GENIUS JOURNAL
general nursing science journal
e-ISSN: 2723-7729
Vol. 05 No. 02 PP. 139-146 E-ISSN 2723-7729 Prefix DOI: 10.56359/gj

Effectiveness of Maternity Infrared Electric Massage Mattress (Kapein) on Labor Pain and Progress in Primigravida during the Active Phase of Labor

Irka Pramukani[1], Roni Rowawi[2], Herri S Sastramihardja[3], Yanti Herawati[1], Teni Nurlatifah HR[1], Hidayat Wijayanegara[1]

[1]*STIKes Dharma Husada Bandung, Indonesia,* [2]*Immanuel Hospital, Bandung, Indonesia*
[3]*Universitas Padjadjaran, Bandung, Indonesia*

Correspondence author: Irka Pramukani
Email: irkapramukani1408@gmail.com
Address: Perum Citra Kebun Mas Block E1 No 3 Bengle, Karawang, Indonesia
DOI: https://doi.org/10.56359/gj.v5i2.385

ABSTRACT

Introduction: Labor pain in mothers is partly caused by a reduced oxygen supply to the uterine muscles during contractions. Non-pharmacological interventions, such as electric massage with infrared therapy on the spine, can help increase oxytocin levels, which may accelerate labor progress.
Objective: This study aimed to determine the effectiveness of the infrared electric massage mattress (Kapein) in reducing labor pain and enhancing labor progress in primigravida mothers during the active phase of labor.
Method: A true experimental research design with a pretest-posttest control group was used. The study involved all primigravida mothers in the active phase of labor at the Musytasyfah Karawang Clinic. A total sampling technique was employed, with 30 participants divided into an intervention group (15) and a control group (15). The data were analyzed using the McNemar test. The research was conducted from April to July 2024.
Results: The study found that the infrared electric massage mattress (Kapein) was effective in reducing labor pain in primigravida mothers during the active phase (p=0.000). It also demonstrated effectiveness in improving labor progress (p=0.027).
Conclusion: The infrared electric massage mattress (Kapein) is effective in reducing labor pain and improving labor progress in primigravida mothers during the active phase of labor. It is suggested that this intervention be considered as an alternative tool in obstetric services and recommended for use by the Health Office in childbirth care.

Keywords: kapein, labor progress, labor pain

Introduction

The process of childbirth is a natural event that every mother will experience, involving the expulsion of the baby and placenta from the womb. Childbirth is divided into four important stages, each requiring integrated care starting from the first stage (Prawirohardjo, 2018). The first stage of labor begins with the onset of strong contractions and continues until full cervical dilation. During this stage, physical changes occur that can cause discomfort, such as fatigue, lower back pain, difficulty sleeping, and shortness of breath, as well as psychological changes like fear related to the mother's condition. Additionally, cervical stretching and widening, resulting from uterine contractions, lead to labor pain as the cervix dilates (Sulistyowati, 2020).

Labor pain is a subjective feeling of discomfort that can only be fully understood and assessed by the individual experiencing it. These contractions cause pain in the lower back, abdominal area, and may radiate to the thighs (Permata & Zulfa, 2018). Labor pain is caused by reduced oxygen supply to the uterine muscles during short contractions, leading to increased pain due to incomplete restoration of oxygen supply. In the first stage of labor, pain arises from uterine contractions, cervical dilation, thinning, and uterine ischemia, which are all experienced during contractions (Utami, 2019).

Labor pain results from the contraction (shortening) of uterine muscles (Fitriahadi, 2019). Pain during labor can be managed through pharmacological and non-pharmacological methods (Wiwi, 2019). Pharmacological methods involve using analgesic drugs, which are administered through intravenous infusions, inhalation, or nerve blocks. Non-pharmacological methods involve natural pain relief techniques, such as relaxation exercises, which externally influence the body's internal response to pain (Sulistyowati, 2020). Non-pharmacological methods are generally safer and simpler to apply. One effective approach is oxytocin massage (Mustaghfiroh, 2022).

Infrared therapy produces heat effects on tissues, providing comfort and relaxation, which can reduce pain from muscle tension. The heat generated by infrared therapy increases tissue metabolism, causes vasodilation, and promotes nutrient flow to tissues while eliminating accumulated metabolic waste, thereby reducing pain (Sari A, 2022). The massage from the device’s vibrations is programmed to simulate back and oxytocin massages. Acupressure points for labor induction, such as SP6, L14, and BL32, stimulate the release of oxytocin from the pituitary gland, promoting uterine contractions and aiding in labor or pain management (Kurniyawan, 2016).

At Musytasyfah Clinic, approximately 10–15 mothers give birth monthly, attended by 4 midwives working in two shifts. Due to limited human resources for manual oxytocin massage, researchers developed an infrared electric massage mattress for maternity (Kapein), modified from Lexata massage equipment. The infrared electric massage mattress for maternity (Kapein) is a specialized medical device designed to provide oxytocin massage through infrared rays. This device mimics conventional oxytocin massage but offers the convenience and practicality of an electric massage. The advantages of the infrared electric massage mattress for maternity (Kapein) include providing comfort, relaxation, and speeding up labor for mothers preparing for childbirth (Nurul & Erli, 2020). The speed and pressure of the massage can be adjusted to suit the user’s preferences and the level of pain from contractions. However, one drawback is the high production cost, and the device must be used in healthcare facilities where the mother is delivering.

Objective

This study aimed to determine the effectiveness of the infrared electric massage mattress (Kapein) in reducing labor pain and enhancing labor progress in primigravida mothers during the active phase of labor.

Method

The design of this study is a true experimental design with a Pretest-Posttest Nonequivalent Control Group. The target population in this study includes all maternity mothers at Musytasyfah Karawang Clinic. The accessible population consists of all primigravida mothers who gave birth at Musytasyfah Karawang Clinic between April and July 2024. The sample for this study was primigravida mothers in the active phase of labor (Phase I). The sampling technique used was total sampling, with 30 respondents divided into two groups: 15 in the experimental group and 15 in the control group.

Result

Table 1. Pain scale before and after intervention

Groups		Pain Scale (n)			Mean	MD
		Mild	Moderate	Severe		
Intervention a	*Pretest*	0	15	0	2.27	0.73
	Posttest	11	4	0	3.00	
Intervention b	*Pretest*	1	14	0	2.73	0.20
	Posttest	4	11	0	2.93	

Intervention a = electric massage mattress with infrared maternity (kapein)
Intervention b = manual oxytocin massage

The results of the study presented in Table 1 show that before using the infrared electric massage mattress for maternity (Kapein), all 15 respondents reported experiencing moderate pain. After using the infrared electric massage mattress, 11 respondents reported experiencing mild pain. The posttest mean value was higher than the pretest value, with a mean difference of 0.73 for the group using the infrared electric massage mattress, which is greater than the mean difference of 0.20 observed in the group using manual oxytocin massage.

Table 2. Labor Progress before and after intervention

Groups		Progress of labor (n)		Mean	MD
		Progressed	Not progressed		
Intervention a	*Pretest*	7	8	1.07	0.46
	Posttest	14	1	1.53	
Intervention b	*Pretest*	9	6	1.27	0.13
	Posttest	11	4	1.40	

Intervention a = electric massage mattress with infrared maternity (kapein)
Intervention b = manual oxytocin massage

The results of the study in Table 2 show that, before using the infrared electric massage mattress for maternity (Kapein), the majority of respondents (8 people) did not experience labor progress. However, after using the infrared electric massage mattress, the majority of respondents (14 people) experienced labor progress. The posttest mean value was higher than

the pretest value, with a mean difference of 0.46 for the group using the infrared electric massage mattress, which was greater than the mean difference of 0.13 in the group using manual oxytocin massage.

Table 3. Effectiveness of intervention to decrease labor pain

Groups		Labor pain (n)			R*
		Mild	Moderate	Severe	
Intervention a	*Pretest*	0	15	0	0.000
	Posttest	11	4	0	
Intervention b	*Pretest*	1	14	0	0.165
	Posttest	4	11	0	

Intervention a = electric massage mattress with infrared maternity (kapein)
Intervention b = manual oxytocin massage
** Mc Nemar test*

Based on Table 3, the difference in pain scale after using the maternity infrared electric massage mattress (Kapein) shows a p-value of <0.000 (0.05), indicating that the use of the infrared electric massage mattress is effective in reducing labor pain in primigravida mothers during the active phase of labor at Musytasyfah Karawang Clinic. Meanwhile, in the group receiving manual oxytocin massage, the p-value was 0.165 (>0.05), suggesting that manual oxytocin massage was not effective in reducing labor pain in primigravida mothers in the active phase. Therefore, it can be concluded that the use of the infrared electric massage mattress (Kapein) is effective in reducing labor pain in primigravida mothers during the first active phase at Musytasyfah Karawang Clinic.

Table 4. Effectiveness of intervention on he progress of labor

Groups		Progress of labor (n)		R*
		Progressed	Not progressed	
Intervention a	*Pretest*	7	8	0.027
	Posttest	14	1	
Intervention b	*Pretest*	9	6	0.068
	Posttest	11	4	

Intervention a = electric massage mattress with infrared maternity (kapein)
Intervention b = manual oxytocin massage
** Mc Nemar test*

Based on Table 4, the progress of labor in the group using the infrared electric massage mattress for maternity (Kapein) shows a p-value of 0.027 (<0.05), indicating that the infrared electric massage mattress is effective in improving labor progress in primigravida mothers during the active phase of labor at Musytasyfah Karawang Clinic. In contrast, the group receiving manual oxytocin massage had a p-value of 0.068 (>0.05), suggesting that manual oxytocin massage was not effective in improving labor progress in primigravida mothers in the first active phase. Therefore, it can be concluded that the use of the infrared electric massage mattress (Kapein) is effective in enhancing labor progress in primigravida mothers during the active phase at Musytasyfah Karawang Clinic.

Discussion

Based on the results of the study, the difference in pain scale from the use of the infrared electric massage mattress for maternity (Kapein) shows it is effective in reducing labor pain in primigravida mothers during the active phase of labor at Musytasyfah Karawang Clinic. In contrast, manual oxytocin massage was not effective in reducing labor pain in primigravida mothers during the same phase at the clinic. It can be concluded that the use of the infrared electric massage mattress (Kapein) is effective in reducing labor pain in primigravida mothers during the first active phase at Musytasyfah Karawang Clinic.

In this study, among the respondents in the intervention group who received the infrared electric massage, four still experienced moderate pain. One of them, aged 18 years, suggests that maternal age is a risk factor related to pregnancy quality and reproductive readiness. The other three respondents who still felt moderate pain were multiparous women (3rd and 4th deliveries), indicating that uterine weakness may prolong labor and increase the risk of bleeding. Higher parity can lead to prolonged labor due to weakened uterine muscles (Khonsary, 2017).

Several factors influence the childbirth process, including the passage or birth canal. Cervical dilation and fetal station serve as indicators of labor progress, typically assessed through vaginal exams (Manuaba, 2013). During the first stage of labor, the cervix dilates and thins, allowing for vaginal delivery, and the fetal head descends, as assessed by the station (Marmi, 2018). Labor involves uterine contractions that push the baby down toward the cervix, eventually leading to full cervical dilation and the baby's descent (Nurasih, 2016). Labor pain arises from reduced oxygen supply to the uterine muscles, especially during short contractions, which elevate pain levels due to incomplete oxygen recovery (Andarmoyo, 2017). Uterine contractions and cervical changes cause the pain experienced in the first stage of labor (Dyah Permata & Zulfa R, 2018).

One method to accelerate labor progress is oxytocin massage (Kasmiati & Metasari, 2022). The infrared electric massage mattress (Kapein) was designed by researchers to address labor pain caused by contractions. Traditionally, labor pain is alleviated through back massage by a birth companion, but this method does not always optimally reduce pain. Midwives must be innovative and critical in solving labor pain issues, and the creation of the infrared electric massage mattress (Kapein) offers a practical, efficient solution (Kasmiati & Metasari, 2022).

In this study, the researchers interviewed respondents about their comfort and satisfaction with the infrared electric massage mattress (Kapein). One respondent shared that during its use, they felt comfortable, their muscles relaxed, and the assistance from the midwives was excellent. They also mentioned being taught how to adjust the device for personalized comfort. They felt less severe pain during contractions, and the time in the delivery room did not feel prolonged, leading to a satisfying labor experience. They even expressed an intention to return for future deliveries at the Musytasyfah Karawang Clinic.

These findings are consistent with Aco (2018), who found that friction and infrared therapy can reduce pain in patients with low back pain, showing a significant decrease in pain scores from 55.25 pre-test to 42.50 post-test. Infrared therapy, which produces electromagnetic energy absorbed by tissues, causes a thermal effect, reducing pain. Based on the study results, the infrared electric massage mattress (Kapein) was also effective in

promoting labor progress in primigravida mothers during the active phase at Musytasyfah Karawang Clinic.

The group that performed manual oxytocin massage was not effective in improving the progress of labor in primigravida mothers during the active phase I at Musytasyfah Karawang Clinic. This indicates that the use of the infrared electric massage mattress for maternity mothers (Kapein) is effective in enhancing the progress of labor in primigravida mothers during the first active phase at the clinic.

In this study, monitoring the progress of labor was conducted using a partograph, which helps midwives determine whether the mother remains in a normal condition or is beginning to encounter difficulties. Additionally, the partograph records labor progress by assessing cervical dilation and the descent of the fetal head. Subani (2023) found a relationship between midwife knowledge and the use of partographs in childbirth, emphasizing that the partograph is instrumental in detecting early problems and complications in labor, allowing for prompt management.

Furthermore, research by Suryani and Lushinta (2023) demonstrated the effectiveness of acupressure and ice massage on the progress of labor in the first stage of the active phase. Women who adapt well to labor pain tend to navigate the labor process more easily, facilitating faster delivery and alleviating anxiety that can negatively impact tissue perfusion. Various factors influence the childbirth process, including the passage or birth canal. Cervical dilation and fetal station serve as pseudo-fields for assessing labor progress, indicating how far the fetal head has descended through vaginal examination (VT). During the first stage of labor, the cervix undergoes dilation and thinning, facilitating vaginal delivery. As cervical dilation progresses, the fetal head's descent can be assessed using hodge or station fields (Qonitun, 2021).

In this study, respondents received back massages aimed at improving cervical dilation and fetal station progress, thus accelerating the delivery process and facilitating normal labor. The pathophysiology of the infrared electric massage technique involves pressing acupressure points, including SP6, L14, and BL32. Stimulating these points is believed to promote the release of oxytocin from the pituitary gland, which, in turn, stimulates uterine contractions, enhancing the labor process and managing labor pains.

Qonitun (2021) indicated that oxytocin massage affects the frequency and duration of contractions in inpatient mothers at BPM ASRI Tuban. The benefits of oxytocin massage include expediting the labor process to prevent prolonged labor and associated complications. Additionally, back massage can stimulate the release of endorphins, which act as natural pain relievers, promote relaxation, and reduce muscle tension.

Conclusion

There is evidence supporting the effectiveness of the infrared electric massage mattress for maternity mothers (Kapein) in decreasing labor pain and enhancing the progress of labor in primigravida mothers during the active phase I. This finding is expected to serve as a valuable reference for midwives in their practice to facilitate the labor process. Additionally, it is recommended that future researchers explore other variables related to the infrared electric massage mattress (Kapein) to gain deeper insights into its effects on maternity mothers.

Acknowledgement

Authors would like to express my deepest gratitude to Dr. Siti Sugih H., S.Si., M.Kes, the chairman of STIKes Dharma Husada Bandung, as well as to the owner of the Musytasyfah Clinic in Karawang and her family, for their unwavering support.

Authors' contribution

Each author contributed equally in all the parts of the research. All authors have critically reviewed and approved the final draft and are responsible for the content and similarity index of the manuscript.

Conflict of interest

The researchers stated that there is no conflict of interest related to the implementation and publication of the results of this research. The entire research process, from planning, data collection, analysis, to report preparation, was carried out independently without any influence or pressure from any third party. A commitment to research ethics is upheld throughout the research process, ensuring transparency, accuracy and honesty in reporting results. Respondents' participation was voluntary with informed consent, and their confidentiality and privacy were maintained in accordance with applicable research ethics standards. With this statement, researchers hope that the research results can be trusted and used as a valid reference for the development of science and health practices related to ethnomedicine and reproductive health.

Ethical consideration

Ethical clearance for this study was obtained from the Ethics Committee of STIKes Dharma Husada Bandung, under approval number No. 19/KEPK/SDHB/B/V/2024.

Funding

This research is not funded by any party and is not intended for any financial gain.

References

1. Andarmoyo. (2017). *Konsep dan Proses Keperawatan Nyeri*. Ar-Ruzz.
2. Dyah Permata, Zulfa R, S. W. (2018). Nyeri persalinan. *Jurnal Stikes Majapahit Mojokerto*, *1*(1), 1–7.
3. Fitriahadi. (2019). *Buku ajar asuhan persalinan & managemen nyeri persalinan*. Univ Aisyiyiah Yogyakarta.
4. Kasmiati K, Ria Metasari A, E. E. (2022). Efektifitas pijat postpartum dengan korset pijat terhadap kecepatan pengeluaran asi ibu postpartum. *Jurnal Ilmu Kesehatan*, *15*(1), 71–76.
5. Khonsary, S. G. and H. (2017). *Textbook of Medical Physiology*. Surgical Neurology International.
6. Kurniyawan, H. E. (2016). Terapi Komplementer Alternatif Akupresur Dalam Menurunkan Tingkat Nyeri. *NurseLine Journal*, *1*(2), 246–256.
7. Manuaba, I. B. . (2013). *Ilmu Kebidanan Penyakit Kandungan dan Keluarga Berencana untuk Pendidikan Bidan*. EGC.
8. Marmi. (2018). *Asuhan Kebidanan pada persalinan*. Pustaka Pelajar.
9. Mustaghfiroh L, H. N. (2022). Pengaruh pijat oksitosin terhadap lama kala I persalinan. *Jurnal Ilmu STIKES Kendal.*, *12*(2), 279–286.

10. Nurul M. Erli Z. (2020). Asuhan kebidanan persalinan. *Jurnal Kebidanan*, *1*(1), 21–27.
11. Prawirohardjo, S. (2018). *Ilmu Kebidanan Sarwono Prawirohardjo*. Bina Pustaka.
12. Qonitun U, Q. M. (2021). Pengaruh pijat oksitosin terhadap frekuensi His, durasi His pada ibu inpartu di PMB ASRI Tuban. *Jurnal Kebidanan*, *10*(1), 75–82.
13. Sari A, R. A. (2022). Penatalaksanaan fisioterapi pada kondisi post orif fraktur 1/3 distal radius dengan modalitas infrared (ir) dan terapi latihan di rsud Bendan Kota Pekalongan. *Jurnal Keperawatan Mandira*, *1*(1), 57–65.
14. Soeparno Sulistyowati, E. S. (2020). Kala I fase aktif. *Jurnal Keperawatan*, *1*(1), 74–83.
15. Subani P, W. E. (2023). Hubungan pengetahuan bidan dengan penggunaan partograf dalam persalinan di wilayah kerja Puskesmas Petanang Kota Lubuklinggau. *Jurnal Ilmu Kesehatan Anak*, *23*(1), 405–409.
16. Suryani H, Lushinta L, P. A. R. (2023). Efekktivitas pemberian akupresur dan pijat es terhadap kemajuan persalinan kala I fase aktif. *Jurnal Kebidanan Indonesia*, *14*(2), 55–61.
17. T, A. (2018). Pengaruh fruction dan infra red terhadap penurunan nyeri akibat low back pain pada wanita hamil di rskdia fatimah makassar. *Jurnal Kesehatan*.
18. Utami. (2019). *Buku Ajar Asuhan Persalinan & Managemen Nyeri Persalinan*. Universitas Aisyiyah.
19. Wiwi W T. (2019). Efektivitas Endorphin Massage terhadap Intensitas Nyeri Persalinan Kala I pada Ibu Bersalin. *Jurnal Kesehatan Ilmiah Indonesia (Indonesian Health Scientific Journal)*, *4*(2), 49–53.