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Is Massage Therapy Effective in Reducing Labor Pain in Intrapartum Women?

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A SELECTIVE EVIDENCE BASED MEDICINE REVIEW

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ABSTRACT

OBJECTIVE: The objective of this selective EBM review is to determine whether massage therapy is an effective intervention in reducing pain in intrapartum women.

STUDY DESIGN: A systematic review of two randomized controlled trails (RCTs) and one case study published between 2009-2019. All studies were published in English.

DATA SOURCES: The two double-blind RCTs and case study were found via PubMed. All sources were published in peer reviewed journals and chosen based on their relevance to the clinical question.

OUTCOMES: Pain reduction was the outcome measured in all three studies using visual analog scale. In this systematic review, pain level was evaluated as change from baseline.

RESULTS: In the double-blind RCT conducted by Gallo et.al, there was a statistically significant reduction in pain at -17mm with massage therapy. In the quasi-experimental study viewed as a case study conducted by Hajiamini et.al, ice massage was found to reduce pain from baseline by 1.74cm and 1.57cm at zero and thirty minutes, respectively, with a p-value <0.05. However, pain reduction was not found to be statistically significant at sixty minutes after intervention. Lastly, in a double-blind RCT by Taghinejad et.al, the massage therapy group reported 36.3% less pain than the music therapy group with a p-value <0.001.

CONCLUSIONS: Both a clinical and statistically significant reduction in pain were demonstrated by all three studies. Thus, the results of this review are conclusive in that massage therapy is an effective method in reducing pain in intrapartum women. Furthermore, massage therapy is an inexpensive, informal, and widely available therapeutic method with the added benefit of having no side effects.

KEYWORDS: massage, labor pain

INTRODUCTION

Child labor pains are thought to be one of the most severe pains in human existence. It is believed that every individual who endures child labor experiences and interprets pain differently. Nonetheless, pain is felt to some degree. Despite continuous advancements in modern medicine, intrapartum labor pain has yet to be effectively managed by one modality.

Universally, individuals experience some amount of pain during the process of labor. Women experience intense and steady pain that may begin before the active phase of labor and persist throughout all stages.[1] According to the CDC, over 3 million babies are born each year in the United States alone.[2] It can be concluded that hundreds of millions of individuals worldwide endure the pain of childbirth each year.

National yearly statistics have concluded that over 95% of all live births in the U.S. still occur in a hospital setting.[3] The average cost of an in-hospital birth in 2016 was $15,204 USD.[2] The average cost of pain intervention, such as an epidural, may cost an additional $2000.[4] Pharmacotherapy, such as analgesics for pain, are also additional charges that may range from hundreds to thousands of dollars.[4] Usual methods in the treatment of labor pain include epidural, spinal block, analgesia (opioid and non-opioid), general anesthesia, and other complementary pain management techniques such as breathing, visualization, nitrous oxide, and water baths.[5] A quick glance at these numbers makes it abundantly clear that not only is intrapartum labor pain unavoidable, but it is also extremely expensive to treat.

It has been theorized that labor pain has two components. Individuals feel visceral pain during the early first and second stages of labor. Then, they typically feel somatic pain in the late first stage and second stage of labor. It is believed that pain in the first stage of labor is conducted through nerves T10-L1, whereas T12-L1 and S2-S4 control pain in the second stage.[5]

However, pain is subjective. It is impossible to tell an individual exactly how much pain they will experience. Currently, there is no cure or 100% effective treatment for intrapartum labor pain. Nonetheless, all interventions mentioned above have been proven to reduce pain and discomfort to some degree. Massage therapy has been thought to cause muscle relaxation by promoting endorphin release, controlling nerve gates, and stimulating sympathetic nerves.[1] Other studies have shown that massage has the ability to reduce both physical and psychological effects experienced throughout the various stages of labor.[6] Massage therapy may be used as an early intervention during active labor and improve morale as well as decrease stress in laboring individuals.

OBJECTIVE

The objective of this selective EBM review is to determine whether massage therapy is an effective intervention in reducing pain in intrapartum women.

METHODS

Criteria used for Selection of Studies:

The population of interest includes women at least 18 years of age, 37 weeks of gestation or more who naturally started labor and are at least 3 cm cervically dilated. The intervention of focus includes massage therapy. The comparison is a placebo group in which massage therapist only answer questions. Outcomes measured include the efficacy of massage therapy in reducing pain in women who are actively laboring. The types of studies included are two randomized, double-blind, placebo controlled clinical trials and one case study.

Table 1. Demographics & Characteristics of Included Studies

Study	Type	# Pts	Age (yrs)	Inclusion Criteria	Exclusion Criteria	W/D	Interventions
Gallo[6] (2013)	Double blind RCT	46	19 ± 3 years	A single fetus, at least 37 weeks of gestation, spontaneous onset of labor, cervical dilation of 4-5 cm, w/ no use of medication	Presence of dermatologic conditions that would CI the application of massage	0	30-min lumbar massage VS physiotherapist only answers questions
Hajlamin[7] (2012)	Quasi-experimental Study (examined as a case study)	90	27.82 ± 6.20 years	Women 18-40 years of age, singleton and term pregnancy, naturally started labor with normal fetal heart rate, and dilation of 3-4 cm	Any complications during labor, which lead to analgesic drug use or mid-wifery interventions to accelerate labor	0	Massage therapy using ice balls VS ice balls without pressure or massage
Taghinejad[1] (2010)	Double blind RCT	101	20-30 years old	Primiparous singletons ages 20-30 w/ cervix dilation of less than 4 cm, at 37-42 weeks of gestation and pregnant with babies of cephalic presentation and normal birth weight	Mothers who had received analgesic or antipsychotic medications or were labor-induced, and those with spontaneous rupture of the membrane longer than 20 hrs	0	Massage therapy VS music therapy

Data Sources:

The key words for searching articles were “massage” and “labor pain”. All articles were published in English and in peer reviewed journals. Articles were researched on PubMed and selected based on their relevance to the clinical question.

The inclusion criteria of my search consisted of randomized control trials that were published in the last 10 years. The exclusion criteria consisted of studies published before 2009 and studies including other animals. All three articles evaluated the treatment effect using visual analog scale. Table 1 depicts the demographics and characteristics of the included studies.

OUTCOMES MEASURED

The outcome measured was pain reduction which was evaluated using a Visual Analog Scale. This scale allows patients to subjectively measure acute or chronic pain by marking a 10 cm line that represents a continuum between “no pain”, usually denoted by the number 0, or the worst pain, denoted by the number 10.[8]

RESULTS

All studies include women over 18 years of age at least 37 weeks gestation who spontaneously started the laboring process. The study by Gallo et al.[6] is a randomized control trial that measured the patient’s pain level after receiving massage therapy compared to a placebo group. The study by Hajlamini et al.[7] is a quasi-experimental study, viewed as a case study for the purpose of this review, that compares the effects of ice massage versus acupressure therapy in reducing intrapartum labor pain. Lastly, the study by Taghinejad et al.[1] is a randomized control trial that measures intrapartum pain reduction after massage therapy compared to music therapy.

The study by Gallo et al.[6] used a 100mm Visual Analog Scale (VAS) to determine the change in pain severity at the end of the intervention. Forty-six participants, randomly categorized into intervention and control groups, marked their pain level on the scale before the intervention began and after the intervention was complete (30 minutes). The study considered a difference of 13mm of acute pain reduction on the visual analog scale to be clinically significant. It was concluded that participants in the experimental group improved by a mean of 17mm on the VAS from the baseline with a 95% CI (-10mm to -31mm). The standard deviation was noted to be 14mm. Participants in the control group actually reported an increase in pain intensity by a mean of 3mm. Between both groups observed, the effectiveness of massage therapy may be added to result in a 20mm reduction in pain on VAS. A mean experimental change of 17mm is larger than the minimum accepted clinical difference of 13 mm therefore, this study may be viewed as clinically valuable.[6] Table 2 shows the mean change from baseline after thirty minutes of intervention was performed.

Table 2. Mean Change on Visual Analog Scale in Gallo et al. After 30 Minutes of Intervention

Baseline mm	Control group (mean +/- SD) mm	Control mean change from baseline (mm)	Intervention group (mean +/- SD) mm	Intervention mean change from baseline (mm)
69	72 +/- 15	+3	52 +/- 20	-17

The study by Hajiamini et al.[7] included ninety women who were randomly divided into three groups. This study compared two interventions, ice massage and acupressure therapy, versus a placebo group. For the purpose of this review, the only intervention evaluated was ice massage, so this article was examined as a case study. A 10cm VAS was used to measure pain reduction during child labor at the time intervals of zero minutes, thirty minutes, and one hour

after the intervention was performed. VAS scores where then analyzed using one-way ANOVA. The results of the study concluded that there was a significant difference observed in the ice massage group ($p < 0.05$) immediately after intervention, -1.74cm, and thirty minutes, -1.57cm, after intervention. However, the difference at one hour after intervention was not significant. This study demonstrated a clinically significant difference in acute intrapartum pain at thirty minutes, but not at or after one-hour post-intervention.[7] Table 3 shows the mean change in pain intensity from baseline at the time intervals of zero minutes, thirty minutes, and one hour after intervention.

Table 3. Mean Pain Intensity on Visual Analog Scale in Hajiamini et al. at 0 Minutes, 30 minutes and 1-hour Post-Intervention

Baseline cm	**0 min post-intervention (mean +/- SD) cm**	**0 min mean change from baseline cm**	**30 min post-intervention (mean +/- SD) cm**	**30 min mean change from baseline cm**	**1 hour post-intervention (mean +/- SD)**	**1 hour mean change from baseline cm**
7.47	5.73 +/- 1.74	1.74	5.90 +/- 1.84	1.57	6.77 +/- 1.97	0.7
P-value	< 0.05					

Similar to the above studies, the one conducted by Taghinejad et al.[1] is a randomized control trial that compared massage therapy to music therapy in reducing intrapartum labor pain. One hundred one participants were recruited and randomly placed into the massage or music intervention groups. Data were collected using VAS then analyzed by nonparametric statistical test including Manvitny and Wilcoxon. It was concluded that mothers in the massage group reported lower amounts of pain compared to the music group. In the “agonizing phase” of labor, described as when mothers feel the most severe pain, the percent difference in pain between

massage and music groups was 36.3% with a p-value of 0.001.[1] The results of this study could be converted to dichotomous data. Participants can be divided into" improved" or "not improved" groups. Based on patient reported pain severity percentages before and after intervention, numbers needed to treat (NNT) were calculated to be 4 and 6, respectively, for massage and music groups. This study demonstrated a significant difference between massage and music therapies in reducing acute pain. Therefore, massage therapy can be used as an alternative and effective non-pharmacologic technique in decreasing intrapartum labor pain. Table 4 shows the different in pain intensity in number of participants who scored their pain as "most severe" on VAS before and after music and massage therapies using the Wilcoxon test.

Table 4. Pain Intensity Before and After Interventions in Taghinejad et al

Pain severity	**Before massage intervention n (%)**	**After massage therapy intervention n (%)**	**NNT**	**Before music intervention n (%)**	**After music therapy intervention n (%)**	**NNT**	**Percent difference between groups**
Most severe	14 (27.5)	1 (1.9)	4	13 (26.0)	5 (10)	6	36.3%
p-value	0.001						

Discussion

Intrapartum labor pain is theorized to be one of the most severe pains in human existence. It is thought to be virtually unavoidable in the process of childbirth. Not only does pain make the birthing process uncomfortable, but prolonged and intolerable pain for the mother may stunt the progression of labor[6]. This systematic review examined the efficacy of massage therapy in reducing intrapartum pain in laboring mothers. All three studies showed acceptable statistical significance in the reduction of pain. Participants in the Gallo et al. study reported an average reduction of 17 mm, on a 0-100 mm VAS, after intervention which surpassed the clinically

acceptable significant statistic of 13mm defined by the original researchers.[6] Similarly, Hajiamini et al.[7] were able to conclude a clinically significant reduction in pain immediately and thirty minutes after ice massage. Participants reported 1.74 cm and 01.57 cm less pain on VAS immediately and thirty minutes after massage, respectively, with p-value < 0.05.[7] However, reported levels of pain reduction were not significant one hour after the intervention was performed.[7] Lastly, Taghinejad et al[1] compared massage therapy and music therapy. This study concluded that patients in the massage group reported 36.3% less pain after the intervention compared to the music groups.[1] NNT for the massage group was calculated to be 4. This means four patients need to receive massage therapy in order for one patient to feel the benefit. In contrast, the NNT for music therapy was calculated to be 6 meaning more patients need to receive music therapy for one patient to receive a benefit. While all these of these studies demonstrated clinical significance in pain reduction, it is unclear how long pain relief will last or how much pain will be relieved.

Each of the studies reviewed possessed their own limitations. In Gallo et al., authors mentioned limitations in both the study itself and the environment in which the study was conducted. For example, the influence of surrounding laboring women and women on analgesics in the same environment as participants may skew the pain perception of participants.[6] Another limitation noted was if participants were informed previously about the study, they may have expectations about pain relief after intervention.[6] Hajiamini et al. mentioned the limitation of ice massage time only being ten minutes.[7] Taghinejad et al. discussed how their study examined massage and music therapies independently and proposed that a combination of the two therapies be studied in the future.[1] Another limitation with the potential to be studied in the future includes the lasting effect of massage therapy on post-partum pain and recovery.

The introduction of massage therapy dates back to 3000 BC in India and was thought to promote "natural healing".[9] Only in the last several decades has massage therapy been researched as a pain relief modality in the laboring process. The cost of massage therapy is dependent on time of therapy but may still be considerably less than any pharmacological agent a woman may receive in a hospital setting.[5] Massage therapist are also widely available and can be easily trained.[5] Due to its low cost and availability, massage therapy may easily be implemented without the extra hassle of needing prior authorization from the patient's insurance if discussed with a health care provider prior to labor.[10] One problem that can arise is the uncertainty of duration of effect. Only one study obtained participants' pain rating at an extended time after intervention was performed. The effect was not found to be clinically significant. This factor needs to be considered and researched further to reinforce the efficacy of this intervention.

Conclusion

Based on this systematic review, a clinical significance was reported in all three of these studies based on visual analog scale difference from baseline and p-value. However, only two studies were found to be statistically significant. The study by Gallo et al. was limited by demonstrating a 95% CI measure of precision. Thus, the results of this review mostly supports massage therapy in being an effective intervention in reducing pain in intrapartum women. Additional research to reinforce this statement would include exploring the efficacy of a longer massage therapy time and observing the lasting effects of massage by rating post-partum pain as well. Massage therapy may be considered as an inexpensive, informal, and widely available method in relieving some labor pain. Additionally, massage offers the benefit of no side effects. There is no expert training needed to administer this intervention, and it can be utilized in all settings including remote areas where intensive medical care may not be readily available.

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