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Effect of Uterine Massage to Women during Third Stage of Labor on Preventing Postpartum Hemorrhage

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Abstract
Background: Postpartum hemorrhage is still the leading cause of death of birthing mothers in the world today. The aim of this study is to assess the effect of uterine massage to women during the third stage of labor on preventing postpartum hemorrhage. **Method:** The Design of this study was quasi-experimental. The study sample consisted of 400 women divided into 4 groups. The study was conducted at Menoufia University Hospital. The tool of this study was a structured interview questionnaire. The validity of the tool was ascertained by a group of experts who reviewed the tool for content validity. The reliability of the tool was assessed through testing their internal consistency. **Results:** there was statistically significant difference between the studied groups as regards the amount of blood loss, time of placental delivery, the use of uterotonics and the occurrence of postpartum hemorrhage. **Conclusion**, uterine massage during and after placental delivery is effective in reducing blood loss. uterine massage during and after placental delivery must be applied. It is also recommended to teach nurses how to apply uterine massage.

Introduction

The third stage of labor is the time starting from the delivery of the fetus until the delivery of the placenta. The natural course of this final stage of childbirth involves cessation of umbilical cord pulsation, separation of the placenta from the uterine wall, and passage of the placenta through the birth canal. Volume of blood loss depends on how long it takes the placenta to separate from the uterine wall and how effectively the uterine muscle contracts in the immediate postpartum period. During this stage of labor, however, the woman may encounter complications that could lead to maternal morbidity and mortality. The most common complication is postpartum hemorrhage (PPH) (1).

Hemorrhage (heavy blood loss) is still the leading cause of death of birthing mothers in the world today, especially in the developing world. Heavy blood loss leads to hypovolemic shock, insufficient perfusion of vital organs and death if not rapidly treated. Blood transfusion may be life saving. The maternal mortality rate (MMR) varies from 9 per 100,000 live births in the US and Europe to 900 per 100,000 live births in Sub-Saharan Africa (2). While according to WHO (2007) more than half million women die during pregnancy or childbirth every year.

Postpartum hemorrhage (PPH) is excessive bleeding following the birth of a baby. Hemorrhage may occur before or after the placenta is delivered. The average amount of blood loss after the birth of a single baby from vaginal delivery is about 500 ml . The average amount of blood loss for a cesarean birth is approximately 1,000 ml (3).

The management of PPH started during the third stage of labor. It is multifaceted and can involve health care team within the hospital (obstetricians, nurses, anesthesiologists, blood bank personnel, laboratory medicine, surgical subspecialists and interventional radiology). These teams are often required to work together under the conditions of great stress and time pressures. After the removal of the placenta, bleeding will most often be due to uterine atony. The first maneuver to reduce bleeding is uterine massage, an empty bladder and administration of drugs as Oxytocin. The approach to treat PPH depending on the cause and whether hemorrhage occurs after vaginal birth or cesarean delivery (4).

The International Confederation of Midwives and the International Federation of Gynecologists and Obstetricians ICM/FIGO (2004) recommend routine massage of the uterus after delivery of the placenta for the prevention of PPH. Uterine massage involves placing a hand on the woman's lower abdomen and stimulating the uterus by repetitive massaging or squeezing movements. Massage is thought to stimulate uterine contraction, possibly through stimulation of local prostaglandin release and thus to reduce hemorrhage. However, it is not done routinely after delivery in a systematic way. If shown to be effective, it would have important advantages as it is inexpensive and requires no access to medication or other specialised services, and could be used in any location in which women give birth. Disadvantages include the use of staff time, and the discomfort caused to

women. However, there is very little empirical research to evaluate the effectiveness of this method. There is, therefore, a need to evaluate systematically the effectiveness of uterine massage for preventing PPH (5).

Significance of the study

From the previous mentioned literature, postpartum hemorrhage (PPH) is a major cause of maternal mortality and morbidity worldwide (6). The South African National Committee for the Confedential Enquiries into Maternal Death analyzed 3406 reported maternal deaths from the years 2002 to 2004. Overall, 9.5% were due to PPH (7). In Egypt, in spite of the drop in maternal mortality ratio, PPH is still the leading cause and responsible for 25% of maternal deaths. So, the researcher found it important to examine the effect of third stage uterine massage on preventing postpartum hemorrhage.

Aim of the study: This study was conducted with the aim of assessing the effect of uterine massage to women during third stage of labor on preventing postpartum hemorrhage.

Research hypothesis: there is a relationship between uterine massage after birth and postpartum blood loss.

Method

A quasi-experimental design was used in carrying out the current study.The study was conducted at Menoufia University Hospital in the Obstetrics and Gynecological Department. Necessary approval from higher authority was taken. An informed consent to participate in the current study was taken after the purpose of the study was clearly explained to each woman. Confidentiality of obtained personal data, as well as respect of participants' privacy was totally ensured.

The sample was a purposive non- probability sample as the researcher had the conscious selection of the subjects (pick up a target population). The sample size of the present study was compared with that of many previous studies and also with the result of the sample size formula which is as follows:

$$n = \frac{2(z1 - \alpha/2 + z1 - \beta)2}{\left(\frac{\mu 0 - \mu 1}{\sigma}\right)2}$$

Where z1-α/2 is the z score, α is the significant level, β is the type II error, μ 1 and 2 are the population numbers, σ is the population variance.The researcher recruited the whole study subjects according to the inclusion criteria as the study subjects were 400 women. The sample was divided into four groups:

Study group 1: women receiving Syntocinone and having uterine massage.
Study group 2: women receiving Syntocinone and having no uterine massage.
Study group 3: women who did not receive Syntocinone and have uterine massage.
Study group 4: women who did not receive Syntocinone and have no uterine massage.

The filed work of the present study was conducted from October 2010 to February 2011 with range of 10cases weekly.

Inclusion criteria of the sample were: Having single fetus, having birth vaginally, free from any medica diseases or disorders. without any complications during pregnancy.

Exclusion criteria of the sample**:** women who have traumatic postpartum hemorrhage caused by lacerations of perineum, vagina or cervix, ruptured uterus, an involuted uterus, episiotomy, use of instrumentation, multiple pregnancy, placenta previa or preeclampsia.

Monitoring, assessing, observing and comparing the effect of uterine massage versus no uterine massage on preventing postpartum hemorrhage.The uterine massage was applied to women for 15 minutes after delivery of the fetus and before delivery of the placenta for groups with uterine massage (the first and the third group). The urinary bladder was evacuated before applying uterine massage. The researcher monitor the amount of blood loss , if it increased, the researcher interfere with uterine massage and use of additional uterotonics. The additional uterotonics were Methergine and Misotac. The researcher seeks for senior obstetrician when there was no response for decreasing blood loss.

The subjects of the study were randomly assigned to four equal groups.

Study group 1: women receiving Syntocinone and having uterine massage.
Study group 2: women receiving Syntocinone and having no uterine massage.
Study group 3: women who did not receive Syntocinone and have uterine massage.
Study group4: women who did not receive Syntocinone and have no uterine massage.

The amount of blood loss was calculated by weighting the pads when it is dry and then weighting it when soaked with blood.

The study data were collected using a structured interviewing questionnaire which was developed by the researcher and revised by a jury of qualified experts then tested for validity and reliability. The validity of the tools was ascertained by a group of subject area experts (medical and nursing staff) who reviewed the tools for content and internal validity. Also they were asked to judge the items for completeness and clarity. Suggestions were incorporated into the tools. Test – retest reliability measure was applied by the researcher for testing the internal consistency of the tool. It was done through the administration of the same tools to the same participants under similar conditions on two or more occasions. Scores from repeated testing were compared.

A pilot study was conducted to test the applicability of the tools, the feasibility of the study and to estimate the time needed for data collection. It was conducted on 10 % from the total sample (40 cases). On the basis of the pilot study results; the researcher set the final tool. The subjects used in piloting were excluded from the main study sample.

Upon completion of data collection, each answer sheet was coded and scored. The researcher coded the data into a coding sheet so that data could be prepared for computer use. Data was statistically analyzed using statistical package for social studies (SPSS. Inc, Chicago, IL, USA) version 12 on IBM compatible computer. Test of significance was used and level of significance was $p< 0.05$. Statistical presentation and analysis of the present study was carried out.

Results

The main findings of the present study were:

Table 1 reveals that the age of patients ranged between 15 to 48 years with a mean of 25.58 and standard deviation of 4.99. Table 2 shows that the majority of cases were housewives (about 85.5%). Also, the majority of cases were resident in rural areas (about 73.8%).

Table 3 reveals that about 10% of cases had retained placenta while 34% recorded post partum hemorrhage and received uterotonic. Table 4 reveals that there were significant differences between studied groups and the amount of blood loss ($P< 0.01$) as the mean of blood loss was lower in the first and third groups than that of the second and fourth group; 103 and 133 ml versus 240 and 303ml respectively.

Table 5 reveals that there were significant differences between the studied groups and the occurrence of postpartum hemorrhage; 69.1% of post partum cases did not receive either uterine massage or Syntocinone but about 4 % of postpartum cases had both massage and Syntocinone .

Table 6 shows that there were significant differences between both groups and occurrence of postpartum hemorrhage. The relative risk was 0.4 (<1), this means that the presence of uterine massage decreases the risk of postpartum hemorrhage than group without massage.

Table 7 shows that there was significant difference between both groups and the occurrence of postpartum hemorrhage .The relative risk was 0.22 (<1), this means that the presence of uterine massage decreases the risk of occurrence of postpartum hemorrhage .

Table8 shows that there was a highly significant difference ($p< 0.01$) between studied groups and the time of delivery of placenta as the first group (uterine massage and use of Syntocinone) had the shorter time of placental delivery (3.66±1.82) where as the fourth group had the longer time of placental delivery (27.73±4.19).

Table 9 reveals that neither the amount of blood loss nor time of delivery of placenta had significant correlation with parity.

Table 10 reveals that there was no significant difference between duration of the second stage of delivery and either amount of blood loss or time of delivery of placenta.

Discussion

Postpartum hemorrhage (PPH) is one of the leading causes of maternal morbidity and mortality. Majority of these deaths occur within hours of delivery due to complications in 3rd stage of labor**.** The current study aimed to detect the effect of uterine massage in the third stage of labor on decreasing the amount of blood loss and incidence of postpartum hemorrhage.

Regarding the age of patients in the study, it ranged between 15 to 48 years as this is considered the reproductive age. The majority of cases were housewives and also the majority of cases were resident in rural areas as the study was conducted on a rural area. The frequent distribution of obstetric complications in the third stage of labor among the population study showed that about 10% had retained placenta where as about 34% recorded post partum hemorrhage and received uterotonics.

According to the consideration of the amount of blood loss in the first hour postpartum, there were significant differences between the studied groups as the means of blood loss were lower in groups with uterine massage than groups without uterine massage. Also, the blood loss was lower in groups associated with the use of emergency uterotonics beside the uterine massage. The main inclusion criterion of the study was the mode of delivery (vaginal delivery) because other methods may be a cause of postpartum hemorrhage. This result is consistent with **(5)** whom conducted their research in egypt reported that the mean blood loss was less in the uterine massage group than the group without massage at 60 minutes.

As regarding to the postpartum hemorrhage, there were significant differences between the studied groups and occurrence of postpartum hemorrhage; as the majority of post partum cases did not receive either uterine massage or Syntocinone. But a few of postpartum cases had both massage and Syntocinone. The use of uterine massage is explained as being the main manipulation of the current study and was intended to measure the effect of uterine massage on postpartum hemorrhage. This result went parallel with (8) which stated that active management of the third stage of labor (AMTSL) which includes uterine massage and use of Syntocinone significantly reduces postpartum hemorrhage and decreases blood loss.

This study showed that there were significant differences between the group recieving massage and syntocinone and the group without massage and having syntocinone and the occurrence of postpartum hemorrhage. This means that the presence of uterine massage decreases the risk of postpartum hemorrhage more than the group without massage. The researcher reason for selecting participants with the criterion of Syntocinone use is to be able to examine the effect of Syntocinone on decreasing blood loss. This result is in line with the study of (9) who found that there was a significantly lower mean blood loss in the uterine massage group compared with the non-massage group.

There were significant differences between both groups (the group with uterine massage and without Syntocinone and the group without massage and no Syntocinone) and the occurrence of postpartum hemorrhage. This means that uterine massage decreases the risk of occurrence of postpartum hemorrhage. The single and viable intra uterine fetus was an inclusion criterion in the study as multiple pregnancies was a risk factor for postpartum hemorrhage. This study is agreed with the study of (10) who clarified that the uterotonic component of Active management of the third stage of labor (AMTSL) seems to be important for the reduction in blood loss after delivery. (11) have trials that compared Oxytocin to nothing without other active management components and found that Oxytocin used at 5–10 IU seemed to reduce the risk of severe postpartum hemorrhage.

Also, there were highly significant differences between the studied groups and time of delivery of placenta as the first group (with uterine massage and use of syntocinone) had the shortest time of placental delivery. On the other hand the fourth group (with neither massage nor Syntocinone) had the longest time of placental delivery. The researcher reasoned this result for the limitation of study setting compared with other studies. This result is contrasted with (12) that showed that the use of a prophylactic uterotonic might trap the placenta in the uterus. (13) also said that the early uterotonic use leads to retained placenta. But, the study published in Vietnam agreed with the current study found that AMTSL was associated with reduced risks for prolonged third stage beyond 30 minutes (8).

With reference to the use of additional uterotonics, the current study revealed that there were highly significant differences between the studied groups and use of additional uterotonics. The fourth group (group with niether massage nor Syntocinone) had the majority of cases that used additional utrerotonics. Because the use of additional uterotonics can prevent postpartum hemorrhage. This is consistent with the study of (9) that showed that administration of additional uterotonics was significantly higher in the control group (without massage) compared with the intervention group (with massage use).

Neither the amount of blood loss nor time of delivery of placenta had significant correlation with parity. The researcher did not include the criteria of parity in choosing the subjects of the study. This result is against some published studies that reached varying conclusions; identifying primiparity or high parity as risk factors for PPH (14).

As for the duration of second stage and the amount of blood loss, there were no significant differences between the duration of second stage of delivery and both the amount of blood loss and time of delivery of placenta. The researcher reasoned this result because of different studies settings. This study was against the study of (15) who concluded that prolonged second stage was associated with increased amount of blood loss.

Concerning the duration of the second stage and the occurrence of postpartum hemorrhage, there were no significant correlation between the duration of the second stage of delivery and occurrence of postpartum hemorrhage. The researcher reasoned this result for sample size which is smaller than the compared studies. This study was against that of (15) who concluded that prolonged second stage was associated with greater than three-folds increased risk for PPH. Also, it is against the study of (16) who mentioned that there was significant

association between the duration of the second stage with maternal outcomes such as postpartum hemorrhage.

Conclusion:
Based on the results of the current study that examined the relationship between uterine massage after birth and postpartum blood loss, it can be concluded that: Uterine massage during and after placental delivery was effective in reducing postpartum blood loss.

Recommendations

- Uterine massage before, during and after placental delivery is highly recommended to decrease blood loss after delivery and prevent primary postpartum hemorrhage.
- Some future studies are suggested:
  1. Teaching the nurses how to apply uterine massage and how to manage postpartum hemorrhage.
  2. Studying the relationship between the duration of the second stage of labor and the amount of blood loss, time of placental delivery and the use of uterotonics in a large study sample.
  3. Studying the relationship between the parity and postpartum hemorrhage in a large sample size

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Conflict of Interest
Researchers declare no conflict of interest with any organization regarding the materials discussed in this manuscript

Table 1: Age Distribution of Studied Patients

Age	Minimum	Maximum	Mean	Sd
	15.00	48.00	25.58	4.99

Table 2: Demographic Characteristics of Studied Patients.

Demographic variable		Cases	
		N	%
Occupation	House wife	342	85.5
	Employee	58	14.5
Residence	Rural	295	73.8
	Urban	105	26.3

Table 3: Frequency distribution of Patients regarding retained placenta, postpartum hemorrhage and the use of additional utero-tonics.

Variable		N (400)	%
Retained placenta	*Not retained*	360	90
	Retained	40	10
Postpartum hemorrhage	*Absent*	264	66
	Present	136	34
Additional Uterotonics	*Not used*	264	66
	Used	136	34

Table 4: The Relation between Study Groups and the Amount of Blood Loss in the 1st Hour during Postpartum Period.

	Pathological findings	N = 400	Mean ± SD	*Kruskal-Wallis Test*	P value
Blood loss 1st hour	***uterine massage+ syntocinone***	100	103.55±43.86		
	uterine massage only	100	240.35±45.92		
	syntocinone use without massage	100	133.40±54.02	286.78	**<0.01***
	No massage nor syntocinone	100	303.10±124.00		

(*) Statistically significant at p<0.01

Table 5: Relation between Study Groups And Occurrence Of Postpartum Hemorrhage.

Studied variables	*Postpartum hemorrhage*				X² test	P Value
	Yes (N= 136)		No (N= 264)			
	N	%	N	%		
uterine massage+ syntocinone	6	4.4	94	35.6		
uterine massage only	21	15.4	79	29.9		
syntocinone use without massage	15	11.0	85	32.2	218.98	< 0.01*
No massage nor syntocinone	94	69.1	6	2.3		

(*) Statistically significant at p<0.01

Table 6: Relative Risk of Postpartum Hemorrhage Occurrence between Groups of Uterine Massage and Those without Uterine Massage in the Presence of Syntocinone use.

Studied variables	Postpartum hemorrhage				X² test	R.R	P Value
	yes (N= 21)		No (N= 179)				
	N	%	N	%			
uterine massage+ syntocinone	6	28.6	94	52.5	4.31	0.4	< 0.05*
No uterine massage + syntocinone use	15	71.4	85	47.5			

(*) Statistically significant at p< 0.005

Table (7): Relative Risk of Postpartum Hemorrhage Occurrence Between Groups of Uterine Massage and without Uterine Massage in the Absence of Syntocinone use.

Studied variables	Postpartum hemorrhage				X² test	R.R	P Value
	yes (N= 115)		No (N= 85)				
	N	%	N	%			
uterine massage+ without syntocinone	21	18.3	79	92.9			
No uterine massage +without syntocinone use	94	81.7	6	7.1	109.03	0.22	< 0.01*

(*) Statistically significant at p<0.01

Table (8): The Relation between Study Groups and Time of Placental Delivery.

	Pathological findings	N = 400	Mean ± SD	*Kruskal-Wallis Test*	P value
Time of placental delivery	*uterine massage+ syntocinone*	100	3.66±1.82	337.89	< 0.01*
	uterine massage only	100	12.70±6.00		
	Syntocinone use without massage	100	15.55±1.77		
	No massage nor syntocinone	100	27.73±4.19		

(*) Statistically significant at p<0.01

Table (9) : Spearman's Correlation between Number of Parity and the Amount of Blood Loss and Time of Placental Delivery.

Variable	Parity	
	R	P value
Blood loss 1st hour	0.10	> 0.05
Blood loss 1st day	0.06	> 0.05
Time of placental delivery	-0.02	> 0.05

Table (10): The Relation between Duration of Second Stage and Amount of Blood Loss and Time of Pacental Delivery.

Variable	Duration of second stage		Mann -Whitney test	P value
	Prolonged (No= 36) Mean ± SD	Not prolonged (No= 364) Mean ± SD		
Blood loss 1st hour	235.55 ± 233.17	191.09 ± 88.34	-0.764	>0.05
Blood loss 1stday	474.72 ± 623.79	364.65 ± 160.20	-0.758	>0.05
Time of placental delivery	16.61± 10.36	14.f74 ± 9.3	-0.856	>0.05

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