Effect of Counter-Pressure Versus Effleurage Massages on Labor Pain Intensity Among Parturient Women

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Abstract

Context: Labor-related pain is a universal experience for parturient women. Several non-pharmacological methods have been utilized to relieve this pain including counter-pressure and effleurage massages. **Aim:** This study aimed to examine the effect of counter-pressure versus effleurage massages on labor pain intensity among parturient women. **Methods:** A quasi-experimental design (nonequivalent control group pretest/posttest) was adopted. A purposive sample of 96 parturient women was recruited and allocated to either control, counter-pressure, or effleurage massage group. This study was conducted at inpatient obstetrics and gynecology department of Kafrelsheikh general hospital, Kafrelsheikh governorate, Egypt. Data were collected using two tools: structured interviewing questionnaire schedule and Numeric Pain Rating Scale (NPRS). **Results:** The mean pain scores at baseline assessment did not show a significant difference between the control group and interventions groups (p>0.05). However, at 30 minutes, 1 hour, and 2 hours after intervention the differences in mean pain scores between the control group and interventions groups were highly statistically significant (p<0.001). When comparing mean pain scores between counter-pressure and effleurage groups the differences were not statistically significant either at baseline assessment or after intervention (p>0.05). **Conclusion:** counter-pressure and effleurage massages are effective non-pharmacological measures in reducing labor pain. **Recommendation:** Utilizing such simple and effective pain relief strategies by nurses and midwives should be encouraged.

Keywords: Counter-pressure, effleurage massage, labor pain intensity, parturient women

Introduction

Labor is regarded as one of the most memorable events in a woman's life. Labor is considered a physiological and psychological challenge that women have to go through because it is associated with the most desirable event in life, bringing out a new life. Unfortunately, almost all deliveries are accompanied by pain **(Orr, 2017; Ashagrie et al., 2020)**. Most women believe that labor pain is the most severe and distressing pain they could experience **(Costa-Martins et al., 2014)**. This pain occurs due to the physiological process of labor in the form of uterine contractions. During the first stage of labor, the pain is mainly related to cervical dilatation, uterine muscle hypoxia at the time of

contraction, uterine corpus ischemia, and cervical nerve compression **(Sari & Christiani, 2016; Lee & Neumeister, 2020)**.

Uncontrolled labor pain can affect maternal and fetal health negatively. Excessive pain increases fear and anxiety in parturient women resulting in an increase in catecholamines secretion, which increases blood pressure. Also, increased catecholamine leads to pelvic muscle strain resulting in resistance against the repulsive force of the uterus and the repulsive force exerted by laboring woman. Thus, labor pain aggravates more and labor time is prolonged. Furthermore, labor pain is a powerful respiratory stimulus, resulting in a marked increase in minute ventilation and oxygen consumption during contractions. Hyperventilation causes severe

respiratory alkalosis and fetal hypoxia. In addition, as a result of stress and fear caused by excessive labor pain, peripheral vasoconstriction may occur, which reduces blood flow to the placenta and thus leads to negative fetal health (**Kulkarni & Sia, 2014; Janssen et al., 2015; Byford &Weaver, 2016).**

Therefore, it is necessary to manage labor pain effectively. Many approaches are accessible to reduce labor pain, both pharmacological and non-pharmacological approaches. If possible, the choice of non-pharmacologic methods for pain management in labor should be considered before using pharmacologic one. Several non-pharmacological approaches have been proposed to relieve labor pain including relaxation, imagery and visualization, or massages. Massage promotes pain relief and provides physical contact with the parturient woman thus potentiating the feeling of relaxation and reducing emotional stress **(Hensley, 2017; Herinawati et al., 2019)**.

One of the suggested massage techniques is a counter-pressure technique. Counter pressure massage is a massage that applying continuous pressure using the base of the hand or fist on the sacral bone and lumbar region of the parturient woman during contraction. It can be applied in lying down, knee-chest, or half-sitting position, depends on the comfort of the parturient woman **(Paseno et al., 2019)**. The strong pressure generated by counter-pressure massage could activate endorphin from the halted pain transmission process and reduce the pain sensation in the synapses of the spinal cord and brain cells **(Alimoradi et al., 2019; Farida & Sulistiyanti, 2019; Raana & Fan, 2020).**

Another non-pharmacological measure that manages labor pain is effleurage massage. It involves application of light or deep stroke by using palms on abdominal areas of laboring women, corresponding with rhythmic breathing during uterine contractions **(Wahyuni & Wahyuningsih, 2015; Murtiningsih & Andani, 2018)**. Previous studies have reported the benefits of effleurage massage because it can improve blood circulation, promote venous and lymphatic return, warm the abdominal muscles, and enhance physical and mental relaxation, thus providing pleasant and relaxing distraction for labor pain management **(Bolbol-Haghighi et al., 2016; Yanti & Mardiyana, 2017)**. Additionally, it can promote the release of muscle spasms, endogenous endorphins, and conflicting sensory stimuli that override pain signals **(Sri et al., 2017)**.

Managing and controlling labor pain is an essential part of midwifery services and is an important goal of childbirth care. Nurses have a significant role in providing the childbearing woman with clear, accurate, concise, and evidence-based information regarding efficient non-pharmacological pain relief measures. Nurses also have the responsibility to help woman in labor to select the appropriate modality for effective pain relief that consistent with woman's beliefs and preferences through shared decision-making and to implement the chosen modality. Therefore, nurses should be knowledgeable about the most recent scientific studies on labor pain-relieving methods **(Abdulaziz, 2017; Mirzaiinajmabadi, 2018)**.

Nevertheless, in Egypt, there were a few scattered nursing researches that examine the effect of counter-pressure and effleurage massages on labor pain intensity. Therefore, the present study would contribute to better understanding of the effect of two non-pharmacological pain relief methods and increase the body of nursing knowledge.

Significance of the study

Pain control during childbirth can plays an important role because it contributes to the physical and psychological well-being of both mother and fetus. Unfortunately, labor pain is a problem that has not received enough attention, although one of the intrapartum management goals is to relieve pain and provide comfort to the parturient woman. Furthermore, efforts to alleviate labor pain itself continue to prioritize pharmacological methods, while non-pharmaceutical strategies are still poorly understood and less utilized by health care providers **(Yosepha et al., 2020)**.

Although the use of pharmacological methods is more popular and has better effect in relieving pain compared to non-pharmacological methods, but nevertheless it

may affect the progress of labor and increase the risk of instrumental delivery and cesarean section **(Ismail, 2013).** Moreover, the use of such analgesia is associated with adverse effects including neonatal respiratory depression. What is more important is that, in women with respiratory and heart diseases or mothers who have allergy to drugs, the use of non-pharmacological methods is safer alternative **(Kumar et al., 2014)**. In contrast, the use of non-pharmacological approaches holds the promise of reducing labor pain as well as decreasing analgesic consumption during childbirth **(Adams et al., 2015)**. Furthermore, they are simple, safe, relatively inexpensive, and effective techniques that can increase maternal satisfaction and improve other obstetric and neonatal outcomes (**Khomsah et al., 2017**).

Aim of the study:

The current study aimed to examine the effect of counter-pressure versus effleurage massages on labor pain intensity among parturient women.

Research hypotheses

H.1. Parturient women who receive effleurage massage during active phase of labor will experience less labor pain intensity than those who do not receive it.

H.2. Parturient women who receive counter-pressure massage during active phase of labor will experience less labor pain intensity than those who do not receive it.

H.3. There is a difference in labor pain intensity between parturient women who receive effleurage massage and those who receive counter-pressure massage.

Subjects and Method

Research design

A quasi-experimental design (nonequivalent control group pretest/posttest) was adopted to test the proposed hypotheses. In this design, subjects are assigned to either intervention or control group. The baseline measures of the dependent variables were performed for all subjects. Then subjects in the intervention group only received the proposed intervention. After that, all subjects were post-tested to measure the degree of change in the dependent variables **(LoBiondo-Wood & Haber, 2018).**

Setting

The study was conducted at inpatient obstetrics and gynecology department of Kafrelsheikh general hospital, Kafrelsheikh governorate, Egypt. This hospital is affiliated to the Ministry of Health. The department located in the third floor of the hospital and consists of 3 rooms, each of them includes six beds. It also included two labor units for vaginal delivery. It provides free services to women with different conditions such as; high-risk pregnancy, labor, and postpartum care. According to the statistical department of Kafrelsheikh general hospital, the total annual admission to labor unit is approximately 2000 parturient women.

Sample

A purposive sample of 96 parturient women was recruited according to the following inclusion criteria: age between 18 and 35 years, in active phase of labor (i.e., cervical dilation 4-5 cm), term gestation (37–42 completed weeks of pregnancy), singleton pregnancy with normal position (i.e., occpito anterior position), and accept to participate in the study. While, the exclusion criteria included: the presence of dermatologic conditions that would contraindicate the application of massage, getting pain medication, woman with pre-existing medical conditions including diabetes, hypertension, renal, or cardiac disease. As well as, woman with obstetrical conditions arising during pregnancy including antepartum hemorrhage, gestational hypertension, gestational diabetes, polyhydramnios, and oligohydramnios will be excluded from the study.

Sample size calculation

Based on data from a previous study **(Abd-Ella, 2018),** considering level of significance of 5% and power of study of 80%, the sample size can be calculated using the following formula: n = [2(Zα/2 + Zβ)2 × p (1-p)]/(p1 - p2)2. *Where*

n = sample size required in each group,

p = pooled proportion (proportion of event in group 1 + proportion of event in group 2)/2

p1-p2 = difference in proportion of events in two groups

$Z_{\alpha/2}$: This depends on level of significance, for 5% this is 1.96

Z_{β}: This depends on power, for 80% this is 0.84

n = $[2(1.96 + 0.84)^2 \times 0.30 (1-0.30)]/(0.325)^2$=31.2

Based on the above formula, the sample size required per group is 32, giving a total sample of 96 parturient women.

Sample recruitment and group allocation

A total of 110 eligible parturient women were invited to participate in the current study.

From them14 subjects refused to participate in the study. After confirmation of eligibility and taking informed written consents, parturient women were assigned randomly into three groups by selecting one sealed envelope containing either effleurage, counter-pressure or control group. The assignment was carried out at 1:1:1 ratio (i.e., n=32 per each group). Seven parturient women were missed during the follow-up (2 from control group, 4 from effleurage group, and 1 from counter-pressure group) and were replaced. The statistical analysis was conducted on 96 subjects. A flowchart of the study groups is presented in Figure1.
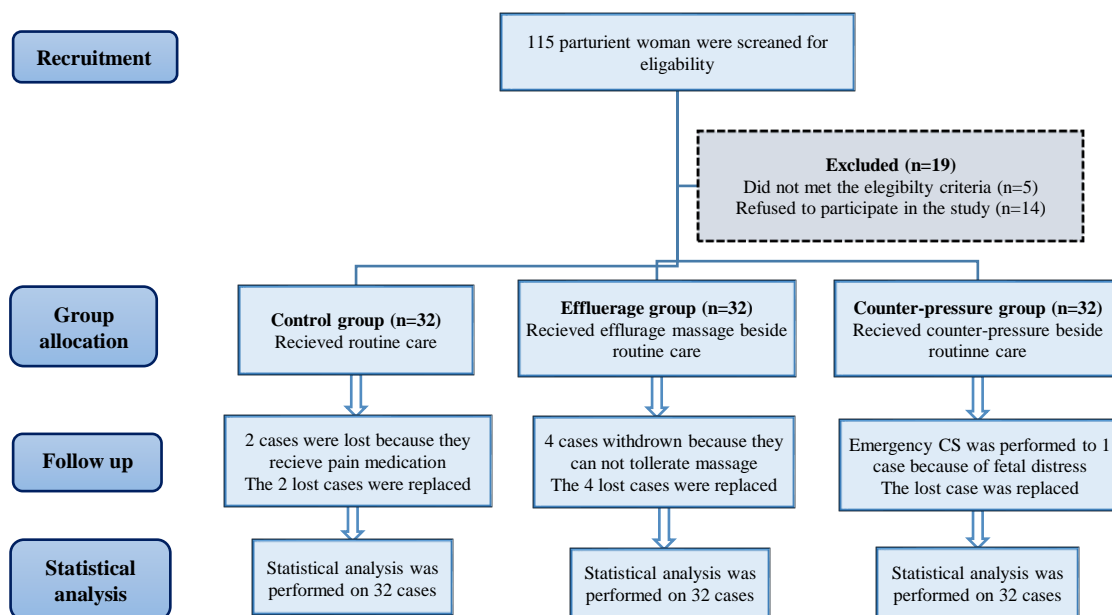
Figure 1. Study flowchart showing number of included women, excluded or lost to follow-up and analyzed.

Tools of data collection

Data pertinent to the study were collected using two tools: structured interviewing questionnaire schedule and Numeric Pain Rating Scale (NPRS).

Structured interviewing questionnaire schedule:

This tool was developed by the researchers after reviewing the related literatures, and consists of three main sections: *a. personal background data:* This section included questions about age, residence, level

of education, and occupation; **b. past obstetrical history:** This section concerned with the obstetric history such as gravidity, parity, mode of previous delivery, and complications during previous pregnancy and/or delivery; and **c. present obstetrical history:** entails data related to gestational age and cervical dilatation on admission.

The Numeric Pain Rating Scale (NPRS)

The intensity of labor pain was assessed using the NPRS, a self-report pain scale, (**McCaffery et al., 1989**). The NPRS is a horizontal bar numbered from zero to ten, which reflects the pain intensity of the respondents. Respondents were asked to select a whole number that best reflects pain intensity they feel on a scale from 0, "no pain," to 10, "severe pain". A Score given by the respondent was categorized and 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 or sever pain. The NPRS was validated earlier and its use for assessing pain intensity had been anticipated.

Tool validity

The content validity of the tool developed by the researchers, the structured interviewing questionnaire schedule, was tested and confirmed by three scholastic nursing specialists in the field of maternity nursing. The tool was validated for clarity, relevance, and completeness of its contents. Accordingly, the recommended modifications were performed.

Tool reliability

The reliability of the proposed tools was tested using Cronbach's alpha coefficient test. For the structured interviewing questionnaire schedule, Cronbach's alpha of 0.89 showed a strong, positive correlation between the tool's items. While test–retest reliability of the NRPS was 0.95 (**Alghadir et al., 2018**).

Ethical consideration

Informed consent was obtained from each parturient woman who accepted to participate in the study after explanation of the aim of the study and its significance. Likewise, the researchers emphasized that participation in the study is entirely voluntary, and parturient women were reassured that they had the right to withdraw from the study at any time without having to offer justifications. Anonymity and confidentiality were assured through coding the data.

Pilot study

A pilot study was carried out on 10% of the pre-determined sample size (10 parturient women) who met the selection criteria. It aimed to assess the feasibility of the study process as well as, the clarity, relevance, and applicability of the study tools. Based on the results of the pilot study, no problems were found that interfere with the data collection process and no modifications were performed in the tools. The participants in the pilot study were excluded from the main study sample.

Procedure

Data were collected within a period of five months—from the beginning of February 2021 to the end of June 2021. The researchers visited the study setting three days a week from 9:00 am to 3:00 pm. The study was conducted through: preparation, interview and assessment, implementation, and evaluation.
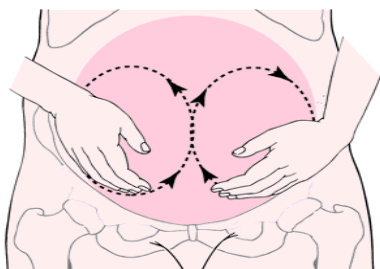
Preparation for the study: A thorough review of related literature has been done to construct data collection tools. Also, an official permission to conduct the study was obtained from concerned authorities (i.e., directors of Kaferelshiekh general hospital).

Interview and assessment: After enrollment, the researchers hold an interview with each parturient woman individually to obtain data related to personal background data, past, and present obstetrical history through using the structured interviewing questionnaire schedule. The questions were asked in Arabic and the responses were documented by researchers. In addition, parturient woman was asked to rate their pain level on the NPRS to obtain the baseline assessment of pain. The interview and assessment were carried out for all parturient women in the three groups. The time taken to complete this assessment was about 15-20 minutes.

Implementation: Parturient woman in the control group received the routine care

according to the hospital protocol of care. While, parturient woman in counter-pressure group received the routine care in addition to counter-pressure massage. The researchers using the heel of their hands to apply steady, strong force to one spot on the lower back during contractions while parturient woman is in knee-chest position or left lateral position. Counter-pressure is carried out 4 times in a row at 4 times of uterine contractions with a time of 40–50 seconds each treatment.

For effleurage massage group, in addition to the routine care parturient woman received effleurage massage started at the beginning of each uterine contraction for 10 min and

repeated four times with each contraction. During massage, both palms were gently and delicately pressed with circular, rhythmic, stroking, ascending movements on the abdomen starting from the upper area of the symphysis pubis, pointing at the abdomen, continuing to the fundal level during inhalation. And then, sliding from the top of the fundus outward and downward to the starting point during exhalation. The shape of the movement pattern is like "butterfly". The intensity of the massage was determined by the parturient woman who was instructed to request greater or lesser force during execution of the massage according to her preference.

Figure 2a. Effleurage massage

Figure 2b. Counter-pressure massage

Evaluation: The researchers assess the level of pain intensity at three points of time: 30 minutes, one hour, and then two hours after performing the proposed intervention either counter-pressure or effleurage massage. Parturient women were asked to rate their pain level on the NPRS.

Statistical analysis

Collected data were organized, coded, and entered into a computer. All statistical analyses were performed using a statistical package for social science version 26.0 (SPSS, Chicago, IL). The arithmetic mean and standard deviation were used for quantitative variables to describe the central tendency of observations and to measure the dispersion of results around the mean. The Student's t-test was used for comparison between two variables with continuous quantitative data, while one-way analysis of variance (ANOVA) test was used for comparison among more than two variables with continuous quantitative data. Chi-square [X^2] test was used for comparison of variables with categorical data. Statistical significance was set at p<0.05.

Results

Results of the current study presented in three main sections: a. personal background data; b. obstetrical profile; and c. labor pain intensity.

a. Personal background data

Findings of the current study exhibit homogeneity of the parturient women and matching between the three groups, as there were no statistically significant differences between the three groups in relation to age, place of residence, educational level, and occupational status (p> 0.05). As shown in table (1), 53.1% of the control group's age ranged between 25 to 30 years as compared to 46.9 % of the counter-pressure group and 43.8 % of the effleurage massage group. Concerning place of residence, 62.5% of the control group, as compared to 68.8% of the counter-pressure group and 71.9% of the effleurage massage group lived in rural areas. In relation to education, 56.3% of the control group as compared to 62.5% of the counter-pressure group and 71.9% of the effleurage massage

group had completed their secondary education. Regarding occupation, 84.4%, 78.1%, and 81.3% of the control, counter-pressure, and effleurage massage group respectively were housewives.

b. Obstetrical profile

Regarding previous obstetrical history, findings of the current study reveal homogeneity of the parturient women as there were no statistically significant differences between all the three groups regarding gravidity, parity, mode of previous delivery, and complication with previous pregnancy (p> 0.05). Concerning gravidity, 65.6%, 78.1%, and 71.9% of the control, counter-pressure, and effleurage massage group respectively were gravida 2 and para 1. In relation to mode of previous delivery, 93.8% of the control group, as compared to 96.9% of the counter-pressure group and 87.5% of the effleurage massage group delivered vaginally. Only 3.1% of the control group experiences complications during their previous pregnancies in form of abortion (Table, 2).

Regarding present obstetrical history table (3) reveals that, the mean gestational age of the control group is 39.6± 1.5 weeks as compared to 39.7 ± 1.8 weeks for counter-pressure group, and 39.5± 1.6 weeks for effleurage massage group. The table also revealed that, the mean

cervical dilation at admission to delivery unit of the control group is 5.4 ±1.2 cm as compared to 5.6 ±1.3 cm for counter-pressure group, and 5.2 ±1.2 cm for effleurage massage group. There are no statistically significant differences between the three groups regarding gestational age and cervical dilation at admission (p> 0.05).

c. Labor pain intensity

The pain scores of parturient women were recorded and compared among the three groups at baseline (before intervention) and at 30 minutes, 1 hour, and 2 hours after intervention. As shown in table (4) and figure (3) during baseline assessment, the mean pain scores did not show a significant differences among the three groups (p>0.05). However, at 30 minutes, 1 hour, and 2 hours after intervention, the differences in the recorded pain scores among the three groups were highly statistically significant (p<0.001). When comparing mean pain scores between every two groups, table (4) illustrates that, the mean pain scores of the counter-pressure and effleurage massage group were significantly lower than those of the control group at 30 minutes, 1 hour, and 2 hours after intervention (p<0.001). Meanwhile, there are no statistically significant differences between the mean pain scores of the counter-pressure group and effleurage massage group (p>0.05).

Table 1. Distribution of the demographic characteristics among the studied sample (N=96)

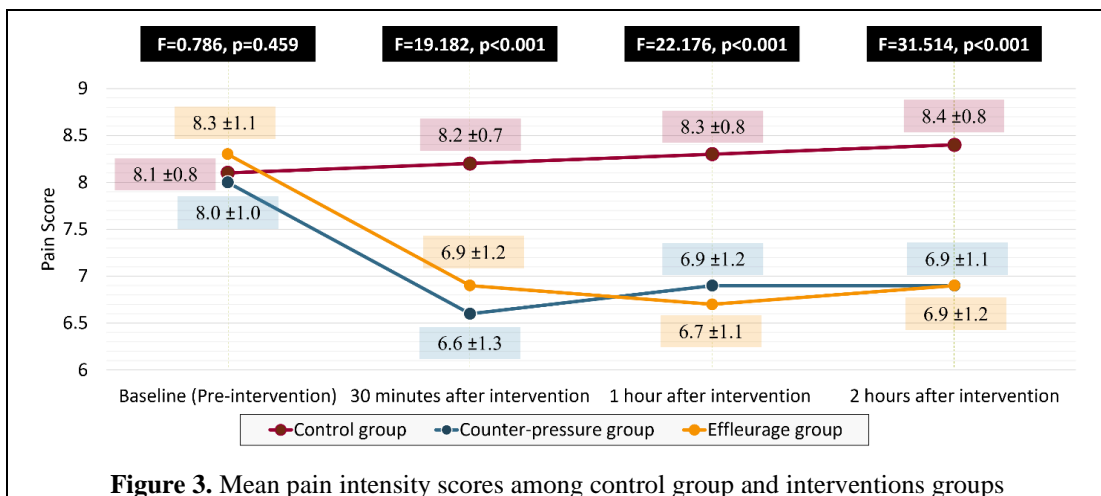| Items	Control group (N=32)		Counter-pressure group (N=32)		Effleurage group (N=32)		Control vs. Counter-pressure group		Control vs. Effleurage group		Counter-pressure vs. Effleurage group	
	Freq.	%	Freq.	%	Freq.	%	X^2	p	X^2	p	X^2	p
Age (years)												
<25	10	31.3	9	28.1	12	37.5						
25 –	17	53.1	15	46.9	14	43.8						
30-35	5	15.6	8	25.0	6	18.8						
							0.870	0.647	0.563	0.755	0.749	0.688
Mean ±SD*	28.1 ±4.5		28.6 ±3.8		28.2±4.2		0.480	0.633	0.092	0.927	0.399	0.691
Residence												
Urban	12	37.5	10	31.3	9	28.1						
Rural	20	62.5	22	68.8	23	71.9						
							0.277	0.599	0.638	0.424	0.075	0.784
Educational level												
Primary	4	12.5	3	9.4	2	6.3						
Secondary	18	56.3	20	62.5	23	71.9						
University	10	31.3	9	28.1	7	21.9						
							0.301	0.860	1.806	0.405	0.659	0.719
Occupation												
Housewives	27	84.4	25	78.1	26	81.3						
Working	5	15.6	7	21.9	6	18.8						
							0.410	0.522	0.110	0.740	0.097	0.755

Comparison by Student's t test

Table 2. Distribution of past obstetrical history among the studied sample (N=96)

Items	Control group (N=32)		Counter-pressure group (N=32)		Effleurage group (N=32)		Control vs. Counter-pressure group		Control vs. Effleurage group		Counter-pressure vs. Effleurage group	
	Freq.	%	Freq.	%	Freq.	%	X²	p	X²	p	X²	p
Gravidity												
1	2	6.3	1	3.1	4	12.5						
2	21	65.6	25	78.1	23	71.9						
≥3	9	28.1	6	18.8	5	15.6						
							1.281	0.527	1.900	0.387	1.974	0.373
Parity												
Nullipara	3	9.4	1	3.1	4	12.5						
1	20	62.5	25	78.1	23	71.9						
≥2	9	28.1	6	18.8	5	15.6						
							1.933	0.380	1.362	0.506	1.974	0.373
Mode of previous delivery												
Vaginal delivery	29	90.6	31	96.9	28	87.5						
Nullipara	3	9.4	1	3.1	4	12.5						
							0.350	0.554	0.736	0.391	1.953	0.162
Complications during previous pregnancies												
Yes	1	3.1	0	00	0	00						
No	31	96.9	32	100.00	32	100.00						
							1.016	0.313	1.016	0.313	0	1.000
Type of complications												
Abortion	1	3.1	0	0.0	0	0.0	1.016	0.313	1.016	0.313	0	1.000

Table 3. Comparison of present obstetrical history between control group and interventions groups (N=96)

Items	Control group (N=32)	Counter-pressure group (N=32)	Effleurage group (N=32)	Control vs. Counter-pressure		Control vs. Effleurage		Counter-pressure vs. Effleurage group	
	Mean ±SD	Mean ±SD	Mean ±SD	t	p	t	p	t	p
Gestational age (weeks)	39.6± 1.5	39.7 ± 1.8	39.5± 1.6	0.241	0.810	0.258	0.797	0.470	0.640
Cervical dilatation on admission (cm)	4.4 ±1.2	4.6 ±1.3	4.2 ±1.2	0.640	0.525	0.667	0.507	1.279	0.206

Figure 3. Mean pain intensity scores among control group and interventions groups

Table 4. Between groups comparison of mean pain scores at baseline and after intervention

	Control group (N=32)	Counter-pressure group (N=32)	Effleurage group (N=32)	Control vs. Counter-pressure		Control vs. Effleurage		Counter-pressure vs. Effleurage	
	Mean ±SD	Mean ±SD	Mean ±SD	t	p	t	p	t	p
Baseline (Pre-intervention)	8.1 ±0.8	8.0 ±1.0	8.3 ±1.1	0.442	0.660	0.832	0.409	1.412	0.258
30 min. after intervention	8.2 ±0.7	6.6 ±1.3	6.9 ±1.2	6.130	<0.001	5.294	<0.001	0.959	0.341
1 hr. after intervention	8.3 ±0.8	6.9 ±1.2	6.7 ±1.1	5.491	<0.001	6.654	<0.001	0.695	0.490
2 hrs. post-intervention	8.4 ±0.8	6.9 ±1.1	6.9 ±1.2	5.238	<0.001	5.884	<0.001	0	1.000

Discussion

Labor-related pain is a universal experience for parturient 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. Several methods have been utilized to relieve this pain (**Neetu et al., 2015; Murtiningsih & Andani, 2018**). The findings of this study will be discussed in order to scrutinize the following hypotheses: H.1. Parturient women who receive effleurage massage during active phase of labor will experience less labor pain intensity than those who do not receive it; H.2. Parturient women who receive counter-pressure massage during active phase of labor will experience less labor pain intensity than those who do not receive it; H.3. There is a difference in labor pain intensity between parturient women who receive effleurage massage and those who receive counter-pressure massage.

The present study findings revealed that, at baseline assessment there is no statistically significant difference between control group and effleurage massage group concerning pain scores (p>0.05). However, after intervention there is a significant decline in pain scores at the three points of pain intensity assessment in the effleurage massage group compared to those in the control group (p<0.001). Therefore, the first hypothesis was accepted. These findings announced that, effleurage massage is an effective method in relieving labor pain. The effectiveness of effleurage massage may be explained by the relaxation effect of massage through acting on motor, cardiovascular, and nervous systems which in turn decrease anxiety and stress hormones thus, decreasing pain. Another rationale is that massage releases muscle tension and spasm, thus increasing the release of endogenous endorphins which act as a natural pain killer.

In the same line **Abd-Ella (2018)** in his study evaluated the effect of effleurage massage on labor pain intensity in parturient women. He reported that, at the baseline assessment, there was no significant difference in the NPRS pain score between the intervention and the control groups. However, after two hours of receiving effleurage massage 72.5% of the control group had severe pain compared to 40.0% of the intervention group and the difference in NPRS pain score between the two groups was statistically significant (p = 0.003). These findings are also consistent with the findings of the study conducted by **Aifa and Hasnawati (2021).** In their study they evaluated the efficacy of effleurage massage on reducing labor pain and reported the same conclusion in which the difference in labor pain scores before and after performing effleurage massage was highly statistically significant (p=0.000).

The present study findings revealed that, at baseline assessment there is no statistically significant difference between control group and counter-pressure massage group concerning pain scores (p>0.05). However, after intervention there is a significant decline in pain scores at the three points of pain intensity assessment in the counter-pressure group compared to those in the control group (p<0.001). Thus, these findings support the second hypothesis: Parturient women who receive counter-pressure massage during active phase of labor will experience less labor pain

intensity than those who do not receive it. Therefore, our study adds support to the notion that the effect of counter-pressure massage on pain relief is clinically valuable and should be utilized in order to reduce suffering of parturient women and increase their satisfaction.

In agreement with our study findings, **Rejeki et al. (2021)** conducted a study aimed to determine the effect of counter-pressure therapy using tennis balls toward the pain level in the first stage of labor. They reported that, 100% of the respondents experienced severe pain before applying counter pressure massage. However, after the implementation of the counter-pressure massage, 69.2% of the respondents experienced moderate pain and 30.8% experienced severe pain with a p = 0.000 (α < 0.05). Another experimental study carried out by **Oktriani et al. (2018)** aimed to analyze the difference of pain relief on active phase of labor between counter-pressure and abdominal lifting. Their findings revealed that, the mean pain score before counter-pressure was 3.90 ± 0.62 compared to 3.33 ± 0.85 after counter-pressure with a P-value 0.01.

When comparing mean pain scores between the counter-pressure group and the effleurage massage group, the result of the current study showed that, the differences were not statistically significant (p>0.05) at all points of pain assessment. Thus, the result of the current study does not support the third hypothesis: There is a difference in labor pain intensity between parturient women who receive effleurage massage and those who receive counter-pressure massage. This means that both counter-pressure and effleurage massages have similar effect in reducing labor pain. Therefore, nurses and midwifes can utilize either of them in managing labor pain according to the preference and tolerance of parturient women after shared decision making.

These findings were supported by the findings of **Santiasari et al. (2018)**, in their study they examined the effectiveness of effleurage and counter-pressure massages for reducing labor pain. They reported that, mean labor pain score before and after intervention in effleurage group were 9.26±1.05 and 6.88±1.22, respectively (p=0.00). Meanwhile, in counter-pressure groups were 9.00±0.98 and 6.59±1.28 respectively (p=0.00). Moreover, there was no statistically significant difference between effleurage and counter-pressure in reducing labor pain (p=0.74).

Conclusion

In conclusion, the results of the present study declared that counter-pressure and effleurage massages are effective non-pharmacological measures in reducing labor pain.

Recommendations

Based on the findings of this study, the following are recommended:

- Counter-pressure and effleurage massages should be utilized by nurses and midwifes as non-pharmacological strategies to manage labor pain and reduce suffering among parturient women

- Awareness of maternity nurses about counter-pressure and effleurage massages should be raised to be implemented into practice

- Indorse counter-pressure and effleurage massages in nursing syllabus

- Replication of the current study on a larger probability sample and in other settings is necessary

- Parturient women should be equipped with evidence-based knowledge regarding counter-pressure and effleurage massages before labor

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