

Effect of Effleurage Massage on Labor Pain Intensity in Parturient Women

Nadia Youssef Abd-Ella

Lecturer of woman's health and midwifery nursing, Faculty of Nursing, Mansoura University Egypt

Corresponding author: Drnadia96@gmail.com

Abstract

Aim: This study aimed to evaluate the effectiveness of effleurage massage on labor pain intensity in parturient women. **Methods:** A quasi-experimental research design was utilized to conduct the current study at the labor and delivery unit, of Mansoura University Hospital, Egypt. A nonprobability purposive sample of 80 parturient women during their active phase of labor was allocated to either the control group, who received conventional care for parturient women, or the intervention group, who received effleurage massage besides the conventional care. Three tools were used to collect the data; the first tool was a structured interview questionnaire to assess participants' basic characteristics. The second tool was the Numerical Pain Rating Scale (NPRS) to assess pain intensity before and after the massage. The third tool was five point Likert scale for the mother's satisfaction with pain relief. **Results:** At the baseline assessment, there was no significant difference in the NPRS pain score between the two groups. However, immediately after effleurage massage, the NPRS pain score was significantly lower in the intervention group than in the control group (5.9 ± 0.8 vs. 6.3 ± 0.9 , $p < 0.039$). Moreover, at 30 min and 2 h after initiating massage, NPRS pain scores was further reduced in the intervention group than in the control group (5.8 ± 1.1 vs. 6.4 ± 1.3 , $p < 0.029$ and 5.7 ± 1.1 vs. 6.5 ± 1.5 , $p < 0.008$, respectively). Furthermore, 60% of mothers reported a high satisfaction level with massage as pain relief method, while only 10% were dissatisfied. **Conclusion:** Effleurage massage is an effective pain relief method that reduces labor pain intensity in parturient women. Thus, effleurage massage should be integrated into routine care for parturient women.

Keywords: Effleurage, Massage, Labor Pain, Parturient Women.

Introduction

Labor is a physiological and psychological challenge that women have to undergo. Labor-related pain is a unique life experience that differs from other pain forms, because it is associated with the most desirable event of life, bringing out a new life (Hajiamini et al., 2012; Lally et al., 2008). It is a complex, subjective, and multidimensional response related to the sensory stimuli generated during childbirth (Shnol et al., 2014). Moreover, it can lead to negative consequences with exacerbating effects, as the reflex increases blood pressure, oxygen consumption, and release of catecholamines, which can adversely affect the uterine blood supply and progress of labor. However, pain management can minimize these adverse effects (Audu et al., 2010).

Management of labor pain encompasses pharmacological and nonpharmacological

approaches to relieve the pain that mothers may experience during labor (NICE, 2014). However, opioids and epidural analgesia are the most popular and effective pharmacological methods for pain relief during labor but are associated with increasing risk for neonatal respiratory depression (Kumar et al., 2014). Nevertheless, the use of such analgesia may affect labor progress, and increase the risk of instrumental delivery and cesarean section (Ismail, 2013).

In contrast, the use of nonpharmacological approaches holds promise in reducing labor pain and analgesic consumption during labor (Adams et al., 2015). Furthermore, they are simple, effective techniques, associated with absence of side effect, increased maternal satisfaction and improvement in other obstetric and neonatal outcomes (Jones et al., 2012; El-Wahab & Robinson, 2011).

Effleurage massage is one of the nonpharmacological measures that manage labor

pain (Wahyuni & Wahyuningsih, 2015). It involves application of mild pressure with fingers on the abdomen and stomach, corresponding with rhythmic breathing during uterine contraction, resulting in pleasant, relaxing distraction for labor pain management (Yanti & Mardiyana, 2017; Bolbol et al., 2016; Sheeba, 2012). Effleurage should be performed at regular and continuous intervals, as the pain tends to increase when the massage is stopped because the nervous system is already accustomed to the stimulus (Indrayani, 2013). Hence, repetition of slow steady speed and comfortable pressure are keys that make effleurage massage more effective in labor pain management (Murtiningsih & Shintya, 2018; Lowdermilk et al., 2013).

Previous studies have reported the benefits of effleurage massage as it improves blood circulation, promotes venous and lymphatic return, warms abdominal muscles, and improves physical and mental relaxation (Murtiningsih & Shintya, 2018; Neetu et al., 2015). Meanwhile, effleurage's analgesic effects may be related to its physiological basis for pain control, which is based on the pain gate control theory, "that is, it inhibits excitatory pain travel into the central nervous system" (Murtiningsih & Shintya, 2018; Mander, 2004). Furthermore, it can promote the release of muscle spasms, endogenous endorphins, and conflicting sensory stimuli that override pain signals (Sri et al., 2017).

Significance of the study

Effleurage massage is an extremely helpful technique that promotes relaxation and decreases nervousness during labor and restores body balance, subsequently decreasing labor pain (Yanti & Mardiyana, 2017; Neetu et al., 2015). Moreover, effleurage is appropriate to be used by an effleurage maternity nurse because it is a simple, easy procedure to be applied during labor and delivery and also accepted by parturient woman (Murtiningsih & Shintya, 2018; Neetu et al., 2015). Hence, there is a need for pain relief during labor, and seeing the benefits of effleurage massage in labor, this prompted the researcher to investigate the effect of effleurage massage on labor pain intensity in parturient women. Therefore, this study will be conducted to evaluate the effectiveness of effleurage massage

on labor pain intensity effleurage in parturient women.

Aim of the study

This study aimed to evaluate the effectiveness of effleurage massage on labor pain intensity in parturient women.

Hypotheses of the study

Hypothesis 1: Parturient women who receive effleurage massage during the active phase of labor have less pain than those who do not.

Hypothesis 2: Parturient women who receive effleurage massage during the active phase of labor are much more satisfied with the pain relief than those who do not.

Subjects and Method

Study design

A quasi-experimental research design was utilized to conduct the current research work. Such design fits the nature of the study under investigations, in which the researcher attempted to assess the effect of the independent variable (i.e., effleurage massage) on the dependent variable (i.e., labor pain intensity).

Setting of the study

The study was conducted at the labor unit of Mansoura University Hospital in Egypt. This setting was selected because it is an educational hospital where the interventions can be applied with sufficient staff collaboration and without any real obstacles. The unit has one story, which is divided into five sections: reception, examination room, antenatal room, delivery operating room, and post-delivery room. It offered emergency obstetric care services, 24 h a day, and three days a week.

Sampling

A nonprobability purposive sample of 80 parturient women during the active phase of labor was recruited from the previously mentioned setting from February 1 to the end of October 2017. Each parturient woman was included in the current study if she fulfilled the following inclusion criteria: age between 18 and 35 years, free from medical or obstetric problems, ≥ 37

weeks of gestation, single viable fetus with normal position (i.e. occipito anterior position), and active phase of labor (i.e., cervical dilation \geq 4 cm). Meanwhile, women who were uncooperative and had complications or accelerated labor with amniotomy were excluded.

Sample size calculation

Based on data from literature (Khomsah et al., 2017), considering the level of significance of 5% and power of study of 80%, the sample size can be calculated using the following formula: sample size = $[(Z_{1-\alpha/2})^2 \cdot SD^2] / d^2$, where

- $Z_{1-\alpha/2}$ = is the standard normal variate, at 5% type 1 error ($p < 0.05$), which is 1.96
- SD = standard deviation of variable
- d = absolute error or precision

Thus, sample size = $[(1.96)^2 \cdot (1.1)^2] / (0.344)^2 = 39.3$. Hence, the required sample size for the study is 40 participants for each group.

Sample recruitment

To prevent the extent of the test effect on the participants in the studied groups, participants were assigned to one of the study groups according to their attendance to the study setting: the first participant was assigned to effleurage massage group, while the second one was assigned to the control group. A total of 95 eligible parturient women were invited to participate in the current study. Ten subjects did not provide their consent for participation because they did not feel comfortable with touching during massage, and five subjects did not meet the inclusion criteria. Thus, 15 parturient women were excluded from the sample, leaving 80 eligible women allocated to either the control or intervention group (n=40 per each group). Eight pregnant women in the intervention group were missed during the follow-up but were replaced. The statistical analysis was conducted on 80 subjects. A flowchart of the study groups is presented in Figure 1.

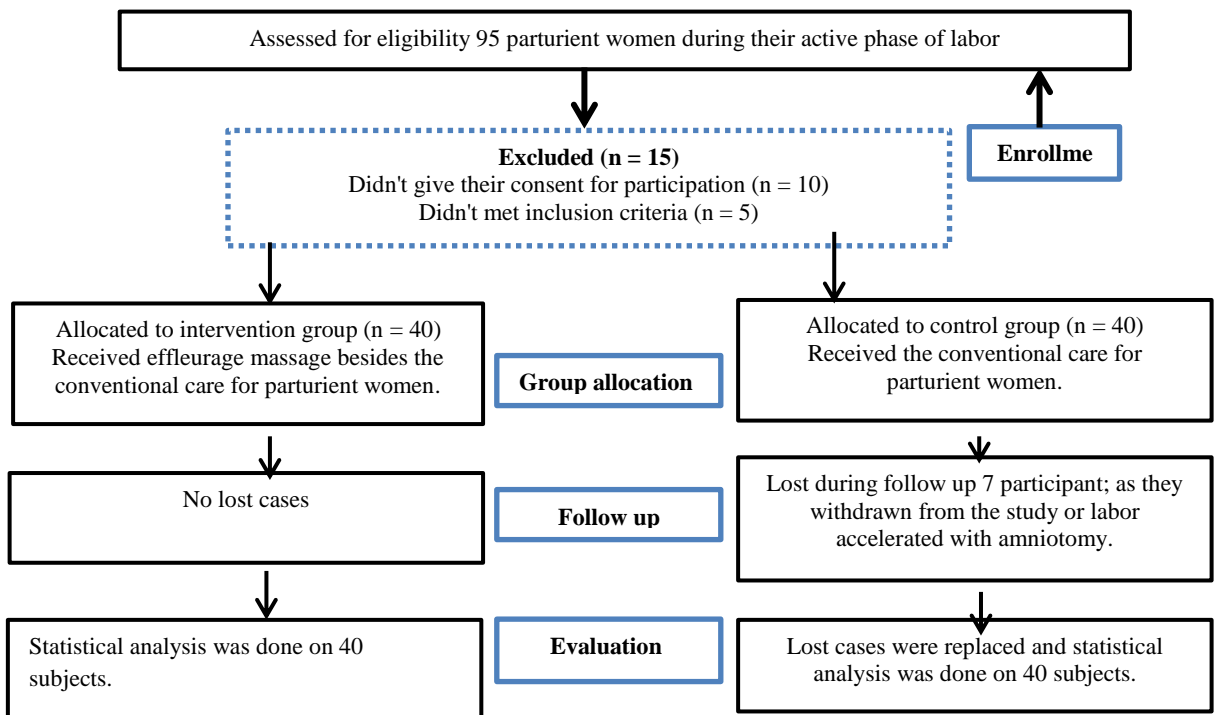


Figure 1. Flowchart of the study groups

Tools of data collection

To achieve the aim of this study, three data collection tools were used: structured interview questionnaire schedule, Numeric Pain Rating Scale (NPRS), and Likert scale for women's satisfaction.

Tool I: Structured interview questionnaire schedule

It is designed by the researcher after reviewing the related literatures, collecting required data through an individual interview with each participant, and reviewing the participant's medical file. This tool was used to collect the basic data as follows: the first part, concerned with the general characteristics of the enrolled subjects (e.g., name, age, and educational level); second part, concerned with the obstetric history (e.g., gravidity and parity); and third part, concerned with the details about the current delivery (e.g., cervical dilatation, number of vaginal examinations and the duration of labor stages).

Tool II: The Numeric Pain Rating Scale (NPRS)

The NPRS (McCaffery et al., 1989), the numeric version of the visual analog scale, is used to assess women's pain level before and after effleurage massage. The NPRS is a horizontal bar numbered from zero to ten, which best reflects the pain intensity of the subjects. The subjects were asked to verbalize the intensity of their pain level on a scale from 0, "no pain," to 10, "severe pain." Scores were interpreted as follows: "0" interpreted as "no pain," "1 to 3" as "mild pain," "4 to 6" as "moderate pain," and "7 to 10" as "worst pain imaginable."

Tool III: Likert scale for women's satisfaction

The scale was adopted from Likert (1932) to assess maternal satisfaction with massage. It is a one-dimensional five-point Likert scale. The cumulative score ranges from 1 to 5. Score 1 indicated strongly unsatisfied, 2 unsatisfied, 3 not sure, 4 satisfied, and 5 strongly satisfied. The higher score suggests greater satisfaction with effleurage massage.

Validity of the tools

The content validity of the developed tool was confirmed by a panel of three experts in the midwifery nursing specialty to be ensured that the questions were consistently conveyed and carried the anticipated meaning they were prepared for. Experts' opinions regarding the consistency, accuracy, and relevance of the tools were elicited. Accordingly, the recommended modifications were conducted. Thus, the study provided information on feasibility and practicability of the designed methodology.

Reliability of the tools

The inter-rater reliability of the study tool was assessed, revealing an interclass correlation coefficient r-value of 0.87, indicating good internal consistency of the used tool.

Pilot study

A pilot study was applied on 10% (8 parturient women who were excluded from the main study sample) of the total study sample to test the objectivity, applicability of the study tools, and feasibility of the research process. The pilot study aimed to determine the clarity, relevance, and applicability of the tools. The results of the pilot study were that the tools were clear, relevant, and applicable. Moreover, no problems were found that interfere with the data collection process, and no changes were made.

Ethical considerations

To conduct this study, an ethical approval was obtained from the Research Ethics Committee, Faculty of Nursing, Mansoura University and from the concerned authorities. Oral informed consent was obtained from each participant after the study objective was clarified. Likewise, participants were reassured that they had the right to leave the study at their will without assigning any reason and also reassured about the confidentiality of the collected data.

Field work

The researcher visited the study setting two days a week, "Tuesday and Thursday from

9 a.m. till 3 p.m.” The study was accomplished through three phases: preparation, implementation, and evaluation of the study outcomes.

Preparation

The tools for data collection were prepared after a massive review of related literature and then tested for its validity and reliability.

Implementation

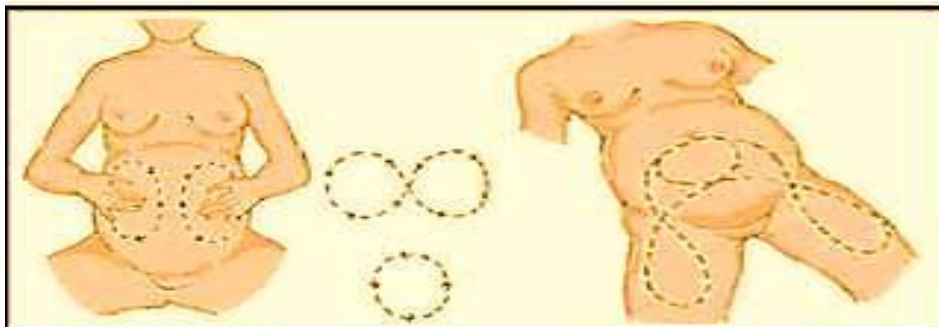
1. Assessment

The researcher interviewed parturient women, introduced herself to them, and clarified the aim of the study. Once eligibility for participation was confirmed, and informed consent was obtained, each eligible woman was allocated to one of the two groups. Thereafter, an initial assessment was conducted to collect the baseline data on the women’s general characteristics.

2. Procedure

Participants in the control group (received conventional care) as dictated by their obstetrician according to the hospital protocol

of care in addition to assessment of pain level using NPRS scale of four time points every 30 min (i.e., baseline assessment and after 30 min, 1 h, and 2 h). Meanwhile, each participant in the intervention group (received effleurage massage) were asked to rate the pain level immediately before massage and directly verbalize the pain intensity, ranging from numbers 1 to 10, using the NPRS. Subsequently, the researcher provided effleurage massage for each parturient woman. The massage started at the beginning of each uterine contraction for 10 min and repeated four times with each contraction. During massage, both hooked hands were gently and delicately pressed with circular stroking movements using fingertips on the abdomen starting from the upper area of the symphysis pubis up to the fundus level during inhalation and vice versa from the top of the fundus down to the starting point during exhalation (**Dubey & Lata, 2017**).



(**Dubey & Lata, 2017**) Self-Comforting Techniques and Non-Pharmacologic Methods to Relieve Pain During Labor. *International Journal of Science and Research (IJSR)*.6(1)1594-99. Retrieved from: <https://www.ijsr.net/archive/v6i1/ART20164262.pdf>

Evaluation of the study outcomes

This phase entails two post-intervention evaluations: the first evaluation was conducted at four time points (i.e., immediately after the first effleurage massage and then after 30 min, 1 h, and 2 h). Through this, participants were asked to rate their pain level on the NPRS. During this time, the difference between the control and effleurage massage groups related to pain severity was assessed. Meanwhile, the second evaluation was conducted after labor

using the Likert scale to rate their satisfaction about effleurage massage as a convenient method to relieve or reduce intensity of labor pain.

Data analysis

The results of statistical analyses were obtained using IBM SPSS for Windows, version 20.0 (SPSS, Chicago, IL). Variables containing continuous data were tested for normality of distribution prior to any statistical procedure. Variables with continuous data

showed normal distribution of data, and data were presented in mean \pm standard deviation (SD). Categorical data were presented in number and percentage. The chi-square test was used in comparing categorical variables. Cronbach's coefficient α -test was used to measure the reliability (internal consistency) of the tools used in the study. Statistical significance was set at a P-value <0.05 .

Limitation of the study

It was difficult to control all extraneous factors that influence labor processes, such as policy of the study setting to augment labor with oxytocin and inability to change conventional care. However, the use of oxytocin in both groups is negligible. Another limitation is that necessary national references were lacking; thus, the researcher had difficulties in discussing the research topic.

Results

Table 1. Sociodemographic characteristics of the intervention and control groups

Variables	Control group (n=40)		Intervention group (n=40)		Chi square test	
	No.	%	No.	%	X ²	p
Age (years)						
<25	19	47.5	21	52.5		
25 - 30	12	30.0	12	30.0		
>30	9	22.5	7	17.5	0.350	0.839
Mean \pm SD	25.8 \pm 5.1		25.4 \pm 5.1		0.417	0.678
Educational level						
Cannot read or write	8	20.0	6	15.0		
Basic education	12	30.0	18	45.0		
High education	20	50.0	16	40.0	1.930	0.381
Occupation						
Housewife	18	45.0	21	52.5		
Working	22	55.0	19	47.5	0.450	0.502
Marital status						
Married	29	72.5	27	67.5		
Divorced	7	17.5	6	15.0		
Widow	4	10.0	7	17.5	0.967	0.617
Residence						
Rural	23	57.5	19	47.5		
Urban	17	42.5	21	52.5	0.802	0.370

Table 1 shows the sociodemographic characteristics of the intervention and control groups. Both groups were matched as regards the maternal age, educational level, occupation, marital status, and residency. There were no significant differences between groups ($p > 0.05$).

Table 2. Obstetric history and current delivery characteristics between the intervention and control groups

Variables	Control group (n=40)		Intervention group (n=40)		Chi-square test	
	No.	%	No.	%	X ²	p
Obstetric history						
Gravidity	1.45 ± 0.50		1.58 ± 0.50		1.113	0.269
Parity	1.38 ± 0.49		1.48 ± 0.51		0.898	0.372
Gestational age (weeks)	39.8 ± 1.6		39.7 ± 1.7		0.336	0.738
Current delivery characteristics						
Cervical dilation on admission (cm)	6.7 ± 2.2		6.8 ± 2.0		0.212	0.832
Augmented with oxytocin						
Yes	30	75.0	32	80.0	0.287	0.592
No	10	25.0	8	20.0		
Number of vaginal examinations						
1-3	16	40.0	17	42.5	0.572	0.751
4-6	14	35.0	11	27.5		
≥7	10	25.0	12	30.0		
mean ± SD	1.85 ± 0.80		1.88 ± 0.85		0.135	0.893
Duration of labor stages						
Active phase (hours)	13.2 ± 3.5		14.2 ± 3.6		1.254	0.213
Second stage (min)	47.8 ± 8.2		45.5 ± 9.6		1.182	0.241
Third stage (min)	16.5 ± 4.4		17.4 ± 4.5		0.946	0.347

Table 2 shows no significant differences between the studied groups regarding obstetric history and current delivery characteristics ($p > 0.05$).

Table 3. Maternal pain level before and after massage between the intervention and control groups

Variables	Control group (n=40)		Intervention group (n=40)		Chi-square test	
	No.	%	No.	%	X ²	P
Pain level before massage (baseline assessment)						
Mild	4	10.0	6	15.0	0.646	0.724
Moderate	13	32.5	14	35.0		
Severe	23	57.5	20	50.0		
Pain level 2 hours after massage						
Mild	2	5.0	12	30.0	11.327	0.003**
Moderate	9	22.5	12	30.0		
Severe	29	72.5	16	40.0		

**High statistical significance at a P-value < 0.05

Table 3 presents the comparison of maternal pain level before and immediately after effleurage massage. Data revealed that no statistically significant differences were observed among the studied groups related to NPRS pain level at baseline assessment. Meanwhile, the study results showed that pain level in the intervention group was lower than that in the control group, in which 40% and 72.5%, respectively, had severe pain two hours after massage ($p > 0.003$).

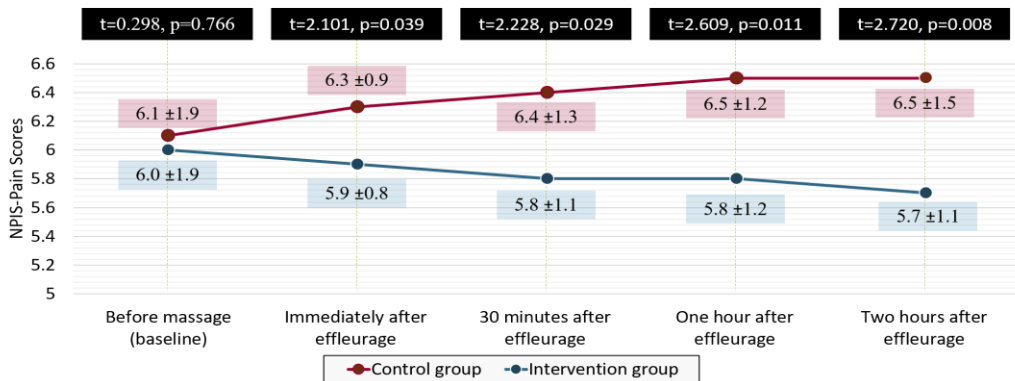


Figure 2. Comparison of NPRS pain scores after massage between the intervention and control groups

Figure 2 shows the NPRS pain scores after massage between the studied groups. In this study, the NPRS pain level was assessed at baseline and immediately after massage, and 30 min, 1 h, and 2 h from initiating massage performance. At the baseline assessment, there was no significant difference in NPRS pain score between the two groups. However, immediately after the effleurage massage, the NPRS pain score was significantly lower in the intervention group than in the control group (5.9 ± 0.8 vs. 6.3 ± 0.9 , $p < 0.039$). Moreover, 30 min and 2 h after initiating massage, the NPRS pain scores were further reduced in the intervention group than in the control group (5.8 ± 1.1 vs. 6.4 ± 1.3 , $p < 0.029$, and 5.7 ± 1.1 vs. 6.5 ± 1.5 , $p < 0.008$, respectively).

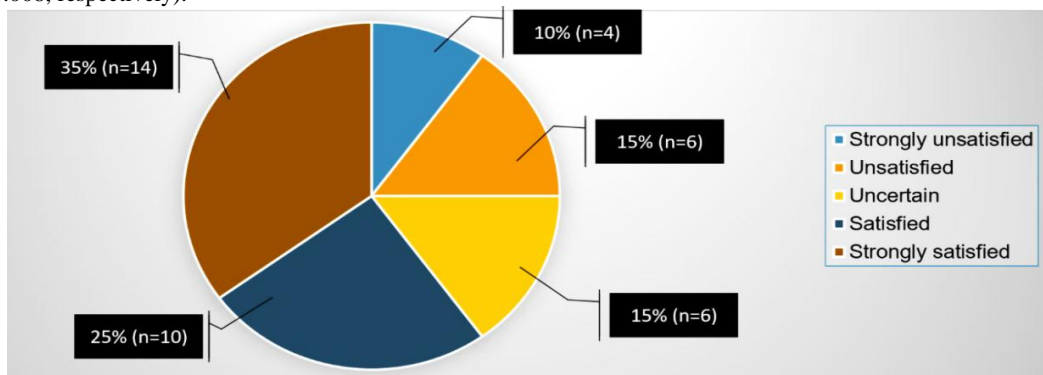


Figure 3. Maternal satisfaction with effleurage massage for decreasing labor pain intensity

Figure 3 presents the maternal satisfaction for pain relief produced by effleurage massage. Moreover, 35% of women reported that they were strongly satisfied, and 25% reported that they were satisfied, while only 10% were strongly dissatisfied with this intervention.

Discussion

Labor pain is a universal experience for child-bearing women. It has been demonstrated that labor pain is one of the most intense forms of pain that a woman can experience throughout her life. Various measures have been utilized throughout history to relieve this pain. Effleurage massage is a massage technique that could be used during the first stage of labor to relieve muscle spasm, promote relaxation, release natural endorphins, and decrease labor pain intensity (Murtiningsih & Shintya, 2018; Neetu et al., 2015).

The current research work aimed to evaluate the effectiveness of effleurage massage on labor pain intensity in parturient women. This aim was achieved through the present study findings, which showed a significant decline in NPRS pain scores at the four points of pain intensity evaluation in the intervention group compared to those in the control group. Consequently, the first study hypothesis is accepted: "Parturient women who receive effleurage massage during their active phase of labor have less pain than those who do not."

The same conclusion was provided by an Indonesian study (Khomsah et al., 2017). It evaluated the efficacy of effleurage massage on reduction of labor pain. Using a 10-point numerical rating scale, severity of labor pain was evaluated before and after massage. Parturient mothers reported a statistically significant decrease in pain intensity after massage, where the mean pain scores in the control group was 6.55, and effleurage group was 6.64, with p-value of 0.504 (>0.05), which indicated that there were no significant differences at the baseline assessment. In contrast, the results of the posttest showed that the P-value decreased by 0.022 (<0.05), revealing a significant difference in pain levels in the studied groups.

Both findings are consistent with that of a quasi-experimental pretest and posttest design by **Wulandari and Hiba (2015)**, where 23 primigravida mothers received effleurage massage during the active labor phase. Using a numerical rating scale, pain severity was assessed before and after the massage. The mean pain value before the massage was 3.78, but after the massage, the mean value was 2.96 with a P-value $(0.000) \leq \alpha (0.05)$.

However, these findings partially agreed with the findings of **Sri et al. (2017)**. This study examined the effect of effleurage and abdominal lifting massage on reducing the intensity of labor pain in 36 parturient women. Using the numerical rating scale, it was found that the pain acuity of labor was 6.11 ± 2.19 in the control group but 6.44 ± 1.68 in the massage group. The pain reduction was significantly higher in the intervention group ($p < 0.05$).

Three rationales can explain the effectiveness of effleurage massage. The first is that massage acts on the motor, nervous, and cardiovascular systems; induces relaxation throughout the body; improves venous and lymphatic flow; and stimulates the sensory receptors of the skin and subcutaneous tissue, reducing pain intensity. Another rationale is that the analgesic effect of massage was based on gate control theory of pain. Lastly, massage works by release of muscle spasms, thus increasing the release of endogenous

endorphins as a natural pain killer (**Sri et al., 2017; Murtiningsih & Shintya, 2018**).

The current study also evaluated the mother's satisfaction with the effleurage massage for reduction the labor pain intensity. The results showed that most subjects were satisfied or very satisfied. Consequently, the second study hypothesis is accepted: "Parturient women who receive effleurage massage during their active phase of labor are much more satisfied with the pain relief than those who do not."

This finding is in agreement with a randomized controlled trial in Iran (**Hashemi et al., 2016**). Such study evaluated the impact of effleurage massage on labor pain intensity and duration in 60 primigravida mothers. The results showed great satisfaction with massage therapy group than the control group. Moreover, this finding is matched with the results by **Mortazavi et al. (2012)**. This study investigated the maternal satisfaction with rhythmic massage during labor, using visual analog scale and found that parturient women were very satisfied with the massage and accepted it as an effective option for pain relief in labor ($p < 0.001$).

The study findings stressed that effleurage massage was an effective therapy that can be utilized by maternity nurses as one of the nursing strategies that manage and decrease labor pain intensity and reduces maternal suffering during labor.

Implication for nursing practice

Effleurage massage is considered a safe, simple, and clinically efficient and cost-effective method. Moreover, the required skills for applying such treatment are already available in the field of nursing practice. Thus, maternity nurses could use this method for pain relief during labor, especially when no other pain relief options are available in developing countries.

Conclusion and recommendations

The results of this study concluded that effleurage massage is an effective pain relief method that reduces labor pain intensity in parturient women. Findings incite the following recommendations:

- Effleurage massage should be utilized by maternity nurses to be part of routine care for labor pain management.
- Awareness of maternity nurses about this method should be raised to be implemented into practice.
- More research is needed to consider other factors that can influence pain of labor, including age, culture, previous labor pain experience, and psychological factors to find more significant reductions in pain.
- Comparative studies with other nonpharmacological methods should be conducted to determine the most effective method for labor pain management.

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