ORIGINAL RESEARCH

Effectiveness of Intermittent Uterine Massage in Reducing Blood Loss During Vaginal Delivery: A Comparative Study

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ABSTRACT Objective: Postpartum haemorrhage (PPH) is the most common cause of maternal mortality in the developing countries. Several interventions have been advocated to reduce the blood loss around the time of childbirth. The aim and primary objective of the present study was to determine the effectiveness of intermittent uterine massage in reducing the blood loss after vaginal delivery. **Material and Methods:** A quasi-experimental study was conducted on 196 pregnant women. Study group included 98 pregnant women who were given active management of third stage of labour and also uterine massage for 1 minute every 10 minutes for 1 hour after the delivery of the baby and the control group included 98 women who were given only active management of third stage of labour after the delivery. **Results:** The mean blood loss amongst the study and control group was 139 and 159 mL, respectively (p=0.021). In the control group, 7 women had blood loss of more than 300 mL in comparison to the study group in which only 2 women had blood loss of more than 300 mL, adjusted odd's ratio=8.6 (95% confidence interval 1.05-17.3). In women who had high risk factors for PPH, the mean blood loss was 154 mL in the study group and was 176 mL in the control group (p=0.0204). **Conclusion:** Intermittent uterine massage is effective in reducing the amount of blood loss during vaginal delivery and also in women with high risk factors for PPH.

Keywords: Postpartum haemorrhage; uterine massage; postpartum blood loss

Classically, postpartum haemorrhage (PPH) is defined as quantified bleeding of more than 500 mL for vaginal deliveries and more than 1000 mL for caesarean deliveries, occurring within the first 24 hours of delivery.[1] PPH is the top cause of maternal mortality in most nations with low incomes and is also related to about one-quarter of all maternal deaths that occur around the world.[1] According to recent reports, PPH was responsible for more than 90 thousand maternal deaths over the world in 2017.[2,3]

PPH is usually avoidable and therefore obstetrical care bundles have been developed and put into practice to lessen the impact that severe haemorrhage has on a patient's life.[4] Most women who develop PPH problems do not have any clear clinical history of risk factors.[5,6] Multiple interventions have been implemented for the prevention of PPH. One of the widely accepted is the "active management of the third stage of labour (AMTSL)" which includes use of oxytocin, controlled cord traction and delayed clamping of the cord which causes significant reduction in the incidence of PPH.[7] Uterine massage has been recommended as part of the AMTSL by the International Confederation of Midwives and the International Federation of Gynecologists and Obstetricians but other societies like the Society of Obstetricians and Gynaecologists of Canada, the Royal College of Obstetrician and Gyanecologist and the American College of Obstetricians

and Gynecologists, made no recommendation regarding prophylactic uterine massage in the third stage of labour.[8,9]

The most common cause of primary PPH is uterine atony, which occurs when the uterus fails to contract after birth. The uterus is stimulated during uterine massage by placing a hand on a woman's lower abdomen and stroking or squeezing the area in a circular motion repeatedly. It is believed that massage can induce uterine contractions, presumably through the stimulation of local prostaglandins release, and so minimise the amount of bleeding that occurs.[10] Uterine massage has several major benefits, including the fact that it is relatively inexpensive, does not need access to medication or other specialised services, does not need any expertise and can be learnt easily and could be utilised in any setting in which women give birth. However, one of the disadvantages is that it takes up a lot of time, and it can be uncomfortable for women.

In Cochrane systematic review of 2013, 2 randomized controlled trials (RCTs) were included to determine the effectiveness of uterine massage after birth and before or after delivery of the placenta, or both, to reduce postpartum blood loss and associated morbidity and mortality. The result of this review was inconclusive as one study showed the significant difference in amount of blood loss and the other did not. Therefore the review concluded that more trials are required to find the effectiveness of uterine massage in reducing the amount of postpartum blood loss and therefore we did this study to find the same.[11]

MATERIAL AND METHODS

This was a single-centre, quasi-experimental study done in the Department of Obstetrics and Gynaecology, LN Medical College, and affiliated JK Hospital, Bhopal, Madhya Pradesh from March 2021 to August 2022. The data collection for the present study was initiated after the research protocol was approved by LN Medical College and JK Hospital Institutional Ethics Committee with reference no: LNMC and RC/Dean/2021/Ethics/268, dated February 18, 2021. The study was carried out in accordance with the Helsinki Declaration principles.

The participants were recruited by random method into the study after verifying that they fulfilled the following:

- Inclusion criteria:
i. Women who delivered vaginally with episiotomy with either spontaneous or induced labour,
ii. Gestational age >28 weeks and cephalic presentation,
iii. Women consenting to participate in the study.
- Exclusion criteria:
i. Women who delivered by cesarean section (CS),
ii. Gestational age <28 weeks,
iii. Women who had traumatic PPH or delivered by operative vaginal delivery,
iv. Women who were known to have bleeding disorder or diathesis,
v. Women who did not consent to participate,

Total of 196 women were included in the study. In the study group (n=98), both AMTSL and uterine massage was given. AMTSL was given immediately after the delivery of the baby. Uterine massage was given for 1 minute, every 10 minutes for 1 hour after the delivery of placenta. Women who had normal vaginal delivery and were given only AMTSL were taken as the control group (n=98).

Blood loss was measured by Quantification of Blood Loss (QBL) using CG Drape. QBL was done by the combined method as the sum of blood in calibrated CG drape added to gravimetric assessment by weighing the pads used to mop blood from vagina or vulva and subtracting the dry weight from it. For the purpose of QBL, standard sized pads were prepared that weighed 20 g when dry and 80 g fully soaked. 1 g increase in weight=1 mL blood loss.[12]

Aim and Objectives: Primary outcome measured was the amount of blood loss after the delivery in both the study and control groups. Secondary outcomes measured in both groups were the amount of blood loss after the delivery in women who have high risk factors for PPH like anemia, pre-eclampsia, fibroid uterus, and others. Other secondary outcome

was the change in hemoglobin levels before and after delivery in both groups.

For the continuous data; mean, median, mode, and standard deviation were calculated. Quantitative data confirming the properties of the normal distribution are presented as means±standard deviation. The statistical significance in the difference in the amount of blood loss in the two group was assessed using the Student's t-test. We performed multiple variable stepwise logistic regression to determine the odds ratio for a blood loss of more than 300 mL in both groups.

RESULTS

The mean age of the participants in the control and study groups were 26.1±3.88 and 25.8±4.03 years, respectively. The median gravida in both the groups was 2. Most of the participants in both groups had school level education (Table 1). Only 15.3% and 19.4% of participants in control and study group were categorised as having high risk factors for PPH (Table 2).

Table 3 illustrates the volume of the blood loss after vaginal delivery in both groups. The mean blood loss among the women in study and control groups was 139 and 159 mL, respectively (p=0.021)

TABLE 2: Risk categorization for PPH.

	Study group (n=98)	Control group (n=98)
Low-risk	79 (80.6%)	83 (84.7%)
High-risk	19 (19.4%)	15 (15.3%)

PPH: Post partum haemorrhage.

TABLE 3: Amount of blood loss after the delivery.

	Study group (in mL)	Control group (in mL)	p value
Mean	139±53.93	159±86.87	0.021
Median	147.5	157.5	
Range	43-445	30-450	

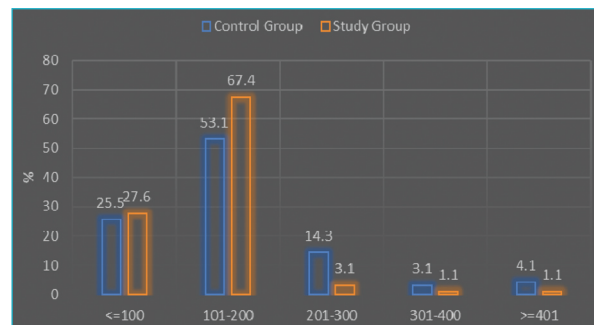Data are presented as mean±standard deviation or frequencies with percentages in parentheses.

FIGURE 1: Blood loss during labor.

which shows a significant difference. None of the women in either group had PPH or blood loss of more than 500 mL. Though 7 women had blood loss of more than 300 mL in the control group compared to 2 women in the study group (Figure 1), the adjusted odd's ratio for a blood loss of >300 mL was 8.6 (95% confidence interval 1.05-17.3). In women who had high risk factors for PPH (anemia, preeclampsia, fibroid uterus, and others), the mean blood loss in the study group was 154 mL and in the control group was 176 mL (p=0.0204). This again showed a significant decreased amount of blood loss in the women who were at high risk for PPH and were given both uterine massage and AMTSL after the delivery.

The women who were categorized as low risk had significantly lower blood loss in comparison to those categorized as high risk (Table 4).

TABLE 1: Sociodemographic characteristics of the women (n=196).

	Group		
Age	Control (n=98)	Study (n=98)	p value
<=20	3 (3.1%)	7 (7.1%)	0.329
21-25	49 (50.0%)	39 (39.8%)	
26-30	34 (34.7%)	41 (41.8%)	
>=31	12 (12.2%)	11 (11.2%)	
Mean	26.1	25.8	0.18
Gravida			
1	40 (40.8%)	45 (45.9%)	0.799
2	34 (34.7%)	34 (34.7%)	
3	20 (20.4%)	15 (15.3%)	
4	4 (4.1%)	4 (4.1%)	
Educational status			
Illiterate	18 (18.4%)	22 (22.4%)	0.32
School level	52 (53.1%)	47 (47.9%)	
College level	28 (28.6%)	31 (31.6%)	

TABLE 4: Mean blood loss according to risk factors for PPH (n=196).

	Study group (in mL)	Control group (in mL)	p value
High-risk	154±24.21	176±28.34	0.0204
Low-risk	132±23.21	140±24.34	0.1832

Data are presented as mean±standard deviation or frequencies with percentages in parentheses. PPH: Post-partum haemorrhage.

TABLE 5: Change in hemoglobin (n=196).

Mean hemoglobin level	Study group (in gm/dL)	Control group (in gm/dL)	p value
Before delivery	10.04	10.27	
After delivery	8.98	8.47	
Delta (adjusted mean difference)	1.19	1.56	0.287

The hemoglobin levels before and after delivery in both groups was noted (Table 5). The change in hemoglobin level in the study group and the control group was 1.19 mg/dL and 1.56 mg/dL, respectively (p=0.287). Though it was not statistically significant, the mean values showed a decreased drop of hemoglobin in the study group.

DISCUSSION

In our study, we found that the mean blood loss in the women who received uterine massage (study group) was 139 mL compared to 159 mL in the women who didn't receive massage (control group) which was statistically significant (p=0.021). Also, blood loss of more than 300 mL was seen only in 2 women in the study group whereas it was seen in 7 women in the control group. There was also a significant (p=0.0204) decrease in the amount of blood loss in high risk women for PPH in the study group. Also, postpartum drop in haemoglobin was less in the study group compared to the control group (1.19 mg/dL v/s 1.56 mg/dL).

Theoretically, uterine massage increases uterine contraction, potentially by triggering the production of local prostaglandins, and lessen the bleeding. It can also cause myometrial fatigue. Many things have been defined for the prevention of PPH like assessment of the patient for risk factors, correction of anemia, readi-ness, and preparedness of the doctors, PPH cart with medications but uterine massage has not been included as the tool for prevention.[13]

Many studies have been done which compared the two groups, one group with AMTSL (control) and other group with AMTSL with massage to see the amount of blood loss after vaginal delivery. Erkaya et al. in 2021 reported that the average amount of blood loss within 2 hours of the delivery was significantly higher in the control group (186 mL) than in the massage group (170 ml p<0.05).[14] They did uterine massage every 15 minutes for 2 hours after delivery of placenta, though the duration of massage was not mentioned in their study but the amount of blood loss in the massage group was significantly less.

In 2018, a meta-analysis was done on RCTs to find the efficacy of uterine massage as part of AMTSL in addition to oxytocin and controlled cord traction to prevent PPH.[10] Only 3 RCTs were included in this meta-analysis and uterine massage was not associated with significant decrease in PPH. Though the quality of included trials was found low and the studies which were included in the meta-analysis, differed in the type of intervention as the duration of uterine massage, the timing of blood assessment (30v/s 60 v/s 120 min) and therefore the quality of evidence for this review was low. Therefore, it was concluded that more studies with specific interventions were required to generalize the evidence for uterine massage as a preventive tool for PPH. We therefore in our study included uterine massage for one minute, every 10 minutes till 1 hour after delivery of placenta to make the intervention more specific.

Other modes of uterine compression have also been studied to reduce the postpartum blood loss. In a RCT study by Ghulmiyyah et al., comparison was done between the sustained compression of the lower uterine segment and uterine massage for the amount of blood loss after the vaginal delivery but they did not find any significant difference in the outcome in both the groups.[15] Some studies of uterine massage have been done in the cases of CS to find the amount of blood loss after CS. In a retrospective cohort study by Zhang et al., uterine massage before delivery of placenta caused a significant decrease in blood loss in

women who had high risk for PPH compared to controlled cord traction method during CS.[16] Though there was no significant difference in intractable PPH and incidence of PPH but still they concluded that uterine massage contributed to decreased blood loss during CS in high risk patients for PPH.

Compared to our study, controversial results were found by Kundu et al. in West Bengal in 2021.[17] They found no significant decrease in blood loss after 1 hour, 2 hour, 24 hr, and 48 hr of delivery in the group of women who received uterine massage with AMTSL. Though the method of their measurement for blood loss was gravimetric method and also the sample size was also small, only 60 women were included in the study, 30 in the experimental group and 30 in the control group.

Regarding the change in haemoglobin before and after the delivery, the mean difference in haemoglobin was less in the study group as compared to the control group though it was statistically insignificant but Erkaya et al. found a significant difference in both groups.[14]

CONCLUSION

Uterine massage is a simple, cost-effective, non-invasive technique without any side effects which can be given to every pregnant woman at the time of labour in addition to the active management of the third stage of labour. In addition, the uterine massage can be easily learned and taught to anyone including the women's birth companion, traditional skilled birth attendants, nurses, midwives, and paramedics. It not only will reduce the atonic PPH but also will decrease the decline in the haemoglobin after the delivery. In low resource countries, postpartum anaemia followed quickly by successive pregnancies aggravates the pre-existing anaemia and increase the risk of mortality in successive pregnancy. Thus, uterine massage by reducing the blood loss during childbirth can also reduce the prevalence of postpartum anaemia and maternal mortality.

Conflict of Interest

No conflicts of interest between the authors and / or family members of the scientific and medical committee members or members of the potential conflicts of interest, counseling, expertise, working conditions, share holding and similar situations in any firm.

Authorship Contributions

Idea/Concept: Pooja Patil; Design: Pooja Patil, Nalini Mishra; Control/Supervision: Pooja Patil, Nalini Mishra; Data Collection and/or Processing: Priya Mittal; Analysis and/or Interpretation: Smita Batni; Literature Review: Priya Mittal; Writing the Article: Pooja Patil; Critical Review: Nalini Mishra; References and Fundings: Smita Batni, Priya Mittal; Materials: Priya Mittal.

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