Effect of massage therapy on relieving labor pain, reducing labor duration, and increase delivery satisfaction among parturient women

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ABSTRACT: Background: *Labor is a special experience for mothers and families. Therefore, pain relief, reducing labor time, and satisfaction with the delivery are very important.* ***Aim****: to evaluate the effect of massage therapy on relieving labor pain, reducing labor duration and increase delivery satisfaction among parturient women.* ***Research design:*** *Randomized controlled trial.* ***Settings:*** *A study was carried out in labor ward at Maternity and children Hospital in Al Madinah Al Munawarh, Saudi Arabia.* ***Sample****: 60 parturient women were involved in this study. Participants were divided into two equal groups, 30 women on a massage group and 30 women on a control group and the study conducted from October 2020 to March 2021.* ***Tools:*** *The first instrument is an interviewing questionnaire constructed by the investigators to collect baseline demographics characteristic and obstetric history. The second instrument is a maternal assessment sheet including pain intensity scale, obstetric outcomes and maternal satisfaction. The third instrument includes neonatal assessment sheet.* ***Results:*** *the majority (93.4%) of massage group have mild and moderate pain compared to 76.6% of control group, with a statistically significant difference observed between the two studied groups (p=.001). The mean duration of the first stage and second stage of labor for the massage group were lower than of the control group. The massage group stated more positive feelings than the control group, and the massage was found to be successful in improving satisfaction.* ***Conclusions:*** *The results of this study indicate that the application of massage therapy is an effective intervention that significantly reduce the perceived labor pain during the first stage of delivery, labor duration, and increase maternal satisfaction.* ***Recommendation:*** *the midwives should apply massage therapy safely and perform it within routine maternal care during labour.*
Keywords: labor pain, massage, labor duration, women's satisfaction, RCT.

I.   Introduction

One of the most special experience in women life is labor. The severity of labor pain is classified as one of the most severe pain which women undergo **(Nanji & Carvalho, 2020).** Thus, uncontrolled labor pain produces stress that negatively affect newborns as well as mothers **(Gönenç & Terzioğlu, 2020).** Positive childbearing experience is associated with women who receive maternity care, receive support, safety, and are able to be involved in making decisions with health care supporters **(Bohren, et al., 2020).** Accordingly, the women's emotional and physical needs are proven to be central to healthcare professionals and women **(Karlsdottira et al., 2018).**

In line with the process for apprising perinatal and maternal health protocols of healthy pregnant women for demanding pain relief during labor, the World Health Organization (WHO) sets a priority for carrying out manual techniques as well as massages for pain management **(WHO, 2018).** Massage is one of the world's oldest treatment. It is the systematic, mechanical stimulation of the body's soft tissues by applying a rhythmic set of pressure and stretching **(Larkinb et al., 2017).**

Tabatabaeichehr and Mortazavi (2020) found that the most critical pain a woman ever encounters is labor pain. Pain is an inevitable actuality of labor and the most notable determinant of the delivery experience. At present, several methods are used to reduce labor pain including non-pharmacological and pharmacological regiment. Using the oldest non-pharmacological technique "massage" will lead to the reduction of noradrenaline secretion and adrenaline and elevating the release of oxytocin and endorphins; therefore, reducing the childbirth duration and pain by increasing the uterine contractions **(Unalmis Erdogan et al., 2017).** Performing massage

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endorse pain relief and physical comfort. The nerve impulse generated by massage and pain compete for the same cerebral receptors; therefore, labor pain is expected to decrease when massage techniques are performed to women during labor **(Vargens et al., 2013)**.

Nilvér et al., (2017) reported that perinatal and serious maternal complications, and the decreased chances of spontaneous vaginal delivery are associated with longer duration of labor. The rate of cesarean delivery (CS) is growing globally, with a higher maternal morbidity and mortality rate. The rate of caesarean section (CS) births has increased significantly in Saudi Arabia in the last two decades, and one of the reasons leading to prolonged labor **(Alsulami et al., 2020)**. Non-pharmacological methods were related to increased maternal satisfaction with delivery, reductions in caesarean and instrumental delivery, a shortened duration of labor and the reduction of oxytocin and epidural analgesia use, **(Ngai & Xiao, 2020)**.

Akköz Çevik and Karaduman (2020) illustrated that sacral massage implementation during labor minimizes anxiety and labor pain; thus, enhancing satisfaction levels for women during delivery. **Bolbol-Haghighi et al., (2016)** pointed out that massage therapy decreases labor period in the first two stages and enhances Apgar score reading in first and fifth minutes. The complications emerged from extended labor time are massive; therefore, the employment of massage treatment is safe, in-expensive, easy and lead to shorter labor duration.

According to **Gönenç and Terzioğlu (2020),** the correct applying of massage therapy may reduce labor pain of women during all delivery phases and increases maternal satisfaction, therefore, massage approaches are proven to be safe in handling labor pain. Accordingly, the midwifes should be trained well to carry out massage techniques in a proper manner and the families of labored women should also be familiar and trained on how to perform massage and initiate a supportive environment to applicate massage techniques **(Bolbol-Haghighi et al., 2016)**.

The non- pharmacological methods which decrease pain and enhance comfort to pregnant women are the midwife's responsibility. **(Türkmen & Oran, 2020).** Consequently, Saudi Arabia, where non-evidence-based procedures are used, is seeking to improve health care. The Mother and Baby- Friendly Hospitals Initiative was initiated in 2018 by the Saudi health ministry. The initiative thrives to encourage the role of a balanced model of maternity care that supports the individual health needs and choices of women, such as the choice of non-pharmacological approaches for women to alleviate labor pain **(MOH, 2019).**

Significance of the study

This study is important for the midwifes who work in maternity hospitals. Also, it is in compliance with the ministry of health 2030 vision which aims to "safe and natural childbirth" in maternity program. At the time of this study, there are limited number of studies addressing the impacts of massage treatment on delivery satisfaction, labor period and the management of labor pain among parturient women in Saudi Arabia. Massage therapy during labor is not provided as a method of standardized care in Saudi Arabia, so this study will investigate the implementation of massage during labor as a method to improve maternal care in parturient women.

Aim of the study
This study aims to evaluate the effect of massage therapy on relieving labor pain, reducing labor duration and increase delivery satisfaction among parturient women.
Research Hypothesis

(1) Parturient women who receive massage therapy will have decreased labor pain during the first stage of delivery than those who do not.
(2) Parturient women who receive massage therapy will have a decrease duration of labor than those who do not.
(3) Parturient women who receive massage therapy will have increased satisfaction with labor than those who do not.

II.   Methodology
 Research Design
A randomized controlled trial was utilized to accomplish study's aims.
Variables
- An independent variable is a massage.
- Dependent variables are a labor pain, labor duration and delivery satisfaction of parturient women.

Operational Definition
1- Massage therapy- in this study, it refers to applying a rhythmic set of pressure and stretching on the sacral region between T10 and S4 by hand (palm and fingers) only without oil, lasted for (35 min).
2- labor pain, it refers to the pains that women feel during the contractions of childbirth.
3- labor duration, it refers to the time in hours and minutes that a woman spends during childbirth stages.
4- delivery satisfaction, it refers to the woman's feelings or attitudes toward the childbirth experience either positive or negative.
5- parturient women, it refers to the women who in the active phase (4–7 cm) and in transition (8–10 cm) phases of labor.

Setting
 The current study was carried out at the labor ward in Maternity and Children Hospital in Al Madinah Al Munawarh, Saudi Arabia.

Sampling
A sample of 60 parturient women who were undergone normal vaginal delivery. They were assigned randomly and divided alternatively into two equal groups, 30 women on each group. The study group was exposed to massage therapy, while the control group was only exposed to routine intrapartum hospital care.

Sample size
The estimated sample size was calculated to be 60 parturient women. The researcher calculated the number of the target population based on the flow rate of the subjects with this specific inclusion and exclusion criteria. level and ratio of case ⁄ control 1: 1. The sample size was equal to 60 women. The parturient women were assigned to one of the two groups (30 women in each group). The first group (study group or massage group) consisted of 30 women. The second group (control group) consisted of 30 women. So, the parturient women were selected according to the following criteria:

Inclusion criteria
- Participants aged from 18 to 45years.
- Primigravida and multiparous parturient with a low-risk pregnancy.
- A gestational age > 37 weeks.
- A single fetus in the cephalic position.
- Spontaneous onset of labor; cervical dilation of 4 to 5 cm (in active phase of labor).
- Appropriate uterine contractions for this phase which measured with CTG.

Exclusion criteria
The criteria for excluding the participants were:
- Development of any adverse medical disease such as diabetes mellitus and/or hypertension,
- Pregnancy complications such as placenta previa, placental abruption and preeclampsia,
- Psychological depression,
- Any possibility of previous surgery on the uterus and any fetal anomaly.
- women who not in active phase of labor.

Study Tools
Three tools were employed to collect data.
Tool I: An interviewing questionnaire:
Self-developed based on the review of the related literature, it covers two sections:
A- Participants' demographics data
It contains age, educational level, occupation, and residency.
B- Obstetric history data
It contains gestational age (weeks), parity, abortion, and number of children.
Tool II: Maternal assessment sheet:
A- visual analogue scale (VAS)
Which includes changes in pain intensity after the non-pharmacological interventions were applied to the study group. Pain intensity was indicated by the participant on a **visual analogue scale** (VAS) of 0 to 100 mm, the total time of labor was measured, in minutes, from admission to the end of labor, not including the time for release of the placenta, the types of visceral pain can have divided to, colicky, intermittent and severe **(Chaillet, Belaid, Crochetière, Roy, Gagné, Moutquin, Bonapace, 2014).**
B- Obstetric outcomes
The degree of cervical dilation, duration of first and second stage of labour were also used to determine whether the interventions delayed the administration of oxytocin further into labor, mode of delivery (normal vaginal delivery, cesarean section).

C- Maternal outcomes

Obstetric complications including intrapartum bleeding, failure progress of labor, maternal hypotension and premature rupture of membranes (PROM).

D- Maternal satisfaction

some questions were employed to indicate maternal satisfaction with the interventions. This questions include elements associated with the delivery experience. They address subjects' expectations toward the quality of care delivered by healthcare providers within active phase of labor, severity of pain during labor, labor experience and labor period **(Hajiamini et al., 2012).**

Scoring system

The maternal satisfaction questions were distributed after 5 hours of labor. Score was used to evaluate parturient women related to labor satisfaction. Questions were scored as followed 1 mark for (not satisfied) and 4 marks for (very satisfied). Summation of all questions (16 marks) and then cut acquired into two groups as follow:

1)The total score of each aspect equal 60% or more than → adequate or satisfactory

2)The total score of each aspect less than 60% → inadequate e or unsatisfactory

Tool III: Neonatal assessment sheet

Variables of birth weight, Apgar scores at 1 and 5 minutes, and the neonatal complications such as neonatal admission (NICU) were also determined.

Administrative and ethical considerations

Official letter from Taibah University College of Nursing and the IRB committee at health ministry was delivered to the responsible authorities at hospital (the hospital chief executive and the director of labor department). The approval to conduct this study was obtained after the demonstration of the aim of the study. The researcher informed the participants about the proposed study, aims, and expected outcomes; a cover letter containing this information was also given to the participants. The participants were also informed that if they chose not to participate, they can withdraw from the research at any time and the participants were also made aware that the rejection of involvement would not impact their care. Confidentiality and privacy of participants' information and data were maintained. All collected data are kept in a secured cabinet at the researcher's office and they will only be kept for five years after data collection.

Field work

- This study was carried out from October 2020 to the end of March 2021. Women who consented to take part in this work and who met the inclusion criteria were selected.
- After obtaining the ethical committee approval, the scope and the purpose of this study were explained to hospital's head nurse, nurses and midwives, and the charge nurse.
- The scope and the purpose of this study were explained to subjects agreed and consented to take part in this study. The subjects who met the selection criteria were made aware that their participation is entirely voluntarily. It worth mentioning here that no one from the participants requested withdrawal.
- Recruited participants were divided into two equal groups (30 women on each group). The first group received massage therapy and the control group received the routine hospital intrapartum care during delivery. the women in the study group were interviewed individually by the researcher during the first stage of labor. Massage therapy then was performed during the active phase of the first stage of labor and in the presence of the researcher to clarify any questions. Each session lasted 40 minutes.
- Administration of the first intervention was done when the participants reached 4 to 5 cm of cervical dilation. The researcher massaged the participants for 40 minutes, using rhythmic ascending kneading hand movements and a return with sliding through the lateral region of the trunk in association with sacral pressure. The technique was applied between T10 and S4. This area resembles the route of the pudendal nerve and the hypogastric plexus, which innervate the perineum, delivery canal and paravertebral ganglia. While performing massage, the intensity of the massage was determined by the subjects by inviting less or greater force. The subjects also indicated the idea position for massaging (standing with the trunk bending forward, lateral decubitus or sitting).
- Participants in control group were attended by the researcher during the period of 4 to 5 cm of cervical dilation, the control group received normal nursing care during labor; for example, offering fluids to avoid dehydration, motivating 2 times in an hour urine voiding, and observing the fetal condition and labor progress by using CTG.
- During the period of dilation, maternity routine assistance was offered to both groups according to the MOH recommendations. Avoid analgesic use or any medication which may interfere with uterine contraction during the study period.

- The participants in the experimental group were given a massage to the sacral region (30 min) in the active phase (4–7 cm) and (5 min) in transition (8–10 cm) phases of labor; in addition to the routine nursing care.
- Before discharged from the hospital, the researcher collected the participants' data from the official birth records of neonatal as well as participants' hospital charts.
- **Validity and reliability:** content and face validity to the questionnaire items were reviewed by Gynecology and Obstetrics expert nurse. All amendments made were taken into consideration.

Statistical analysis

Qualitative variables were expressed as frequency and percentage; quantitative variables were expressed as mean ± SD. Qualitative variables were compared using the Pearson χ2 test, continuity correctionχ2 test, and the Fisher exact test. Quantitative variables were compared using the Student t test, Mann–Whitney U test, analysis of variance, and the paired Student t test. All data were analyzed using SPSS version 17.0 (SPSS) and $P < 0.05$ was considered statistically significant.

III. Results

Table 1 Distribution of both massage and control groups according to their socio-demographics characteristic

Variables	Massage group (n=30)		Control group (n=30)		X^2	P-value
Age group	N	%	N	%		
18- 20 years	4	13.3	7	23.3		
21-30 years	19	63.3	14	46.7	94.5	0.000*
31- 40 years	5	16.7	3	10.0		
More than 40 years	2	6.7	6	20.0		
M±SD	28.6 ± 5.4		26.1 ± 5.5		t=3.3	0.001*
Educational level						
Illiterate	8	26.7	7	23.3		
Primary school	3	10.0	5	16.7	1.4	0.687
Secondary school	13	43.3	14	46.7		
University	6	20.0	4	13.3		
Occupation						
Housewife	16	53.3	18	60.0	2.4	0.078
worker	14	46.7	12	40.0		
Residency						
Urban	24	80.0	25	83.3	2.6	0.097
Rural	6	20.0	5	16.6		

* P < 0.05 (significant)

Table 1 demonstrates the distribution of both massage and control groups according to their socio-demographic characteristic. The table showed that two third (63.3%) massage group was in age ranged between (20-30) years old compared to (46.7%) of control group with a mean age of 28.6 ± 5.4 versus 26.1 ± 5.5. Differences observed are statistically significant (t=3.3 and 0.001*). As regards the level of education, the percentage of women with secondary or university education was higher in the massage group (63.3%) compared to (60.0%) of control group, but with no statistical significant difference. Regarding to occupation, more than half (53.3%) of the massage group as compared to (60.0%) of the control group were housewife. Finally, according to residence, about (80.0%) of massage group come from urban area. There are no statistical significant differences were seen between both massage and control groups in relation to occupation and residency.

Table 2 Distribution of both massage and control groups according to their obstetric history

Variables	Massage group (n=30)		Control group (n=30)		X^2	P-value
Gestational age **M±SD**	39.23±.56		38.31± .65		t=0.35	0.21
Parity						
Primipara	3	10.0	7	23.3		
2-4	2	6.7	20	66.7	151.0	0.000*
5-8	25	83.3	3	10.0		
Mean ± SD	5.2 ± 0.6		2.0 ± 0.8		t=30.2	0.000*
Abortion						
Yes	16	53.3	8	26.7	16.4	0.001*
No	14	46.7	22	73.3		
Number of children						
0	6	20.0	5	16.7		
1-3	13	43.3	11	36.7	0.083	0.772
4-6	9	30.0	10	33.3		
> 7	2	6.7	4	13.3		

* P-value < *0.05 (significant)*

Table 2 reveals the distribution of both massage and control groups according to their obstetric history. As regards gestational age, it was observed that the mean gestational age for the massage group (39.23±.56) compared to (38.31± .65) for the control group. There are no statistical significant differences were seen between both groups in relation to the mean gestational age. Regarding parity, women had statistically high mean number of para (5.2 ± 0.6) of massage group compared to women with low parity 2.0 ± 0.8 of control group (P=0.000). As for the history of previous abortion, they had a higher percentage of abortion (53.3%) of massage group compared to 26.7% in the control group, with statistical significant difference (p=0.001). Concerning to the number of children, (43.3%) of the massage group compared to (36.7%) of the control group have children from 1-3 and there was no statistically significant difference between the two studies group.
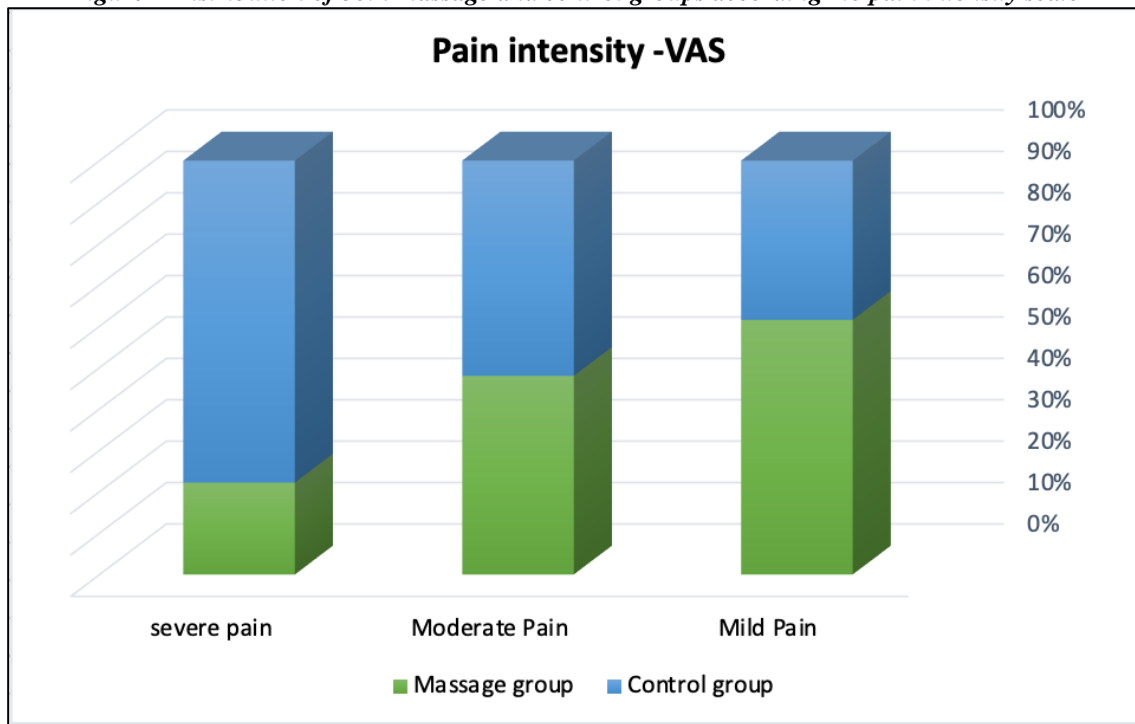
Table 3 Distribution of both massage and control groups according to obstetrical outcomes

Variables	Massage group (n=30)		Control group (n=30)		X^2	P-value
Duration of the delivery	M±SD		M±SD			
Duration of first stage of Labour, hours	7.96±5.31		10.46±3.71		t=3.86	.0001
Duration of second stage of labour, minute	24.6±12.7		31.7±20.5		t=2.96	0.003
Cervical dilation at admission	N	%	N	%		
4 cm – 5 cm	27	90.0	25	83.3	0.82	0.414
≥ 6cm	3	10.0	5	16.7		
Oxytocin						
Yes	8	26.7	9	30.0	0.27	0.606
No	22	73.3	21	70.0		
Mode of delivery						
Cesarean section	4	13.3	14	46.7	30.3	0.000*
SVD	26	86.7	16	53.3		

Data concerning the obstetrical outcomes between the massage and control group are presented in **table 3**. As regards the duration of the first and second stage of labor, the mean duration of the first stage of labor from admission time to 10 cm cervical dilation per hour of the massage group was (7.96±5.31) compared to (10.46±3.71) of the control group, and there was a statistically significant difference observed between the two studied groups (p=<0.0001). Moreover, the mean duration of the second stage of labor (per min) between the massage group and control group were (24.6±12.7and 31.7± 20.5) respectively with a statistically significant difference observed between the two studied groups (p=0.003). On the other hand, the cervical dilation at admission 4 cm – 5 cm was (90.0%) for the massage group compared to (83.3%) for the control group. As regrades to the administration of oxytocin, (26.7%) of massage group took oxytocin compared to (30.0%) of the control group, with no statistically significant difference observed between the two studied groups. Furthermore,

the majority (86.7%) of the massage group compared to (53.3%) of the control group had a spontaneous vaginal delivery, differences observed are statistically significant between the studies group (p= 0.000*).

Figure 1 Distribution of both massage and control groups according   to pain intensity scale

Figure1 represented the distribution of both massage and control groups according   to pain intensity scale, the majority (93.4%) of massage group have mild and moderate pain compared to 76.6% of control group, and (6.7%) of massage group have severe pain compared to 23.3% of control group with a statistically significant difference observed between the two studied groups (p=.001).

Table 4 Distribution of both massage and control groups according to maternal outcomes

Variables	Massage group (n=30)		Control group (n=30)		X^2	P-value
	N	%	N	%		
Intrapartum bleeding						
Yes	3	10.0	4	13.3	3.2	0.068
No	27	90.0	26	86.7		
Failure progress of labour						
Yes	1	3.3	2	6.7	2.4	0.078
No	29	96.7	28	93.3		
Maternal hypotension						
Yes	4	13.3	5	16.7	2.2	0.527
No	26	86.7	25	83.3		
PROM						
Yes	2	6.7	3	10.0	1.3	0.627
No	28	93.3	27	90.0		

Table 4 shows the distribution of both massage and control groups according to maternal outcomes. The table illustrations that the percentage of intrapartum bleeding (10.0%), the failure progress of labour (3.3%), maternal hypotension (13.3%) and PROM (6.7%) of massage group compared to in the control group were 13.3%, 6.7%, 16.7% and 10.0% respectively, there is no statistical significant differences were seen between both study and control groups in relation to above mentioned maternal outcomes.
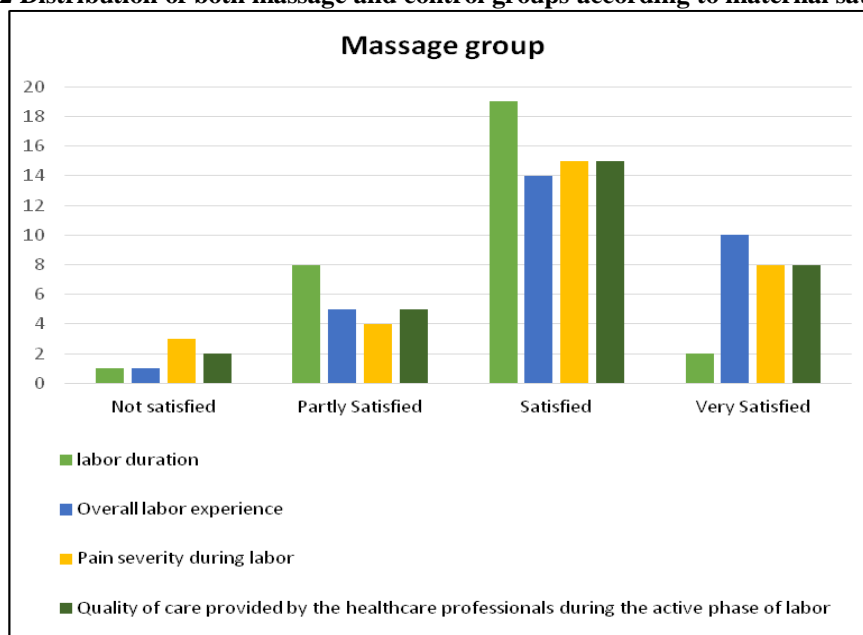
Table 5 Distribution of both massage and control groups according to neonatal outcomes

| Variables	Massage group (n=30)		Control group (n=30)		X^2	P-value
	N	%	N	%		
Body weight						
Birth weight ≥ 2. 500 kg	25	83.3	23	76.7	3.8	0.150
Birth weight ≤ 2. 500 kg	5	16.7	7	23.3		
M±SD	2987.37±462.78		2875.15±372.35		t=0.435	0.908
Apgar scores						
Apgar scores at 1 ≤ 7 minute	4	13.3	11	36.7	14.1	0.001*
Apgar scores at 1 ≥ 7 minute	26	86.7	19	63.3		
M±SD	8.55 ±0.74		7.82 ± 0.93		t=0.332	0.97
Apgar scores at 5 ≤ 7 minute	2	6.7	9	30.0	19.9	0.000*
Apgar scores at 5 ≥ 7 minute	28	93.3	21	70.0		
M±SD	9.37 ± 0.71		8.91 ± 0.90		t=1.7	0.086
Admission to NICU						
Yes	5	16.7	7	23.3	1.5	0.630
No	25	83.3	23	76.7		

* P-value (0.05)

Table 5 illustrate neonatal outcomes among massage and control groups. The table shows that the mean neonatal weight was (2987.37±462.78) in the massage group compared to (2875.15±372.35) in the control group, and there were no statistical differences. on the other hand, there were neonates with Apgar at 1 minute with a mean (8.55 ±0.74) for the massage group compared to (7.82 ± 0.93) and at 5-minute scores with a mean (9.37 ± 0.71) of the massage group compared to (8.91 ± 0.90) of the control group, and there were observed statistically significant differences between the two studied groups (p=<0.0001). According to the neonate needed admission to NICU, (16.7%) of the massage group needed admission to NICU compared to 23.3% neonate of the control group and there were no statistical significance differences (p= 0.63). Finally, there is no neonatal mortality between the two study groups.

Figure 2 Distribution of both massage and control groups according to maternal satisfaction
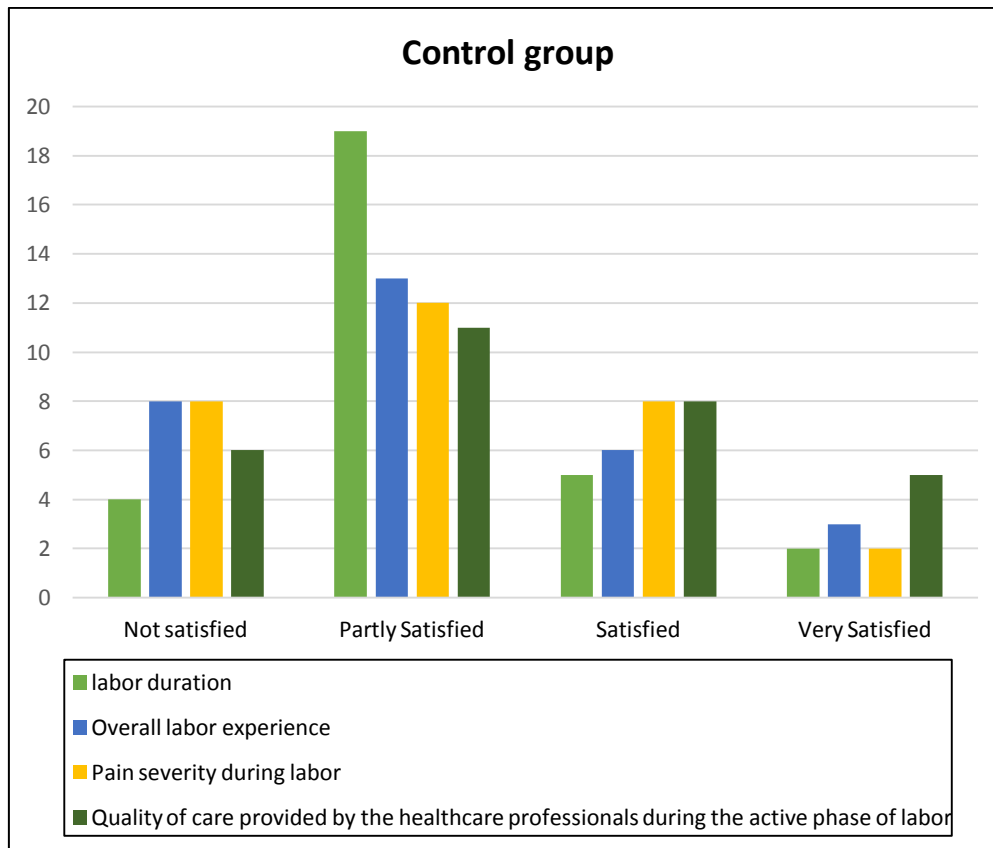
Figure 2 demonstrates the distribution of both massage and control groups according to maternal satisfaction. As regards to labor duration, two third 19 (63.3%) of the massage group were satisfied about labour duration compared to 5 (16.7%) of control group. According to overall labor experience, 14 (46.7%) of the massage group were satisfied about labour experience compared to 6 (20.0%) of the control group, Moreover, the pain severity during labor was 15 (50.0%) of the massage group compared to 8 (26.7%) in control group were satisfied related to severity of pain during labour. Regarding the quality of care provided by the healthcare professionals during the active phase of labor, 15 (50.0%) of the massage group were satisfied compared to 5 (16.7%) of control group were satisfied regarding the quality of care. There are a statistical significant differences were seen between both massage and control groups in relation to labour duration, overall labor experience, pain severity during labour and quality of care during active phase of labour.

IV. Discussion

Labor is one of the humans' physiological behaviors that has existed since the beginning of humanity, in which the formation cycle has remained unchanged. Labor is a health state that most women aspire to at some point in their lives. The first thought that comes to the mind of an expecting woman regarding her delivery is the pain of labor **(Çevik & Karaduman, 2020)**. Massage is an old technique that is widely used in childbirth and can decrease the childbirth pain and increase the endorphins and oxytocin release, thus reducing the childbirth duration by increasing the uterine contractions **(Bolbol-Haghighi et al., 2016)**. So, the goal of this research was to evaluate the effect of massage therapy on relieving labor pain, reducing labor duration, and increase delivery satisfaction among parturient women

This study has shown that the mean age of the women in massage group were 28.6 years compared to 26.1 years of control group. Differences observed are statistically significant. Similar study was conducted by **Gonenc & Terzioglu (2020)** who reported that the mean maternal age was of 23.4 years of study group compared to 22.4 years of control group. As regards to the level of education, more than two third of the massage group as compared to the control group were secondary or university education. This is in line with **(Bolbol-Haghighi et al., 2016)** who found that the number of women with high school diploma and upper education in massage group was significantly higher than the control group.

The present study showed that there was a statistical significance difference regarding to mean gestational age between massage and control group. Similar study conducted by **Gonenc & Terzioglu (2020)** highlight that more than three quarters (79.2%) did not reach the 40th gestational week of pregnancy, and the

majority of pregnancies were planned. Almost all participants reported that they did not attend any antenatal preparatory training or had education about how to deal with labor.

As regards pain intensity, the majority of massage group have mild and moderate pain compared to 76.6% of control group, and (6.7%) of massage group have severe pain compared to 23.3% of control group with a statistically significant difference observed between the two studied groups. This result coincided with **Santana et al., (2016)** demonstrated that non-pharmacological interventions to decrease pain severity were enough to allow women in labor to reduce their use of analgesic medication. Specifically, the massage was able to significantly reduce pain severity at 4 to 5 cm of cervical dilation. Massage significantly reduced pain severity between the study and the control group. Another study that was carried out by **(Bonapace et al., 2018)** showed that the labor pain intensity is one of the most severe pain that almost all women experience during labor which may have some adverse effects on newborns as well as mothers. The same study found that the massage therapy significantly reduced pain severity between massage and control group.

The current study found a statistical significant difference on the shortening of duration of the first stage of labor from admission time to 10 cm cervical dilation per hour between massage and control group. Moreover, the mean duration of the second stage of labor (per min) between massage group and control group showed statistical significance difference. These results were similar to **Bolbol-Haghighi et al., (2016)** who stressed that the duration of first stage of labor and also the duration of second stage of labor in massage group was significantly shorter than the control group. Also, **(Keshavarz, et al., 2015)** confirmed that the average duration of labor first and second stage in massage receivers was significantly lower than the subjects of control group.

Furthermore, (**Türkmen & Oran, 2020**) reported reduce labor duration, risk of caesarean section and need for epidural, while having no association with the increased need for interventions or negative effects on the mother and fetus. Moreover, **(Gallo, Santana et al., 2018)** reviewed the effects of massage on labor in six randomized controlled studies; the study observed reduced pain in the first phase of labor with no differences in the proportion of vaginal deliveries, caesarean sections, or neonate admissions to the intensive care unit. This contrast with, **Khavandizadeh Aghdam, & Kazemzadeh, Nikjoo, (2015)** who reported shortening of duration of labor in first and second stages, the mean duration of labor in the massage group were significantly higher than the control group.

In addition, **Türkmen & Oran, (2020)** found in a study about the effect of massage on pain and anxiety during childbirth has no significant difference during childbirth in massage therapy and control groups regarding duration of labor; however, a slight increase was reported in the first stage of labor in massage therapy group.

As regrades to mode of delivery, the majority of massage group compared to control group had spontaneous vaginal delivery, the differences observed are statistically significance. Similar study was conducted by **Ranjbaran, et al., (2017)** recommended that the decreases of utilization of analgesics, epidural anesthesia in labor, and reducing childbirth with cesarean and instruments, and women in massage group had spontaneous vaginal delivery than the control group. However, **(Bolbol-Haghighi et al., 2016)** emphasized that women who delivered by caesarean due to abnormal events, such as decrease in fetal heart rate or dystocia in the massage therapy group was lower than the control group; although, the difference was not statistically significant. In support of this finding, **Nilvér et al., (2017)** found significant difference between the two study groups in relation to the type of childbirth, the study also reported that active management of childbirth may decrease the labor duration and reduce the cesarean rates in all cases.

Additionally, **Bonapace et al., (2018)** claimed that the increased childbirth interventions such as cesarean can be explained in relation to the use of partogram. The reason for this increase could be related to the stricter monitoring of labor, faster decision making and preventive measures in order to decrease the labor duration. Finally, **Bolbol-Haghighi et al., (2016)** showed that no statistical significance difference between massage and control group regarding the number of maternal infections, perineal trauma, use of oxytocin, caesarean sections or vaginal deliveries.

In this study, there were no statistical significance differences between the massage and control groups regarding to adverse effects on obstetric outcomes. On the same line **Inga et al., (2018)** reported that the interventions group did not have any discernible adverse effects on obstetric outcomes, as the failure progress of labor, maternal hypotension with no significant effects on the path of delivery, status of the perineum, or frequency of obstetric complications. Neonatal outcomes were better when the series of interventions was applied to the mother. Specifically, the likelihood of respiratory distress was reduced by 15%.

Concerning neonatal outcomes, there were neonate with good Apgar at 1 minute and at 5 minutes' scores and there were a statistical significance differences between the two studies groups. Also, one third of control group had neonate needed admission to (NICU) compared to the massage group and there were no statistical significance differences. Finally, there is no risk of respiratory distress syndrome and neonatal mortality between the two study groups. These results were similar to **Gallo et al., (2018)** highlighted that the risk of respiratory distress among neonates and admission to (NICU) was significantly reduced in the experimental group. This result means that for every seven women treated with the series of experimental

interventions, one neonate will avoid respiratory distress who would otherwise have experienced it. There is considerable uncertainty around this estimate of seven women, as seen in the confidence interval, which ranges from three to 31. However, the result is reinforced by the Apgar scores, where the neonates in the experimental group had significantly better scores at both 1 minute and 5 minutes, and there were no significant differences among any of the other obstetric and neonatal outcomes.

In alignment with findings of this research, **(Karlsdottir et al., 2018)** found that Apgar scores at the first minute and fifth minute were both significantly better in the experimental group than the control group. While all of these statistically significant benefits for the neonate were associated with substantial uncertainty (with confidence intervals spanning down to trivial benefits), as the results support the idea that the interventions were safe and probably beneficial for the neonates. In the study by **Keshavarz et al. (2015)** reported improved Apgar scores at minutes 1 and 5 in massage therapy group compared to control group. Also, supportive treatment had increased the first minute Apgar significantly. Considering the shortening of labor in first and second stages, it is evident that Apgar scores in the massage therapy group were significantly higher than the control group.

In the present study, there was a statistical significant differences observed regarding maternal satisfaction about labor duration, overall labor experience and the pain severity during labor, among the massage group and control group. Moreover, a statistical significant difference was observed regarding to the quality of care provided by the healthcare professionals during the active phase of labor. Also, this was asserted by **Gallo et al., (2018)** who noted that maternal satisfaction with the duration of labor, and with the overall labor experience were significantly higher on the 4-point maternal satisfaction questionnaire. Maternal satisfaction with pain severity during labor was also significantly higher. Maternal satisfaction with the duration of the expulsion period was 0.4 points higher, which was of borderline statistical significance. Maternal satisfaction with the quality of care, however, was not significantly different between the two groups.

V. Limitations

The subsequent limitations of the study have to be considered. This study was conducted in single hospital on a homogeneous population. some women who received analgesia or epidural anesthesia were excluded from the study because of the potential effects of these medications on labor pain, labor time, and satisfaction. Therefore, the effects of massage on those concurrently using analgesia or anesthesia in labor were not evaluated. Also the sample size was small in this study. So these findings may not be generalizable to different populations. Finally, a future study should investigate this issue.

VI. Conclusion

Massage can be used as an efficient treatment of pain relief during labour according to the current findings, also massage intervention significantly reduce labor duration of the first and second stage of labour and the interventions effectively increased maternal satisfaction. So, the study's results will contribute to supporting the maternity program's orientations. Therefore, the following conclusions may be drawn based on these findings, Massage interventions are a safe approach for women to use to manage labor pain.

NURSING IMPLICATION AND RECOMMENDATION

This study recommends that massage intervention is a safe approach for women to manage labor pain, so families should receive training on how to perform massage during the antenatal period. Also, primary care personnel who are attendant to women during labor should be properly trained in massage method to provide good care to women in labor Moreover, the midwives should implement an educational program for women during labor on how to perform the massage therapy safely. Finally, further studies are recommended to investigate the effect of massage during labor.

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