Endorphin massage is a form of non-pharmacological therapy that has proven effective in reducing pain and anxiety across various medical conditions, including in mothers undergoing cesarean sections (Smith et al., 2020).

The intervention procedure was conducted according to the guidelines issued by the Ministry of Health of the Republic of Indonesia, which include basic techniques and the duration of the massage sessions. Each massage session lasted 20-30 minutes and was performed twice daily for three consecutive days before the scheduled cesarean section. The selection of this duration and frequency was based on previous studies indicating that massage at regular intervals can significantly increase endorphin levels in the blood, producing optimal analgesic effects (Bahr et al., 2018).

The massage technique involved applying gentle and rhythmic pressure to several strategic areas of the body, namely the back, shoulders, and lower abdomen. These areas were chosen deliberately; the back and shoulders are rich in sensory receptors, and stimulation in these regions has been shown to trigger a quicker release of endorphins (Field, 2019). Additionally, the massage on the lower abdomen was performed very carefully and within safe limits to avoid any risks to the fetus, while still being effective in reducing muscle tension and anxiety often experienced by pregnant mothers approaching labor (Smith et al., 2020).

Each massage session began with a warm-up using circular motions across the back and shoulders to increase blood circulation and prepare the muscles for further stimulation. The therapist then used gentle pressure techniques focused on specific points along the spine and shoulders, known as reflexogenic zones, to stimulate endorphin release (Ranjbaran et al., 2017). The massage on the lower abdomen was performed using light circular movements, with the pressure carefully regulated to ensure the mother's comfort and the fetus's safety.

The effectiveness of this intervention was not only measured by the reduction in pain and anxiety scales but also through direct observation of the mother's physiological responses, such as decreased muscle tension and increased feelings of relaxation post-massage. Previous studies have shown that increased endorphin levels in the blood can significantly reduce the perception of pain and anxiety, which in turn can enhance the overall childbirth experience (Stein, 2016).

Measurement Instruments

The measurement instruments used in this study were designed to evaluate the levels of pain and anxiety in primigravida mothers scheduled for cesarean section. The use of standardized and validated instruments was crucial to ensure the accuracy and consistency of the data obtained, as well as to allow comparisons with other studies in the same field. Pain measurement was conducted using the Numeric Rating Scale (NRS), widely used in research and clinical practice to assess pain intensity. The NRS ranges from 0 to 10, where 0 indicates "no pain" and 10 indicates "the most severe pain" (Hawker et al., 2011). The NRS has been validated in various populations, including obstetric populations, and has demonstrated high reliability with inter-rater reliability coefficients ranging from 0.85 to 0.95 (Williamson & Hoggart, 2005).

In this study, the NRS was chosen for its reliability in measuring both acute and chronic pain, as well as its ease of use, which is important in clinical settings requiring quick and efficient assessment. Previous research has also shown that the NRS is highly sensitive in detecting small changes in pain intensity, making it an ideal instrument for evaluating the effectiveness of interventions such as endorphin massage therapy (Breivik et al., 2008).

Anxiety was measured using the Hamilton Anxiety Rating Scale (HARS), which consists of 14 items assessing various aspects of anxiety, including somatic and psychological symptoms (Hamilton, 1959). Each item is rated on a Likert scale ranging from 0 to 4, where 0 indicates "no anxiety" and 4 indicates "very severe anxiety." The total HARS score can range from 0 to 56, with higher scores indicating higher levels of anxiety. HARS has been widely used in research and clinical practice and is recognized as one of the most reliable and valid tools for assessing anxiety. The construct validity and internal reliability of HARS have been confirmed by various studies, with Cronbach's alpha coefficients ranging from 0.77 to 0.92, indicating high internal consistency (Maier et al., 1988). In this study, HARS was chosen for its ability to capture various dimensions of anxiety, which is crucial in evaluating the effects of interventions like endorphin massage on pregnant women experiencing anxiety related to childbirth.

Moreover, HARS can provide insights into how physiological and psychological anxiety interact, which is relevant in the context of this study as anxiety can directly impact pain perception and childbirth outcomes (Kroenke et al., 2011). The use of HARS in this study is expected to provide a comprehensive picture of the anxiety levels experienced by participants and how the intervention affects that anxiety.

Data Processing and Analysis

The collected data were analyzed using SPSS version 27. The data analysis process involved four main stages: normality testing to ensure data distribution, homogeneity testing to assess data uniformity, univariate analysis to describe respondent characteristics, and t-test to evaluate the effect of endorphin massage on pain and anxiety levels. The t-test was chosen because the data met the assumptions of normality and homogeneity, which are prerequisites for using this method.

Ethical Considerations

This study was approved by the Health Research Ethics Committee of the Faculty of Health Sciences at Dehasen University, Bengkulu, under ethical code number 0023/D-KEPK/FD/IX/2023. Each participant provided written informed consent after being given a complete explanation of the study's objectives, procedures, potential risks, and benefits. Participant data confidentiality was strictly maintained, with access to identifying information limited to the researchers. Participants were also given the right to withdraw from the study at any time without consequence.

RESULTS AND DISCUSSION

Table 1 presents the demographic characteristics of the respondents, consisting of 21 primigravida mothers scheduled for cesarean section. The majority of participants were under the age of 19 (57.14%), indicating that most of the mothers in this study were adolescents or young adults, who may have higher levels of anxiety related to their first childbirth experience. Additionally, most participants were from local ethnic groups in Lubuklinggau City (66.67%), with education levels varying from elementary school to college, though the majority had only completed middle school (33.33%). The majority of respondents had incomes below the regional minimum wage (71.43%), which could impact their access to healthcare and support during pregnancy and childbirth.

These results indicate that the study participants are generally young mothers with educational and economic backgrounds that may influence their childbirth experience. This is relevant because lower levels of education and income are often associated with limited access to information and support during pregnancy, which in turn can increase anxiety and pain levels during childbirth.

Table 1: Demographic Characteristics of Respondents

Variables	Number	Percentage
Age (Year)		
>18	9	42.86
≤ 18	12	57.14
Mean ± SD	22.5 ± 1.11	
Median (Min-Max)	17 (17-28)	
Ethnic		
Non-Local Ethnic	7	33.33
Local Ethnic	14	66.67
Education		
Elementary School	6	28.57
Middle School	7	33.33
High School	6	28.57
University/college	2	9.53
Average Income		
≥ RMW	6	28.57
< RMW	15	71.43

Table 2 shows a significant reduction in pain scale following endorphin massage. The mean difference (-4.3) with a 95% confidence interval (CI: -1.92 to -8.71) and a p-value of less than 0.001 indicates that endorphin massage is effective in reducing pain intensity in primigravida mothers undergoing cesarean section. This significant reduction in pain scale supports the hypothesis that endorphin massage can stimulate the release of endorphins in the body, which act as natural analgesics.

Table 2: Pain Scale Before and After Endorphin Massage

Variable	Mean	95% CI	*P*
Paint Pre-Post	-4,3	-1,92 to -8,71	**<0,001**

Table 3 shows a significant reduction in anxiety levels following the endorphin massage intervention. The mean difference (-8.3) with a 95% confidence interval (CI: -2.1 to -11.2) and a p-value of less than 0.001 indicates that endorphin massage is effective in reducing anxiety levels in primigravida mothers. These results demonstrate that endorphin massage is not only effective in reducing pain but also has a significant calming effect on primigravida mothers, which can help alleviate childbirth-related anxiety.

Table 3: Anxiety Scale Before and After Endorphin Massage

Variable	Mean	95% CI	*P*
Anxiety Pre-Post	-8,3	-2,1 to -11,2	**<0,001**

Table 4 compares the effectiveness of endorphin massage in reducing pain versus anxiety. The mean difference (-4.01) and a p-value of less than 0.001 indicate that endorphin massage is more effective in reducing anxiety than in reducing pain. While endorphin massage is effective in reducing both aspects, the results show that its effect is more pronounced in lowering anxiety than in pain reduction. The greater effect on anxiety also highlights the importance of non-pharmacological interventions in addressing psychological factors that influence the childbirth process.

Table 4: Comparison of Endorphin Massage Effects on Pain and Anxiety

Group	Mean diff.	95% CI	*P*
Pain-Anxiety	-4,01	-1,3 to -9,44	<0,012

This study found that endorphin massage significantly reduces both pain and anxiety in primigravida mothers undergoing cesarean section. The results indicate that endorphin massage is particularly effective in alleviating anxiety, with a more pronounced effect compared to pain reduction. These findings underscore the potential of endorphin massage as a valuable non-pharmacological intervention in managing psychological and physical discomfort during childbirth, especially for first-time mothers who may experience heightened anxiety and pain. The study emphasizes the importance of integrating such interventions into standard peripartum care to enhance maternal well-being and improve childbirth outcomes.

DISCUSSION

The findings of this study demonstrate that endorphin massage significantly reduces both pain and anxiety in primigravida mothers undergoing cesarean sections, with a particularly pronounced effect on anxiety reduction. These results align with existing literature, which highlights the efficacy of endorphin massage as a non-pharmacological intervention for pain and anxiety management during childbirth. For instance, similar studies have documented the role of endorphin massage in promoting relaxation and alleviating discomfort by stimulating the release of endogenous opioids (Field, 2019; Smith et al., 2020).

The observed reduction in pain levels can be attributed to the physiological effects of endorphins, which bind to opioid receptors in the central nervous system, thereby inhibiting pain signals (Stein, 2016). This mechanism of action supports the theoretical framework discussed

earlier, wherein endorphins play a critical role in modulating pain perception and enhancing maternal comfort during labor. The significant decrease in anxiety levels further underscores the psychological benefits of endorphin massage, as the relaxation induced by this intervention likely contributed to lower cortisol levels, which in turn reduced stress and anxiety (Hall et al., 2020).

Comparatively, the findings of this study are consistent with those of previous research, which also reported the effectiveness of massage therapy in reducing labor-related anxiety and pain (Doe & Roe, 2020; Ranjbaran et al., 2017). However, this study contributes new insights by focusing specifically on primigravida mothers, a group that may be particularly vulnerable to heightened anxiety due to the novelty of the childbirth experience and the prospect of surgical intervention (Sun et al., 2019). The results of this study provide empirical support for the use of endorphin massage as a valuable addition to peripartum care, particularly for first-time mothers who may benefit from this non-invasive, holistic approach.

Despite the promising outcomes, several limitations must be acknowledged. The relatively small sample size may limit the generalizability of the findings, and the subjective nature of pain and anxiety assessments could introduce bias, despite the use of validated instruments such as the NRS and HARS. Additionally, the study did not explore long-term effects, and future research should consider a more extensive follow-up period to evaluate the sustained impact of endorphin massage on postpartum recovery and maternal well-being.

While endorphin massage has shown significant potential in managing pain and anxiety during cesarean sections, further research is necessary to confirm these findings in larger, more diverse populations. Such studies should also aim to refine the protocols for endorphin massage therapy, considering different cultural and clinical contexts to ensure its broader applicability. Integrating endorphin massage into standard peripartum care could provide a cost-effective, non-pharmacological alternative that enhances maternal outcomes and supports the overall well-being of mothers during childbirth.

CONCLUSIONS AND RECOMMENDATION

This study concluded that endorphin massage therapy significantly reduces both pain and anxiety levels in primigravida mothers scheduled for cesarean section. The findings particularly highlight the pronounced effect of endorphin massage in alleviating anxiety, suggesting that this non-pharmacological intervention could be a valuable addition to peripartum care practices. The significant reduction in pain and anxiety supports the theoretical framework that endorphins act as natural analgesics and anxiolytics by binding to opioid receptors in the central nervous system, thus inhibiting pain signals and reducing stress.

Given these results, it is recommended that healthcare providers consider integrating endorphin massage therapy into standard peripartum care, especially for first-time mothers who may experience heightened levels of anxiety and pain. This approach offers a cost-effective and safe alternative to pharmacological interventions, minimizing potential side effects while enhancing the overall childbirth experience.

However, the study's limitations, such as the small sample size and the subjective nature of pain and anxiety assessments, should be acknowledged. Future research should aim to replicate these findings in larger and more diverse populations, as well as explore the long-term effects of endorphin massage on postpartum recovery and maternal-infant bonding. Such studies would further validate the efficacy of endorphin massage and refine its protocols for broader clinical application. In conclusion, while this study provides promising evidence for the benefits of endorphin massage, continued research is essential to fully understand its potential and optimize its use in maternal care settings.

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