

Effect of Breast Crawl on the Outcomes of Third Stage of Labor, Initiation of Breastfeeding, and Bonding among Primiparae

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Abstract:

Background: Psycho-physiological care during the third stage of labor including breast crawl technique comprises immediate and continued mother and baby skin-to-skin contact as well as breastfeeding. It has been believed to bring numerous protective effects for the mother and her newborn. **Aim of the study:** This study aimed to evaluate the effect of breast crawl on the third stage of labor, initiation of breastfeeding, and bonding among primiparae. **Design:** A quasi-experimental research design was utilized. **Subjects:** A convenient sample of 60 primipara women. **Setting:** labor and delivery unit of Damnhour Medical National Institute, Egypt. **Tools:** Data was collected through four tools, basic data structured interview questionnaire, clinical assessment sheet, modified LATCH scale, and postpartum bonding questionnaire. **Results:** This study revealed significantly decreased mean of blood loss (312.67 ± 51.154 ml) after delivery and short duration of the 3rd stage of labor (12.75 ± 4.858 min) among the study group, compared to (357.50 ± 43.127 ml & 20.25 ± 5.217 min) respectively of the control group. In addition, the study revealed a significantly higher total score of breastfeeding initiation and bonding among 80% & 90% respectively of the study group, compared to 0% & 10% respectively of the control group. **Conclusion:** This study concluded that breast crawl significantly reduced the amount of blood loss after delivery, shortened the duration of the 3rd stage of labor, enhanced good breastfeeding initiation and strong bonding. **Recommendations:** It is suggested that maternity nurses should support evidence-based breast crawl practice during the 3rd stage of labor.

Keywords: Breast Crawl, Outcomes of third stage of labor, breastfeeding initiation, Bonding & Primiparae

Introduction:

Breast crawl is a spontaneous behaviour in which the newborn can move toward the mother's breast and starts latching on for the initial feed when put on the mother's abdomen immediately after delivery. The newborn first uses the stepping reflex to climb the mother's abdomen, then starts to search in a trial to find, catch, and suck the nipple. (Organization, 2017; Thomas et al., 2018).

Breast crawling immediately after delivery of the baby (during the third stage of labor) brings numerous protective effects for the mother and her newborn. The movement of the baby's hands over the mother's breasts during skin-to-skin contact and nipple stimulation during subsequent suckling induces a large oxytocin surge in a pulsatile manner (3-4 secretions every 5 to 15 min) from the pituitary gland of the mother into her blood stream (Safari et al., 2018; Sumithra et al., 2019). During breast crawl, close emotional contact as well as the baby's cutaneous, visual, and auditory stimuli also aid in the secretion of oxytocin. This may further stimulate uterine contractions, which will help in the early separation and expulsion of the placenta as well as closing off a lot of blood vessels in the uterus, consequently decreasing blood loss and preventing

anemia. The infant's feet pressure on the mother's abdomen may also help in placental expulsion. In addition, kicks from the baby, during breast crawl, will provide tender firm jerks to the uterus, which also enhance uterine contractions and lead to the previously mentioned benefits. Moreover, breast crawl encourages early initiation of breastfeeding, increases maternal-infant bonding, and decreases the risk of postpartum hemorrhage (Al Sabati & Mousa, 2019; Dashtinejad et al., 2018).

Therefore, the Baby Friendly Hospital Initiative (BFHI) recommended that newborn babies must be in skin to skin contact with their mothers immediately after delivery, and mothers must be assisted with the initiation of breastfeeding within thirty minutes after birth (Al Sabati & Mousa, 2019). This will supply the baby with colostrum which provides vital antibodies and growth factors to the baby as well as prevents early death and protects the newborn against many infectious diseases. Consequently, it could significantly reduce the neonatal mortality rate by saving the lives of more than 1.3 million newborns yearly worldwide, in addition to maintaining healthier growth and improving their IQ (Nadeem et al., 2017; Organization, 2015; Sadhana, 2015)

The third stage of labor is the time between the delivery of the baby and the expulsion of the placenta and membranes (usually 6-30 min). Although its pathophysiology is still not fully understood; after the delivery of the baby, the uterine contractions along with the formation of capillary hemorrhage lead to shrinking of the placental surface which ends with placental separation and its expulsion outside the uterus. Although hemorrhage is controlled by uterine contractions and the activation of coagulation factors, some bleeding always occurs (100-250 cc) (Güngördük et al., 2018).

The Management of the third stage of labor is done through two methods: physiological and active management. In physiological management, the placenta is separated and delivered naturally through the vagina, while in active management a prophylactic uterotonic agent is administered as soon as the newborn is delivered and the umbilical cord is clamped and cut early along with constant controlled cord traction. This management is recommended by the world health organization (WHO) and includes the administration of 5 or 10 international units of oxytocin intramuscularly or 20 units diluted in 500 mL normal saline through IV infusion after expulsion of the baby's shoulder or after the delivery of the placenta to prevent PPH. However, oxytocin may produce some maternal complications such as nausea, vomiting, elevated blood pressure, and adverse cardiovascular response. Water intoxication may also occur when oxytocin is administered continuously by infusion (Almutairi et al., 2020; Dashtinejad et al., 2018; Güngördük et al., 2018)

Midwives use the active management of the 3rd stage of labor, but often substitute expectant management to make the third stage pass naturally without excessive medical interventions. Expectant management is known as a "hands-off" policy, which includes waiting for the signs of placental separation and allowing the placenta to be expelled naturally. Psycho-physiological care has been added to expectant management in order to make mothers feel linked to their environment, safe, and supported. Psycho-physiological care comprises immediate and continued mother and baby skin-to-skin contact as well as breastfeeding immediately during the third stage of labor. It has been believed to be especially important to prevent PPH (Almutairi et al., 2020; Begley et al., 2019)

If early suckling associated with active management of the third stage of labor is maintained by a skilled midwife, it will help in the reduction of the duration of the third stage and the amount of blood loss by augmenting or strengthening uterine contraction, also, this will help in establishing a bond between the mother and her newborn. Moreover, the third stage of

labor is a critical period where sudden and uncontrolled bleeding can lead to a rapid deterioration in the mother's general health which may result in her death. Maternity nurses play a pivotal role in strengthening women's capabilities and the normal processes during childbirth also they have a very unique position in, protecting, promoting and supporting breastfeeding. Therefore, strengthening midwifery care is needed to spotlight the importance of early suckling, which could facilitate maternal and neonatal well-being and reduce their mortality rate (Almutairi et al., 2020; Sumithra et al., 2019)

Significance of the study:

The first hour after delivery has a great impact on the survival, future health, and well-being of the newborn baby, who has basic needs for warmth, normal breathing, protection from infection, and breastfeeding (Widström et al., 2019). Initiation of breast suckling immediately after delivery of the baby is a fundamental step for a continuum of care for the mother and newborn resulting in long-lasting effects on their health and welfare (Phukan et al., 2018). Many maternity health personnel are probably not aware of this fact, and as a result, the early initiation of breastfeeding is frequently delayed. They also lack awareness of breast crawl because it is not a part of the standard medical curriculum, therefore, this intervention is underutilized (Safari et al., 2018). So, this study was conducted to apply breast crawl and evaluate its effect on the outcomes of the third stage of labor, initiation of breastfeeding and bonding.

Aim of the study:

This study aimed to evaluate the effect of breast crawl on the outcomes of the third stage of labor, initiation of breastfeeding and bonding among primiparae

Research hypotheses:

- H [1]:** Parturient women who experience breast crawl have less amount of blood loss and a shorter duration of the third stage of labor than those who don't experience it.
- H [2]:** Parturient women who experience breast crawl have good initiation of breastfeeding than those who don't.
- H [3]:** Parturient women who experience breast crawl have strong bonding than those who don't.

Subjects and Method:

Research design: A quasi-experimental research design was used.

Study setting:

The study was conducted at the labor and delivery unit of Damnhour Medical National Institute, Egypt. This setting is used because the turnover of labor cases is satisfactory and it is

considered the main and largest setting in Damanhour city.

Study subjects:

A convenient sample of 60 parturient women was recruited from the above-mentioned setting according to the following inclusion criteria:

- Primipara women.
- With no previous history of intra or post-partum hemorrhage.
- Have normal pregnancy
- Full-term (38- 42 weeks of gestation).
- Undergone normal vaginal delivery with no complications.
- Free from nipple anomalies
- Have a singleton viable and normal newborn with no congenital anomalies that can affect breastfeeding
- Willing to participate in the study.

The study subjects were assigned to two equal groups:

- The study group included 30 parturient women, who experienced the breast crawl technique.
- The control group involved 30 parturient women, who received routine hospital care.
 - The sample size of parturient women was estimated by using the Epi Info statistical software V7, where the following parameters were applied:
 - Population size = 150/month
 - Expected frequency =50%
 - Acceptable margin of error = 10%
 - Confidence coefficient = 95%
 - Minimal sample size = 59
 - Total sample size= 60 parturient women

Tools:

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

Tool one: Basic Data Structured Interview questionnaire, which was developed by the researcher and entailed 2 parts:

Part I: Socio-demographic data such as age, level of education, occupation, marital status, original residence, as well as family type and income/month.

Part II: Obstetric history such as gravidity, number of abortions, as well as current pregnancy planning, weeks of gestation and number of antenatal visits.

Tool two: Clinical Assessment Sheet, which was developed by the researchers and consisted of three parts:

Part I: assessment of uterine condition such as the presence of uterine contractions after delivery of the baby, consistency of the uterus after delivery of the placenta, augmentation of uterine contractions as well as the level of the fundus and performing uterine massage after delivery of the placenta.

Part II: assessment of hemoglobin level before and after labor by hemoglobinometer device as well as quantification of the amount of blood loss during the third stage of labor using the BRASS-V drape.

Part III: assessment of the nature of the third stage of labor such as duration, method of placental delivery as well as the completeness of placenta and membranes:

Tool Three: Modified LATCH Scale

This scale was developed by (Jensen et al., 1994) and adapted by the researchers to assess breastfeeding within the first 24 hours after delivery. LATCH denotes the Latching of the baby onto the nipples, Amount of audible swallowing, Type of nipples, Comfort of the mother, and Help needed by the mother to hold the baby to her breast. Each item assigns a numerical score [0, 1 or 2] and the total score ranges from 0 -10; worst or notable to initiate breastfeeding through breast crawl (0–3), better or need assistance to initiate breastfeeding through breast crawl (4–7) and good or actively initiated breastfeeding through breast crawl (8–10).

Tool four: Postpartum Bonding Questionnaire (PBQ), which was developed by (Brockington et al., 2001) and adapted by the researchers to evaluate the bonding formation between the mother and her child during the postpartum period. It is a self-report questionnaire that contains 25 items divided into 4 factors: general factors (12 items), rejection and pathological anger (7 items), anxiety about the infant (4 items) and incipient abuse (2 items). Each item is evaluated on a four-point Likert scale (0-3). The total score ranges from 0 -75; weak (<25), medium (25-<50) and strong (50-75).

Field Work:

The first phase (Initial preparatory phase):

- Approval from the Research Ethics Committee, Faculty of Nursing- Alexandria University was obtained on 18 November 2021.
- Official permission to collect data was obtained from the responsible authority of the study setting after an explanation of the aim of the study.
- Tools one & two were developed by the researchers based on an extensive review of up-to-date and relevant literature, while tools three & four were adapted.
- Tools were reviewed for content validity by a jury of 3 expert professors in the maternity nursing field.
- Tools three & four were checked for their reliability by the test-retest method, using Karl Pearson's coefficient correlation (r) and the result was reliable for tool three (0.844) and tool four (0.98).
- A pilot study was carried out on 6 parturient women (excluded from the study subjects) to test the feasibility of the study, as well as to verify relevance, clarity and applicability of the tools, in

addition to calculate the time needed to complete them. After the pilot study, the tools were revised, modified, and made ready for use.

The second phase (Implementation phase):

- Data was collected over a period of six months, starting from the beginning of February 2022 till the end of August 2022.
- Data was collected from the parturient women while attending labor and delivery unit, through an interview schedule which was conducted individually.
- Data of tool one was gathered from parturient woman during their first stage of labor.
- For the study group, breast crawl technique was applied after drying the neonate, except hands to facilitate breast crawl. Then the baby was shown to the mother, placed on her abdomen and covered with a pre-warmed blanket to initiate breastfeeding through breast crawl until the end of the third stage.
- Data of tool two was assessed for parturient women during their 2nd & 3rd stages of labor
- The researchers palpated the parturient's abdomen to evaluate uterine contractions, consistency, and level of the fundus. They also observed if augmentation of uterine contractions is done and performed uterine massage when needed.
 - Hemoglobin level was also estimated before and after delivery using hemoglobinometer device.
 - Amount of blood loss was measured immediately after delivery of the baby by BRASS-V drape which has a 2500 ml calibrated and funneled collecting pouch, with a flexible filter to garble non-blood components. This drape is incorporated within a plastic sheet that is placed beneath the woman's buttocks and tied around her waist with the funnel portion hanging down between her legs. The BRASS-V drape is not available as a routine assessment tool for blood loss during the third stage of labor in the study setting so, it was funded by the researchers.
 - The method of placental delivery was also identified and the duration of the third stage of labor was estimated.
 - The placenta and membranes were received in a basin, washed under running water, and put on a flat surface to determine their completeness, then discarded according to the setting's policy.
- Initiation breastfeeding and bonding were assessed for parturient women, using tool three.
- For the control group, routine hospital care was followed for the parturient women and their neonates.

The third phase (Evaluation phase):

After the completion of data collection, a comparison between the two groups was done to evaluate the effect of breast crawl on the third stage of labor, initiation of breastfeeding and bonding.

Statistical analysis was done by the researchers as follows:

- The collected data was categorized, coded, computerized, tabulated and analyzed using Statistical Package for Social Sciences (SPSS) version 23 program.
- Statistical measures were used such as cross tabulation to describe and summarize categorical variables of the two groups.
- A descriptive and analytical statistics were used such as percentages, mean & SD; whereas Chi-square-test, Fisher Exact-test and t-test were used to find out the difference in the results at < 0.05 (5%) level of significance.

Ethical considerations were maintained by obtaining the appropriate approvals; securing the subjects' written informed consent, after explaining the aim of the study; maintaining their privacy and right to withdraw at any time as well as assuring and protecting the confidentiality of their data.

Results:**Table (I): Distribution of parturient women according to their socio-demographic data**

Socio demographic data	Study Group (n=30)		Control Group (n=30)		t- test (P) F/ χ^2 (P)
	No	%	No	%	
Age (years): - Min-max - Mean \pm SD	17-25 19.63 \pm 2.008		17-24 20.13 \pm 1.925		0.985 (0.329)
Level of Education: - Read & Write - Basic - Secondary/its equivalent - University	8 2 11 9	26.67 06.66 36.67 30.00	7 0 15 8	23.33 00.00 50.00 26.67	2.741 (0.433)
Occupation: - Housewife - Working	24 6	80.00 20.00	28 2	93.33 06.67	2.308 (0.129)
Marital status: - Married - Divorced	29 1	96.67 03.33	29 1	96.67 03.33	0.000 (1.000)
Original residence: - Urban - Rural	14 16	46.67 53.33	9 21	30.00 70.00	1.763 (0.184)
Type of family: - Nuclear - Extended	11 19	36.67 63.33	9 21	30.00 70.00	0.3 (0.584)
Family income/month: - More than enough - Just enough - Not enough	1 11 18	03.33 36.67 60.00	2 4 24	06.67 13.33 80.00	4.457 (0.108)

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

F (P): Fisher Exact test & P for F Test

*: Significant at $P \leq 0.05$ **Table (2): Distribution of parturient women according to their obstetric history**

Obstetric history	Study Group (n=30)		Control Group (n=30)		F/ χ^2 (P) t- test (P)
	No	%	No	%	
Gravidity: - 1 - 2-3	24 6	80.00 20.00	24 6	80.00 20.00	0.000 (1.000)
No. of abortions: - 0 - 1-2	24 6	80.00 20.00	24 6	80.00 20.00	0.000 (1.000)
Current pregnancy planning: - Planned - Unplanned	28 2	93.33 06.67	29 1	96.67 03.33	0.351 (0.554)
Weeks of gestation: - Min-max - Mean \pm SD	38-41 39.77 \pm 0.728		39-42 40.10 \pm 0.759		1.719 (0.091)
No. of current AN visits: - <4 - 4+	17 13	56.67 43.33	16 14	53.33 46.67	0.067 (0.796)

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

F (P): Fisher Exact test & P for F Test

*: Significant at $P \leq 0.05$

Table (3): Number and percent distribution of parturient women according to their uterine condition during current labor and delivery

Uterine condition	Study Group (n=30)		Control Group (n=30)		F/ χ^2 (P)
	No	%	No	%	
Presence of uterine contractions after delivery of the baby:					
- Yes	28	93.33	24	80.00	2.308 (0.129)
- No	2	06.67	6	20.00	
Consistency of the uterus after delivery of the placenta:					
- Firm	30	100.0	29	96.67	1.017 (0.313)
- Soft	0	00.00	1	03.33	
Augmentation of uterine contractions:					
- Yes	2	06.67	7	23.33	3.268 (0.071)
- No	28	93.33	23	76.67	
Level of the fundus after delivery of the placenta:					
- At the level of umbilicus	22	73.33	20	66.67	9.368 (0.009)*
- One finger below umbilicus	8	26.67	3	10.00	
- One finger above umbilicus	0	00.00	7	23.33	
Performing uterine massage after delivery of the placenta:					
- Yes	0	00.00	7	23.33	7.925 (0.005)*
- No	30	100.0	23	76.67	

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

F (P): Fisher Exact test & P for F Test

*: Significant at $P \leq 0.05$ **: Highly significant at $P \leq 0.05$ **Table (4): Mean distribution of parturient women according to their hemoglobin level and amount of blood loss**

Hemoglobin level and amount of blood loss	Study Group (n=30)	Control Group (n=30)	t-test (P)
	M & SD	M & SD	
Hemoglobin level before labor (g/dl):	11.583 \pm 0.617	11.396 \pm 0.724	1.077 (0.286)
Hemoglobin level after labor (g/dl):	11.013 \pm 0.673	10.348 \pm 0.740	3.641 (0.001)*
Amount of blood loss before delivery of the placenta (ml):	312.67 \pm 51.154	357.50 \pm 43.127	3.670 (0.000)**

*: Significant at $P \leq 0.05$ **: Highly significant at $P \leq 0.05$ **Table (5): Distribution of parturient women according to the nature of the third stage of labor**

Nature of the third stage of labor	Study Group (n=30)		Control Group (n=30)		F/ χ^2 (P) t-test (P)
	No	%	No	%	
Method of placental delivery:					
- Spontaneous	30	100.00	27	90.00	3.158 (0.076)
- Manual	0	00.00	3	10.00	
Duration of the 3rd stage of labor (min): M & SD	12.75 \pm 4.858		20.25 \pm 5.217		5.763 (<0.0001)**
Completeness of placenta:					
- Yes	30	100.00	28	93.33	2.069 (0.150)
- No	0	00.00	2	06.67	
Completeness of membranes:					
- Yes	30	100.00	27	90.00	3.158 (0.076)
- No	0	00.00	3	10.00	

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

F (P): Fisher Exact test & P for F Test

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

Table (6): Number and percent distribution of parturient women according to their initiation of breastfeeding using modified LATCH scale

Initiation of breastfeeding	Study Group (n=30)		Control Group (n=30)		F / χ^2 (P)
	No	%	No	%	
Good (8-10)	24	80.0	0	00.0	45 (0.000)**
Better (4-7)	6	20.0	10	33.3	
Worst (0-3)	0	00.0	20	66.7	

χ^2 (P): Chi-Square Test & P for χ^2 Test
 *: Significant at $P \leq 0.05$

F (P): Fisher Exact test & P for F Test
 **: Highly significant at $P \leq 0.05$

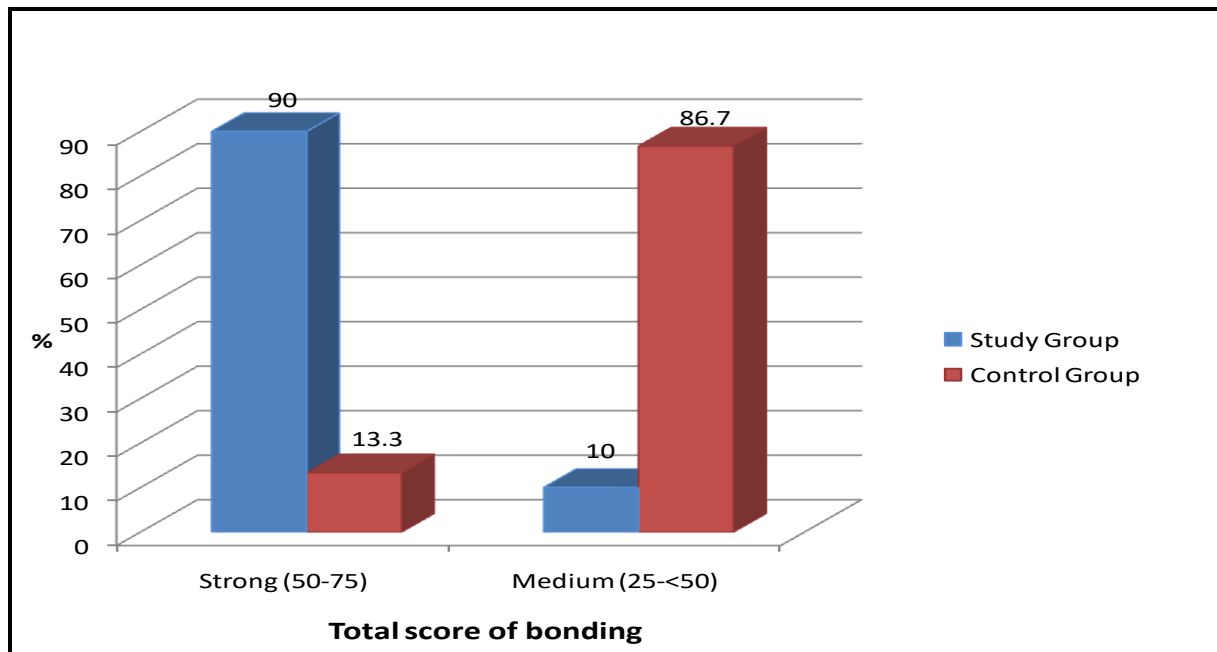


Figure (1): Percent distribution of parturient women according to their total score of bonding using PBQ ($\chi^2 = 35.306$ & $P = <0.0001$)

Table (1): Shows the distribution of parturient women according to their socio-demographic data. **Mean age** was 19.63 ± 2.008 years & 20.13 ± 1.925 years for the study and the control groups respectively. **Level of education** manifested that 26.67 % & 23.33% of the study and the control groups respectively can read & write as well as 30 % & 26.67 of them respectively had university level. **Occupation** also demonstrated that majority of the study group (80%) and most of the control group (93.33%) were housewives. In addition, marital status illustrated that almost all of the two groups (96.67%) were married. Moreover, the **original residence** showed that 70% of the study group was rural residents, compared to 53.33% of the control group. Furthermore, a sizeable proportion of the former and the latter groups (70% & 63.33%) respectively had extended families. Finally, **family income/month** was not enough among four-fifths (80%) of the control group, compared to three-fifths (60%) of the

study group. Accordingly, the two groups' socio-demographic data were almost similar, with no statistically significant differences were found between them.

Table (2): Displays the distribution of parturient women according to their obstetric history. The majority of the study and the control groups (80%) were **primigravidae** and had **no abortion**. In addition, most of the two groups (93.33% & 96.67%) respectively had **planned pregnancy**. Moreover, **mean weeks of gestation** was 39.77 ± 0.728 weeks and 40.10 ± 0.759 weeks for the study and the control groups respectively. Furthermore, less than four **antenatal visits** were reported by more than one-half (56.67% & 53.33%) of the study and the control groups respectively. Consequently, the two groups' reproductive history was almost alike, with no statistically significant differences were found between them.

Table (3): Clarifies the number and percent distribution of parturient women according to their uterine condition during current labor and delivery. **Uterine contractions** were present after delivery of the baby among the vast majority of the study group (93.33%) and the majority of the control group (80%). **Firm uterus** was also observed, after delivery of the placenta, among almost the entire latter and former groups (96.7% & 100%) respectively. In addition, **augmentation of uterine contractions** was performed for 23.33% of the control group, compared to 6.67% of the study group. Moreover, **level of the fundus after delivery of the placenta** was at the level of umbilicus among 73.33% of the latter group, compared to 66.67% of the former group. Furthermore, **uterine massage** was performed, after delivery of the placenta, for almost one-quarter (23.33%) of the control group, compared to none of the study group. The difference between the two groups was found to be statistically significant regarding level of the fundus and performing uterine massage after delivery of the placenta ($P=0.009$ & $P=0.005$) respectively.

Table (4): Reveals the number and percent distribution of parturient women according to their hemoglobin level and amount of blood loss. As for **hemoglobin level**, no statistically significant difference was observed between the two groups before labor. However, a statistically significant difference was noted between them after labor ($P=0.001$), where the mean hemoglobin level was 11.013 ± 0.673 g/dl for the study group and 10.348 ± 0.740 g/dl for the control group. As regards amount of blood loss before delivery of the placenta, a highly statistically significant difference was found between the two groups ($P=0.000$), where the mean amount of blood loss was 312.67 ± 51.154 ml for the study group, compared to 357.50 ± 43.127 ml for the control group.

Table (5): Highlighted the distribution of parturient women according to their condition of placenta, umbilical cord, and membranes during current labor and delivery. **Spontaneous delivery of the placenta** was performed for 100% of the study group, compared to 90% of the control groups. In addition, **the mean duration of the 3rd stage of labor** was 12.75 ± 4.858 min for the former group, compared to 20.25 ± 5.217 min for the latter group. Moreover, **placenta and membranes were complete** among all (100%) of the study group and the vast majority of the control group (93.33% & 90%) respectively. No statistically significant differences were found between the two groups, except for duration of the 3rd stage of labor, where $P=(<0.0001)$

Table (6): Elucidates the number and percent distribution of parturient women according to their

initiation of breastfeeding using a modified latch scale. Initiation of breastfeeding was found to be good among the majority of the study group (80%), compared to none of the control group. On the contrary, it was worst among two-thirds of the latter group (66.7%), compared to none of the former group. Therefore, a highly statistically significant difference was found between the two groups ($P=0.000$).

Figure (1): Expounds the percent distribution of parturient women according to their total score of bonding using PBQ. Strong total score was attained by the vast majority of the study group (90%), compared to a minority of the control group (13.3%). In contrast, a medium total score was gained by the vast majority of the latter group (86.7%), compared to a minority of the former group (10%). The difference between the two groups was found to be highly statistically significant, where $P=<0.0001$.

Discussion

Most deaths resulting from PPH occur during the first 24 hours after birth; the majority of these could be avoided through the use of prophylactic uterotonics during the third stage of labor and by timely and appropriate management **Organization (2017)**. The most effective strategy to prevent postpartum hemorrhage is the active management of the third stage of labor (AMTSL) **Evensen et al. (2017)** along with integration of newborn care practices such as skin to skin contact and immediate initiation of breastfeeding through breast crawl technique (**Abedi et al., 2016; Begley et al., 2019**). So the current study investigated the effect of breast crawl technique on the outcomes of third stage of labor (**FIGO, 2018; Organization, 2019; Smith et al., 2022**).

The results of the present study discovered that the level of the uterine fundus was significantly lower after delivery of the placenta among the study group than the control group whom uterine massage was significantly needed. These results also reported significantly lesser amount of blood loss and higher hemoglobin level after delivery of the placenta as well as shorter duration of the third stage of labor among the study group, compared to the control one. These results are matching with the results of a study conducted by **Hublikar & Bhore (2021)** to investigate effect of breast crawl on maternal outcome in the third stage of labor, they concluded from this study that breast crawl technique was very effective in the reduction of blood loss during the third stage of labor and the time of placental separation.

In addition, another supporting study performed in the Kingdom of Saudi Arabia by **Al Sabati & Mousa (2019)** about the effect of early initiation of

breastfeeding on uterine consistency and the amount of vaginal blood loss during the early postpartum period, the researchers observed that the mean of vaginal blood loss among the control group was higher (260.58ml) compared to the experimental group (194.1ml) which was relatively low, and the difference was statistically significant. Also, the current findings relatively match a study conducted in Punjab India, in which the researchers reported that breast crawl technique is successful in decreasing the third stage duration and enhancing early initiation of breastfeeding (**Kaur & Kaur, 2019**).

Moreover, These findings were similar to those reported by **Anto & Dash (2018)** in their study about the effect of early initiation of breastfeeding on the outcome of third stage of labor, where they concluded that the mean difference in blood loss between the control and experimental groups was 104.34 ml and the mean difference of the duration of third stage between the control and the experimental groups was 6.7mins. The current findings also, align with that of **Christena (2018)** who evaluated the effectiveness of the breast crawl technique on the physiological outcome during the third stage of labor and the immediate initiation of breastfeeding among postnatal mothers. She revealed that the amount of blood loss in the third stage of labor was small in the study group, while it was moderate in the control group, as well as the mean duration of the third stage of labor was 5.4 minutes in the experimental group and 13.56 minutes in the control group.

Likewise, another relatively supportive study undertaken by **Dashtinejad et al. (2018)** who found that there was no significant difference between breast stimulation by suckling and administration of oxytocin in relation the duration of the third stage of labor and bleeding in low risk women, accordingly, they concluded that using breast stimulation immediately after delivery of the baby is cost effective and could be used for women with low risk of postpartum hemorrhage.

On the other hand, the current findings come in contradiction with a study carried out by **Narenji et al. (2012)** to compare the effect of oxytocin IM injection and nipple stimulation on bleeding and duration of third stage of labor immediately after the delivery of the baby in three groups of women. Their findings revealed no significant difference between the three groups in the mean length of the third stage of labor and the amount of vaginal bleeding after delivery. Again, in opposition to the current study findings, the study done by **Bullough (1996)** who test the effect of breast suckling or nipple stimulation in the third stage of labor on the prevention of postpartum hemorrhage. The researcher reported that no difference was found between nipple stimulation

and control groups concerning the amount of blood loss after delivery of the placenta.

Furthermore, which is worth noting also that the current study results denoted statistically significant differences between the study and control groups in relation to the consistency and the level of uterus as well as the need for performing uterine massage after expulsion of the placenta. These findings are relatively similar to the results of another study about the effect of early maternal and newborn skin to skin contact after birth on the duration of third stage of labor and initiation of breastfeeding (**Abdelmenem et al., 2019**). Also, the current findings are congruent with that of (**Al Sabati & Mousa, 2019**).

The current study further revealed that breastfeeding was also significantly actively initiated through breast crawl, when assessed by modified LATCH scale, where the majority of the study subjects had a latch score of 8-10 which entails a good initiation of breastfeeding. This finding is similar to that of **Kaur & Kaur (2019)** who elaborated that the initiation of breastfeeding was effective in the majority of breast crawl group while it was moderately effective in the control group. Further, **Widström et al. (2019)** reported the newborn's ability to find out, grasp the nipple and suck in the first hour after birth, without the active participation of the mother, they found that 20 out of 21 newborns had successfully completed breast crawl. Additionally, two matching results were reported by (**Vijayalakshmi, 2018**) & (**Sadhana, 2015**) who disclosed from their studies that the latch score was 11-18 in the majority of the intervention group and the initiation of breastfeeding was active. Besides, a partly supportive study carried out by **Safari et al. (2018)** titled "The effect of mother and newborn early skin-to-skin contact on initiation of breastfeeding, newborn temperature and duration of third stage of labor", their results demonstrated that skin to skin contact immediately after delivery of the baby was effective in the initiation of breastfeeding within 2.41 mins. Accordingly, these results emphasize the positive effect of breast crawl technique which lead to early latch on and initiation of breastfeeding.

On top of that, the current study findings revealed that bonding between the mother and the newborn was strong in the majority of study subjects who practice breast crawl technique. This result is in harmony with the findings reported by **Thomas et al. (2018)** in their study about the effect of breast crawl on initiation of breastfeeding and initial weight loss among newborns, they concluded that breast crawl technique helped the mother to initiate breastfeeding along with an enormous mother-baby bonding. Also, **Komalavalli (2015)** concluded that the major advantage of breast crawl technique is that it helps in

the establishment of greater mother-newborn bonding and maintains the newborn's warmth and promotes early initiation of breastfeeding.

Such favorable effects of breast crawl technique obtained from the current study and the aforementioned supporting ones are observed in the relevant literature where, several lines of evidence suggest that both suckling and stimulation of the nipples are believed to cause the release of endogenous oxytocin from the posterior part of the pituitary gland. All methods of nipple stimulation could result in a short rush of oxytocin, stimulating the uterine contractions and encouraging placental separation which consequently reduces postpartum hemorrhage and the duration of the third stage of labor. Fortunately, the pulsatile nature of endogenous oxytocin allows its release in moderate doses which can cause slow and regular uterine contractions with relaxation period in between, while high doses of synthetic oxytocin may cause constant tonic contractions that can lead to uterine atony. Also, endogenous oxytocin can cross the brain barrier which in turn improves the oxytocin receptors sensitivity and enhance functioning, while the synthetic oxytocin cannot cross the brain barrier (Abedi et al., 2016). Furthermore, breast suckling along with mother-baby skin to skin contact decrease the circulating levels of cortisol and adrenocorticotropin hormones (ACTH) in maternal blood, leading to an increase in the endogenous oxytocin levels (Handlin et al., 2009).

Additionally, UvnäsMoberg et al. (2020) in their systematic review about maternal plasma levels of oxytocin during breastfeeding found that all the included studies showed that suckling is associated with oxytocin release. Also they reported that, there were correlations between oxytocin levels and milk production in most of the studies. Moreover, oxytocin release associated with breast suckling, the movement of the newborn's hands over the mother's abdomen and skin to skin contact associated with breast crawl technique play a role in creating a nurturing and physiologically supportive environment for the mother, creating positive maternal experiences, reducing maternal stress, and helping in the promotion of maternal-newborn bonding. A strong bonding can be also established due to staring of the mother into the eyes of her baby during the first few moments after delivery. In addition, higher levels of oxytocin may result in some loving feelings toward the baby and affectionate behaviors, including touch Begley et al. (2019). Accordingly, early initiation of breastfeeding through breast crawl technique is one of the physiological management measures of third stage of labor and a beneficial practice that promotes immediate initiation of breastfeeding because it

enhances the ability of newborn to initiate breastfeeding without assistance. Therefore, babies who do a breast crawl are more likely to have a better latch and success with early breastfeeding (Abedi et al., 2016).

Conclusion

Based on the findings of the present study, it can be concluded that breast crawl significantly reduced the amount of blood loss after delivery and shortened the duration of the 3rd stage of labor as well as enhanced good breastfeeding initiation and strong bonding.

Recommendations

Based on the results of the current study, the following recommendations are suggested:

- Specific policies about the use of breast crawl to improve the outcome of the 3rd stage of labor should be provided in maternity health agencies.
- Health care providers should support evidence-based breast crawl practice during the 3rd stage of labor through anticipatory guidance.
- Early suckling though breast crawl is a safe, comfortable, easy, natural, and effective intervention that could be utilized independently by maternity nurses during the 3rd stage of labor. Also, it is a perfect substitute when parenteral
- Pregnancy and those with a low-risk for postpartum hemorrhage, but, it is not recommended for high-risk women.

Further studies are needed to:

- Replicate the study on a larger sample size for better generalization.
- Evaluate the effect of nipple stimulation (e.g., breast crawl), compared to uterotonic agents (e.g., syntometrine & oxytocin) on the outcomes of the 3rd stage of labor.
- Compare the effect of breast crawl on primigravidae and multigravidae during the 3rd stage of labor.

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