Original Article

doi:10.31674/mjn.2025.v16i03.011

MJN

Effects of Novel Hegu Acupressure Clips on Pain Relief During the First Stage of Labour in Primigravidas

Threenush Kumtanat[1]*, Chadarat Kaewveingdach[1], Thipakorn Srikean[2]

[1]Department of Maternal and Child Nursing and Midwifery, Boromarajonani College of Nursing, Nakhon Phanom, Nakhon Phanom University, 48000 Thailand

[2]Department of Nursing, Bueng Kan Hospital, Mueang Bueng Kan, Bueng Kan 38000, Thailand

**Corresponding Author's Email: yim.t.kumtanat@gmail.com*

ABSTRACT

Background: Pain during the first stage of labour lasts the longest, making innovative pain management crucial for maternal well-being and improved outcomes. A 20-minute Hegu acupressure session can effectively relieve this pain and discomfort. **Objective:** To develop and assess the effectiveness of novel Hegu acupressure clips for pain relief during the first stage of labour. **Methods:** A quasi-experimental study was conducted with a sample of 52 primigravidae in the labour room of Bueng Kan Hospital, randomly divided into two groups of 26 each. The experimental group used novel Hegu acupressure clips with standard pressure during cervical dilation of 4–7 cm for 20 minutes, applied only during contractions. The control group used the same clips but with non-standard pressure. Data were collected using a labour pain coping behaviour scale at pre- and post-test. Pain levels were analysed using descriptive statistics and compared with an independent sample *t*-test. Results: There were no significant differences in pre-test pain levels between the experimental and control groups during the first stage of labour ($p > 0.05$). However, post-test pain levels in the experimental group were significantly lower than those in the control group ($p < 0.05$), indicating a substantial reduction in pain. **Conclusion:** The novel Hegu acupressure clips effectively relieve pain during the first stage of labour and could be integrated into standard labour management practices to enhance maternal comfort.

Keywords: Acupressure Hegu Clips (LI-4); First Stage of Labour; Pain Relief

INTRODUCTION

The first stage of labour pain lasts the longest compared to other stages of labour and affects both the expectant mother and the foetus. The effects on the expectant mother have both physical and psychological consequences. Physically, pain causes the sympathetic nervous system to secrete more catecholamines, corticosteroids, and cortisol, leading to depressed and inefficient uterine contractions, resulting in prolonged labour. The respiratory system reacts by increasing oxygen consumption, causing faster breathing with potential hyperventilation and respiratory alkalosis. The cardiovascular system can cause blood pressure to rise by 20–30 mmHg and increase cardiac output. The gastrointestinal tract triggers the release of gastrin, resulting in more acid in the stomach and decreased gastric function. Psychological effects include tension, suffering, potential postpartum depression, poor attitude, and negative childbirth experiences. Reduced oxygen delivery to the foetus leads to acidosis and an irregular foetal heartbeat. The foetus can also experience hypoxia, which, if not addressed in time, may harm or result in the death of the baby during childbirth (Taveekaew, Bouban & Ketkaew, 2019). The effects of pain necessitate alleviating pain to reduce potential complications.

Acupressure is highly effective during labour as it can increase blood circulation, balance yin and yang, and release endorphins. Additionally, it can stimulate specific points known to influence the nervous system, helping to reduce pain perception and promote relaxation, which is crucial during the intense contractions of the first stage of labour without complications for the expectant mother or foetus (Carmona-Rodríguez *et al*.,

Received: July 24, 2024, Received in revised form: August 30, 2024, Accepted: December 26, 2024

2023; Hibatulloh, 2022; Sehhatie-Shafaie, Amani & Heshmat, 2013; Dangdee *et al*., 2015). Several acupressure points for first-stage labour pain relief must be considered in the context of the expectant mother. The most frequently used points are the four Hegu points, the Sanyinjiao point, and the Yongquan point. Each point is located in a different place, but the easiest point for expectant mothers to apply acupressure by themselves is the Hegu point, located on the back of the hand at the midpoint between the thumb and index finger of both hands (or when the thumb and index finger are pressed together, a fleshy mound form at the base of both fingers). This acupressure is effective in relieving labour pain (Dewi, Ariani & Amna, 2022; Rosyidah, Azizah & Arti, 2020).

Based on additional research, it was found that devices used to apply acupressure, apart from the thumb, have been developed for pain relief in the first stage of labour. For example, Mirzaee *et al.* (2021) used ice to apply acupressure. However, if applied without adjusting the pressure according to muscle thickness, it may not only reduce the effectiveness in relieving pain but also lead to inconsistent outcomes, potentially increasing discomfort or prolonging labour.

Significance of the Study

As a result of reviewing these studies on acupressure clips and their numerous limitations, in developing these innovative clips, considerations such as ease of application, safety during use, and the ability to provide consistent pressure across various hand sizes and muscle thicknesses were paramount to ensuring broad applicability and effectiveness. Therefore, the researcher is interested in developing novel Hegu acupressure clips that are more effective in relieving first-stage labour pain. By developing clips that ensure ease of application and safety during use, with standard pressure according to individual muscle position and thickness, maternal comfort can be improved, contributing to more efficient labour processes.

Aim of the Study

The goal is to create clips that can be widely applied to all expectant mothers during the first stage of labour, ensuring effective pain relief across diverse populations and potentially becoming a standard tool in labour pain management.

METHODOLOGY

Study Design

A quasi-experimental study was performed in two groups. The experimental group received novel Hegu acupressure clips with standard pressure (the appropriate pressure for the muscle thickness at the Hegu point of each pregnant woman, which is effective in relieving pain during the first stage of labour, includes the following: For muscle thickness greater than 30 mm [measured using a Vernier Caliper], use an acupressure clip with a pressure of 6.5 kg; for muscle thickness between 20 and 30 mm, use a pressure of 5.5 kg; and for muscle thickness at the Hegu point less than 20 mm, use a pressure of 4.5 kg) on the skin when cervical dilation was at 4–7 centimetres for approximately 20 minutes, with pressure applied only during uterine contractions. The control group received the same treatment but with non-standard pressure (pressure that is less than the standard compared to the muscle thickness at the Hegu point of each pregnant woman, which is merely a touch that remains at the Hegu point. It is not effective enough to relieve pain during the first stage of labour) on the novel Hegu acupressure clips.

Sample Size Collection

The sample consisted of 52 primigravidae waiting for delivery in the labour room of Bueng Kan Hospital. The sample size was calculated using power analysis at 0.80, and reliability was determined with a significance level of 0.05. The effect size for the sample was set at 0.05, with the variable effect size being moderate at 0.40–0.60. The sample size was increased by 20% to prevent insufficiency due to withdrawal, resulting in 26 participants in each group, divided by systematic random sampling. The sample characteristics were: 1) Primigravidae; 2) Age 20–34 years; 3) Term pregnancy from 37 to 42 weeks; 4) No maternal or foetal complications during pregnancy and labour; 5) Normal foetal position with the head as the leading part in the occiput anterior position; 6) Stage 1 active phase with cervical dilation from 4 to 7 centimetres; 7) No pain relief

administered at any stage of labour; and 8) No medication administered to induce or accelerate labour.

Intervention

The intervention was the use of innovative acupressure clips to relieve pain in the first stage of labour. The researcher collaborated with professors and students from That Phanom College, Nakhon Phanom University, to design and develop the novel Hegu acupressure clips in 3 sizes: 1) Size 6.5 kg for expectant mothers with a muscle thickness of more than 30 mm at the Hegu points; 2) Size 5.5 kg for expectant mothers with a muscle thickness of 20–30 mm; and 3) Size 4.5 kg for expectant mothers with a muscle thickness of less than 20 mm. The quality of the innovation was checked by stretching the pressure clips to the average muscle thickness at the Hegu points 100 times per round, then measuring the pressure again. The pressure values remained the same at 4.5, 5.5, and 6.5 kg, indicating high quality.

After obtaining the novel quality Hegu acupressure clips, the researcher conducted trials and collected data with the sample group as follows:

Experimental Group

The following steps were followed:

The researcher visited the sample for the first time, explained the research objectives and procedures for data collection. The researcher then requested cooperation in conducting the research and clarified with the sample in writing while the sample had cervical dilation in the latent stage at 1–3 cm. Once the sample consented to participate in the study, the researcher asked the sample to sign the information sheet and protected the participants' rights, collecting data through personal data questionnaires as well as from pregnancy and birth information.

The researcher assessed uterine contractions and listened to the foetal heart rate every 30 minutes, assessed labour progress by examining within 1–2 hours or when there were indications such as more frequent uterine contractions, amniotic sac rupture, an urge to push, etc.

When entering the stage of rapid dilation, when cervical dilation was between 4–7 centimetres (active phase) in Stage 1 of labour, the researcher conducted the experiment and collected data in which the researcher assessed the level of pain using a labour pain coping behaviour assessment form before using Hegu acupressure clips to relieve the pain and then recorded it.

The researcher assessed uterine contractions by positioning the mothers on the left side to prevent supine hypotension during the experiment. When the uterine contractions began, the researcher used Hegu acupressure clips that were appropriate for the size of the expectant mothers and pressed the Hegu points on both hands at the same time as the uterus began to contract. The researcher then removed the Hegu acupressure clips when the uterus relaxed, which took approximately 20 minutes.

At the end of the 20-minute period, the researcher assessed the level of pain by using the labour pain coping behaviour assessment after using the clips, pressing on the Hegu points and recording it.

After completion of data collection, the expectant mothers were positioned to lie in a comfortable position. If the expectant mothers wanted to continue using the Hegu acupressure clips, the mothers were allowed to do so until delivery.

The researcher checked data integrity, gathered the data obtained together and submitted it to statistical analysis.

Control Group

Practice was the same as in the experimental group, but the participants were purposively selected with characteristics and levels of cervical dilation similar to those of the experimental group, matching the participants in the control group with those in the experimental group, minimising extraneous variables in conducting the research and using the Hegu acupressure clips that were similar to the novel Hegu acupressure clips but with non-standard pressure instead.

In this study, all participants were blinded to the group they were assigned to, to reduce bias in pain assessments. All phases of the experiment were conducted identically, with the exception of the pressure applied by the Hegu acupressure clips.

The measurement of the effect of the novel Hegu acupressure clips on pain relief in the first stage of labour in this study used the labour pain assessment form, which was divided into 5 aspects of behavioural observation: vocal sounds, physical movement, breathing control, facial expressions, and vocal responses. The researcher adapted this from the model for observation of pain coping behaviour in the first stage of labour by Panthongchai, Yusamran, and Pahuwattanakorn (2017). The assessment was then presented to 3 experts to check the content validity, and the Item-Objective Congruence Index (IOC) was then checked. The findings revealed that the IOC equalled 0.91, which was at a good level. The instrument reliability was then determined by submitting the labour pain coping behaviour assessment form to a trial in a sample of 30 expectant mothers in labour, which yielded a validity of 0.86, while interrater reliability was determined by preparing 1 research assistant who is a delivery room nurse with more than 10 years of work experience. The researcher explained the background, objectives of the research, research methodology, tools used to collect research data, and the tools used in the research, and demonstrated the measurement of muscle thickness at the Hegu point, selecting the correct and appropriate Hegu acupressure clips for the thickness of the Hegu muscle, and having the research assistant demonstrate until the research assistant could do it correctly. An acceptable level of interrater reliability was found at 0.87.

Data collection began after human research ethics had been certified. The researchers were the ones who collected the data themselves. The process for collecting data was strictly in accordance with the intervention plan mentioned in the previous topic.

The researcher conducted data analysis using statistical methodology with the aid of a computer programme. Descriptive statistics were first employed to analyse the volunteer data, the thickness of the participants' Hegu points, and the use of innovative acupressure. To compare the characteristics of the sample between the experimental and control groups, chi-square testing was utilised. Paired sample testing was then applied to assess the pre- and post-test first-stage labour pain levels within each group. Lastly, an independent sample *t*-test was used to compare the post-test first-stage labour pain levels between the experimental and control groups, allowing for a comparison of the outcomes between the two groups after the intervention.

Ethical Consideration

The research obtained ethical clearance from the Human Research Ethics Committee, Bueng Kan Hospital, Thailand with Reference Number BKHEC 2020-10 on 10th September 2020.

RESULTS

Characteristics of Participants

According to the findings, the mean ages of the experimental and control group participants were 28.38 and 27.38 years, respectively, with secondary education levels at 61.5% and 53.8%, respectively, and employment as ordinary workers at 61.5% in both groups.

In terms of mean gestational age at delivery, the participants in the experimental and control groups were 37.73 and 38.77 weeks, respectively.

In terms of labour, childbirth, and postpartum complications, the participants in the experimental group had no complications, while those in the control group had one complication during Stage 2 of a long labour/delivery.

When the personal data of the participants in both groups were examined for distribution, it was found that the personal data of both groups had a normal distribution with statistical significance at 0.05. When the data of both groups were tested for mean values, there were no differences between the two groups with statistical significance at 0.05.

Thickness of Hegu Points of the Participants and Use of Acupressure Innovation

The participants in the experimental group had Hegu point thicknesses of 21-30 millimetres. The

innovation used had standard pressure at 5.5 kilograms per person. In addition, the 25 and 26 participants in the experimental and control groups, respectively, had Hegu points with thicknesses of 31 millimetres and above. Thus, the innovation with a standard pressure of 6.5 kilograms was used.

First Stage of Labor Pain Levels

Pre-test, 2 and 0 participants in the experimental and control groups had no pain at all during the first stage of labour, respectively, while 7 and 0 participants had mild pain, respectively, 15 and 22 had moderate pain, respectively, and 2 and 4 had extreme pain, respectively (Table 1).

Post-test, 3 and 0 participants in the experimental and control groups had no pain at all during the first stage of labour, respectively, while 8 and 0 had mild pain, respectively, 14 and 6 had moderate pain, respectively, and 1 and 20 had extreme pain, respectively (Table 1).

Table 1: Pre- and Post-Test of First Stage of Labor Pain Levels in Experimental and Control Groups

Pain Levels	Pre-test (*N*=26)		Post-test (*N*=26)	
	No.	%	No.	%
Experimental Group				
No Pain	2	7.7	3	11.5
Mild Pain	7	26.9	8	30.8
Moderate Pain	15	57.7	14	53.8
Extreme Pain	2	7.7	1	3.8
Control Group				
No Pain	0	0	0	0
Mild Pain	0	0	0	0
Moderate Pain	22	84.6	6	23.1
Extreme Pain	22	84.6	6	23.1

When the data on the first stage of labour pain levels of both groups were examined for distribution, it was found that the first stage of labour pain levels in both groups had a normal distribution with statistical significance at 0.05.

When the mean differences in the first stage of labour pain levels were compared between the experimental and control groups using paired sample testing, the participants in the experimental group were found to have no significant differences between pre- and post-test scores at the 0.05 level. However, the pre- and post-test mean first stage of labour pain levels of the participants in the control group showed significant differences at the 0.05 level.

When the pre- and post-test mean differences in the first stage of labour pain levels were compared between the experimental and control groups using an independent sample t-test, there were significant differences in the pre- and post-test mean first stage of labour pain levels between the participants in the experimental and control groups at the 0.05 level (Table 2).

Table 2: Differences in Pre- and Post-Test of the First Stage of Labor Pain Levels between Experimental and Control Groups

Pain Level	Mean	S.D.	*N*	*t*	*p*
Pre-Test				3.068	0.003
Experimental Group	2.15	0.368	26		
Control Group	1.65	0.745	26		
Post-Test				7.401	0.000
Experimental group	1.50	0.762	26		
Control Group	2.77	0.430	26		

DISCUSSION

The primigravidas in the groups using the novel Hegu acupressure clips with standard pressure to relieve labour pain had lower pain levels than those who used the innovation with non-standard pressure. The difference was statistically significant at 0.05 (Table 2), which can be explained as follows:

The participants in the experimental group who used the innovation with standard pressure, appropriate for the thickness of each volunteer's Hegu points, were able to trigger large nerve impulses. This caused a closed-gate mechanism for spinal cord pain. As a result, pain signals from the spinal cord were not sent to the brain. Perceived pain was, therefore, reduced. For the participants in the control group who used the innovation with non-standard pressure, the pressure applied was not able to trigger large nerve impulses in the spinal cord to activate the closed-gate mechanism for pain. Thus, pain signals could be sent to the brain, causing perceived pain.

The findings from various studies consistently demonstrate that Hegu acupressure is effective in relieving first-stage labour pain, although the methods and devices used to apply the pressure differ across the research. Several studies (Mady *et al*., 2024; Masruroh *et al*., 2024; Mammadov & Taş, 2024; Hasanin, Elsayed & Taha, 2023; Dewi, Ariani & Amna, 2022; Gönenç & Terzioğlu, 2020; Schlaeger *et al*., 2017; Dangdee *et al*., 2015; Dabiri & Shahi, 2014) employed traditional acupressure techniques, where manual pressure was applied using human fingers or thumbs. This method is the most commonly studied and has consistently been shown to effectively relieve pain during the first stage of labour.

In contrast, other studies have explored alternative methods of applying Hegu acupressure, such as using innovative devices like Hegu acupressure clips (Panthongchai, Yusamran & Pahuwattanakorn, 2017). These devices offer a more consistent and possibly more convenient way to apply pressure. Another alternative approach is the use of ice for acupressure (Mirzaee *et al*., 2021), which combines the effects of cold therapy with acupressure. This method also demonstrates effective pain relief, potentially enhancing the acupressure's benefits through the additional stimulus of cold. Similarly, cold or warm acupressure pouches have been studied (Altinayak & Özkan, 2024; Maftuchah, Wulaningsih & Ulfah, 2024), which provide temperature-controlled pressure at the Hegu point. These studies indicate that varying the temperature, whether cold or warm, can further enhance the pain-relieving effects of acupressure during labour.

While all studies confirm the effectiveness of Hegu acupressure for pain relief in labour, the different methods and tools used may provide varied experiences depending on individual preferences and the devices employed. The diversity in research populations and techniques used highlights the potential for different outcomes, suggesting that while manual acupressure remains the most commonly studied, newer methods like clips, ice and temperature-controlled pouches offer promising alternatives.

However, using fingers for acupressure can cause fatigue in the person applying the pressure, leading to inconsistent and possibly substandard pressure. Similarly, using ice for acupressure results in the ice melting, which also leads to inconsistent pressure and causes the area where the pressure is applied to become wet and damp. Each method has been found to have the same acupressure effectiveness, but there might be some limitations in terms of practice. In addition, all studies were similar in that there were no reports of complications from Hegu acupressure.

The highlight of this research is that there is an innovation to replace Hegu acupressure applied with the thumb or acupressure using various other devices with standard pressure. There are many sizes to choose from and match with the right thickness for each expectant mothers Hegu points. In terms of use, the innovation is easy, convenient, durable, and easy to clean. Whether used by a nurse to care for expectant mothers or even by expectant mothers themselves, the use of the innovation is feasible because it is hassle-free.

According to the findings of this study, the effects of Hegu acupressure with the novel Hegu acupressure clips can be confirmed as influencing pain relief for the first stage of labour pain in primigravida participants without any complications and can explain pain reduction mechanisms with gate-control theory, in addition to supporting the research hypothesis.

Limitation

The main limitation of this study remained the selection of participants due to the data collection period. There were few expectant mothers who met the inclusion criteria, and even among those who did, many were not interested in natural childbirth due to fear of the pain. Consequently, nurses should explain the benefits of natural childbirth and the advantages of Hegu acupressure during labour to alleviate pain, in order to increase the interest of pregnant women in natural childbirth and the use of Hegu acupressure for pain relief during labour.

CONCLUSION

The group of primigravidae who used the innovation with standard pressure had lower pain levels that differed from the group of primigravidae who used the innovation with non-standard pressure, with statistical significance at 0.05. Furthermore, no complications occurred from the use of the innovation. It can be concluded, therefore, that the novel Hegu acupressure clips developed by the researcher and the research team can be used instead of thumb acupressure with good results, providing steady pressure to the Hegu points. No complications were observed in the participants and, importantly, the first stage of labour pain was relieved for the primigravidae.

The nursing innovation developed and tested in this study can effectively reduce pain during the first stage of labour. Therefore, nurses should consider adopting this innovation to reduce labour pain in the first stage and recommend its use to expectant mothers because the process is straightforward, safe, and truly effective in pain reduction during labour.

Moreover, future studies should further investigate the effectiveness of the novel Hegu acupressure clips in alleviating pain during the first stage of labour in a variety of populations and settings to confirm these results and ensure their generalisability. Additionally, long-term studies should be conducted to explore the potential benefits of using novel Hegu acupressure clips, such as reducing the duration of labour, or the possible drawbacks of using these clips during multiple pregnancies or in various stages of labour.

Conflict of Interest

The authors declare that they have no competing interests.

ACKNOWLEDGEMENT

The researcher would like to express gratitude for the research grant from Boromrajonani College of Nursing, Nakhon Phanom University, Thailand with much appreciation for Bueng Kan Hospital, Thailand for its generosity and facilitation in data collection. The researcher would also like to thank all participants who took the time to participate in the study.

REFERENCES

Altinayak, S. Ö., & Özkan, H. (2024). Effect of warm and cold acupressure applied to the li4 acupressure point on childbirth comfort during labor: a randomized controlled trial. *Alternative Therapies in Health and Medicine, 30*(2), 13–17. Retrieved from: https://alternative-therapies.com/pdfarticles/7686.pdf. Accessed on 24th December, 2024.

Carmona-Rodríguez, M. Á., Martínez-Flores, S., Morilla-Romero-de-la-Osa, R., & Luque-Oliveros, M. (2023). Effects of acupressure on maternal and neonatal obstetric outcomes during labor: study protocol. *Healthcare, 11*(14), 2111. https://doi.org/10.3390/healthcare11142111

Dabiri, F., & Shahi, A. (2014). The effect of LI4 acupressure on labor pain intensity and duration of labor: A randomized controlled trial. *Oman Medical Journal, 29*(6), 425-429. https://doi.org/10.5001/omj.2014.113

Dangdee, D., Ratinthorn, A., Yusamran, C., & Kovitcharoenkul, S. (2015). Effect of Acupressure at LI4 and BL32 on Labor Pain in the First Stage of Labor in Primigravidas. *Nursing Science Journal of Thailand, 33*(4), 15–26.

Retrieved from: https://he02.tci-thaijo.org/index.php/ns/article/view/53360. Accessed on 14th January, 2024.

Dewi, M., Ariani, N., & Amna, A. D. (2022). The effect of administration of acupressure LI4 (Hegu) on the scale of labor pain in active phase 1 in primipara mothers in Sehati Kepanjen Maternity Homes. *Science Midwifery, 10*(2), 1020-1025. Retrieved from: http://midwifery.iocspublisher.org/index.php/midwifery/article/view/410. Accessed on 29th August, 2024.

Gönenç, I. M., & Terzioğlu, F. (2020). Effects of massage and acupressure on relieving labor pain, reducing labor time, and increasing delivery satisfaction. *Journal of Nursing Research, 28*(1). https://doi.org/10.1097/jnr.0000000000000344

Hasanin, M. E., Elsayed, S. H., & Taha, M. M. (2023). Effect of acupressure on anxiety and pain levels in primiparous women during normal labor: A randomized controlled trial. *Journal of Integrative and Complementary Medicine, 30*(7), 654–661. https://doi.org/10.1089/jicm.2023.0072

Hibatulloh, Q. N. (2022). The effectivity of acupressure therapy to relieve labor pain during the active phase of the first stage. *Indonesian Midwifery and Health Sciences Journal, 6*(1), 96–110. https://doi.org/10.20473/imhsj.v6i1.2022.96-110

Mady, M. M., Aly, I. K., Abu-Elmagd, E. H., & Aly, S. G. (2024). Effect of acupressure on labor pain for women during first stage of normal labor. *Journal of Medicine in Scientific Research, 7*(1). https://doi.org/10.59299/ 2537-0928.1061

Maftuchah, M., Wulaningsih, I., & Ulfah, R. (2024). The effectiveness of acupressure and common cold massage on healing cold in infants. *Jurnal Kebidanan, 14*(2). https://doi.org/10.31983/jkb.v14i2.9572

Mammadov, B., & Taş, Ç. (2024). The effect of acupressure and massage on labor pain and birth satisfaction: A randomized controlled trial. *Explore (NY), 20*(5). https://doi.org/10.1016/j.explore.2024.04.006

Masruroh, N., Anggraini, F. D., Zuwariah, N., & Qur'any, N. N. (2024). The effect of acupressure points l14 and sp 6 on pain intensity in the first stage labor. *Revista De Gestão Social E Ambiental, 1*8(5). https://doi.org/10.24857/rgsa.v18n5-083

Mirzaee, F., Hasaroeih, F. E., Mirzaee, M., & Ghazanfarpour, M. (2021). Comparing the effect of acupressure with or without ice in LI-4 point on labour pain and anxiety levels during labour: a randomised controlled trial. *Journal of Obstetrics and Gynaecology, 41*(3), 395–400. https://doi.org/10.1080/01443615.2020.1747412.

Panthongchai, S., Yusamran, C., & Pahuwattanakorn, W. (2017). Effects of self-efficacy enhancing program during childbirth on pain coping behavior in nulliparous women. *Kuakarun Journal of Nursing, 24*(1), 130–146. Retrieved from: https://he01.tci-thaijo.org/index.php/kcn/article/view/95250. Accessed on 14th October, 2023.

Rosyidah, R., Azizah, N., & Arti, W. (2020). The effectiveness of acupressure Hegu LI4 on decreasing labor pain during active phase. *Journal Kebidanan, 10*(2), 85-90 https://doi.org/10.31983/jkb.v10i2.5770

Schlaeger, J. M., Gabzdyl, E. M., Bussell, J. L., Takakura, N., Yajima, H., Takayama, M., & Wilkie, D. J. (2017). Acupuncture and acupressure in labor. *Journal of Midwifery & Women's Health, 62*(1), 12-28. https://doi.org/10.1111/jmwh.12545

Sehhatie-Shafaie, F., Amani, F., & Heshmat, R. (2013). The effect of acupressure on sanyinjiao and hugo points on labor pain in nulliparous women: a randomized clinical trial. *Journal of Caring Sciences, 2*(2), 123. https://doi.org/10.5681/jcs.2013.015

Taveekaew, C., Bouban, K., & Ketkaew, S. (2019). Coping with pain in the first stage of labour and the role of midwifery in the new dimension. *Vajira Medical Journal: Journal of Urban Medicine, 63*(3), 231–238. Retrieved from: https://he02.tci-thaijo.org/index.php/VMED/article/view/211776. Accessed on 24th December, 2024.