

Effect of Hands-on, Hands-off and Warm Compresses Perineal Techniques during the 2nd stage of labor on Perineal Outcomes among Primiparae with Vaginal Delivery

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Abstract: Most vaginal births are associated with adverse perineal outcomes. Perineal tears are the most significant unfavorable outcomes, especially the third and the fourth degrees. Other unfortunate perineal outcomes include pain, dyspareunia, wound infection, hematoma, stress urinary and fecal incontinence as well as vesico-vaginal fistula. Different techniques were developed to overcome these poor outcomes such as hands-on, hands-off and warm compresses. **Objective:** Assess the effect of hands-on, hands-off and warm compresses perineal techniques during the 2nd stage of labor on perineal outcomes among primiparae with vaginal delivery. **Setting:** El Shatby Maternity University Hospital affiliated to Alexandria University, Egypt. **Results:** Hands-on technique was highly significantly related to intact perineum and mild perineal pain (P=0.000). Hands-off technique was highly significantly associated with more episiotomies, occurrence of the second degree perineal tear, moderate and severe perineal pain, dyspareunia, and wound infection (P=0.000), as well as significantly linked to perineal hematoma (P=0.009). Warm compresses were highly significantly attributed to mild perineal pain and wound infection (P=0.000). **Conclusion:** Hands-on technique during vaginal delivery had significantly better perineal outcomes than hands-off and warm compresses techniques, in terms of fewer episiotomies, absence of perineal tear, mild perineal pain, as well as less dyspareunia, wound infection and perineal hematoma. **Recommendations:** Midwives should use hands-on and warm compresses perineal techniques efficiently during vaginal delivery to reduce the risk of perineal trauma and assure safe vaginal childbirth. Further research could be performed to evaluate the effect of different types of perineal techniques during vaginal birth on maternal and fetal outcomes

Keywords: Hands-on, Hands-off, Warm Compresses, the 2nd stage of labor, Perineal Outcomes, Primiparae, vaginal delivery.

I. INTRODUCTION

Labor is the series of events by which the products of conception (fetus, placenta, membranes, cord, amniotic fluids, and blood) are expelled from the mother's uterus. Delivery refers to the actual delivery of the fetus and could be conducted either vaginally or by cesarean section. Labor is divided into four stages; the first stage of labor is the longest stage, which begins from true uterine contractions to full cervical dilatation. The 2nd stage starts with full cervical dilatation and ends

with delivery of the fetus. The third stage of labor begins from fetal expulsion and ends with separation and expulsion of the placenta, while the fourth stage of labor is 1-2 hours after delivery of the placenta, during which, physical recovery from the hard work of labor is achieved through the maternal body stabilities and the full adjustment of the baby to extra-uterine life ⁽¹⁾.

The process of labor and delivery is lauded by numerous physical and psychological stressors, which start from the beginning of the first stage of labor and reach its maximum at the 2nd stage that is considered the climax of the birth process. The most important sources of stress are severe abdominal and back pain associated with spontaneous and uncontrolled uterine contractions, as well as severe perineal pain associated with stretching and tears of the perineal area and pelvic floor muscles. Perineal tears are the most common complications that could occur during the 2nd stage of labor; they include any spontaneous or induced (episiotomy) injury to the perineal area or pelvic floor muscles ^(2,3).

Every year millions of women worldwide sustain trauma to the perineum when giving vaginal birth ⁽⁴⁾. Perineal tears affect about 50-85% of women during childbirth, whereas the rate of second degree has been reported to be 35.1–78.3% among primiparous women, while the third- and the fourth-degree occur in 5.1–8.3% of them ⁽⁵⁾.

Perineal tears are classified into four degrees according to their severity: the first degree involves the vaginal mucosa or perineal skin, while the second degree includes the vagina and/or perineal muscle. The third degree perineal tear encompasses the anal sphincter complex (i.e., internal sphincter, longitudinal muscle layer, and external sphincter). It further subdivided into the third degree A, B & C: the third degree A, where less than 50% of the external anal sphincter is torn; the third degree B, where more than 50% of the external anal sphincter is torn and the third degree C, where the external and internal anal sphincters are torn. The fourth degree perineal tear extends through the mucous membrane that lines the rectum. However, the third- and fourth-degree tears are collectively called Obstetric Anal Sphincter Injuries (OASIs) ⁽⁶⁾.

Perineal trauma is a multi-factorial and has numerous predisposing factors, including primiparity; abnormal presentations; macrocosmic baby; instrumental delivery; occipito-posterior position; previous episiotomy, especially median type; poor visualization of the perineum; fundal pressure; lithotomy position; and oxytocin augmentation. However the incidence of the third and the fourth degree perineal tears was correlated to directed pushing technique, birthing in an upright position, and prolonged 2nd stage of labor ⁽⁷⁾. Other risk factors were also identified such as precipitated labor; old or young age; previous perineal trauma; fundal pressure during the 2nd stage of labor; and frequent vaginal examination. Some risk factors are pertaining to pre-labor, such as demographic factors, nutritional status, ethnicity, level of physical activity, parity, and size of the baby ^(8,9).

Perineal trauma may have a negative impact on a woman's life, where approximately 50% of this trauma results in short and long term health implications, especially in women having their first baby. This is directly related to the extent and complexity of perineal trauma. Around 6% of affected women will experience short-term complications such as bleeding; prolonged recovery; wound dehiscence, edema or infection; extension of episiotomy to the rectum; perineal hematoma or pain; slow mother-newborn bonding and disturbed maternal-infantile interaction. On the other hand, long-term complications include rupture of the anal sphincter; urinary and fecal incontinence, dyspareunia, recto-vaginal fistula, ano-rectal dysfunction, genital prolapse as well as perineal and pelvic pain. In addition, perineal trauma may lead to disabling physical, psychological and social problems as well as affects the whole family's quality of life ^(4,10).

There are several intra-partum interventions that can potentially modify the risks of perineal trauma such as maternal birthing position, delayed pushing in the 2nd stage of labor with an epidural in situ, restrictive use of episiotomy, (preference of a medio-lateral over a midline episiotomy), the choice of instrumental vaginal delivery (the use of a vacuum extractor instead of forceps), warm compresses, and manual perineal support (hands-on). It is thought that hands-on technique reduces perineal trauma by slowing down the birth of the fetal head, and by reducing its presenting diameter ⁽¹¹⁾. Nurses, midwives and physicians should also be able to repair perineal trauma by ensuring that the tissues and structures involved are properly repaired to promote healing and reduce complications. Therefore, reducing the risk of perineal trauma during childbirth is important for both women and their caregivers. At least 70% of perineal tears require suturing; for the first degree, few or no stitches are required, while the second degree usually requires to be repaired with stitches under local anesthesia. However, women recover from the first and the second degree perineal tears within the

first few weeks or months after birth. For the third and the fourth degree perineal tears, repair should take place in an operating theatre, under regional or general anesthesia⁽¹²⁾.

Hence primary prevention is paramount, it is important that the maternity nurses have the skills to detect and accurately classify trauma and then perform the next correct management steps⁽¹³⁾. Maternity nurses utilize a variety of non-pharmacological methods during the 2nd stage of labor, in the belief that these may help lower genital tract trauma by slowing down the birth of the fetal head, and allowing the perineum to stretch slowly. These methods include hands-on or hands-off, perineal massage, Ritgen's maneuvers, and using lubricant gel, warm packs or cold application. Each one of these methods may be used alone or in combination with another one. However, massage and perineal lubrication are mostly used together⁽¹⁰⁾.

Hands-on technique used to protect the perineum during the 2nd stage of labor, has been the routine midwifery practice for a long time. It includes applying downward pressure with one hand to maintain flexion of, and control, the expulsion of the fetal head as well as guarding and supporting the perineum with the other hand. This technique reduces the speed of birth of the fetal head and its presenting diameter, allowing the smallest diameter to emerge. On the other hand, there is a shift to a hands-off/ poised technique, where the midwife observes the parturient and do not touch the perineum during the 2nd stage of labor, while fetal head is delivering^(14, 15). Perineal warm packs or warm compresses have been also advocated for many years in the belief that they reduce perineal trauma and increase comfort during late 2nd stage of labor. Its mechanism of action includes vasodilatation; increasing tissues blood supply; assisting tissue stretching or extensibility, as well as facilitating the removal of waste products and oxidative agents from the tissues. In addition, warm sensation is known to make dermal stimulation that decreases the pain perception, induces relaxation and reduces the nervous tension^(3, 16).

However, there is no consensus on the use of hands-off/poised, hands-on and warm compresses techniques as their effects on perineal outcomes are still controversial and partially investigated as well as have contradicting results that necessitate further studies to fill the gap in this respect⁽¹⁷⁾. Therefore, these techniques should be compared late in spontaneous vaginal delivery to determine which method was more effective in reducing perineal trauma.

Hence, the aim of this study was to assess the effect of hands-on, hands-off and warm compresses perineal techniques during the 2nd stage of labor on perineal outcomes among primiparae with vaginal delivery

Research hypotheses:

H₁ Women who are managed by hands-on perineal technique during the 2nd stage of labor experience better perineal outcomes than those who are managed by hands-off or warm compresses techniques.

H₂ Women who are managed by hands-off perineal technique during the 2nd stage of labor experience better perineal outcomes than those who are managed by hands-on or warm compresses techniques.

H₃ Women who are managed by warm compresses perineal technique during the 2nd stage of labor experience better perineal outcomes than those who are managed by hands-on or hands-off techniques.

Null Hypothesis:

H₀ There is no difference in perineal outcomes among women who are managed by hands-on, hands-off or warm compresses perineal techniques during the 2nd stage of labor.

II. MATERIALS AND METHOD

MATERIALS

Research design:

A comparative quasi experimental research design was utilized to fulfill the aim of the study

Setting:

This study was conducted in labor and delivery unit of El-Shatby Maternity University Hospital affiliated to Alexandria University, Alexandria, Egypt.

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Subjects:

The study comprised a convenient sample of 90 women attended the previously mentioned setting. To guarantee consistency of the study execution and freedom from any bias, women were selected according to the following criteria:

- Pregnant at 38-42 weeks of gestation
- Primiparae
- With normal spontaneous vaginal birth of a singleton fetus with cephalic presentation
- Don't have premature rupture of membranes, placenta previa or abruption, narrow pelvis, fetal distress, and vaginal infections
- Don't have medical diseases
- Have lack of Kegel's and professional exercises
- Willing to participate in the study as well as to comply with procedure and follow-up visits as specified for them.

The study subjects were assigned based on their preference of the protective perineal techniques during the 2nd stage of labor, into three study groups: hands-on (30 women), hands-off (30 women), and warm compresses (30 women).

The sample size of pregnant women was estimated by using the Epi-Info 7 program, where the following parameters were applied:

- Population size 300/3 months
- Expected frequency 50%
- Acceptable error 10%
- Confidence coefficient 95%
- Minimum sample size 73

Tools:

Four tools were used by the researchers to collect the necessary data:

Tool one:

Basic data structured interview schedule

It was developed by the researchers and included two parts:

Part I:

- Socio-demographic characteristics such as age, level of education and occupation.
- Obstetrical and clinical data, including: gravidity, history of abortion, weight, height and body mass index (BMI).

Part II: Labor & delivery data such as duration of the 2nd stage labor, use of epidural analgesia, presence of shoulder dystocia and undergoing an episiotomy

Tool two:

Classification of perineal trauma

This tool was adopted from the updated perineal care guidelines of **the National Institute for Health and Care Excellence (2017)** ⁽¹⁸⁾. It was used to assess incidence and degree of perineal trauma as well as need for repair as follows:

- **First-degree:** Small tears or grazes in the vaginal mucosa or perineal skin. Few or no stitches are required.
- **Second-degree:** Involves the vagina and/or perineal muscle. It usually requires to be repaired with stitches under local anesthesia.

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- **Third-degree:** include anal sphincter complex. Repair should take place in an operating theatre, under regional or general anaesthesia.
- **Fourth degree:** Go to the mucous membrane that lines the rectum. Repair is the same as the third degree.

Tool three:**Postpartum follow-up assessments sheet**

This tool was developed by the researchers to assess incidence of postpartum morbidities associated with perineal trauma such as dyspareunia perineal pain, infection or hematoma as well as stress urinary incontinence.

Tool four:**Visual Analog Scale (VAS)**

It was originally developed by **wall & Katz (1994)**⁽¹⁹⁾ as a self-report scale used to report subjective data concerning different health problems as pain and discomfort. This scale was adapted, translated into Arabic and used by the researchers to assess intensity of perineal pain. It is 10 point numerical scale corresponding to the level of pain as follows: Zero (no pain), 1-<4 (mild pain), 4-<7 (moderate pain), 7-<10 (severe pain) and 10 (unbearable pain).

METHOD

The study was accomplished according to the following steps:

1. Approvals:

- Approval was obtained from the Ethical Committee, Faculty of Nursing, Alexandria University, Egypt.
- An official letter from the Faculty of Nursing, Alexandria University was directed to the responsible authority of the study setting to take his permission to collect data after explaining the purpose of the study.

2. Tools development:

Tools one and three were developed by the researchers based on extensive review of recent and relevant literature, while tool two was adopted and tool four was adapted.

3. Validity and reliability:

- Tools one and three were tested for content validity by a jury of 5 experts in the field.
- Tools were checked for their reliability by Cronbach's alpha test and the result was reliable (0.887).

4. Pilot study:

A pilot study was carried out on 9 women (excluded from the study sample) to test the feasibility of the study, ascertain relevance, clarity and the applicability of the tools as well as detect any problem peculiar to the statements as sequence and clarity that might interfere with the process of data collection. After conducting the pilot study, it was found that the sentences of the tool were clear and relevant; however, few words had been modified. Following this pilot study, the tool was revised, reconstructed and made ready for use.

5. Data collection:

- Using tool three, postpartum assessment of women was started after the first 24 hours following delivery and was repeated after the 2nd; the 8th and the 12th week.
- Using tool four, each woman was asked to select from 10 points numerical continuum of VAS the number that corresponds with her perceived level of pain.
- Collection of data covered a period of 6 months, starting from the beginning of December till the end of February 2020
- The data was conducted through the following three phases:

a. Preparation and assessment phase:

- This phase started during the latent phase of the first stage of labor where the researchers interviewed each parturient individually and privately to explain the aim of the study and identify basic data using part I of tool one.
- The researchers explained to each parturient the different available protective perineal techniques to select one of them.

b. Intervention phase:

The chosen protective perineal technique was implemented by the researchers for each parturient during the 2nd stage of labor as follows:

- Hands-on technique involved supporting the perineum with hands to protect the perineum as well as maintain flexion of the fetal head and control its expulsion.
- Hands-off technique in which the researcher didn't touch the fetal head or maternal perineum and allowed spontaneous birth of the shoulders. But she was ready otherwise to put light pressure on the baby's head in case of rapid expulsion.
- Warm compresses technique in which the researcher applying compress to the parturient's perineum and external genitalia as well as holding it continuously with gloved hands during and between pushes.
- Assessment of perineal outcome was performed by the researchers after receiving extensive training on perineal assessment with the aid and supervision of obstetric clinicians in the labor and delivery unit of El-Shatby Maternity university hospital.
- Perineal assessment was performed by the researchers during the immediate postpartum period based on NICE perineal care guidelines such as ensuring privacy; seeking consent prior to assessment and repair if needed; communicating clearly and sensitively; positioning woman to optimize comfort and clear view of perineum; ensuring adequate lighting so that the genital structures can be seen clearly; assisting the obstetrician in repair if needed as soon as practicable; and ensuring adequate analgesia throughout assessment and repair. Findings were documented by the researchers, using tool two.
- Further systematic assessment that include rectal examination was not carried out, where no incidence of the 3rd or the 4th degree of perineal tears was found among the study subjects.
- Data related to labor and delivery as well as neonates were identified using part II & III of tool one.

c. Evaluation phase:

- This phase was done for the three study subjects' groups after the first 24 hours following birth, then after 2nd, 8th & 12th weeks.
- The researchers assessed the perineal outcomes (tear, pain, dyspareunia, wound infection, hematoma, stress urinary and fecal incontinence as well as vesico-vaginal fistula) of the three study subjects' groups according to the aforementioned schedule, using tool three and four.

6. Comparison between the three study subjects' groups was done to identify the effect of protective perineal techniques during the 2nd stage of labor on perineal outcomes.

7. Statistical analysis:

- The collected data were categorized, coded, computerized, tabulated and analyzed by the researchers, using Statistical Package for Social Sciences (SPSS) version 23 program.
- Cross tabulation was carried out to explore the relationships between variables.
- A descriptive and analytical statistics were used such as percentages; whereas Chi-square-test, Fisher Exact-test and One – Way ANOVA test were used to find out the difference in the results at 0.05 level of significance.

Ethical consideration:

For each recruited subject the following issues were considered: securing the subjects' written informed consent, keeping their privacy and right to withdraw at any time as well as assuring confidentiality of their data.

III. RESULTS

Table (I) presents the number and percent distribution of laboring women according to their socio-demographic data. **Age** clarified that a sizeable proportion of hands-off, warm compresses and hands-on groups (83.3%, 73.3% & 70%) were 20- <30 years old. **Level of education** also manifested that four-fifths and slightly more (80% & 83.3%) of hands-off and hands-on groups respectively had secondary level, compared to three-fifths (60%) of warm compresses group. In addition, **occupation** revealed that all laboring women (100%) of the three groups were housewives. However, no statistically significance differences were found between the three groups' socio-demographic data.

Table (II) displays distribution of laboring women according to their reproductive history and clinical data. **History of abortion** was not reported by 80% & 86.7% of hands-off and hands-on groups respectively, compared to 66.7% of warm compresses group. **Mean gestational age** was 26.53 ± 4.69 weeks for hands-on group, 26.13 ± 3.13 weeks for hands-off group and 25.43 ± 3.69 weeks for warm compresses group. In addition, **mean weight** was 91.60 ± 5.67 kg, 91.0 ± 6.75 kg & 89.0 ± 5.93 kg of the three groups respectively. Moreover, **mean height** was 167.0 ± 6.10 cm for hands-off group, compared to 165.0 ± 4.55 cm for warm compresses and hands-on groups. Furthermore, **BMI** showed that most of hands-on group (93.3%) and the majority of warm compresses and hands-off groups (80%) were obese. However, the relationship between the three groups' reproductive history and clinical data was found to be not statistically significant.

Table (III) explains distribution of laboring women according to their labor and delivery. **Mean duration of the 2nd stage** was 89.97 ± 16.99 minutes for hands-off group, compared to 91.07 ± 17.26 & 93.47 ± 16.96 minutes for hands-on and warm compresses groups respectively. However, all (100%) of the three groups didn't receive **epidural analgesia** or develop **shoulder dystocia**. On the other hands, **episiotomy** was done for 80% of hands-off group, compared to 40% of warm compresses group and 23.3% of hands-on group. However no statistically significance differences were found between the three groups' labor and delivery, except for **episiotomy**, where highly statistically significance difference was found ($P=0.000$).

Figure (1) clarifies distribution of laboring women according to classification of their perineal trauma. The relationship between the three groups was found to be highly statistically significant ($P=0.000$), where 60% & 40% of hands-on and warm compresses groups had intact perineum respectively, while 60% of hands-off group had second degree perineal tear.

Table (IV) illustrates distribution of laboring women according to their postpartum assessment of pain, dyspareunia and wound infection. **Pain** was highly statistically significant between the three groups after the first 24 hours ($P=0.000$), where the majority of warm compresses and hands-off groups (80 %) had moderate pain, compared to a minority of hands-on group (33.3%). It was also highly statistically significant between them after the 2nd week ($P=0.000$), where most of hands-on group (90%) and the majority of warm compresses group (80 %) had mild pain, compared to 40% of hands-off group. In addition, pain was statistically significant between the three groups after the 8th week ($P=0.002$), where all (100%) of hands-on and warm compresses groups had mild pain, compared to 80% of hands-off group.

Moreover, **dyspareunia** was statistically significant between the three groups after the 8th weeks ($P=0.001$), where it was reported by only 13.3% of hands-on group, compared to 60% & 40 % of warm compresses and hands-off groups respectively. It was also highly statistically significant between them after the 12th weeks ($P=0.000$), where it was reported by 60% of hands-off groups, compared to 20% of warm compresses group and none of hands-on group.

Furthermore, **wound infection** was highly statistically significant between the three groups after the 2nd week ($P=0.000$), where it was observed among 40% of hands-off and warm compresses groups, compared to only 6.67% of hands-on group. It was also statistically significant between them after the 8th week ($P=0.031$), where it was not developed among 20 % of the former two groups, compared none of the later group.

Table (V) also manifests distribution of laboring women according to their postpartum assessment of perineal hematoma, stress urinary and fecal incontinence as well as vesico-vaginal fistula. **Perineal hematoma** was statistically significant

between the three groups after the first 24 hours and the 2nd weeks ($P=0.009$), where it was developed among 40% of hands-off group, compared to 6.7% & 23.2 of hands-on and warm compresses groups respectively. It was also statistically significant between them after the 8th week ($P=0.002$), where it was developed among 20% of hands-off group, compared to 10% of warm compresses group and none of hands-on group.

Although *stress urinary incontinence* was not statistically significant between the three groups after the 2nd, the 8th & the 12th weeks, it was developed among 20% of hands-off group, compared to 6.7% & 13.3% of hands-on and warm compresses groups respectively after the 2nd week, 10% & 13.3% of them respectively after the 8th week and 10% after the 12th week. However, *fecal incontinence and vesico-vaginal fistula* were not statistically significant between the three groups, where they were not developed among them after the scheduled weeks.

IV. DISCUSSION

Perineal trauma is a common outcome following vaginal birth, which may affect postpartum recovery and have short- or long-term physical and psychological impact on women's health. Therefore, adequate management reduces morbidity and improves maternal health and wellbeing⁽²⁰⁾ (Aguiar, et al., 2019). Evidence suggests that a hands-on approach (guarding) probably reduces the first degree perineal tears, while warm perineal compresses reduce the third- and the fourth-degree. This low-cost preventative perineal techniques are accepted and their impacts are highly valued by most women, but, great controversy is still surrounds them⁽²¹⁾ (WHO, 2018). Therefore, this study was conducted to assess the effect of hands-on, hands-off and warm compresses perineal techniques during the 2nd stage of labor on perineal outcomes among primiparae with vaginal delivery.

The results of the current study established that hands-on perineal technique during vaginal delivery was highly significantly associated with the performance of fewer episiotomies than hands-off and warm compresses techniques (Table III). This was expected, since reducing the performance of episiotomies will reduce perineal trauma, but it was a little bit confusing, since poor-quality evidence suggests that hands-off technique may reduce episiotomy⁽¹⁶⁾ (Aasheim, et al., 2017). However, hands-on technique has been the routine midwifery practice for a long time; nevertheless, its effect on protecting the perineum has been doubted⁽¹⁷⁾ (Huang, et al., 2020).

The present finding is partly in agreement with a study performed in Benisuef city, Egypt, where it was observed that perineal warm compresses didn't significantly decreased the rate of episiotomies⁽³⁾ (Ibrahim, et al., 2017). In contrast, the current finding contradicts a Cochrane review, which reported low-quality evidence that using hands-off the perineum during the 2nd stage of labor results in fewer women having an episiotomy, but this technique had no clear impact on other perineal outcomes. This review also found that the impact of warm compresses on other perineal outcomes, including episiotomy, is unclear or inconsistent⁽¹⁶⁾ (Aasheim, et al., 2017). It is also incongruent with A meta-analysis, which revealed that perineal warm compresses during the 2nd stage of labor lower the risk of episiotomy⁽²²⁾ (Magoga, et al., 2019). The variance between the finding of these Cochrane review and meta-analysis and the present study may be attributed to different research design and large sample size, where 15,181 women were included in the former and 2103 participants were involved in the latter.

In addition, the current finding doesn't coincide with a study carried out in Damanhour, Albehera Governorate, Egypt, where it was concluded that hands-off technique had significant effect on decreasing episiotomy rate. This was explained as keeping hands-off the perineum during vaginal delivery, help tissues reach its natural and gradual dilatation, without the need for episiotomy⁽²³⁾ (Ismail & Tayel 2019). Moreover, the present finding doesn't agree with a systematic review and meta-analysis, which indicated that hands-off, may be a promising delivery technique to reduce episiotomy use among women with low-risk pregnancy and vaginal delivery⁽¹⁷⁾ (Huang, et al., 2020). The distinction between the finding of Damanhour study and the current one may be due to different study setting and objective. While the disparity between the systematic review and meta-analysis and the present study may be attributed to different research design and large sample size (44898 participants).

In addition, it was revealed in the present study that hands-on and warm compresses perineal techniques during vaginal delivery was highly significantly linked to intact perineum, while hands-off was highly significantly attributed to occurrence of the second degree perineal tear (Figure 1). This was expected, since hands-on technique has historically been one of the most frequently considered interventions for reducing the rate and degree of perineal trauma as it plays an

important role in the reduction of perineal tension through supporting it during crowning of the fetal head. It also controls the speed of the fetal head delivery by slowing its passage or expulsion through the perineal structures and maintaining its flexion, protecting the anterior region of the perineum. Simultaneously, hands-on technique protects the posterior region of the perineum by supporting it with the right hand during crowning, delivery of the shoulders and remainder of the body. On the other hand, placing a warm compress on the perineum can help reduce the severity of tearing as the baby's head stretches the perineal tissues ⁽²⁴⁾ (Healy, et al., 2020).

The current finding, in one hand, corresponds with a Cochrane review, which revealed moderate-quality evidence suggesting that warm compresses applied on the perineum during vaginal birth may reduce the third- and the fourth-degree tears, but the impact of this technique on the other perineal outcomes was unclear or inconsistent. It is on the other hand, not concordant with this Cochrane review as it showed moderate-quality evidence that hands-on or hands-off the perineum made no clear difference in the incidence of intact perineum; low-quality evidence that they reduce the 1st & the second degree perineal tear; and vary low-quality evidence that they reduce the 3rd & the 4th degree perineal tear ⁽¹⁶⁾ (Aasheim, et al., 2017). The discrepancy between the finding of this Cochrane review and the current study, in relation to hands-on or hands-off, may be referred to different research design and large sample size (15,181 women).

The present finding partly and relatively also agrees with a study fulfilled in Benisuef city, Egypt, where it was evidenced that warm compresses significantly reduced the degree of tears and episiotomy extension although it didn't significantly decrease the rate of perineal trauma ⁽³⁾ (Ibrahim, et al., 2017). In addition, it partly conforms to a retrospective interventional study in London, and a prospective cohort study, which demonstrated that manual perineal support during vaginal birth significantly reduced the risk of major (the 3rd & the 4th degree tears) obstetric anal sphincter injuries (OASI) ^(25, 26) (Naidu M et al., 2017; Meutter, et al., 2018). Moreover, the current finding is partly concordant with a systematic review, which revealed that application of perineal warm compresses during the 2nd stage of labor is associated with an increased incidence of intact perineum and a decreased risk of severe perineal trauma ⁽²²⁾ (Magoga, et al., 2019). Furthermore, it partly tallies with a study achieved in turkey, where it was detected that the application of warm compresses during vaginal birth maintains the perineal integrity ⁽²⁷⁾ (Türkmen, et al., 2020).

In contrast, the present finding relatively is not in line with a retrospective cross-sectional study executed in Brisbane, Australia, where no statistically significant deference was found in the risk of moderate or severe perineal injury between hands-on and hands-off techniques among nulliparae; while their risk was significant increased with the use of a hands-on approach among multiparae ⁽¹⁵⁾ (Lee et al., 2018). The inconsistency between the finding of this study and the current one study may reflect different research design and variables as well as large sample size (26393 women). The current finding is also partly not coincidental with the study fulfilled in Damanhour, Albehera Governorate, Egypt, where it was concluded that hands-off technique had a significant effect on decreasing the rate of perineal tears and their degrees. This can be interpreted as hands-off the perineum during vaginal delivery, helps natural and gradual dilatation of perineal tissues, resulting in reduced tear and its severity. Additionally, it can be justified as applying pressure on the fetal head will not only impede the natural process of birth, but also affect the posterior perineum, which may be stretch more or rupture, leading to higher risk of perineal trauma ⁽²³⁾ (Ismail & Tayel 2019). The discrepancy between this study and the current one may be pertaining to different study setting and objective.

Moreover, the present finding is not compatible with a systematic review and meta-analysis, which clarified that hands-on perineal technique during spontaneous vaginal delivery of singleton gestations, results in similar incidence of several perineal traumas, compared to a hands-off technique. However, the incidence of the 3rd degree tear increases with hands-on technique, which applies additional pressure, resulting in some perineal ischemia, and consequently severe perineal tears ⁽²⁸⁾ (Pierce-Williams, et al., 2019). The dissimilarity between this systematic review and meta-analysis and the present study may be attributed to different study design and large sample size (7287 women). Furthermore, the current finding is not in line with a systematic review and meta-analysis, which indicated that hands-off, may be a promising and safe technique to maintain intact perineum and decrease the risk of severe perineal trauma among women with low-risk pregnancy and vaginal delivery. This technique allows gradual extension of the perineum without exerting additional manual pressure, which could lead to perineal ischemia, and in turn to severe perineal tears ⁽¹⁷⁾ (Huang, et al., 2020). The distinction between this systematic review and meta-analysis and the present study may be due to different research design and large sample size (44898 participants).

On assessing perineal pain, the results of the study revealed that hands-off group significantly experienced more moderate and severe pain than hands-on and warm compresses groups (Table IV). This was expected, since the lower likelihood of episiotomy use and the higher possibility of intact perineum among these groups (Table III & Figure 1), result in less perineal pain. Warm compresses are also known to increase perineal tissue's blood supply, as well as facilitate removal of waste products and oxidative agents from it. Moreover, warm sensation is known to make dermal stimulation that decreases pain perception, induces relaxation and reduces nerve tension ⁽²⁷⁾ (Türkmen et al 2020).

The present finding is partly and relatively in agreement with a study conducted in Benisuef city, Egypt, where it was found that perineal pain intensity was highly significantly reduced among the warm compress group ⁽³⁾ (Ibrahim, et al., 2017). It also partly tallies with a study done in turkey, where it was discovered that the application of warm compresses during vaginal birth decreases perineal pain and improves postpartum comfort ⁽²⁷⁾ (Türkmen, et al., 2020). On the other hand, the current finding is incongruent with a systematic review and meta-analysis, which evidenced that hands-off, may be a promising technique to reduce perineal pain among women with low-risk pregnancy and vaginal delivery ⁽¹⁷⁾ (Huang, et al., 2020).

Finally, the results of the current study indicated that hands-off perineal technique during vaginal birth was significantly related to experiencing Dyspareunia, wound infection and perineal hematoma (Table V). This was not astonishing, since hands-off technique was highly significantly attributed to the occurrence of the second degree perineal tear (Figure 1) and the performance of more episiotomies (Table III). In fact, episiotomy and perineal tear may be complicated by perineal wound infection (perineal pain, wound dehiscence, or purulent vaginal discharge), which, in turn, may be complicated by hematoma or a blood clot that can form underneath the wound and impede its healing. Dyspareunia is also the most common long-term sexual health problem associated with perineal trauma (tear or episiotomy) that impacts woman's quality of life (e.g., physical, relational, psychological wellbeing) ⁽⁶⁾ (Goh, et al., 2018).

The present finding is partly and relatively consistent with the guideline of the French College of Gynecologists and Obstetricians, which reported that episiotomy was associated with high rate of dyspareunia at 6 months postpartum, which was similar for medio-lateral and lateral episiotomies ⁽²⁹⁾ (Marty & Verspyck , 2018). It also partly and relatively matches a prospective cohort study carried out in Denmark, where it was revealed that women with 2nd, 3rd & 4th degree tears had a higher risk of dyspareunia, Compared to those with no or first-degree tears ⁽³⁰⁾ (Gommesen, et al., 2019).

On the contrary, the current finding partly doesn't coincide with a study performed in Norway, where it was detected that episiotomy and the second degree laceration were not a risk factor for dyspareunia, one year postpartum, compared to obstetric anal sphincter injuries ⁽³¹⁾ (Fodstad, et al., 2016). The disagreement between this study and the present one may be related to different inclusion criteria and large sample size (2846 pregnant women). The present finding is also partly not consistent with the study completed in Damanhour, Albehera Governorate, Egypt, where it was obvious that there was no statistically significant difference between hands-off and hands-on groups in relation to the occurrence of perineal hematoma ⁽²³⁾ (Ismail & Tayel 2019). The contrast between this study and the current one may reflect different study setting and objective.

V. CONCLUSION

Based on the findings of the present study, it can be concluded that Hands-on technique during vaginal delivery had significantly better perineal outcomes than hands-off and warm compresses techniques, in terms of fewer episiotomies, absence of perineal tear, mild perineal pain, as well as less dyspareunia, wound infection and perineal hematoma.

VI. RECOMMENDATIONS

Based on the findings of the present study, the following recommendations are suggested:

- All midwifery education and training programs should include evidence suggested and safe protective perineal techniques during vaginal delivery
- Techniques to reduce perineal trauma and facilitate spontaneous birth (including warm compresses and hands-on) are recommended, based on a woman's preferences and available options.

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- Midwives should use hands-on and warm compresses perineal techniques efficiently during vaginal delivery to reduce the risk of perineal trauma and assure safe vaginal childbirth.
- Episiotomy is only recommended in case of high likelihood of major perineal tear, soft tissue dystocia, acceleration of compromised fetus delivery, facilitating an operative vaginal delivery and a history of female genital mutilation.
- In case of perineal repair of episiotomy or tear, broad-spectrum antibiotics are recommended in the immediate postpartum period to reduce the risk of wound infections and dehiscence.
- Laxatives are also recommended following perineal repair as the passage of stool can result in wound dehiscence.
- The urgent need for adequately powered and efficiently designed randomized controlled trials on a large sample is recommended to evaluate the complex interventions adopted as part of manual perineal support policies and to ensure a controlled delivery.
- Further research could be performed to evaluate the effect of different types of perineal techniques during vaginal birth on maternal and fetal outcomes as well as assess women's satisfaction with these techniques

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APPENDICES - A

Table (I): Distribution of laboring women according to their socio-demographic data

Socio-demographic data	Hands-on group (n = 30)		Hands-off group (n = 30)		Warm compresses group (n = 30)		F / χ^2 (P) F (P)
	No.	%	No.	%	No.	%	
Age (years):							
20 – 30 – 39	21 9	70.0 30.0	25 5	83.3 16.7	22 8	73.3 26.7	1.564 (0.457)
Min. – Max.	20 – 34		22 – 34		20 – 31		0.614
Mean ± SD	26.53 ± 4.69		26.13 ± 3.13		25.43 ± 3.69		(0.543)
Level of education:							
- Basic - Secondary	5 25	16.7 83.3	6 24	20.0 80.0	12 18	40.0 60.0	5.023 (0.081)
Occupation:							
- Housewife	30	100	30	100	30	100	-

F (P): Fisher Exact Test & P for FET-Test

χ^2 (P): Chi-Square Test & P for χ^2 Test

F (P): F for One – Way ANOVA test & (P) for F test

*: Significant at P ≤ 0.05

Table (II): Distribution of laboring women according to their reproductive history and clinical data

Reproductive history and clinical data	Hands-on group (n = 30)		Hands-off group (n = 30)		Warm compresses group (n = 30)		F / χ^2 (P) F (P)
	No.	%	No.	%	No.	%	
History of abortion:							
- Absent - Present	26 4	86.7 13.3	24 6	80.0 20.0	20 10	66.7 33.3	3.6 (0.165)
Gestational age (weeks):							
Min. – Max. Mean ± SD	20 – 34 26.53 ± 4.69		22 – 34 26.13 ± 3.13		20 – 31 25.43 ± 3.69		0.614 (0.543)
Weight (kg):							
Min. – Max. Mean ± SD	86 – 100 91.60 ± 5.67		80 – 100 91.0 ± 6.75		85 – 100 89.0 ± 5.93		1.478 (0.234)
Height (cm):							
Min. – Max. Mean ± SD.	160 – 170 165.0 ± 4.55		160 – 175 167.0 ± 6.10		160 – 170 165.0 ± 4.55		1.526 (0.223)
BMI (kg/m²):							
- Overweight - Obese	2 28	06.7 93.3	6 24	20.0 80.0	6 24	20.0 80.0	2.707 (0.258)
Min. – Max. Mean ± SD	29.41 – 35.16 32.72 ± 2.18		29.39 – 35.16 32.65 ± 2.17		29.41 – 37.50 33.34 ± 2.43		0.845 (0.433)

F (P): Fisher Exact Test & P for FET-Test

χ^2 (P): Chi-Square Test & P for χ^2 Test

F (P): F for One – Way ANOVA test & (P) for F test

*: Significant at P ≤ 0.05

Table (III): Distribution of laboring women according to their labor and delivery

Labor and delivery	Hands-on group (n = 30)		Hands-off group (n = 30)		Warm compresses group (n = 30)		F / χ^2 (P) F (P)
	No.	%	No.	%	No.	%	
Duration of the 2nd stage (min):							
Min. – Max.	61– 119		62 – 119		60 – 120		2.184
Mean \pm SD	91.07 \pm 17.26		89.97 \pm 16.99		93.47 \pm 16.96		(0.119)
Use of epidural analgesia:							
- No	30	100	30	100	30	100	-
Shoulder dystocia:							
- Absent	30	100	30	100	30	100	-
Episiotomy:							
- Not done	23	76.7	6	20.0	18	60.0	40.0
- Done	7	23.3	24	80.0	12	40.0	(0.000)**

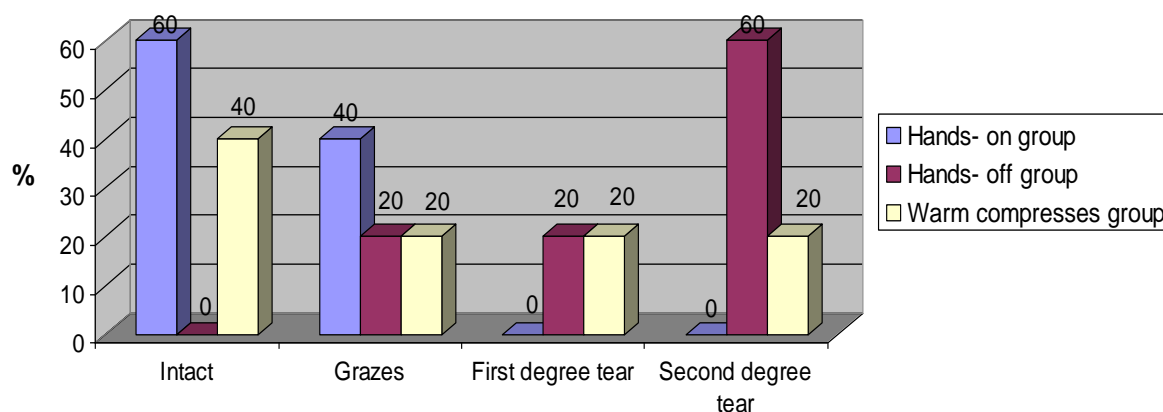
F (P): Fisher Exact Test & P for FET-Test

χ^2 (P): Chi-Square Test & P for χ^2 Test

F (P): F for One – Way ANOVA test & (P) for F test

*: Significant at $P \leq 0.05$

** : Highly significant at $P \leq 0.05$



Classification of perineal trauma

F(P): 46.8 (0.000)**

Figure (1) Distribution of laboring women according to classification of their perineal trauma

Fisher Exact Test & P for FET-Test

** : Highly significant at $P \leq 0.05$

Table (IV): Distribution of laboring women according to their postpartum assessment of pain, dyspareunia and wound infection

Postpartum assessment	Hands-on group (n = 30)		Hands-off group (n = 30)		Warm compresses group (n = 30)		F / χ^2 (P)
	No.	%	No.	%	No.	%	
Pain:							
<i>1st 24 hrs:</i>							
- Mild	15	50.0	0	00.0	6	20.0	28.681 (0.000)**
- Moderate	10	33.33	24	80.0	24	80.0	
- Severe	5	16.67	6	20.0	0	00.0	
<i>2nd week:</i>							
- Mild	27	90.0	12	40.0	24	80.0	20 (0.000)*
- Moderate	3	10.0	18	60.0	6	20.0	
<i>8th week:</i>							
- Mild	30	100	24	80.0	30	100	12.857 (0.002)*
- Moderate	0	00.0	6	20.0	0	00.0	
<i>12th week:</i>							
- Mild	30	100	30	100	30	100	-
Dyspareunia:							
<i>8th week:</i>							
- Absent	26	86.7	12	40.0	18	60.0	13.992 (0.001)*
- Present	4	13.3	18	60.0	12	40.0	
<i>12th week:</i>							
- Absent	30	100	12	40.0	24	80.0	28.636 (0.000)**
- Present	0	00.0	18	60.0	6	20.0	
Wound infection:							
<i>2nd week:</i>							
- Absent	28	93.3	18	60.0	18	60.0	16.364 (0.000)**
- Present	2	06.7	12	40.0	12	40.0	
<i>8th week:</i>							
- Absent	30	100	24	80.0	24	80.0	6.923 (0.031)*
- Present	0	00.0	6	20.0	6	20.0	
<i>12th week:</i>							
- Absent	30	100	30	100	30	100	-

F (P): Fisher Exact Test & P for FET-Test

χ^2 (P): Chi-Square Test & P for χ^2 Test

*: Significant at $P \leq 0.05$

** : Highly significant at $P \leq 0.05$

Table (V): Distribution of laboring women according to their postpartum assessment of perineal hematoma, stress urinary and fecal incontinence as well as vesico-vaginal fistula

Postpartum assessment	Hands-on group (n = 30)		Hands-off group (n = 30)		Warm compresses group (n = 30)		F / χ^2 (P)
	No.	%	No.	%	No.	%	
Perineal Hematoma:							
<i>1st 24 hrs:</i>							
Absent	28	93.3	18	60.0	23	76.7	9.317 (0.009)*
Present	2	06.7	12	40.0	7	23.3	

2nd week:								
Absent	28	93.3	18	60.0	23	76.7	9.317	
Present	2	06.7	12	40.0	7	23.3	(0.009)*	
8th week:								
Absent	30	100	24	80.0	27	90.0	6.796	
Present	0	00.0	6	20.0	3	10.0	(0.036)*	
12th week:								
Absent	30	100	30	100	30	100	-	
Stress urinary incontinence:								
2nd week:								
Absent	28	93.3	24	80.0	26	86.7	2.248	
Present	2	06.7	6	20.0	4	13.3	(0.373)	
8th week:								
Absent	27	90.0	27	60.0	30	100	1.230	
Present	3	10.0	3	40.0	0	00.0	(0.654)	
12th week:								
Absent	27	90.0	27	80.0	27	90.0	1.600	
Present	3	10.0	3	20.0	3	10.0	(0.577)	
Fecal incontinence:								
2nd week:								
Absent	30	100	30	100	30	100	-	
8th week:								
Absent	30	100	30	100	30	100	-	
12th week:								
Absent	30	100	30	100	30	100	-	
Vesico-vaginal fistula:								
8th week:								
Absent	30	100	30	100	30	100	-	

F (P): Fisher Exact Test & P for FET-Test

χ^2 (P): Chi-Square Test & P for χ^2 Test

*: Significant at $P \leq 0.05$

**: Highly significant at $P \leq 0.05$