ORIGINAL ARTICLE

JOURNAL OF
Obstetrics and Gynecological
INVESTIGATIONS

J Obstet Gynecol Investig 2020; 3: e26–e34
DOI: https://doi.org/10.5114/jogi.2020.102418

Submitted: 29 July 2020
Accepted: 4 November 2020

A comparative study of Brass-V Drape and standardised visual estimation of blood loss during vaginal delivery – a single-observer study

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Abstract

Introduction: According to the World Health Organisation (WHO), postpartum haemorrhage (PPH) is a leading cause of maternal mortality, accounting for 35% of maternal deaths worldwide. If blood loss is not assessed correctly and managed swiftly, it may rapidly result in fatality. The accurate assessment of blood loss is a guide to treatment and helps identify the cause of excessive blood loss. The present study was aimed at improving the accuracy of blood loss estimation during vaginal delivery by standardising the visual estimation method using a pre-weighed gauge and mops. This was correlated with measurement using the sterile Brass-V Drape under the buttock to determine the volume of blood loss.

Material and methods: The study was conducted on 500 gravidas with singleton pregnancy undergoing vaginal delivery in the Labour room of Umaid hospital, Dr S.N. Medical College, Jodhpur (Rajasthan), to estimate and compare the accuracy of blood loss occurring during vaginal delivery using visual estimation (standardised) and Brass-V Drape method. The difference in estimation of blood loss by the two methods up to 100 ml was not considered significant in our study because this difference is unlikely to have any impact on maternal health.

Results: The mean blood loss in our study by standardised visual estimation method was 155.36 ±54.75 ml, and by Brass-V Drape estimation method it was 213.57 ±79.08 ml. The mean difference of blood loss in the two methods was 58.21 (213.57–155.36) ml. For vaginal blood loss up to 200 ml and up to 400 ml, the underestimation of blood loss by the standardised visual method was 41.9 ml and 99.34 ml, respectively. However, when the loss was more than 500 ml, the underestimation was 198 ml. Therefore, this trend is indicative of the fact that with the increase in blood loss, the inaccuracy of the standardised visual estimation also increases.

Conclusions: Although the Brass-V Drape estimation method is the gold standard, the standardised visual blood loss estimation method is more practical, economical, readily available, easy to understand, and can be implemented with just a minimum of training. It is definitely an appealing method of blood loss estimation for all healthcare providers at facilities dealing with childbirth. For normal vaginal deliveries, except for those with massive blood loss, standardised visual blood loss estimation should be recommended as a routine method even in remote and peripheral areas by almost all levels of health care providers.

Key words: blood transfusion, obstetrics, blood loss.

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To cite this article: Singh G, Singh V, Sasidharan S, Singh S, Naseer A, Babitha M, Singh Dhillon H. A comparative study of Brass-V Drape and standardised visual estimation of blood loss during vaginal delivery – a single-observer study. J Obstet Gynecol Investig 2020; 3: e26–e34. DOI: https://doi.org/10.5114/jogi.2020.102418

Introduction

The period between the birth of the baby and expulsion of the placenta and membranes is the third stage of labour. Blood loss during this period and immediately thereafter depends on how well the placenta separates from the uterine wall and how well the uterus contracts to close the vascular channels in the placenta bed. Blood loss during delivery is physiological and does not lead to later problems except for women who are already anaemic. The major complication associated with this stage is postpartum haemorrhage.

Gyte in 1992 suggested that blood loss at birth is physiologically normal and is a part of the mechanism that brings the mother's blood volume back to its nonpregnant level [1]. According to the World Health Organisation (WHO), postpartum haemorrhage (PPH) is defined as bleeding from the genital tract in excess of 500 ml after vaginal delivery of the baby: postpartum haemorrhage (PPH) minor: 500–1000 ml, PPH major: over 1000 ml (moderate 1000–2000 ml and severe > 2000 ml).

The American College of Obstetricians and Gynaecologists *(*ACOG) define postpartum haemorrhage as excessive bleeding from the genital tract causing a haematocrit drop of more than 10% requiring immediate transfusion. Postpartum haemorrhage is sufficient to affect the general condition of the mother, which can be shown clinically by tachycardia and hypotension. Morbidity following PPH varies from simple to severe, such as the patient being vulnerable to anaemia, prolonged hospital stay, difficulties in establishing breast feeding, DIC, shock, acute renal failure, multiple organ dysfunction, sepsis, or death.

According to the World Health Organisation, 60% of maternal deaths in developing countries are due to PPH, accounting for more than 100,000 maternal deaths per year [2]. PPH is a complication in 5% to 10% of all deliveries and is currently one of the leading causes of maternal death worldwide [3]. PPH continues to be alarming for birth attendants because it can be uncontrolled. Postpartum haemorrhage is the primary cause of morbidity and mortality in obstetrics and the most important cause of admission for postpartum women in the intensive care unit [4].

Because of different diagnosing criteria, the incidence of PPH is variable. According to a systemic review, the prevalence of PPH with > 500 ml of blood loss was 2.6% in Asia, 6.3% in North America and Europe, 8.9% in Latin America and the Caribbean, and 10.5% in Africa [5]. In India, the incidence of PPH is 2–4% with vaginal delivery [6]. In the United States the pregnancy-related mortality ratio was 17.3 deaths per 100,000 live births in 2013, and approximately 11.4% of these deaths were due to PPH [7].

In India, the incidence of maternal death due to PPH is 25.6% [8]. In rural India, maternal mortality rates due to PPH are 350 to 650 per 100,000 live births, accounting for the world's highest number of maternal deaths per year [9]. In November 2003, FIGO and ICM issued a joint statement declaring the reduction of PPH an integral component of the Safe Motherhood global initiative.

Assessment of postpartum blood loss is difficult, particularly after vaginal birth, due to physiological adaptation to pregnancy including an increase in plasma volume and haemodilution providing a reserve of circulatory volume, and signs of haemorrhage may be delayed [10, 11]. Assessment of blood loss after delivery is important because active intervention in the "golden hour" is crucial to prevent maternal morbidity and mortality [12]. Delays in treating postpartum haemorrhage are because of late symptom recognition and timely accurate diagnosis [13, 14], due to lack of clinical experience in accessing the accurate blood loss following PPH, which may lead to underestimation by up to 50% [15]. Delays in the diagnosis and treatment of PPH may result from an underestimation of blood loss at delivery. PPH, if not assessed correctly and managed swiftly, can result in a healthy woman becoming critically ill in few minutes and can be fatal.

Risk of haemorrhage is always present at birth, but early diagnosis of postpartum haemorrhage and implementation of preventive and curative measures as soon as possible can avoid the risks associated with delay. Therefore, blood loss estimation at delivery is crucial because the delay in recognising PPH can cost a woman her life. However, accurate measurement of blood loss is difficult. Blood loss quantification is not only important for immediate management, but also necessary to measure the incidence of haemorrhage.

Timely management of PPH requires quantification, so that mortality and morbidity can be reduced. For that, we can have several methods to quantify postpartum vaginal blood loss, and the details are as mentioned below: clinical assessment, visual estimation, standardised visual estimation, direct collection (Brass V drape), gravimetric estimation, photometry, venous blood sampling, dye dilution techniques for plasma volume measurement.

With this background, this study was conducted to estimate and compare the accuracy of blood loss occurring during vaginal delivery using visual estimation (standardised) and Brass-V Drape method.

Material and methods

Study design

Hospital-based descriptive observational study.

Study location

Labour room of Umaid hospital, Dr S.N. Medical College, Jodhpur (Rajasthan).

Study duration

Subjects were recruited after approval of the Ethics Committee until a sample size of 500 was achieved.

Inclusion criteria

All gravidas with singleton pregnancies undergoing vaginal delivery at this institute were included in the study.

Exclusion criteria

1. Preterm deliveries.

Table I. Interpretation of κ value

Value of κ	Strength of agreement
< 0.20	Poor
0.21–0.40	Fair
0.41–0.60	Moderate
0.61–0.80	Good
0.81–1.00	Very good

2. Pregnancy is associated with co-morbidities like preeclampsia, eclampsia, severe anaemia, heart disease, thyroid, and liver disease.
3. All planned/emergency caesarean section, antepartum haemorrhage.
4. All women undergoing operative vaginal delivery.

Data collection

Data from all women in this study undergoing normal vaginal delivery were collected in a preset predesigned performa including all required details. Data from all subjects was collected by the same researcher to avoid bias. All women were provided with a Brass-V Drape under-the-buttock drape after delivery of the baby and before delivery of placenta. The Brass-V Drape was covered by a sheet. At the completion of the third stage of labour and just before shifting the mother from the labour table, blood loss was estimated. Blood loss estimation was first done by the routine standardised visual estimation method used at our institute, and then the actual amount of blood collected in the Brass-V Drape was noted by the observer. We compared both methods of blood loss estimation, and the mean difference of blood loss up to 100 ml between both methods was not considered substantial enough because this difference would be unlikely to have an impact on maternal health.

Data analysis

Qualitative data variables were expressed using frequency and percentage. Continuous variables were summarised as median, range, mean, and standard deviation. All statistical analysis was done using Epi info statistical software. An inter-rater agreement statistic (κ, kappa) was calculated with 95% confidence interval.

The κ value was interpreted as shown in Table I.

Methodology

For standardised visual estimation of blood loss

Earlier, blood loss was quantified based only on visual approximation, which was inaccurate in up to 50% of cases, but to make it more reliable, we have a standardised a pictorial visual blood loss estimation guideline in place at our institute, and the estimation was done accordingly (Figure 1). To minimise the bias in results during standardised visual estimation, we covered the Brass-V Drape with sheets. According to the standardised visual guide chart:

- Maternity pad (10 × 5 cm) fully soaked standing for 100 ml blood,
- Roller gauge packing fully soaked equals 100 ml,
- Large (45 × 45 cm 12 ply) fully soaked swab stood for 350 ml,
- 1 kg of soaked swabs means 1000 ml,
- 50 cm diameter floor spill amounts to 500 ml,
- 75 cm diameter floor spill equals 1000 ml,
- 100 cm diameter floor spill means 1500 ml,
- Vaginal PPH limited to the bed is 1000 ml,
- PPH overflow from the bed stood for 2000 ml.

Estimation using Brass-V Drape

We used a Brass-V Drape with a graduated pouch under the buttocks for blood loss estimation (Figure 2). To avoid contamination of amniotic fluid, the Brass-V Drape was used immediately after delivery of the baby and before delivery of the placenta. It consists of a funnelled and calibrated collecting pouch attached to a plastic sheet that is placed under the woman's buttocks immediately after delivery of baby. The gauges and pads (soaked in blood) were used for cleaning and repairing of the episiotomy, which were put in the Brass-V Drape for accurate measurement of blood loss. Blood spilled on the sheet under the buttocks was also included in the Brass-V Drape estimation.

Results

After initial screening on the basis of inclusion and exclusion criteria of the study, 500 pregnant women were enrolled and evaluated by detailed history taking, and clinical and obstetric examination. Out of 500 deliveries at our institute, only 5 women had mild PPH. Vaginal blood loss estimation was done by the standardised visual blood loss estimation method and the Brass-V Drape estimation method, and the results were compared.

Table II depicts mean, median, and range of vaginal blood loss using both methods. The mean value of blood loss using the standardised visual method was found to be 153.36 ±54.75 ml while it was 213.57 ±79.08 ml by Brass-V Drape estimation.

The comparison of vaginal blood loss along with the mean difference of blood loss between both methods using various variables is shown in Table III. The difference of mean blood loss by these two methods in the age groups 18–25 years, 26–30 years, and > 30 years was 54.78 ml, 66.14 ml, and 79.16 ml, respectively, suggesting an increasing difference in amount with rising age. Blood loss was more in unbooked cases, multiparous, underweight, obese, uneducated, urban, and low socioeconomic status women.

Table IV shows the comparison between the standardised visual blood loss estimation method and Brass-V Drape method. There were 5 women who had blood loss > 500 ml as estimated by Brass-V Drape method. However, none of the women had blood loss > 500 ml as per the visual blood loss estimation method. Standardised visual estimation methods had fair agreement (Cohen's κ coefficient 0.307) up to an average blood loss of 500 ml by vaginal delivery.

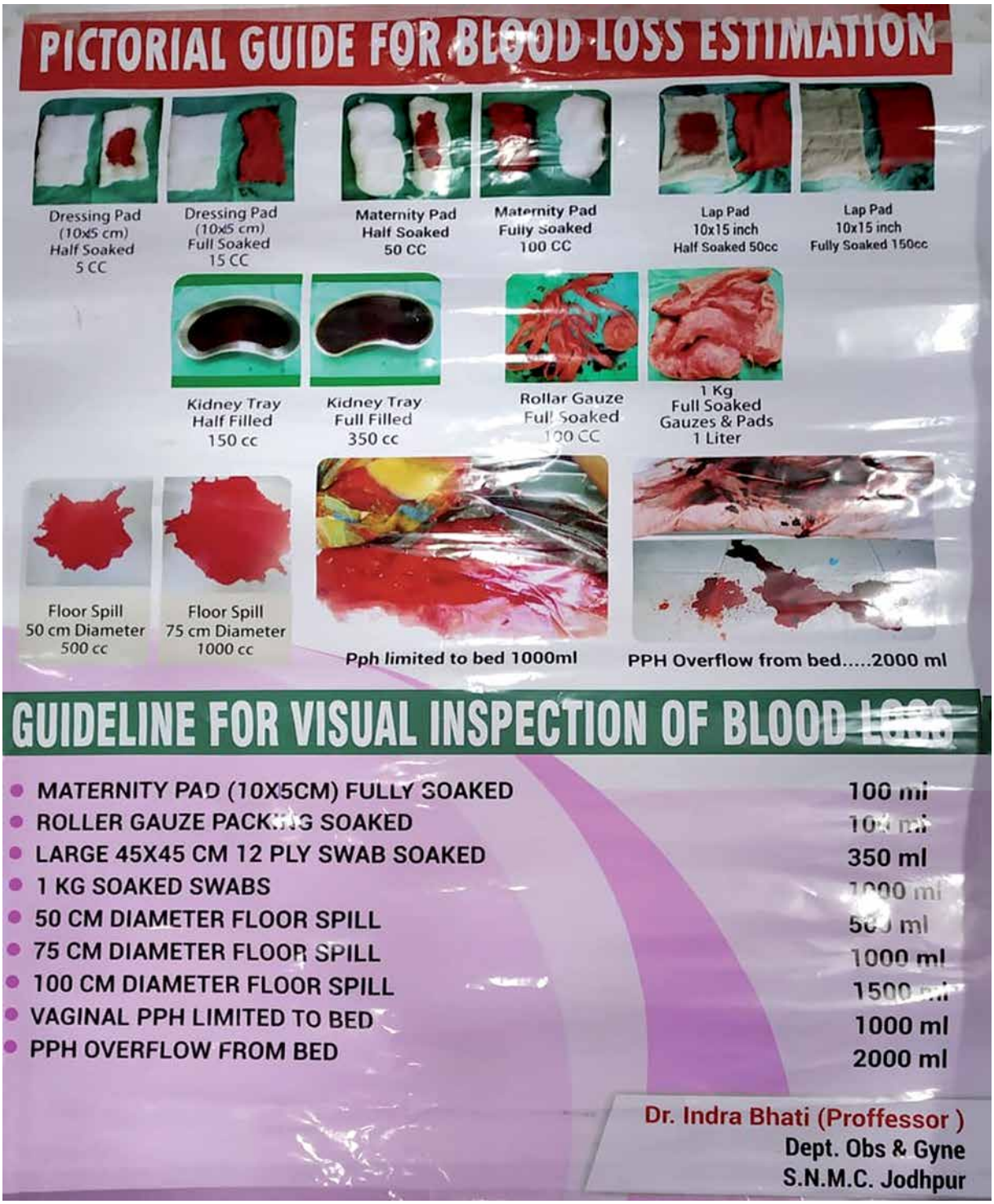

Figure 1. Standardised visual blood estimation method

Discussion

According to the WHO, PPH is a leading cause of maternal mortality accounting for 35% of maternal deaths worldwide. Most deaths occur in low- and middle-income countries (99%) compared with only 1% in industrialised nations. If managed in a timely and efficient manner, the mortalities due to PPH can be curbed. The accurate assessment of blood loss is a guide to the treatment and identification of the causes of excessive blood loss. This helps in early diagnosis and treatment thus reducing morbidity and mortality associated with excessive blood loss. The present study was aimed at improving the accuracy of blood loss estimation during vaginal delivery by standardising the visual estimation method using a pre-weighed gauge and mops. This was correlated with measurements using a sterile Brass-V Drape under the buttocks to determine the volume of blood loss.

The prevalent child-bearing age in India is between 21 and 30 years. The mean age of women in the present study was 23.90 years. Considering different age groups, the

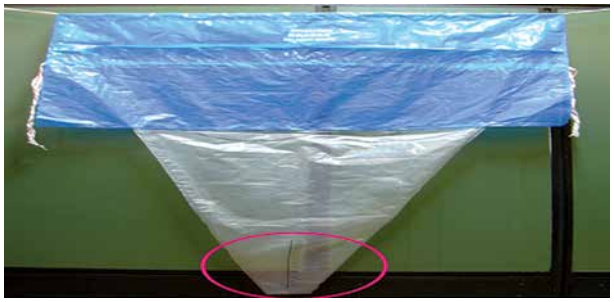

Figure 2. Brass-V Drape method

Table II. Mean, median, and range of blood loss following vaginal delivery using two methods

Statistical analysis	Standardised visual blood loss [ml]	Brass-V Drape estimate [ml]
Mean ± SD	155.36 ±54.75	213.57 ±79.08
Median	150	200
Range	80–400	100–600

vaginal blood loss estimation was higher by Brass-V Drape method as compared to the standardised visual blood loss estimation.

The increase in blood loss was correlated with age. There was an increase in the incidence of postpartum vaginal blood loss with increasing maternal age in the present study, from 147.58 ±46.62 ml in women between the age of 18 and 25 years to 198.75 ±82.32 ml in women who were above the age of 30 years. Our results were comparable with the studies of Girault *et al.* [16], Kramer *et al.* [17], and the Blomberg study [18]. The difference of mean blood loss by these two methods in the age group 18–25 years, 26–30 years, and > 30 years was 54.78 ml, 66.14, and 79.16 ml, respectively, suggesting an increasing difference in amount with rising age.

According to the locality, 303 (60.6%) women were from rural areas and 197 (39.4%) women were from urban areas. The reason for the large number of rural women can be attributed to the fact that ours is the first referral hospital of the entire Western Rajasthan, and financial constraints can be another contributing factor. The volume of postpartum blood loss in the present study was higher in urban than in rural women. The results were contrary to the results of the studies Varadha [19] and Temesgen [20]. This could be because most of the women from the urban areas were actually from the slums and low socio-economic families. The difference of mean blood loss by these two methods in women from rural and urban areas was 55.44 ml and 62.49 ml, respectively.

Our study had more (booked cases) women 337 (67.4%) than unbooked cases 163 (32.6%). Booked women were defined as those who had at-least three antenatal visits at our center, while unbooked women were those who have no prenatal care at all throughout the pregnancy, those who registered at our unit but had less than two antenatal clinic visits, and patients referred as emergency from other facilities. The reason behind the large number of booked caseswas attributed to the fact that in this present study we had excluded women with complications like anaemia, pre-eclampsia, eclampsia, diabetes, etc. because our institute is a tertiary care hospital, so most of the women were referred from rural areas, who were otherwise more vulnerable to the above-mentioned complications. The average blood loss in the present study was more in unbooked cases. Our results are comparable with the studies of Varadha [19] and Gani and Ali [21] but contrary to the findings of Temesgen [20] in which more blood loss was found in booked women. The difference of mean blood loss by these two methods in booked and unbooked category was 56.65 ml and 61.41 ml, respectively. Average blood losses in women who were ANC booked were less when compared to unbooked women.

In present study, 274 (54.8%) women were multipara and 226 (45.2%) were primigravida. We found that post-partum vaginal blood loss was more in multipara than in primigravida, which was in concurrence with Aude, Girault *et al.* [16], Kramer *et al.* [17], the Blomberg study [18], Temesgen [20], and Gani and Ali [21]. Higher parity is a risk factor for blood loss, and this was supported by various studies. The difference of mean blood loss by these two methods in women who were primigravida and multipara is 54.71 ml and 61.12 ml, respectively. With each pregnancy, some uterine muscle fibres are replaced by fibrous tissue, so the retraction power of the uterus decreases, which could be a principal factor for the occurrence of PPH.

We found that vaginal blood loss was greater in uneducated women and in those with low socioeconomic status when compared to educated, high socioeconomic status women. Moreover, women belonging to nuclear families had a greater amount of vaginal blood loss when compared to women who had joint families. Justification for this may be due to the presence of nutritional deficiency and ignorance of health; also, such women had frequent childbirths due to unawareness of family planning services. Comparable data on these factors were not available due to lack of research.

In the present study, 83 (16.6%) out of 500 women were addicted to smoking/tobacco chewing. Our study results show that there was more blood loss in mothers who were addicted (smoker/tobacco). Similar results were found by the studies of Kramer *et al.* [17] and Contreras *et al.* [22]. The difference of mean blood loss by these two methods in women who were addicted and not addicted is 60.26 ml and 57.77 ml, respectively.

We found that both overweight and underweight women had a tendency of high blood loss at delivery compared to normal-weight women. Our results were supported by the results of the Blomberg study [18], Fyfe *et al.* [23], and Ibrahim *et al.* [24].

However, our results were contrary to the results found by Butwick *et al.* [25], who found only a very small effect of maternal BMI on postpartum haemorrhage. The difference of mean blood loss by these two methods in women with normal BMI, obese, pre-obese, and underweight was 53.57 ml, 94.61 ml, 77.3 ml, and 87.78 ml, respectively.

We found that there was slightly more blood loss in women who delivered with an episiotomy compared to delivery without episiotomy, which is similar to the findings

Table III. Comparison of vaginal blood loss estimation by both methods using various variables

Variables	No. of patients	Standardised visual blood loss (mean ± SD) [ml]	Brass-V Drape estimate (mean ± SD) [ml]	Difference of mean blood loss [ml]
Age [years]:				
18–25	376	147.58 ±46.62	202.36 ±65.88	54.78
26–30	100	174.71 ±65.37	240.85 ±97.20	66.14
> 30	24	198.75 ±82.32	277.91 ±122.65	79.16
Residence:				
Rural	303	152.14 ±52.92	207.58 ±74.99	55.44
Urban	197	160.45 ±57.25	222.94 ±84.43	62.49
Booking status:				
Booked	337	152.89 ±51.52	209.54 ±73.22	56.65
Unbooked	163	160.61 ±60.79	222.02 ±89.81	61.41
Parity:				
Primigravida	226	145.80 ±46.47	200.51 ±64.34	54.71
Multipara	274	163.46 ±59.75	224.58 ±88.28	61.12
Educational status:				
Educated	340	149.94 ±49.55	205.79 ±69.68	55.85
Uneducated	160	166.60 ±62.82	229.60 ±93.81	63
Occupation:				
Housewife	335	149.94 ±49.55	205.79 ±69.68	55.85
Working	165	166.60 ±62.82	229.60 ±93.81	63.6
Type of family:				
Single	133	169.13 ±63.06	232.64 ±91.73	63.51
Joint	367	150.21 ±50.40	206.40 ±72.62	56.19
Socioeconomic status:				
Low	78	173.97 ±63.45	240.60 ±96.86	66.63
Medium	422	151.72 ±52.17	208.25 ±74.08	56.53
Addiction:				
Yes	83	161.92 ±57.92	222.18 ±84.74	60.26
No	417	154.09 ±54.08	211.86 ±77.91	57.77
BMI:				
Normal	419	146.83 ±47.09	200.40 ±64.53	53.57
Obese	13	216.15 ±76.76	310.76 ±118.64	94.61
Pre-obese	50	199.8 ±67.23	277.1 ±101.36	77.3
Underweight	18	189.44 ±69.40	277.22 ±120.58	87.78
Newborn sex:				
Male	237	155.37 ±55.11	213.05 ±80.07	57.68
Female	263	155.39 ±54.51	214.04 ±78.32	58.65
Episiotomy:				
Yes	377	155.39 ±54.51	247.31 ±102.95	91.92
No	123	148.16 ±47.53	202.70 ±66.29	54.54
Additional uterotonics:				
Yes	52	272.30 ±44.44	392.30 ±67.58	120
No	448	141.96 ±36.96	193.05 ±48.60	51.09
Baby weight [kg]:				
2–2.5	162	150.61 ±5.34	205.09 ±68.08	54.48
2.5–3	213	157.52 ±55.56	218.09 ±83.32	60.57
> 3	125	157.84 ±57.60	216.68 ±84.35	54.84

Table III. Cont.

Variables	No. of patients	Standardised visual blood loss (mean ± SD) [ml]	Brass-V Drape estimate (mean ± SD) [ml]	Difference of mean blood loss [ml]
Blood loss [ml]:				
100–199	245	117.96 ±22.50	159.86 ±16.40	41.9
200–299	159	161.50 ±22.78	214.46 ±24.42	52.96
300–399	75	224.66 ±30.55	324 ±28.99	99.34
400–499	16	288.12 ±20.07	416.25 ±22.47	128.13
≥ 500	5	368 ±29.49	566 ±42.19	198

of Ashouri *et al.* [26] and Lam *et al.* [27]. The variation of mean blood loss by these two methods in women with episiotomy and without episiotomy were 91.92 ml and 54.54 ml, respectively.

Our study shows that there was no significant difference in postpartum vaginal blood loss according to birth weight of the newborn, which was also supported by the study of Kramer *et al.* [17], who concluded that no significant difference in postpartum blood loss occurred due to birth weight of the newborn especially when their weight was below 4 kg. However, blood loss was more when the birth weight was above 4 kg. Fyfe *et al.* [23] in their study showed that the risk of postpartum haemorrhage increased when the birth weight was more than 3.5 kg. The mean blood loss differences by these two methods in women with baby weight 2–2.5 kg, 2.5–3 kg, and > 3 kg were 54.48 ml, 60.57 ml, and 54.84 ml, respectively.

The difference in estimation of blood loss by the two methods up to 100 ml was not considered significant in our study because this difference is unlikely to impact maternal health. We have observed that in women who had blood loss up to 200 ml and 400 ml, the difference between both methods was 41.9 ml and 99.34 ml, respectively. Furthermore, where the blood loss was in the range of 400–500 ml and > 500 ml, the difference goes up to 128.13 ml and 198 ml, respectively. The mean blood loss in our study by standardised visual estimation method was 155.36 ±54.75 ml and by Brass-V Drape estimation method was 213.57 ±79.08 ml. The mean difference of blood loss in the two methods was 58.21 (213.57–155.36) ml. Our findings with respect to the mean differences in both methods were supported by a number of other studies [28–33]. The prevalence of primary PPH as estimated with Brass-V Drape method was 1% against 0% by standardised visual estimation. For every 500 women, we would be actually missing five women with mild PPH by using the standardised visual methods. The range of blood loss estimated by the standardised visual method and Brass-V Drape method was 80–400 ml and 100–600 ml, respectively, suggesting that up to 500 ml blood loss estimation was comparable by the two methods.

Standardised visual estimation had fair agreement (Cohen's κ coefficient 0.307) up to an average blood loss of 500 ml by vaginal delivery. However, with the increase in blood loss (more than 500 ml), the discrepancy in standardised visual method also increases, but barring such cases of massive blood loss, the standardised visual method can be employed without any hesitation.

Conclusions

Postpartum haemorrhage is the most common cause of serious blood loss in obstetrics. If blood loss is not assessed correctly and managed swiftly, it may result in a fatality and can have a high chance of a healthy women becoming

Table IV. Comparison between visual blood loss estimation method and Brass-V Drape method

Brass V drape estimate [ml]	Standardised visual blood loss [ml]						Total
	0–100	101–200	201–300	301–400	401–499	> 500	
0–100	00	02	00	00	00	00	02
101–200	136	206	00	00	00	00	342
201–300	00	95	07	00	00	00	102
301–400	00	00	43	00	00	00	43
401–499	00	00	06	00	00	00	06
≥ 500	00	00	00	05	00	00	05
Total	136	303	56	05	00	00	500
Weighted κ			0.307				
Standard error			0.015				
95% CI			0.276–0.338				

critically ill within minutes. Blood loss can be measured by a variety of methods, most of which are cumbersome and impractical in general clinical practice. In routine blood loss it is usually estimated by subjective visual quantification, which is generally based upon prior clinical experience. The conclusions drawn from the study are as follows:

1. The mean blood loss by Brass-V Drape method was 213.57 ±79.08 ml against a mean of 153.36 ±54.75 ml blood loss estimated by the standardised visual estimation method, and the mean difference of blood loss between both methods was 58.21 ml. Prevalence of primary PPH as estimated with Brass-V Drape method was 1% against the zero percent by standardised visual estimation.
2. Our findings also indicate that in all these instances where the blood loss was up to 200 ml and 400 ml, the underestimation of blood loss by the standardised visual method was 41.9 ml and 99.34 ml, respectively. However, when the loss was more than 500 ml, the underestimation was 198 ml. Therefore, this trend is indicative of the fact that with the increase in blood loss, the inaccuracy of the standardised visual estimation also increases.
3. The reported difference of 58.21 ml may not be clinically meaningful in women sustaining small blood loss. However, with a blood loss of more than 500 ml, underestimation of the standardised visual method may well have a significant impact on maternal health. Therefore, prompt detection of PPH is essential for timely institution of definitive management or intervention.
4. Brief educational training for standardisation of the visual estimation of blood loss may be helpful in everyday practice to more accurately estimate blood loss and recognise patient risk for haemorrhage-related complications because the appearance of clinical signs due to blood loss may be too late.

Hence, with this study we conclude that although Brass-V Drape estimation method is the gold standard, the standardised visual blood loss estimation method, which is more practical, economical, readily available, easy to understand, and can be practiced with just a minimum of training, is definitely an appealing method of blood loss estimation by all healthcare providers at each and every facility dealing with childbirth.

Recommendations

1. To further validate the results of standardised visual blood loss estimation, such results ought to be compared with laboratory tests like haematocrit estimation and final outcome of patients.
2. For normal vaginal deliveries, except for those with massive blood loss, standardised visual blood loss estimation can be recommended as the routine method even in remote and peripheral areas by almost all levels of health care providers.
3. Larger studies including women with high-risk pregnancies and those sustaining complications like shock, the need for blood transfusion, and operative interventions should be conducted to further validate the two methods.

Strengths of study

1. Reasonable sample size.
2. Vaginal blood loss estimation by both methods appears comparable.
3. Standardised visual estimation methods can be easily taught and used by any level of health facility, even by primary health care workers with minimal training.

Limitations

1. Results were not compared with laboratory methods of estimation like haematocrit measurement and clinical symptoms of women.
2. There was low average blood loss, so the difference between the two methods in massive haemorrhage could not be compared.
3. The size and material of the soaking gauges, roller gauges, laparotomy sponge, and maternity pads used to standardise the visual estimation of blood loss may be different in each institution, and hence each institution needs to prepare their own guidelines with locally used material.

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