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Effect of Hands-off versus Hands-on Maneuver during the Second Stage of Labor on Birth Outcomes among Primiparae Women

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Abstract: *Perineal trauma due to vaginal delivery has been recognized as the causative agent of several co-morbidities that generate losses to women's health. Different strategies including hands-off techniques have been used to prevent trauma at the time of delivery. This study aimed to determine the effect of hands on versus hands off maneuver during the second stage of labor on birth outcome among primiparae women.* ***Methods:*** *A quasi-experimental design was utilized. Setting: This study was conducted at labor and delivery unit of National Medical Institution in Damanhour, Albehera Governorate. The study was carried out from the beginning of June 2018 till the end of December 2018. A convenient sample of 120 parturient women undergoing vaginal delivery was randomly divided into two equal groups of 60 parturient each group as follows: Group 1 (hands-off technique) and Group 2 (hands-on technique). Two tools were used to collect the necessary data. 1) A socio-demographic and clinical data structured interview schedule. 2) An assessment and observational birth outcome sheet.*

Results: *it revealed that there were no statistically significant differences between hands-off and hands-on groups in relation to their newborn birth outcome. Also there were no statistically significant differences between the two groups in relation to their duration of the 2nd stage of labor, total pushing time and timing of beginning oxytocin, hematoma, postpartum bleeding and location of perineal tears. In contrast, There was a statistically significant difference between the hands-off and hands-on groups in favor of the former in relation to perineal condition, and need to repair and degree of perineal tear where P = 0.000 , P =0.000 & P= 0.020 respectively).*

Conclusion: *The study concluded that hands-off technique had significant effect on decreasing episiotomy rate, perineal tears, and need to repair as well as lowering degree of perineal tears.* ***Recommendation:*** *it is recommended that Hands-off technique during the second stage of labor should be recommended in maternity hospitals' protocols to protect perineum during labor.*

Keywords: *Hands-on, Hands-off, Second stage of labor, Birth Outcome, Perineal Trauma*

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I. Introduction

Childbirth is a process experienced with many problems that must be recognized by the midwife, with the aim of providing the necessary support in overcoming this problems, allowing the women to live a natural moment with their child. Every year, more than 130 million babies are delivered worldwide. Most vaginal births are associated with some form of trauma to the genital tract especially in women having their first baby. Bick et al. (2012) reported that approximately 70% of women suffer perineal trauma during vaginal birth. [(1)] Perineal trauma is the most common complications that could occur during second stage of labor. This can happen spontaneously (perineal tear) or result from a surgical incision of the perineum (episiotomy) or both. [(2)]

Perineal tears can be classified to four degrees according to their severity. First degree perineal tears occur when the fourchette and vaginal mucosa are damaged and the underlying muscles become exposed but not torn. The vaginal muscles are still intact. A first degree perineal laceration therefore only extends through the vaginal and perineal skin. Second degree perineal tears occur to the posterior vaginal walls and perineal muscles, but the anal sphincter is intact. In this, the muscles are torn but the anal sphincter is intact. A second degree perineal laceration extends deeply into the soft tissues of the perineum, down to, but not including, the external anal sphincter capsule. The muscles torn or affected in 2nd degree tear are the bulbocavernosus msucles and transverse perineal muscles. [(3, 4)] Third degree perineal tears extend to the anal sphincter without affecting the rectal mucosa. This type of perineal laceration extends through the perineum and the anal sphincter. Fourth degree Perineal Tears are where the anal canal is opened and the tear may spread to the rectum. The fourth degree laceration extends through the perineum, anal sphincter and also through the rectal mucosa, exposing the rectal lumen. [(5, 6)]

The prevalence rate of perineal tears markedly different between studies with incidence tending to be higher in hospital settings compared with community settings. The incidence of third- and fourth-degree perineal tears ranged across countries from15% & 6.4% in Philippines and USA respectively, to 0.1% in Cambodia, India and China. [7, 8] In Australia, the rate of parturients who have perineal tears during delivery ranges from 50% to 70%. [9] The incidence of perineal tears in Asian countries is 75% which is the same to that in other developing countries. [10] A study conducted in Saudi Arabia reported that the incidence of perineal tears among primiparous and multiparous women were 1.4% included second, third or fourth degree perineal tears. [11] The accurate prevalence rate of perineal lacerations in Egypt is unavailable, but there are a few studies which scrutinized the prevalence rate of perineal lacerations in some Egyptian districts. According to a recent study carried out in Mansoura, Egypt the incidence of perineal traumas were nearly three quarters of the study subjects. [12] Another study conducted by Mohamed A (2016) at Zagazig /Egypt, she reported that 27% of the study subjects had second, third or fourth degree perineal tears and 16% of them had episiotomy. She concluded that the prevalence rate of perineal tears was 43% of study subjects. [13]

Perineal trauma is associated with considerable short- and long-term problems for the woman. Pain, hemorrhage, wound edema, hematoma, and infection are short-term complications for mothers and they have a direct relationship with the severity of Perineal trauma during delivery. [14] Perineal trauma and the arising pain could lead to difficulty in breast feeding following delivery because they interfere with a comfortable sitting and disturbances in maternal mood, which in turn adversely affects her behavior toward the baby. The long-term complications include severe pain in perineum as well as fecal and urinary incontinence, dyspareunia, rectovaginal fistula and genital prolapse. Perineal trauma, therefore, may lead to disabling physical, psychological and social problems and affect the quality of life for the whole family. Therefore, reducing the risk of perineal trauma during childbirth is of importance for both women and their caregivers. [15, 16]

Perineal tears have many risk factors including: nulliparity, fetal macrosomia, abnormal presentations, delivery in an occipital posterior position, instrumental delivery, midline episiotomy, previous perineal trauma, use the directed pushing during labor, birthing in an upright position, and longer duration of second stage of labor. Other risk factors were also reported, such as maternal age, precipitate labor, and fundal pressure during 2nd stage. [17, 18]

As already mentioned, Perineal traumas are significant problems that have serious complications. So, its prevention is best than cure. Decreasing the incidence of spontaneous perineal tears associated with vaginal delivery should be one of the priorities in nursing care. Several techniques have been used to minimize these problems to decrease physical, emotional and financial burden to both the mother and healthcare providers. [19] Many women receive the required attention to reach the desirable consequences, but its real effect and consequences have not been proven yet . Worldwide, several techniques have been utilized by midwives to decrease perineal trauma during childbirth. In the latest years, one of the key recommendations has been to decrease perineal trauma by avoiding routine episiotomy. Therefore, World Health Organization has issued rigorous guidelines to reduce the occurrence of episiotomy. [20] Attempts to decrease or prevent perineal trauma during delivery include avoid routine episiotomy, [21] perineal massage, perineal warm compresses, and a variety of strategies used during the delivery. [22] However, these strategies have not been totally appraised and independently proved. One of these strategies is the use of ‘‘Hands-off’’ or ‘‘Hands-on’’ maneuver for controlling the perineum. [23]

However, reports on the effectiveness of these methods are contradictory. de Souza et al. (2006), studied frequency, degree, and location of perineal traumas and the neonatal outcomes when the ‘‘Hands-on’’ and ‘‘Hands-off’’ techniques were employed for perineal protection. They concluded that Hands-off technique does not alter the frequency or degree of perineal lacerations during childbirth. [24] However, two separate studies concluded that frequencies of the third degree lacerations, episiotomy, bleeding, and pain after delivery was higher in the Hands-on group. [25, 26]

Significance of the Study:

Perineal trauma is a serious health problem affecting millions of women during a vaginal delivery all over the world. It leads to serious complications that negatively affect the women physical, mental and social wellbeing. Therefore, midwives should be utilized several techniques to prevent perineal trauma as possible. [27] Numerous studies have been done in this topic, but they have contradicting results. The use of hands-off or hand -on techniques during second stage of labor to prevent the perineal trauma is still controversial. Some studies support the use of hands-off techniques [26, 28] and other studies support the use of hand -on techniques. [29, 30] These contradictory results necessitate several studies to fill the gap in this respect. There are still doubts about hands off superiority over perineal hands on method and needs more research in this field.

Operational Definition:
Birth outcome refers to maternal and newborn birth outcomes:
Maternal outcome includes duration of the second stage of labor, total pushing time, perineal condition after delivery **(**intact perineum**,** episiotomy, tears, degree of tears, need to repair, and hematoma), and postpartum bleeding.
Newborn outcome includes Apgar scores, need for resuscitation and neonatal birth trauma

Aim of the Study:
This study aimed to determine the effect of hands-off versus hands-on maneuver during the second stage of labor on birth outcomes among primiparae women.
Research Hypotheses:
H 0: Parturient women who managed by hands-off techniques during the second stage of labor experience similar birth outcome as those who managed by hands-on techniques.
H 1: Parturient women who managed by hands-off techniques during the second stage of labor experience shorter duration of the second stage of labor, less perineal traumas and need to repair, as well as less postpartum bleeding as those who managed by hands-on techniques.
H 2: babies of women who managed by hands-off techniques during the second stage of labor experience higher Apgar score, less need for resuscitation and less neonatal birth trauma than those of women who managed by hands-on techniques.

II. Material and Methods:

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

Setting: This study was conducted at labor and delivery unit of National Medical Institution in Damanhour, Albehera Governorate.

Sample: The study comprised a convenient sample of 120 parturient women undergoing vaginal delivery. They were selected from the aforementioned setting according to following inclusion criteria: women aged from 16 - 35 years, women who were primigravida, has singleton pregnancy, women whose estimated fetal weight ranged from 2.5 to 3 kg by ultrasonography, and women who were at full term (37-42) with cephalic presentation, in the active phase of labor and agree to participate in the study. The researchers excluded women who were diagnosed as high risk or had medical complications, and women who had complications during labor (obstructed labor, shoulder dystocia or fetal distress).

Sample Size: According to Damanhour National Medical Institute statistical center, 2017, flow rate of the laboring women undergo vaginal delivery were 1090 women at the end of December 2017. Ten percent of flow rate (109 women) was selected. Considering dropout during follow-up, the researchers added 10% from the 109 women. Thus the sample size was 120 parturient women; the sample was randomly divided into two equal groups of 60 parturient each group as follows: Group 1 (hands-off technique) and Group 2 (hands-on technique).

Tools of data collection: Two tools were developed and used by the researchers to collect the necessary data:-
Tool (I): Socio-demographic and clinical data structured interview schedule. It involves two parts:
Part 1: Socio-demographic data such as age, level of education, occupation, and current residence.
Part 2: Current pregnancy profile such as; weeks of gestation, body height and weight to calculate body mass index (BMI).

Tool (II): An assessment and observational birth outcome sheet it included two parts:
Part 1: included assessment of maternal birth outcome such as duration of the second stage of labor, postpartum bleeding, Perineal condition (intact, episiotomy, perineal tear and its degree), presence of hematoma, location of tear, and need to repair.
Part 2: involved assessment of newborn birth outcome and its characteristics such as Apgar score at 1 and 5 minute, need for resuscitation, neonatal birth trauma, and newborn babies' characteristics (newborn's birth weight (kg), and newborn's head circumference (cm)**).**

Tools Validity: tools were checked for content validity by a jury of five experts in the obstetrics and gynecological nursing to ascertain its relevance and completeness.

Tools Reliability: Reliability of the tool (II) (assessment and observational birth outcome sheet) was assessed by using Cronbach's Alpha coefficient test. The tool consisted of relatively homogeneous items as indicated by the high reliability. Internal consistency of the tool (II) = 0.89.

Pilot study: After the development of the tools, a pilot study was carried out on 12 women (who were excluded from the sample) to ascertain the clarity and the applicability of the tools then the necessary changes were undertaken.

Ethical Consideration: An official letter from the Faculty of Nursing, Damanhour University was submitted to the responsible authorities of the research setting to obtain their permission to conduct the study after explaining its aim. Purpose of the study was explained to each women and an oral consent for participation in the study was obtained. Those who agreed to participate were assured about confidentiality, privacy and their right to withdraw from the study at any time.

Collection of data:

- Data collection was done over a period of six months from the beginning of June 2018 till the end of December 2018.
- Data of Tool (I) were collected from both groups through an interview schedule, which was conducted individually and in total privacy. Each study subject was interviewed for 5-10 minutes during the first stage of labor, during this time anthropometric measurements (height and weight) were carried out to calculate BMI.
- During the second stage of labor:

On hands-off group: During the expulsive period, the researcher who conducting the labor only observing the successive movements of restitution, external rotation, delivery of shoulders, and the remainder of the body. During delivery, the researcher should support the baby's head with one hand and the baby's torso with the other hand. If external rotation of the head or delivery of the shoulders does not occur spontaneously within 15 seconds of the delivery of the head, or if the newborn appears hypoxic, the researcher must manually rotate the head by grasping it and applying gentle downward traction. Once the anterior shoulder is delivered, gentle upward traction is used to deliver the posterior shoulder. After the shoulders have been delivered, the baby's neck is held with one hand, while the other hand follows along the baby's back, and the legs or feet are grasped as they are delivered.

On hands-on group: When the baby's head is crowning, the researcher places the index, middle, ring, and little fingers of the left hand close together on the baby's occiput, with the palm turned toward the anterior region of the perineum. In this manner, expulsion is controlled, by maintaining the flexion of the head, protecting the anterior region of the perineum and bilaterally supporting the ischio-cavernous and bulbo-cavernous muscles, the urethral introitus, and the labia majora and minora. Simultaneously, the right hand is flattened out and placed on the posterior perineum, with the index finger and the thumb, forming a "U" shape, exerting pressure on the posterior region of the perineum during the crowning process. The researcher leaves no area without protection, particularly the region of the fourchette. During the delivery of the shoulders and the remainder of the body, the right hand is kept in place, protecting the posterior region of the perineum, while the left hand supports the baby's head, allowing external rotation and the delivery of shoulders spontaneously. If this does not occur, the researcher continues with posterior perineal pressure, and with the left hand, pulls gently downward to deliver the anterior shoulder. Once the anterior shoulder is delivered, gentle traction is applied upward to ease delivery of the posterior shoulder. After both shoulders have been delivered, the researcher removes the right hand from the posterior perineum and supports the baby's neck with one hand, while supporting the remainder of the body with the other hand.

- Tool II was used for both groups immediately following the second stage of labor to assess: time of beginning oxytocin, duration of the 2nd stage (min), pushing time, postpartum bleeding, perineal condition, perineal tear and its degree, presence of hematoma, location of tear, need to repair, newborn's birth weight (kg), newborn's head circumference (cm), Apgar scores at 1 and 5 minute, need for resuscitation and neonatal birth trauma.

Statistical analysis:

Statistical analysis was done by the researchers after collection of data by using Statistical Package for Social Sciences (SPSS) version 16 program. A descriptive and analytical statistics were used such as

percentages, means and standard deviations. Chi-square-test, Fisher Exact-test, and T-test were used to test significance between the groups. The level of significance was considered at p-value ≤ 0.05.

III. Results

Table (1) shows that there were no statistically significant differences between both groups in relation to their socio-demographic characteristics. Where, around three quarters of the hand-off and the hand-on groups (75 % & 70 %) respectively, were 20 to less than 30 years old. Equal proportion (41.7%) of both groups had secondary education. The majority of the hand-off and the hand-on groups (75 % & 80 %) respectively, were housewives. Also, 60%, and 65% of hand-off and hand-on groups, respectively, were from rural areas.

Table (2) presents distribution of the study subjects according to their mean anthropometric measurements and weeks of gestation. The mean height was found to be 161.375 ± 2.157cm & 161.175 ± 2.308 cm among the hands-off and the hands-on groups respectively. Meanwhile, the mean weight was 72.183± 4.332 kg & 73.017± 3.968 kg among both groups respectively. In addition, the mean body mass index was 27.793± 1.313 & 27.995± 1.299 among them respectively. Moreover, the mean weeks of gestation were 39.283±0.739 weeks & 39.500± 0.651 weeks among the hands-off and the hands-on groups respectively. The mean anthropometric measurements and the mean weeks of gestation among the two groups were not statistically significant.

Table (3) clarifies that there were no statistically significant differences between hands-off and hands-on groups in relation to their newborn birth outcome. Newborn Apgar scores at 1 minute were found to be normal among around two thirds of the hands-off and hands-on groups (66.7 % & 70%) respectively. In addition, newborn Apgar scores at 5 minute were found to be normal among the majority of them (88.3 % & 83.3%) respectively. resuscitation was not needed for newborns of around two thirds of the hands-off and the hands-on groups (66.7 % & 70%) respectively. Moreover, neonatal birth trauma was not observed among almost of both groups (100% & 98.3%) respectively.

Table (4) shows distribution of the study subjects according to their newborns' characteristics. The mean newborn' birth weight was 3.380 ± 0.385 & 3.410 ± 0.377 kg for hands-off and hands-on groups, respectively. Also, the mean newborn' head circumference was 32.900 ± 2.49 cm for hands-off group, and 32.880± 2.37 cm for hands-on group. The difference between both groups was not statistically significant.

It is obvious from **table (5)** that there were no statistically significant differences between the two groups in relation to their duration of the 2nd stage of labor, total pushing time and timing of beginning oxytocin. The majority (86.7% & 90%) of the hands-off and hands-on groups respectively, started oxytocin during the first stage of labor. The mean duration of the 2nd stage was 76.475 ± 12.778 minutes for hands-off group, and 76.564 ± 12.786 minutes for hands-on group. The mean total pushing time during the 2nd stage of labor was (34.428± 07.765 & 35.123± 07.868) in both groups respectively.

Table (6) clarifies number and percent distribution of the study subjects according to their perineal condition and postpartum bleeding. It was clear that one-third (33.3%) of hands-off group had perineal tears, compared to more than one-half (55%) of hands-on group. On the other hands, more than one-quarter (28.3%) of the hands-off group had intact perineum compared to only 3.3% of hands-on group. Less than three-fifth (58.3%) of hands-off group their genital tract trauma need to repair compared to the majority (90%) of the hands-on group. There was a statistically significant difference between the hands-off and hands-on groups in favor of the former in relation to perineal condition, and need to repair where P = 0.000 & P =0.000 respectively). All most (100% & 98.3%) of both groups respectively, did not have hematoma, with no significant differences between the studied groups. Regarding the postpartum bleeding, although hands-off group had low incidence of postpartum bleeding (18.3%) than hands-on group (21.7%) the difference between both groups was not statistically significant.

Figure (1) shows the distribution of the study subjects according to perineal tears degree. First degree tears was present in two-thirds (67%) of the hands – off group compared to one-third (33%) of hands-on group, while third degree tears was significantly present in the majority (80%) of the hands-on group compared to the minority (20%) of the hands-off group. There was a statistically significant difference between the hands-off and hands-on groups in favor of the former in relation to degree of perineal tear where P= 0.020.

Figure (2) indicates distribution of the study subjects according to their perineal tears location**.** It was found that tears in the anterior region of the perineum occurred in (35.3 % & 64.7%) of hands-off and hands-on groups

respectively. while tears in the posterior region of the perineum occurred in (41.7% & 58.3%) of them respectively. The difference between both groups was not statistically significant.

Table (1): Number and percent distribution of the study subjects according to their socio-demographic characteristics

Socio-demographic	hands-off group = 60		hands-on group = 60		FET/X^2 (P)
	No	%	No	%	
Age (years):					
<20	10	16.7	11	18.3	0.484
20 -30	45	75.0	42	70.0	(0.785)
≥30	5	08.3	7	11.7	
Level of education:					
- Illiterate/read & write	8	13.3	6	10	0.358
- Primary/ preparatory.	15	25.0	16	26.7	(0.949)
- Secondary	25	41.7	25	41.7	
- University	12	20.0	13	21.6	
Occupation:					
- Housewife	45	75.0	48	80.0	0.43
- Working	15	25.0	12	20.0	(0.512)
Current residence:					
- Urban	24	40.0	21	35.0	0.32
- Rural	36	60.0	39	65.0	(0.572)

X^2 (P): Chi-Square Test & P for X^2 Test; FET (P): Fisher Exact Test & P for FET-Test.

Table (2): Distribution of the study subjects according to their mean anthropometric measurements and weeks of gestation

Anthropometric measurements and weeks of gestation	hands-off group = 60	hands-on group = 60	T (P)
	Mean & SD	Mean & SD	
Weeks of gestation:	39.283±0.739	39.500± 0.651	1.705(0.091)
Height (cm):	161.375 ± 2.157	161.175 ± 2.308	0.400 (0.690)
Weight (kg):	72.183± 4.332	73.017± 3.968	1.099 (0.274)
Body mass index (B M I):	27.793± 1.313	27.995± 1.299	0.846 (0.399)

T (P): T-test & P for T-test

Table (3): Number and percent distribution of the study subjects according to their newborn birth outcome

Newborn birth outcome	hands-off group = 60		hands-on group = 60		FET/X^2 (P)
	No	%	No	%	
Apgar score at 1 minute					
- Normal (7-10)	40	66.7	42	70.0	0.411
- Mild asphyxia (4-6)	18	30.0	17	28.3	(0.814)
- Severe asphyxia (0-3)	2	03.3	1	01.7	
Apgar score at 5 minute					
- Normal (7-10)	53	88.3	50	83.3	0.617
- Mild asphyxia (4-6)	7	11.7	10	16.7	(0.735)
- Severe asphyxia (0-3)	0	00.0	0	00.0	
Need for resuscitation:					
- Yes	20	33.3	18	30.0	0.154
- No	40	66.7	42	70.0	(0.695)
Neonatal birth trauma					
- Yes	0	00.0	1	01.7	1.008
- No	60	100.0	59	98.3	(0.315)

X^2 (P): Chi-Square Test & P for X^2 Test; FET (P): Fisher Exact Test & P for FET-Test.

Table (4) Distribution of the study subjects according to their newborns' characteristics.

Newborns' characteristics	hands-off group = 60	hands-on group = 60	T- test (P)
	Mean & SD	Mean & SD	
Birth weight (kg):	3.380 ± 0.385	3.410 ± 0.377	0.431(0.667)
Head circumference (cm):	32.900 ± 2.49	32.880± 2.37	0.045(0.518)

T (P): T-test & P for T-test

Table (5): Distribution of the study subjects according to their duration of the 2nd stage of labor, total pushing time and Timing of beginning oxytocin

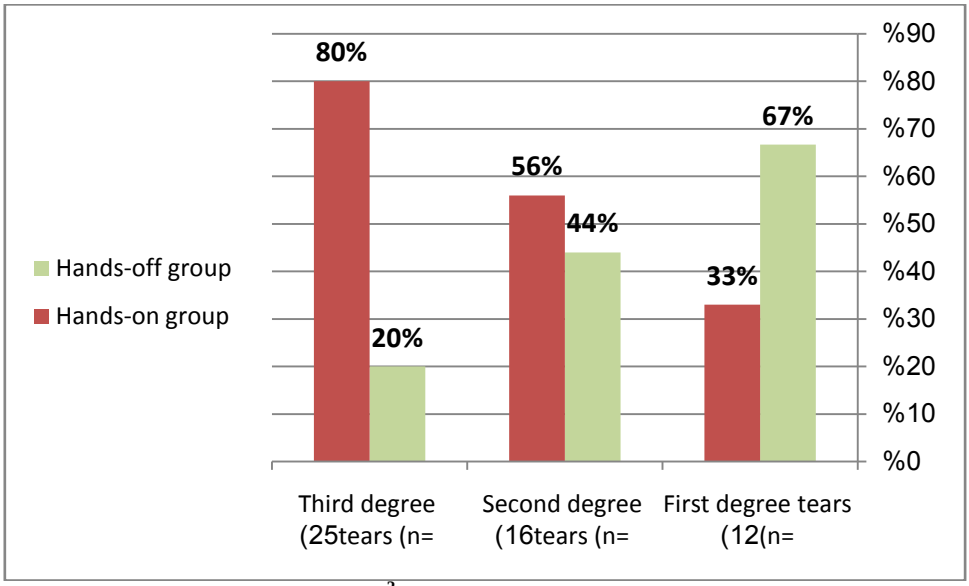
Variables	hands-off group = 60		hands-on group = 60		FET/X^2 (P)
	No	%	No	%	
Timing of beginning oxytocin - 1st stage - 2nd stage	 52 8	 86.7 13.3	 54 6	 90.0 10.0	0.323 (0.570)
Duration of the 2nd stage: (min) **Mean ± SD**	76.475 ± 12.778		76.564 ± 12.786		0.038 (0.515)
Total pushing time: (min) **Mean ± SD**	34.428 ± 07.765		35.123 ± 07.868		0.487 (0.686)

X^2 (P): Chi-Square Test & P for X^2 Test; FET (P): Fisher Exact Test & P for FET-Test and T (P): T-test & P for T-test

Table (6): Number and percent distribution of the study subjects according to their perineal condition and postpartum bleeding.

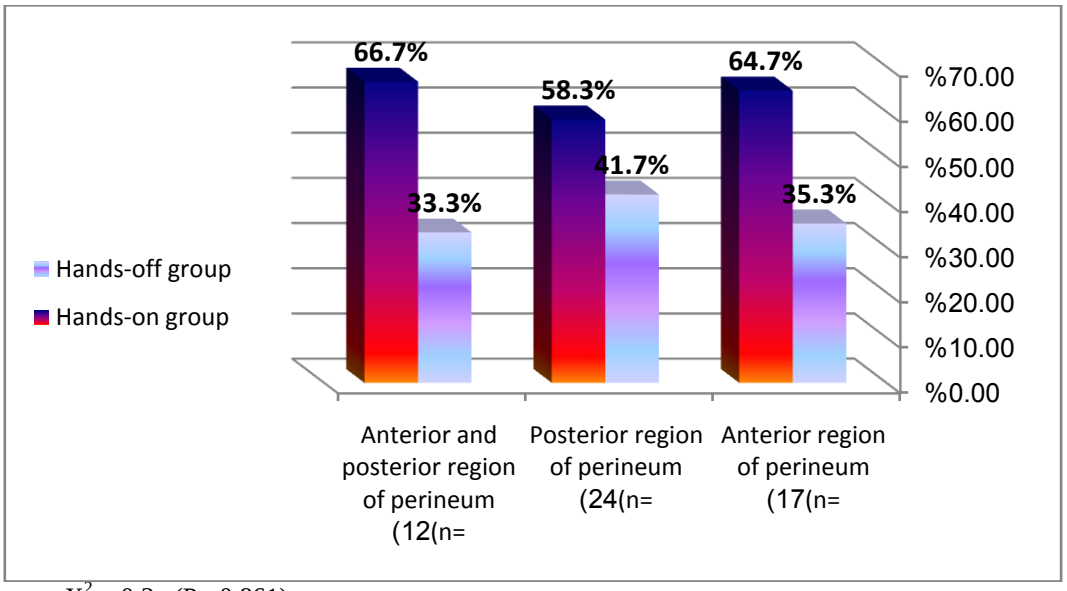
Perineal condition and postpartum bleeding	hands-off group = 60		hands-on group = 60		FET/X^2 (P)
	No	%	No	%	
Incidence of perineal trauma -Intact -Episiotomy -Tear	 17 23 20	 28.3 38.4 33.3	 2 25 33	 03.3 41.7 55.0	15.114 (0.000) *
Need to repair - Yes - No	 35 25	 58.3 41.7	 54 6	 90.0 10.0	15.701 (0.000) *
Hematoma - Yes - No	 0 60	 00.0 100.0	 1 59	 01.7 98.3	1.008 (0.315)
Postpartum bleeding - Yes - No	 11 49	 18.3 81.3	 13 47	 21.7 78.3	0.208 (0.648)

X^2 (P): Chi-Square Test & P for X^2 Test; FET (P): Fisher Exact Test & P for FET-Test, *: Significant at $P \leq .05$.



$\mathbf{X^2}$ = 7.868 (P= 0.020)

Figure (1) Distribution of the study subjects according to their perineal tears degree (n=53)



$X^2 = 0.3$ (P= 0.861)

Figure (2) Distribution of the study subjects according to their perineal tears location. (n=53)

IV. Discussion

Perineal trauma due to vaginal delivery has been recognized as the causative agent of several co-morbidities that generate losses to women's health. Considerable postnatal morbidity and occasionally mortality can be attributed to this. Perineal traumas associated with child birth could be minimized by improving existing Perineal management techniques and employing possible prevention strategies. Different strategies including warm or cold compresses, perineal massage, and hands-off techniques have been used to prevent trauma at the time of delivery. [31, 32]

The present study revealed that there were no statistically significant differences between hands-off and hands-on groups in relation to their newborn birth outcome including Apgar score at 1and 5 minutes, need for resuscitation, neonatal birth trauma, birth weight and head circumference. This result is consistent with at least five other researches. *The first*, Rozita et al (2014) [33] who conducted a randomized clinical trial to compare between the ‘‘Hands-Off’’ and ‘‘Hands-On’’ Methods to Reduce Perineal Lacerations. They found that there were no significant difference between the two groups among birth weight, baby head circumference, and the first and fifth minutes’ apgar score. *The second*, Yap-Icamina et al (2014) [34] who conducted a study titled "The Effect of Hands on versus Hands off Method on Perineal Trauma and Delivery Outcome among Nulliparous Women". They reported that APGAR scores as a measure of neonatal outcome at 1 minute (p=0.297) and at 5 minute (p=0.380) were similar in both groups. *The third*, Rezai et al (2014) [35] who had done a study titled "Comparison of Perineal Protection using " Hands on" and "Hands off" Techniques on Perineal Laceration during Labor". They found that neonatal outcomes were similar in both groups. *The fourth*, Forughi pour et al (2012) [36] who had done a study titled "Comparison of Two Methods of Second Stage of Labor Management of Ritgen’s Maneuver and Hands-off (Non Touch) Methods on Delivery Outcome". They reported that neonatal outcome among the two groups were not significantly different. *The fifth*, Foroughipour et al (2011) [26] who conducted a study to evaluate the effect of perineal control with hands-on and hand-poised methods on perineal trauma and delivery outcome. They reported that the differences in neonatal outcome, including one minute and five-minute APGAR scores, weight, height, head circumference and chest circumference were not significant in two groups.

The results of the present study showed no significant difference between hands-off and hands-on groups regarding, timing of beginning oxytocin, duration of the second stage, and total pushing time (table 5). The present result is similar to the results of Rahimikian et al (2015) [37] who had done a study titled Comparing the effect of active and expectant managements of the second stage of labor on perineal status. Their results had revealed that there was no significant difference between control (hand-on technique), and experimental (hand-off technique) groups in terms of lengths of first and second stages of labor. In addition, this finding is also in agreement with the results of another study done by Foroughipour et al (2011) [26] who had found that no significantly different between the hands-off and the hands-on groups in relation to the duration of each stage of labor, and induction status. They also found that the frequency of using more than 10 unit syntocinon was not different between them. Moreover, the present finding is in accordance with that of de Souza and Riesco (2006) [24] who had found that the average duration of the expulsive period was similar in the two groups.

Regarding perineal condition after delivery, the present study showed that a significant decreased in the incidence of episiotomy and tears, need to repair as well as in the degree of perineal tear among the hands-off group compared to hands-on group (table 6 & figure 1**)**. This may be explained by the fact that in the absence of the perineal touching during delivery, the tissue reaches its natural and gradual dilation and reduces tearing and its severity, and therefore creates less pain and fewer complications after the delivery. Obvious discrepancy in relation to the effect of hands-off techniques on perineum during the second stage of labor was reported by many researches.

The results of the present study agree with the results of at least six other researches. *The first,* Lee et al (2018) [(38)] who had done a retrospective cross-sectional study of non-operative vaginal births, 2011–2016 titled Perineal injury associated with hands on/hands poised and directed/undirected pushing. They found that in nulliparous women a hands-on/directed technique is not associated with a reduced risk of moderate and severe perineal injury when compared to a hands- poised/undirected approach. While in multiparous women the hands-on/directed approach was associated with a significant increase in the risk of moderate and severe perineal injury when compared to a hands-poised/undirected technique. They also concluded that the use of a hands-poised/undirected approach to second stage management may be included in strategies to reduce moderate and severe perineal injury, particularly in multiparous women. *The second,* Ashley and Katherine (2017) [(39)] who had reported that hands off reduces the incidence of episiotomy and the modified Ritgen maneuver does not reduce perineal trauma. *The third,* Tomas & Jayabharathi (2016) [(40)] who had done a study about the effectiveness of hands-off versus hands-on techniques on perineal trauma and perineal pain among parturient mothers. They reported that there was extremely significant difference in perineal trauma and perineal pain of parturient mothers between study Group I (hands-off technique) and study Group II (hands-on technique) at p=0.000 level. Where, the parturient mothers in study Group I had less perineal trauma and perineal pain than study Group II. *The fourth,* Forughi pour et al (2012) [(36)]who Concluded that hands-off method is associated with less perineal trauma, particularly lower need for episiotomy, and less perineal tear and is one safe methods. *The fifth,* Fahami et al (2012) [(28)] who found that tearing prevalence during the labor in Ritgen maneuver group is more than the other two groups (hands-off & perineal massage) and there are significant differences. The severity of tearing in Ritgen maneuver is associated with the higher levels of tearing. They concluded that the hands-off technique during parturition of the neonate's head was associated with fewer complications after delivery. It was even better than perineal massage during the parturition. *The sixth,* Foroughipour et al (2011) [(26)] who concluded that the "hands off" is associated with less perineal trauma, lower need for episiotomy and lower incidence of postpartum hemorrhage. This may be explained by the two forces that act on the fetal head. The first force exerted by the uterus acts posteriorly and the second force supplied by the resistant pelvic floor and symphysis pubis acts anteriorly. This cause fetal extension which will bring the occiput into direct contact with the inferior margin of the symphysis pubis, making the anterior perineum at risk for trauma if "Hands on" technique is performed. [(26)]

The present result is similar to the results of Jahdi et al (2010) [(41)] who had done a study about the effect of hands-off and hands-on methods on perineal status. They had reported that the undamaged perineum in the hands-off group were 44.9%, versus 10% in the hands-on group, where the difference was statistically significant ($P < 0.0001$). they added that in the hands-off group, 3.1% underwent episiotomy as compared with 75.3% in the hands-on group . They also concluded that a policy of hands-off technique in protecting perineum can be safe and efficient technique and can be an alternative method in perineal protection during labor. In addition, this finding is also in agreement with the results of another study done by Kushavar et al (2009) [(42)] who had conducted a randomized clinical trial on 70 nulliparous women that expecting normal birth. They reported that the rate of intact perineum was significantly higher in the 'hands off' group. As well the first and second degree tears were significantly lower in the 'hands off' group. They added that there were no significant differences in the rate of lacerations in the anterior regions of the perineum and frequency of suture between the two groups. They also concluded that the hands off technique in the second stage of labor increases the likelihood of an intact perineum. Moreover, the present finding is in accordance with that of Eyvanbagha et al (2009) [(43)] who had found that the rate of perineal health in non-touching group was higher than the Ritgen maneuver group with a significant difference. The rates of first and second degree of perineal tears in non-touching group were less than Ritgen maneuver group and there was a lower significant difference.

The finding of the present study is relatively in accordance with Pierce-Williams et al (2019) [(44)] recent literature review which concluded that Hands-on technique during spontaneous vaginal delivery of singleton gestations results in similar incidence of several perineal traumas compared to a hands-off technique. The incidence of third-degree lacerations and of episiotomy increases with the hands-on technique. The present finding is also partially in line with that of Rozita et al (2014) [(33)] which reported no significant difference in the perineal lacerations was observed between the hands-off and hands-on methods. While the two groups showed a significant difference among the third degree tears, the number of episiotomy and the periurethral tears. The Hands-on group showed higher third degree tears and the episiotomy than Hands-off group, whereas, the

periurethral tears were more in the Hands-off group. It concluded that the Hands-off method in vaginal delivery offers advantages to the mother's health because this method showed reduced episiotomy and third degree tears. Therefore it is suggested that the ''Hands-off' method a safer method of delivery. The current finding is also partially similar to that of Rezai et al (2014) [(35)] who reported that the rate of Perineal lacerations was not different between the hands-off and hands-on groups (P=0.7). Where, in both groups first degree lacerations were more dominant. Also third degree lacerations (P=0.01) and episiotomy (P=0.003) were significantly lower in hands off group but the rate of periurethral lacerations was significantly higher in hands-off group (P=0.01). They concluded that the use of hands off technique reduced the rate of episiotomy and third degree lacerations of birth canal, therefore, it could be recommended as a safe method during labor. Moreover, the study of Yap-Icamina et al (2014) [(34)] revealed that perineal trauma, postpartum perineal pain and neonatal outcome between the "hands on" versus "hands off" have no significant difference. It recommended that it is not necessary to use "hands on" technique on all women in labor during the second stage of labor.

Dissimilar to the finding of the present study, De Souza et al. (2006) [(24)] found the prevalence of perineal tearing and injuries in both of the perineal non-touching and Ritgen maneuver groups had no statistically significant difference. As well as the use of hands off technique of perineal protection does not alter the frequency or degree of perineal lacerations in childbirth, relative to a hands on technique.

In contrast, different findings were monitored by Mohamed et al (2017) [(45)] who had done a cross sectional descriptive study titled Practices that Applied on Protection of Perineal Trauma among Parturient Women. They had reported that there was a statistical significant difference in relation to the application of hands on technique and prevention of perineal trauma. They concluded that hands on technique, perineal massage and guided pushing technique are suitable interventions that could be used to reduce perineal trauma. Bulchandani et al (2015) [(46)] reviewed five randomized controlled trials (RCTs) and seven non-randomized studies (NRSs) in their systematic review and meta-analysis related to the study subject. They concluded that evidence from the meta-analysis of RCTs is insufficient to drive change in practice; however, NRS meta-analysis results suggest that there might be a significant benefit in a 'hands on' policy. They also recommended that there is an urgent need for an adequately powered and efficiently designed RCT to evaluate the complex interventions adopted as part of hands-on policies to ensure a controlled delivery. A literature review conducted by Aasheim et al. (2017) [(47)] reviewed 20 trials (including 15181 women) related to the study subject. They concluded that poor-quality evidence suggests hands-off techniques may reduce episiotomy, but this technique had no clear impact on other outcomes.

The present study revealed that no significant difference between hands-off and hands-on groups regarding perineal tears location (Figure 2). The current finding is also similar to that of De Souza et al. (2006) [(24)] who found that the location of perineal laceration was similar between the two groups. Where in the hands on group, there was a slight increase of perineal trauma in the anterior region (71.4% versus 62.1% in the hands off group); however, the hands off group had slightly more cases of perineal trauma in the posterior region (65.5% versus 60.7% in the hands on group).

In the light of the finding of the current study, it can be observed that there were no significant differences between the hands-off and hands-on groups in relation to hematoma and postpartum bleeding (table 6). The current finding agrees with that of Forughi pour et al (2012) [(36)] who found that postpartum hemorrhage and hematoma between the two groups were not significantly different.

V. Conclusion

According to the findings of the present study, it can be concluded that hands-off technique had significant effect on decreasing episiotomy rate, perineal tears, and need to repair as well as lowering degree of perineal tears. The findings also revealed that there was no significant difference in the Apgar score at 1 and 5 minute, need for resuscitation, and neonatal birth trauma, duration of the second stage of labor, postpartum bleeding, presence of hematoma and location of tears between the hands-off and hands-on groups.

VI. Recommendations

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

- Hands-off technique during the second stage of labor should be recommended in maternity hospitals' protocols to protect perineum during labor.
- Maternity nurses should have an opportunity to attend training programs about hands-off technique in order to change routine practices of hands-on technique and gain confidence in managing the second stage of labor by hands-off technique.
- Relevant nursing curriculum must entail a detailed portion about hands-off techniques during the second stage of labor with special emphasis on the possible advantages of hands-off versus hands-on pushing.
- Replication of the present study at different sittings and among different subjects with large sample to evaluate the safety and effectiveness of these two methods.

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