

Effect of Warm Compresses Versus Lubricated Massage during the Second Stage of Labor on Perineal Outcomes among Primiparous Women

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Abstract:

Background: Numerous parturient women suffer from perineal trauma during vaginal delivery. Perineal trauma is mostly coupled with pain and serious long life complications. Consequently, prevention of perineal trauma become an urgent need. This study aimed to compare the effect of warm compresses versus lubricated massage during the second stage of labor on perineal outcomes among primiparous women.

Methods: A quasi-experimental design was utilized. Setting: The study was conducted at labor room in Beni-Suef general hospital, Beni-Suef city. A convenience sample of 304 parturient women undergoing normal vaginal delivery was randomly assigned to three groups warm compresses group (102 women), lubricated massage group (102 women) and control group (100 women). Three tools were used for data collection; 1) structured interview schedule to collect data about the women' demographic data, and their current pregnancy profile, 2) second stage and perineal outcome assessment sheet, 3) pain assessment tools, it involves two parts, pain analogue scale and behavioral pain scale.

Results: There were no significant differences between the three groups as regards the rate of intact perineum, spontaneous tears not requiring repair, tear requiring repair and episiotomy ($P = 0.174, 0.111, 0.114$ and 0.660) respectively. In contrast, a significant difference was observed between the lubricated massage, warm compresses and control groups in favor of the former as regards the degree of tears ($P = 0.012$). Perineal pain intensity and behavioral response parameters significantly reduced among the warm compress and lubricated massage groups 15 minutes after starting the intervention ($P = 0.000$) with a significant difference between the three groups.

Conclusion: Perineal warm compresses and lubricated massage didn't significantly decreased the rate of episiotomy and genital tract tears, but they significantly reduced the degree of tears and the degree of extension of episiotomy, when compared to control group. Lubricated massage was more effective than warm compresses in this respect. Perineal pain intensity and behavioral pain response parameters had significantly reduced in lubricated massage and warm compresses groups than the control group.

Recommendation: All governmental hospitals should provide adequately planned in-service training programs for maternity nurses regarding the benefits of warm compresses and lubricated massage during the second stage of labor in order to develop their best practice.

Keyword: Warm compresses, perineal massage, Perineal outcomes, Primiparous women.

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I. Introduction

The process of childbirth is lauded by numerous physical and psychological stressors. These stressors begin from the beginning of the first stage of labor and reach its maximum at the 2nd stage which is considered the climax of the birthing process. The most important sources of stress are the severe abdominal and back pain associated with spontaneous and uncontrolled uterine contractions, severe perineal pain associated stretching and tears of the perineal area and pelvic floor muscles [1]. The second stage of labor starts with the full cervical dilatation and ends with fetal expulsion. Signs of approaching 2nd stage of labor include: uncontrollable urge to push, diaphoresis, flushing of the face, yelling sound, lost concentration, and bulging of the anus and perineum. Perineal trauma and tears are the most common complications that could occur during 2nd stage of labor. Perineal tears include any spontaneous or induced (episiotomy) injury to the perineal area or pelvic floor muscles during the 2nd stage of labor [2].

Although episiotomy is extensively used in most of the health facilities to reduce the risk for spontaneous perineal tears, it has numerous short and long-term complications. Short-term complications involve: perineal lacerations, hemorrhage, wound edema or infection, extension of episiotomy to the rectum, hematoma, dehiscence, and pain. The long-term complications include anorectal dysfunction, urinary incontinence, genital prolapse, sexual problems and pelvic pain. Accordingly, episiotomy should be used when indicated only, not as a routine [3].

Perineal tears can be categorized in its severity to four degrees. First degree occurs when the laceration includes only the fourchette, superficial perineal skin and /or vaginal mucosa. The 2nd degree perineal tears occur when the laceration extends behind the fourchette, vaginal mucosa and /or perineal skin to include fascia and perineal muscles but it does not reach the anal sphincter. In the 3rd degree perineal tears the fourchette, vaginal mucosa, perineal skin, muscles and anal sphincters are included. The 4th degree perineal tear is diagnosed when the tear extends to not only anal sphincter but also the rectal mucosa which is torn [4].

The incidence of 3rd and 4th degree perineal tears differ from country to another as it ranged from 0.1% in China, India and Cambodia to 15% in Philippines. The incidence is also ranged from Null to 76.3% according to the type of health care facilities [5]. A study conducted in England concluded that the prevalence of perineal tear among primiparous women was 91.4% included all degrees of perineal tears and episiotomy. The prevalence was much lower among multiparous women 68.8%. They correlated the higher rate of perineal tears with having birth in community settings such as maternal and child health services [6]. The exact incidence of perineal tears in Egypt as a whole is unavailable, but there are some scattered small studies which investigated the incidence of perineal tears in some Egyptian areas. According to a recent study conducted at Zagazig /Egypt about the risk factors for perineal tears among low-risk parturient women, reported that 27% of the subjects had spontaneous perineal tears (second degree and more) and 16% had intentional tears (episiotomy). So the total incidence among the study sample was 43% [7].

Perineal tear is multifactorial and has numerous predisposing factors. These predisposing factors include primiparity, abnormal presentations, macrosomic baby, instrumental delivery, occipito-posterior position, and previous episiotomy especially median type. Smith et al. correlated the incidence of 3rd and 4th degree perineal tears to directed pouching technique, birthing in an upright position, and prolonged 2nd stage [6]. Other risk factors were also identified, such as precipitated labor, old or young age, previous perineal trauma, fundal pressure during 2nd stage and frequent vaginal examination [7].

Healing and prognosis of perineal tears depend on its degree of tears as well as the skills in its repair. Usually, first and second degree perineal tears have good prognosis and have no long term complications. While, 3rd and 4th degree perineal tears are severe, have poor prognosis and numerous sever long term complications. These complications include but not limited to: wound dehiscence, vaginal hematoma vesico-vaginal fistula, recto-vaginal fistula, recto-cutaneous fistula, fecal incontinence, stress incontinence, fecal urgency, perineal abscess and dyspareunia [4].

As previously mentioned, Perineal tears are serious problems that have sever and long term complications. So, it's prevention is much better than treatment. Most of the trials done to prevent perineal tears concluded a positive correlation between perineal muscle elasticity, perineal blood supply, perineal lubrication during the 2nd stage and decreased rate of perineal tears and pain [2,4].

The worst pain that any women may endure in her life is the labor pain. The labor pain is mostly intolerable and reaches its peak during the 2nd stage of labor [8]. The sever stretching of the perineal tissues at the second stage and mostly at crowning add more burden to the women. Perineal pain is not limited to the second stage only as it may persist following childbirth and beyond the postpartum period. It has serious consequences as hindering the women' movement. Many parturient women reported perineal pain when, standing, walking, and while taking care of the baby or breastfeeding [9,10]. The inevitability of effective pain relief methods especially for the perineum had directed the obstetricians, midwives and nurses to conduct researches in this issue [8].

At the international nurse's day 2012, the International Council of Nurses emphasized that nurses and midwives should use economical, reliable, easy-to-use and beneficial practices in order to minimize the adverse effects of the patients' problems [11]. They can use many approaches and strategies to prevent perineal tears. Those strategies include perineal muscle exercises, hand on (perineal supports), hand off techniques, perineal massage during antenatal period or during labor, warm compresses, cold application, and increasing the perineal area lubrication during the 2nd stage of labor. Each of one of these strategies may be used alone or in combination with another one. Massage and perineal lubrication are mostly used together [2].

The mechanism of action for massage is documented in some researches. It is assumed to increase the tissues blood supply, increase the tissue elasticity, increase the release of internal endorphin (pain reliever), and the lubricant facilitates the delivery of fetal head [12,13,14]. Warm compresses are known to increase the tissues blood supply, and facilitate the removal of waste products and oxidative agents from the tissues. Warm sensation is also known to make dermal stimulation that decreases the pain perception. It also can induce relaxation and reduce the nerve tension [15].

1.2. Significance of the Study

Perineal tear is a serious health problem that leads to serious long term complications that negatively affect the women physical, psychological and social health. Accordingly, serious actions should be taken to prevent it as possible. Many types of research had been done in this respect, but they have contradicting results. The use of lubricated massage or warm compresses to prevent or decrease the incidence and degree of perineal tear and pain is still controversial. Some researchers support and recommend the use of perineal massage [15,16] and other researchers reported no benefits for its use [12,17]. Also, some researchers recommended the use of warm compresses [15,16,18] and others found it with limited or no benefits [19]. These contradictory results necessitate several studies to fill the gap in this respect.

1.3. Operational Definition

- Perineal outcomes in this study refer to the perineal condition after baby expulsion (intact perineum, episiotomy with no or mild extension, episiotomy with marked extension, tears, degree of tears and degree of perineal pain during the 2nd stage of labor).

1.4. Aim of the Study

This study aimed to compare the effect of warm compresses versus lubricated massage during the second stage of labor on perineal outcomes among primiparous women.

1.5. Research Hypotheses

- H0: Parturient women who receive warm compresses or lubricated massage will experience similar perineal outcomes and pain during the 2nd stage of labor as those who receive routine hospital care.
- H1: Parturient women who receive warm compresses will experience lower adverse perineal outcomes and pain during the 2nd stage of labor than those who receive the lubricated massage or routine hospital care.
- H2: Parturient women who receive lubricated massage will experience lower adverse perineal outcomes and pain during the 2nd stage of labor than those who receive warm compresses or routine hospital care.
- H3: Parturient women who receive warm compresses or lubricated massage will experience lower adverse perineal outcomes and pain during the 2nd stage of labor than those who receive routine hospital care.

II. Subjects and Methods

2.1. Research Design: A quasi-experimental design was utilized to fulfill the aim of this study.

2.2. Setting: The study was conducted at labor room, in obstetrics and gynecology department, at Beni-Suef general hospital, Beni-Suef city.

2.3. Subject Type and Criteria: A convenience sample of 304 parturient women undergoing vaginal delivery were recruited for the study according to the following inclusion criteria; full term (37- 42 weeks), normal pregnancy (did not have medical complications) singleton, vertex presentation, did not have contraindication for normal labor, in the active phase of labor and agree to contribute in the study.

2.4. Subject Size: The subject size was calculated based on the previous year census report of Beni-Suef general hospital. The total number of primiparous parturient women in the previous year were 1234 women. Sample size was calculated using Yamane formula [20].

$$n = \frac{N}{1+N(e)^2}$$

Where: n = sample size, N = total population number (1234), e = margin error (0.05)

The 304 women were randomly assigned to warm compresses group (102 women), lubricated massage group (102 women) and control group (100 women).

2.5. Tools of Data Collection

2.5.1. Tool 1: Structured interview schedule. It involves two main parts:

Part 1: Demographic data of the parturient women such as; age, occupation, education, and residence.

Part 2: Current pregnancy profile such as; gestational age, fundal height, body weight and height.

2.5.2. Tool 2: Second stage and perineal outcome assessment sheet: It includes two main parts:

Part 1: Second stage and newborn babies' characteristics as: progress of labor, time of beginning oxytocin, duration of the 2nd stage (min), and newborn' birth weight (kg), and newborn' head circumference (cm).

Part 2: Perineal outcome assessment sheet: It incorporates perineal condition after labor (intact, episiotomy, or tears), degree and region of tears.

2.5.3. Tool 3: Pain assessment tools. It involved two parts

Part 1: Pain analogue scale: It is adopted from Mc Caffery and Pasero [21]. The tool is a horizontal line divided by number with equal distance. It ranged from 0 (no pain) to 10 (worst pain) in between the two extreme points the line is numbered on equal distances (1cm): mild pain (1,2), moderate (3,4), sever (5,6) very sever (7,8) and worst pain (9,10). Each degree of pain is elaborated with a picture for the associated facial expressions.

Part 2: Behavioral Pain Scale (BPS): It is adopted from Mateo and Krenzischek [22]. It is used to evaluate the behavioral response to pain. It asses four parameters of behavioral responses to pain: tense muscles (relaxed muscles, slightly tense, moderate tense and severe tense), restlessness (quiet, slightly restless, moderate restless and very restless) grimacing (no grimacing, some grimacing, moderate grimacing and constant grimacing) and sound (normal sound, groans/moans, groans/moans loudly and cry out or sobs). For each category one of the four alternatives had been chosen by the researcher after assessment.

2.6. Tools Validity: All tools were tested for content validity by a jury of four expertise in the woman health nursing and one from biostatistics field to ascertain its relevance and completeness.

2.7. Tools Reliability: Reliability of the second tool (second stage and perineal outcome assessment sheet) was evaluated by using Cronbach's Alpha coefficient test. The tool consisted of relatively homogeneous items as indicated by the high reliability. Internal consistency of the second tool = 0.81. Tool three was adopted as it is so it has standardized validity and reliability.

2.8. Pilot Study: A pilot study was conducted on 10.0% of the total subjects (30 parturient women) to test the clarity and applicability of the study tools. Participants included in the pilot study were excluded from the study subjects.

2.9. Ethical Consideration: After approval of the research from the nursing college / Beni-Suef University, an official letter was directed from nursing college to the head of Beni-Suef general hospital in order to get his approval to conduct the study after clarifying its aim. Then oral consent was taken from each parturient woman after clarification of the study aim and interventions. Each woman was assured about the confidentiality of her data, her right to refuse participation and her right to withdraw from the study without any consequences.

2.10. Filed Work:

Data collection was done over a period of six months from the beginning of December 2016 till the end of May 2017. For the three groups, the first tool was collected from the medical records during the 1st stage of labor after explaining the study aim and taking oral consent. If some data missed from the medical records the researcher collect it through individual interview. Weight and height were also measured during the first stage. Second and third tool were completed during the 2nd stage of labor. Pain assessment was done two times: at complete cervical dilatation (before the beginning of intervention) and 15 minutes after the intervention.

For group one: (warm compresses group), warm compresses were applied on the perineal area and vulva using a sterile dressing that immersed in a sterile basin of warm water (water temperature at 38°C) and squeezed to release excess water. The water temperature is checked using a glass thermometer. The warm water is changed frequently to assure suitable temperature. The compresses used from the beginning of the 2nd stage until crowning. The perineum is supported using a warm towel during neonatal head expulsion.

For group two: (lubricated massage): at complete cervical dilatation the researcher put five milliliters of KY gel (water-soluble lubricant) on the two index and middle fingers. Then she began to massage the perineum in U shape reciprocal movement. Five milliliters KY gel were introduced also inside the vagina with massaging of the vaginal wall toward the rectum up and down. The massaging process was intermittent through all the duration of the 2nd stage even during the period of contraction and at crowning. The interval between messaging sessions was 5 minutes.

For group three: (control group), the women received the routine care provided by the hospital. In the routine care, the physician makes gentle pressure on the lower wall of the vagina using the index and middle fingers till crowning occurs. The head flexion is also maintained during its expulsion.

At the end of the 2nd stage the three groups were assessed for the presence of episiotomy, genital tract tears and lacerations, region and degree of tears, the degree of extension of an episiotomy. Also, the newborn' weight and newborn' head circumference were also assessed.

2.11. Statistical Analysis

Statistical package for social science (SPSS) version 20 was used to analyze data. Descriptive statistics as numbers, percentage, mean and standard deviations were used to describe the characteristics of the study subjects. Chi-square test, fisher's exact tests and one-way ANOVA test were used to test significance between the three groups. The level of significance was considered at $p\text{-value} \leq 0.05$. A highly statistically significant difference was considered at $p\text{-value} \leq 0.001$.

III. Results

Table (1) shows that there were no significant differences between the three groups in any of their demographic characteristics. Where the mean ages were 23.76 ± 6.21 , 25.26 ± 6.87 and 24.78 ± 5.57 years for warm compresses, lubricated massage, and control groups, respectively. The largest proportion of the three groups had secondary education as it's percent was 45.1%, 47.1% and 42% for the three groups, respectively. Around half of the three groups 56.9%, 58.8% and 50%, respectively, were housewives. Also, 64.7%, 52.9% and 60% of the three groups, respectively, were resident in urban areas.

Table (2) portrays the mean differences of anthropometric measurements and current pregnancy profile among the studied groups. There were no significant differences between the three groups in the mean of their weight, height, gestational age and fundal height. The mean weight was 83.60 ± 9.95 kg in the warm compresses group, 82.13 ± 9.37 kg in the lubricated massage group and 81.74 ± 8.18 kg in the control group. Also, the mean height was 158.60 ± 4.98 cm, 160.09 ± 5.83 cm and 159.96 ± 4.77 cm in warm compresses, lubricated massage and control groups, respectively. The mean gestational age was 38.25 ± 3.95 , 39.15 ± 2.16 and 39.00 ± 1.83 weeks in the three groups, respectively. Moreover, the fundal height was 33.25 ± 2.01 cm in warm compresses group, 33.50 ± 1.97 cm in lubricated massage group and 33.32 ± 1.63 cm in the control group.

It is obvious from **table (3)** that there were no statistically significant differences between the three groups in their 2nd stage and newborns' characteristics. Regarding labor progress, the accelerated labor represents 66.7%, 72.5% and 60% among warm compress, lubricated massage and control groups, respectively. Small proportions (16.7%, 9.8% and 8.8%) of the three groups started oxytocin during the 2nd stage. The mean duration of the 2nd stage was 68.17 ± 12.78 minutes for warm compresses group, 67.23 ± 15.41 minutes for lubricated massage group and 68.94 ± 15.13 minutes for the control group. The mean newborn' birth weight was 3.05 ± 0.212 , 3.01 ± 0.375 and 3.01 ± 0.282 kg for warm compress, lubricated massage and control groups, respectively. Also, the mean newborn' head circumference is 32.91 ± 1.19 cm for warm compresses group, 32.53 ± 2.22 cm for lubricated massage group and 32.90 ± 2.48 cm for the control group.

Table (4) compares the perineal outcomes after labor among the studied groups. It was clear that an intact perineum was observed only in 2.9% in lubricated massage group compared to 1% in warm compresses group and none in control group, with no significant differences between the studied groups as regards intact perineum ($P= 0.174$). Although lubricated massage was appeared to be more effective in decreasing the incidence of tears than warm compresses and routine hospital care, there were no significant differences between the three groups, as regards the incidence of tear not requiring repair and tear requiring repair and

episiotomy (P= 0.111, 0.114 and 0.660), respectively. On the other hand, there were highly statistically significant differences (P= 0.000) between the three groups when considering the extension of an episiotomy in favor of lubricated massage. Where the episiotomy with 2nd degree or marked extension occurred in 25.5% in warm compresses group, and 19.6% in lubricated massage group compared to 48% in control group.

Figure (1) shows that, among those who had perineal tears and extension of an episiotomy, it was found that, 2nd degree tears are the most common among the three groups. It was found in 28.2% in warm compresses group, and 20.4% in lubricated massage group compared to 52.4% in control group. Furthermore, a significant difference was observed between the studied groups as regards the degree of perineal tears in the favor of lubricated massage group (P= 0.012).

Figure (2) clarifies the distribution of the parturient women who experienced perineal tears according to its region after delivery, it was found that, tears in the perineal area represent the largest proportion of tears among the three groups. It was occurred in 22.2%, 20.4% and 57.4 in warm compress, lubricated massage and control group, respectively, without any significant differences between the three groups (P= 0.081).

It is evident from **table (5)** that perineal pain intensity significantly reduced among the warm compresses and lubricated massage groups 15 minutes after starting the intervention (P = 0.000). Where the very severe pain was reported by 46.1%, and 49.0% for warm compresses and lubricated massage groups, respectively, before the intervention. While, 15 minutes after starting the intervention the very severe pain reported by only 32.3% and 27.5% for warm compresses and lubricated massage groups, respectively. On the other hand, perineal pain intensity significantly increased among the control group (P = 0.000). Where the worst pain represents 12.0% in control group and increased to 22.0% 15 minutes later. Furthermore, there were a statistically significant differences (p = 0.003) between the two intervention groups and control group 15 minutes after starting the intervention, where the perineal pain intensity significantly decreased among warm compresses group and lubricated massage group than the control group. Accordingly, the two interventions were more effective in decreasing perineal pain than the routine hospital care.

Table (6) demonstrates that there were a highly statistically significant differences (P = 0.000) regarding all behavioral response parameters before and 15 minutes after starting the intervention among both intervention groups. Where severe tense muscle was observed among 30.4% and 35.3% of both warm compresses and massage groups before the intervention, then these percentages reduced to 18.6% and 20.6% 15 minutes after starting the intervention. The very restlessness decreased from 29.4% and 31.4% for warm compresses group and lubricated massage group before intervention to 23.5% and 26.5% 15 minutes after starting intervention, respectively. A constant grimacing decreased from 53.9% and 56.9% before intervention to 38.2% and 37.3% 15 minutes after starting the intervention for warm compresses and lubricated massage groups, respectively. Also, cry out or sobs were significantly reduced 15 minutes after starting the intervention from 43.1% and 42.2% to 25.5% and 36.3% for warm compresses and lubricated massage group, respectively. On the other hand, all of these parameters significantly increased among the control group (P = 0.000) with statistically significant differences between the two intervention groups and control group (p ≤ 0.05).

Table (1) Distribution of the parturient women according to their demographic characteristics (n = 304).

Variables	Warm compresses group n = 102		Lubricated massage group n = 102		Control group n = 100		Significance test	P value
	No	%	No	%	No	%		
Age							FET= 4.001	0.406
- < 20	31	30.4	22	21.6	29	29.0		
- 30 – 35	62	60.8	74	72.5	66	66.0		
- >35	9	8.8	6	5.9	5	5.0		
Mean ± SD	23.76 ± 6.21		25.26 ± 6.87		24.78 ± 5.57		F= 1.518	0.221
Educational level							FET= 6.707	0.349
- Illiterate	10	9.8	16	15.7	12	12.0		
- Read and write	24	23.5	12	11.8	23	23.0		
- Secondary education	46	45.1	48	47.1	42	42.0		
- University education or more	22	21.6	26	25.5	23	23.0		
Occupation							X ² =1.749	0.749
- Working	44	43.1	42	41.2	50	50.0		
- Housewives	58	56.9	60	58.8	50	50.0		
Residence							X ² =2.961	0.228
- Urban	66	64.7	54	52.9	60	60.0		
- Rural	36	35.3	48	47.1	40	40.0		

X²: Chi-Square test, FET: Fisher's exact test, F: One-way ANOVA test

Table (2): Mean differences of anthropometric measurements and current pregnancy profile among the studied groups (n = 304).

Variables	Warm compresses group n= 102	Lubricated massage group n= 102	Control group n= 100	F	P value
	Mean ± SD	Mean ± SD	Mean ± SD		
- Weight (kg)	83.60 ± 9.95	82.13 ± 9.37	81.74 ± 8.18	1.472	0.231
- Height (cm)	158.60 ± 4.98	160.09 ± 5.83	159.96 ± 4.77	2.734	0.077
- Gestational age (week)	38.25 ± 3.95	39.15 ± 2.16	39.00 ± 1.83	2.414	0.091
- Fundal height in (cm)	33.25 ± 2.01	33.50 ± 1.97	33.32 ± 1.63	0.455	0.635

F: One-way ANOVA test

Table (3) Distribution of the parturient women according to their second stage and newborns' characteristics (n= 304).

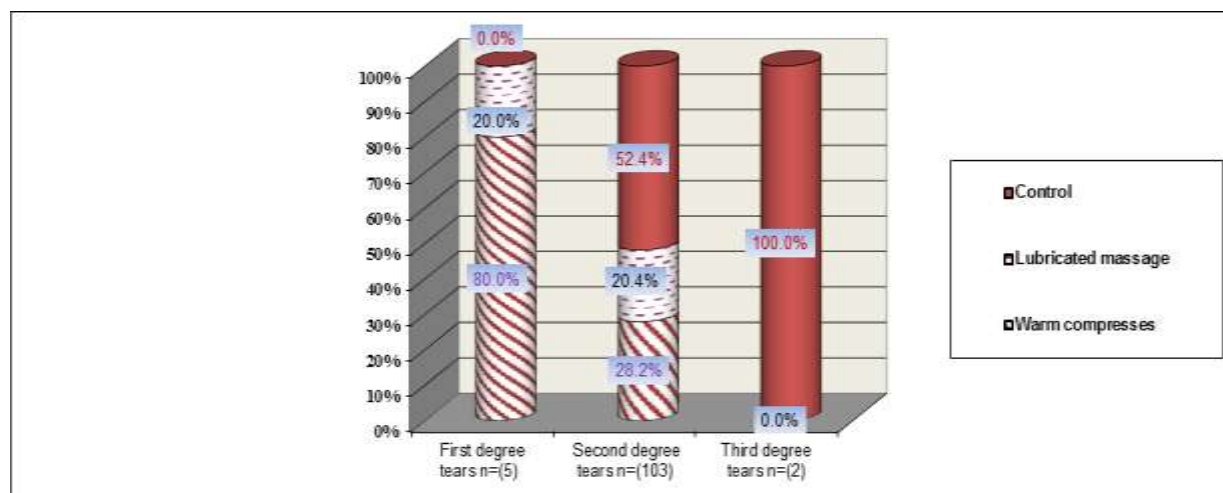
Variables	Warm compresses group n= 102		Lubricated massage group n= 102		Control group n= 100		Significance test	P value
	No	%	No	%	No	%		
Progress of labor							X ² = 0.060	0.195
- Spontaneous labor	30	29.4	20	19.6	32	32.0		
- Induced labor	4	3.9	8	7.8	8	8.0		
- Accelerated labor	68	66.7	74	72.5	60	60.0		
Timing of beginning oxytocin	n= (72)		n= (82)		n= (68)		X ² = 2.561	0.278
- 1 st stage	60	83.3	74	90.2	62	91.2		
- 2 nd stage	12	16.7	8	9.8	6	8.8		
Duration of the 2nd stage (min)	68.17 ± 12.78		67.23 ± 15.41		68.94 ± 15.13		F= 0.514	0.598
Newborn' birth weight (kg)	3.05 ± 0.212		3.01 ± 0.375		3.01 ± 0.282		F= 1.882	0.154
Newborn' head circumference	32.91 ± 1.19		32.53 ± 2.22		32.90 ± 2.48		F= 1.078	0.341

X²: Chi-Square test, F: One-way ANOVA test

Table (4) Comparing the perineal outcomes after delivery among the study groups (n = 304).

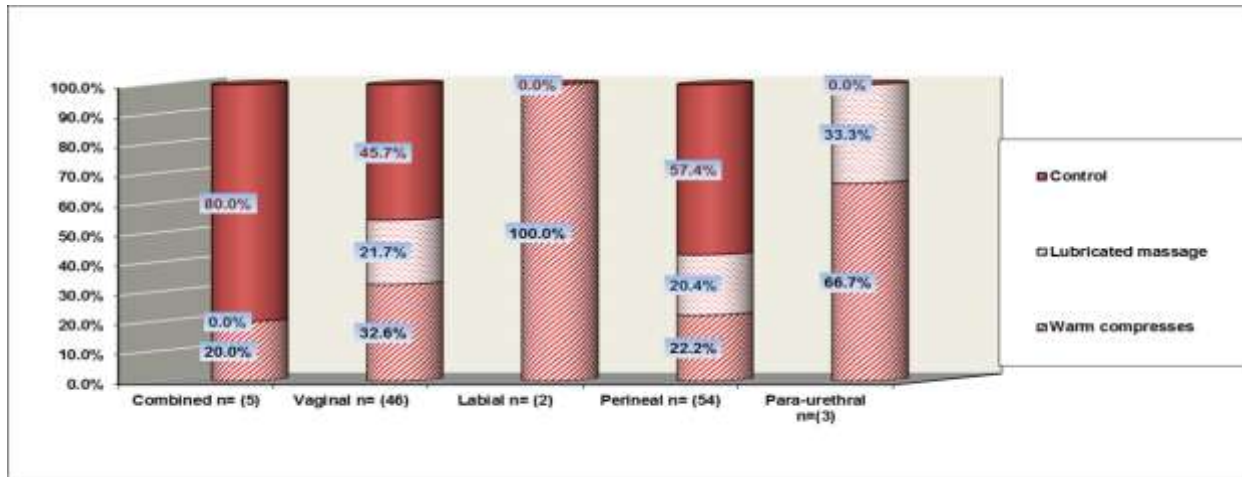
Perineal condition after labor	Warm compresses group n= 102		Lubricated massage group n= 102		Control group n= 100		FET	P value
	No	%	No	%	No	%		
Incidence of perineal trauma								
- Intact perineum	1	1.0	3	2.9	0	0.0	2.858	0.174
- Tear not requiring repair	2	2.0	0	0.0	0	0.0	2.628	0.111
- Tear requiring repair	4	3.9	2	2.0	8	8.0	4.005	0.114
- Episiotomy	95	93.1	97	95.1	92	92.0	0.884	0.660
Degree of extension of an episiotomy								
- No or mild extension	69	67.6	77	75.5	44	44.0	22.783	0.000**
- 2 nd degree and marked extension	26	25.5	20	19.6	48	48.0	20.547	0.000**

FET: Fisher's exact test, **A highly statistical significant difference (p ≤ 0.001)



FET= 11.937 (P= 0.012*).

Figure (1) Distribution of parturient women who experienced perineal tears according to its degree after delivery (n = 110).



FET= 10.189 (P = 0.081).

Figure (2) Distribution of the parturient women who experienced perineal tears according to its region after delivery (n= 110).

Table (5) Distribution of the parturient women according to their perineal pain intensity before and 15 minutes after starting the intervention using pain analogue scale (n = 304).

Variables	Warm compresses group n= 102		Lubricated massage group n= 102		Control group n= 100		Significance between the groups			
	Before	After	Before	After	Before	After	Before intervention		15 minutes after intervention	
							FET	P value	FET	P value
- Severe	46.1%	60.8%	41.2%	62.7%	42.0%	42.0%				
- Very severe	46.1%	32.3%	49.0%	27.5%	46.0%	36.0%	1.351	0.855	15.417	0.003*
- Worst pain	7.8%	6.9%	9.8%	9.8%	12.0%	22.0%				
Significance within groups FET(P value)	22.660 (0.000**)		26.807 (0.000**)		30.714 (0.000**)					

FET: Fisher's exact test, **A highly statistical significant difference (p ≤ 0.01), *A statistical significant difference (p ≤ 0.05)

Table (6) Distribution of the parturient women according to their behavioral pain parameters before and 15 minutes after intervention (n = 304).

Variables	Warm compresses group n= 102		Lubricated massage group n= 102		Control group n= 100		Significance between the groups			
	Before	After	Before	After	Before	After	Before intervention		15 minutes after intervention	
							FET	P value	FET	P value
Tense muscle							0.821	0.942	13.857	0.007*
- Slightly tense	9.8%	14.7%	10.8%	17.6%	10.0%	9.0%				
- Moderate tense	59.8%	66.7%	53.9%	61.8%	56.0%	52.0%				
- Severe tense	30.4%	18.6%	35.3%	20.6%	34.0%	39.0%				
Significance within groups FET (P value)	18.194 (0.000**)		21.465 (0.000**)		15.546 (0.000**)					
Restlessness							0.920	0.633	8.096	0.017*
- Moderate restless	70.6%	76.5%	68.6%	73.5%	74.0%	59.0%				
- Very restless	29.4%	23.5%	31.4%	26.5%	26.0%	41.0%				
Significance within groups FET (P value)	15.458 (0.000**)		16.167 (0.000**)		20.362 (0.000**)					
Grimacing							1.990	0.670	11.064	0.004*
- Moderate grimacing	46.1%	61.8%	43.1%	62.7%	46.0%	42.0%				
- Constant grimacing	53.9%	38.2%	56.9%	37.3%	54.0%	58.0%				
Significance within groups FET (P value)	14.003 (0.000**)		18.769 (0.000**)		16.416 (0.000**)					
Patient sounds							1.397	0.847	12.438	0.016*
- Groans/moans	20.6%	43.1%	28.4%	35.3%	24.0%	23.0%				
- Groans/moans loudly	30.4%	31.4%	29.4%	28.4%	36.0%	31.0%				
- Cry out or sobs	43.1%	25.5%	42.2%	36.3%	40.0%	46.0%				
Significance within groups FET (P value)	26.517 (0.000**)		18.654 (0.000**)		24.554 (0.000**)					

FET: Fisher's exact test, **A highly statistical significant difference (p ≤ 0.001), *A statistical significant difference (p ≤ 0.05)

IV. Discussion

Numerous parturient women suffer from perineal trauma during vaginal delivery. Perineal trauma is mostly coupled with pain and serious long life complications. Consequently, prevention of perineal trauma become an urgent need. Perineal management techniques during the 2nd stage of labor as perineal massage, warm compresses, and Hands-off technique during delivery of the neonate's head may play a major role in the reduction of perineal trauma [23]. For years, many researchers have investigated different timing, positions, and different techniques during the 2nd stage of labor in order to provide the best care and improve outcomes for both mothers and neonates [24].

The findings of this study showed that neither perineal warm compresses nor perineal lubricated massage during the 2nd stage of labor had reduced the length of the 2nd stage, compared with the control group. This result is consistent with at least three other researches. *The first*, Ashwal et al. [25] who conducted “a randomized controlled clinical trial to evaluate the effectiveness of obstetric gel on the length of 2nd stage of labor and perineal integrity”. They had reported that the mean length of the 2nd stage of labor was similar between the study and control groups. *The second*, Essa & Ismail [18] who carried out an experimental research on 160 Egyptian women to “evaluate the effectiveness of perineal warm compresses during the 2nd stage on perineal pain and outcome”. They indicated absence of any significant difference between warm compresses and control groups regarding the length of the 2nd stage of labor. *The third*, Ganji et al. [26] who had done a randomized controlled trial on 64 nulliparous women to “evaluate the effectiveness of local heat and cold compresses on labor pain and labor outcome”. They also reported that application of a warm towel on perineal area did not make any difference in the length of the 2nd stage length.

On the contrary, Seval et al. and Schaub et al. [27, 28] had reported different findings. Where, *the former* had studied “the effectiveness of obstetric gel on the process and duration of labor”. *The latter* also conducted a study entitled “obstetric gel shortens 2nd stage of labor and prevents perineal trauma among primiparous women”. Both of them reported that the mean duration of the 2nd stage of labor was significantly shorter in the obstetric gel group than control group. This incongruity between the current study and latter two studies might be attributed to the differences in the duration and frequency of application of lubricant gel among the studies. Where in the current study the lubricant gel administration started after full cervical dilatation at the beginning of the 2nd stage while in the contradictory studies the lubricant gel application started in the early 1st stage of labor (before to 4 cm cervical dilation) and ended with childbirth. So the application of lubricant gel took more duration and frequency in the contradictory studies than in the current one.

Moreover, Ahmad and Turkey [29] had conducted their study in Al- Qatif, Kingdom of Saudi Arabia, about “the effectiveness of warm perineal pack during the 2nd stage of labor on perineal pain among nulliparous women”. They reported that warm perineal compresses had possible benefits on shortening the length of the 2nd stage and crowning duration. This disagreement between the current study and Ahmad and Turkey study might be attributed to the differences in the studied participants' demographic characteristics as age among the studies. In the present study, no specific age has been determined as inclusion criteria of the studied subjects. While in Ahmad and Turkey study a specific age of 20 to 35 years was defined in the inclusion criteria.

Regarding perineal integrity after childbirth, the present study showed that, using perineal warm compresses or perineal lubricated massage in 2nd stage of labor didn't significantly reduce the incidence of spontaneous perineal trauma or episiotomy when compared with a routine care. Although an intact perineum was observed only in 2.9% among lubricated massage group compared to 1% in the warm compresses group and none among the control group, no statistically significant differences were observed among the three groups as regard the incidence of intact perineum, episiotomy, tears not requiring repair and tears requiring repair. These findings agree with the findings of three other studies, *the first*, an extremely recent literature review conducted by Aasheim et al. [16] reviewed 20 trials (involving 15181 women) related to the study subject. They concluded that perineal warm compresses didn't have any clear effect on the occurrence of intact perineum, perineal trauma requiring suturing or episiotomy. *The second*, Zare et al. [12] who studied “the effectiveness of perineal massage on perineal tears and rate of episiotomy”. They had documented that perineal massage had no apparent significant effect on the rate of perineal integrity, where the studied participant in both perineal massage and control groups needed an identical episiotomy and tears repair. *The third*, Albers et al. [30] had conducted their study on 1211 laboring women. They used three midwifery care measures during 2nd stage of labor: 1) perineal warm compresses 2) lubricated massage, and 3) hand off technique until crowning of the baby's head, to evaluate whether any of these procedures were accompanying with lower incidence of genital tract trauma. The researchers reported that the frequency of genital tract trauma was identical in warm compresses, perineal massage and control groups, without any difference between the three groups.

On the other hand, Mohamed, et al. [2] had "compared two perineal management procedures used to decrease perineal trauma during 2nd stage of labor". They had reported that warm perineal compresses in second-stage of labor reduce the occurrence of perineal laceration and promote perineal integrity than perineal massage. Another study conducted by Geranmayeh et al. [31] on eighty primiparous women aged eighteen to thirty years in Tehran. They had investigated "the effectiveness of perineal massage with Vaseline on perineal trauma". Their results showed that the massage with Vaseline group had significantly more intact perineum and lower episiotomy rate in comparison with the control group ($P = 0.004$). This disagreement between the current study findings and latter two studies might be related to the difference in the parity of the studied women. The current study was conducted on primiparous women only, where primiparous are more risk for perineal trauma and an episiotomy is a routine procedure almost performed for all primiparous births. While the contradictory studies were conducted on primiparous and multiparous women. In fact, episiotomy, and second-degree perineal laceration are acknowledged to be more frequent in primiparous women than multiparous women [32]. In addition, the difference between the current study and in Geranmayeh et al one might be attributed to the difference in lubricant substance used in perineal massage. In the current study, the researchers used sterile KY gel as a water-soluble lubricant, while Geranmayeh et al used medical Vaseline in perineal massage. Using Vaseline with aroma caused perineal softening and help flexibility and elasticity of the perineum and prevent perineal tears at labor [33]. In light of the inconsistent evidence, consideration of the type of lubricant substance used in perineal massage in further studies is important.

Most primiparous women undergoing vaginal delivery are at risk of some form of genital tract trauma. The morbidity linked with genital tract trauma is noteworthy, particularly once it becomes 3rd- and 4th degree laceration. The current study findings found that the degree of tears and lacerations due to the extension of an episiotomy or spontaneous tears without episiotomy lower significantly in lubricated massage and warm compresses groups than the control group ($P = 0.012$). Where, in the current study the second-degree tears are the most common tears occur during labor among the three groups. From the total parturient experienced perineal tears, second degree tears occurred in less than one-third in the warm compresses group, and less than one quarter in the lubricated massage group, compared to more than half of the control group. Moreover, all third-degree degree tears (two cases) occurred in control group only, and no fourth-degree tears were detected in the three groups.

These results are comparable with the results of at least another four studies. *The first*, Karaçam, et al. [34] who had studied "the utilization of perineal massage during the 2nd stage of labor and its impact on postpartum perineal outcomes" their sample was 396 laboring primiparous women in Turkey. They had established that perineal massage decreases the episiotomy size and thus decreases the quantity of suturing material used for episiotomy repair. *The second* Aasheim et al. [35] in their literature review study entitled "the effectiveness of different techniques at the 2nd stage of labor for decreasing perineal tears", surveyed eight trials involving 11651 women. They had stated that there was a noteworthy effectiveness of warm compresses and favoring massage on decreasing 3rd and 4th degree tears. *The third*, Hastings-Tolsma et al. [36] who had investigated "the predisposing factors for perineal trauma during childbirth". They had found that the application of warm packs during 2nd stage of labor were important interventions for reducing the degree of perineal trauma. *The fourth*, Dahlen et al. [19] had conducted a randomized controlled clinical trial on 717 nulliparous women. They had compared the effectiveness of warm compresses during the 2nd stage of labor with the routine hospital care on the perineal outcomes. The researchers showed that there were no statistically significant differences in the percentage of women who had perineal trauma after birth, but they further added that women who received warm compresses had lesser 3rd and 4th degree lacerations.

These results are also supported by the Royal College of Obstetricians and Gynaecologists, 2015 which produces guidelines entitled "management of 3rd and 4th degree perineal tears" as an educational aid to good practice. In addition, they documented that warm compresses at the 2nd stage of labor has a significant impact on decreasing obstetric anal sphincter injuries (3rd and 4th degree perineal tears) [37].

The current study results are in disagreement with the previously discussed Araújo and Oliveira [17] study. They had studied "the effectiveness of liquid petroleum jelly during the expulsive phase of labor on perineal tears among nulliparous women". They had found that the use of petroleum jelly to prevent perineal laceration doesn't decrease the degree of tears and lacerations in childbirth. This discrepancy between the current study and Araújo and Oliveira one might be related to the difference in maternal position during the 2nd stage of labor. In the current study, all participants kept in lithotomy position according to Beni-Suef general hospital policy, while Araújo and Oliveira kept their participants in the left side position during the expulsive

phase. Moreover, Araújo and Oliveira didn't apply perineal massage with the liquid petroleum jelly as does in the current study.

The findings of this study indicated no significant difference between the studied groups regarding the region or location of the tears ($P = 0.081$). In this regard, the previously discussed Zare et al. [12] study stated that the difference between the study and control groups concerning the location of tears was not meaningful. No other researches were found in this topic.

The present study findings indicated that perineal pain intensity had significantly reduced 15 minutes after the warm compresses and after lubricated massage among the two intervention groups ($P = 0.000$) with more effect to the lubricated massage. Meanwhile, perineal pain intensity had increased in the control group after receiving routine care ($P = 0.000$). With statistically significant differences among the two intervention groups and the control regarding perineal pain intensity after intervention ($p = 0.003$).

The present findings are in congruence with the findings of at least four other researches. *The first*, Vaziri et al. [38] who had studied “the effectiveness of warm perineal compress at the 2nd stage of labor on first-birth outcomes”. They showed that the mean of perineal pain severity in the 2nd stage and on the 1st day after delivery was decreased significantly in warm compress group than the control ($p < 0.001$). *The second*, Mamuk, and Gençalp [39] who had evaluated the effectiveness of perineal warm compresses during vaginal delivery on perineal integrity and pain. They stated that warm perineal application was effective in reducing perineal pain, and that application was comfortable and acceptable by the women. *The third*, the previously mentioned study of Ahmad and Turkey [29] which reported that the perineal pain scores continued to decline significantly ($P \leq 0.001$) among the warm backs group than the control group. *The fourth*, the previously discussed Dahlen et al. [19] study, who had found a noteworthy reduction in perineal pain in women who exposed to warm compresses compared to the control group. This study is also supported by another literature review which stated that the warm compresses have been known in the field of nursing since the first as a way to reduce the pain. Warm compress is a method of maintenance of body temperature using liquid or tools that may cause hot very effective in reducing perineal pain during labor [40]. Furthermore, the warm sensation produced by warm compresses may help in making dermal stimulation that decrease the pain perception, induce relaxation and reduce the nerve tension [15].

The effectiveness of perineal lubricated massage during the 2nd stage of labor on perineal pain had been investigated in the current study nevertheless, no trials had been found in this respect. Meanwhile, a very recent literature review study conducted by Ellington et al. [41] entitled “antenatal perineal massage improves women’s experience of labor and postnatal recovery” they stated that perineal massage is considered a part of evidence-based practice to reduce perineal trauma and pain during labor. In addition, Massage also helps in increasing the tissues blood supply, increase the tissue elasticity, increase the release of internal endorphin that helps to alleviate pain [12].

The participants' behavioral responses to perineal pain have been assessed twice in this study, the first time before the intervention at the beginning of 2nd stage of labor, and the second time 15 min after application of warm compresses or perineal lubricated massage. Accordingly, the study results revealed that there were highly statistically significant differences ($P = 0.000$) regarding all behavioral response parameters (tense muscles, restlessness, grimacing and patient sounds) before and 15 minutes after the intervention among both intervention groups. Also, statistically significant differences were observed between the two intervention groups and control group ($p \leq 0.05$) regarding all behavioral response parameters 15 min after the intervention. In accordance with these findings, the previously mentioned study conducted by Essa & Ismail [18] who found that the behavioral responses to perineal pain were decreased significantly after the use of warm compresses among the intervention group compared to control group. The researchers also found highly statistically significant differences ($P = 0.000$) regarding all behavioral response parameters before and after the intervention among warm compresses group.

Such similarities between the current study findings and Essa & Ismail [18] one could be credited to what is formulated in the literature about the therapeutic and relaxation effects that warm compresses produce. Warm compresses can increase relaxation, decrease muscle spasm, produce vasodilatation of blood vessels which may enhance blood flow in the tissue around the area that is compressed. Thus, decreasing the ischemia of the tissue and decrease the level of the pain.

V. Conclusion

Based on the overall results of the current study, H3 is accepted and H0, H1 and H2 are rejected as evidenced by perineal warm compresses and perineal lubricated massage didn't significantly decreased the rate of episiotomy and genital tract trauma, but significantly reduced the degree of tears and the degree of extension of episiotomy, when compared to control group. Lubricated massage was more effective than warm compresses in this respect. The findings also revealed that perineal pain intensity and behavioral pain response parameters had significantly reduced in lubricated massage and warm compresses groups than control group.

VI. Recommendations

- All governmental hospitals should provide adequately planned in-service training programs for the maternity nurses regarding the benefits of warm compresses and perineal lubricated massage during the 2nd stage of labor in order to develop their best practice.
- The nursing curriculum should be revised and updated to include perineal warm compresses and lubricated massage in the nursing management during 2nd stage of labor.
- Further studies are also needed to assess parturient woman's satisfaction regarding the use of perineal warm compresses and perineal massage during the 2nd stage of labor.

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