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Original Research Article

A comparative study of postpartum blood loss using visual method and blood collection drape in a Northwestern Hospital

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ABSTRACT

Background: Postpartum blood loss is an important indicator of postpartum hemorrhage (PPH), which is the commonest cause of maternal death worldwide. Accurate measurement of postpartum blood loss (PPBL) is invaluable in the prompt diagnosis and treatment of PPH. There are various methods of measurement of postpartum blood which have shown varying degrees of accuracy in several studies. **Objective**: To compare postpartum blood loss using visual method and blood collection drape. **Methodology**: Three hundred and twenty-seven consenting parturients who had vaginal delivery were randomized into visual estimation and BRASSS-V drape group. The visual group had blood loss estimated using pictorial aids. BRASSS-V group had blood estimated using calibrations on the drape.Both groups had pre-delivery and post-delivery hemoglobin estimation. Data were analyzed using SPSS 23. Independent and pairedt-test was used to test for associations and P<0.05 was set as level of significance. **Results**: Prevalence of PPH was 9.6% for the visual group and 12.5% for the drape group. The mean blood loss for the visual group was 271.7mls±235.9mls and 331.8mls±295.1mls for the drape group. This wasnot statistically significant (P=0.085). Mean hemoglobin change in both groups was statistically significant (P=0.000). **Conclusion**: The standardized visual method wascomparable to the direct method of postpartum blood loss measurement.Visual estimation remains a valuable and acceptable method of postpartum blood loss especially in resource constrained setting. **Keywords**: Postpartum blood loss, Visual method, BRASSS-V drape, postpartum hemorrhage.

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Introduction

Postpartum hemorrhage (PPH) is vaginal bleeding equal to or in excess of 500mls following a vaginal delivery. PPH is a leading cause of maternal mortality and significant maternal morbidity especially in low-income countries.[1] Visual estimation has been popularly used by birth attendants. It simply involves looking at blood loss and estimating its volume. Though simple, several studies have demonstrated that visual estimation of blood loss is inaccurate, especially for larger volumes.[2] However, it can be improved with training as demonstrated by Mbachu et al.[3] Al-Kadiri et al also noted that consistent education could improve visual blood loss estimation.[4]

The direct method of estimating postpartum blood loss involves use of calibrated containers or collector bags placed under the woman's buttocks. Other methods of estimating postpartum blood loss are dye dilution, radioactive technique and spectrophotometry. However, these methods are difficult to perform and are not readily available especially in poor-resource settings.[5]

Diagnosis of PPH in poor-resource settings is challenging due to inaccurate estimation of actual blood loss. The various methods used limit the accuracy in diagnosis of PPH with the attendant consequence of postpartum complications. High quality evidence suggests use of calibrated drapes improves detection rate of blood loss in excess of 500mls.[5] The BRASSS-V drape is a calibrated plastic blood collection drape that measures the amount of blood lost in the immediate postpartum period objectively. Use of the BRASSS-V drape was found to diagnose PPH four times as often as the visual estimate.[6]

Hemoglobin (Hb) concentration has been used retrospectively to estimate blood loss after delivery. Its drawback is that it cannot be used to assess immediate blood loss resulting in delay of appropriate intervention. Nevertheless, it is an important tool in research to standardize other methods of blood loss.[7]

Inaccurate blood loss estimation can result in adverse complications which may either be delayed treatment or unnecessary blood transfusion in underestimation and overestimation of blood loss respectively. Prompt recognition of PPH allows for interventions to improve health outcomes of the mother. Though BRASS-V has been shown have superior detection rate for PPH, the drape is not readily available in resource constrained settings and increases the health care cost to parturients. Coupled with paucity of evidence in our setting on postpartum blood estimation, we aimed to compare the traditional visual estimation method with BRASSS-V in PPBL estimation in a resource constrained setting with a high burden of PPH.

a) Objectives

To compare visual method and blood collection drape in estimating postpartum blood loss and to determine the prevalence of PPH among parturients in Ahmadu Bello University Teaching Hospital (ABUTH), Zaria-Nigeria.

b) Methodology

It was a comparative cross-sectional study that was conducted among parturients in ABUTH between February to April 2017. Ethical approval was obtained from the Hospital Research Ethical Committee (HREC) with number ABUTHZ/HREC/Q3/2016. Three hundred and twenty-seven consenting parturients who had vaginal delivery at ABUTH were randomized into visual estimation group and BRASSS-V drape group using Winpepi version 11.65. Only parturients who consented and had vaginal deliveries were included. Women who had abdominal delivery, ante-partum hemorrhage, transfusion 48 hours before delivery or within 24 hours of delivery, multiple gestation, pre-eclampsia/eclampsia were excluded. Women were recruited on admission into the labour ward in spontaneous labour. On admission into the labour ward, each parturient picked a number randomly from a ballot envelope, which assigned her to either group. A proforma was filled for each consenting parturient to obtain socio-demographic variable, reproductive profile, pre-delivery hemoglobin, post-delivery hemoglobin and postpartum blood loss data.

c) **Study protocol**

Hemoglobin count was measured using venous blood collected in an EDTA bottle and appropriately labeled with the serial number randomly picked by the parturient. The hemoglobin count was done using an automated Hemocue hemoglobin meter. Using a plain capillary tube, blood was placed on the micro cuvette and mounted on a chamber on the hemoglobin meter which read the hemoglobin count in gram per deciliter (g/dl). The means of the pre-delivery and post-delivery hemoglobin count were compared using Student t-test.

Following vaginal delivery of the baby, the umbilical cord was clamped and cut. All parturients received 10IU of Oxytocin within one minute of delivery of the baby. Visual estimation of blood loss (VEBL) was done after delivery of the placenta by the trained accoucher. A pictorial aid was used to guide visual estimation of blood loss as seen in Figure 1. Using the large kidney dish whose volume is 500mls,the PPBL was estimated in the immediate postpartum period. An incontinence pad of 80cm x 65cm which when fully soaked absorbs up to 500mls was then placed under the parturients' buttocks until one hour postpartum. Both estimates were added and recorded.

Figure 1: Pictorial aid for VEBL

For those randomized to the blood collection drape group, following delivery of the baby, the umbilical cord was doubly clamped and cut, the drape was placed under the parturients' buttocks. The collection pouch was left closed until after delivery of the placenta and after emptying the bladder to minimize contamination by urine and liquor. The collection pouch was then opened and left for one hour postpartum and the volume was recorded. See Fig 2

Five doctors and two midwives were trained on visual estimation of blood loss and the correct way to use the blood collection drape.

Data obtained were analyzed using IBM statistics data editor SPSS version 23 (IBM Corp. Released 2015.IBM SPSS Statistics for Windows, version 23.0,NY:IBM Corp.)Categorical data were expressed as frequencies and percentages. Normally distributed continuous data were described using mean and standard deviation. Mann Whitney U test was used to compare mean ranks of postpartum blood loss of both groups. Paired t-test was used to compare the means of pre-delivery and post-delivery hemoglobin count in each group. The data were presented using tables. A p-value of <0.05 was considered to be statistically significant.

Results

The mean age of all parturients was 28.64 ± 5.98 years and was similar in both groups. Both groups had similar socio-demographic variables($p>0.05$). Majority of parturients had a parity of four and less. This is shown in table 1

Table 1: Socio-demographic characteristics of parturients and reproductive profile

Variable	Visual estimation n=167	Drape n=160	Test	P-Value
Mean Age ± SD (years)	28.8 ± 5.69	28.5 ± 6.28	t = 0.4530	0.6508
Ethnic group				
Hausa	119 (71.3%)	114 (71.3%)	X^2 = 2.544	0.467
Yoruba	20 (12%)	23 (14.4%)		
Igbo	5(3.0%)	8 (5.0%)		
Others*	23(13.7%)	15 (9.3%)		
Occupation				
Trader	19 (11.4%)	18 (11.25%)	X^2 = 4.33	0.228
Professional	36 (21.5%)	40 (25.0%)		
Artisan	5 (3.0%)	10 (6.25%)		
Unemployed	107 (64.1%)	92 (57.5%)		
Education				
None	2 (1.2%)	0 (0%)	X^2= 0.0635	0.951
Quranic	2 (1.2%)	11(6.9%)		
Primary	17 (10.2%)	14 (8.7%)		
Secondary	76 (45.5%)	71 (44.4%)		
Tertiary	70(41.9%)	64(40.0%)		
Parity				
0	51(30.5%)	56(35.0%)	X^2 =1.429	0.698
1-2	59(35.3%)	54(33.7%)		
3-4	33(19.7%)	25(15.6%)		
≥5	24(14.4%)	25(15.6%)		

Others* = Nupe, Ebira, Kanuri, Ijaw, Fulani

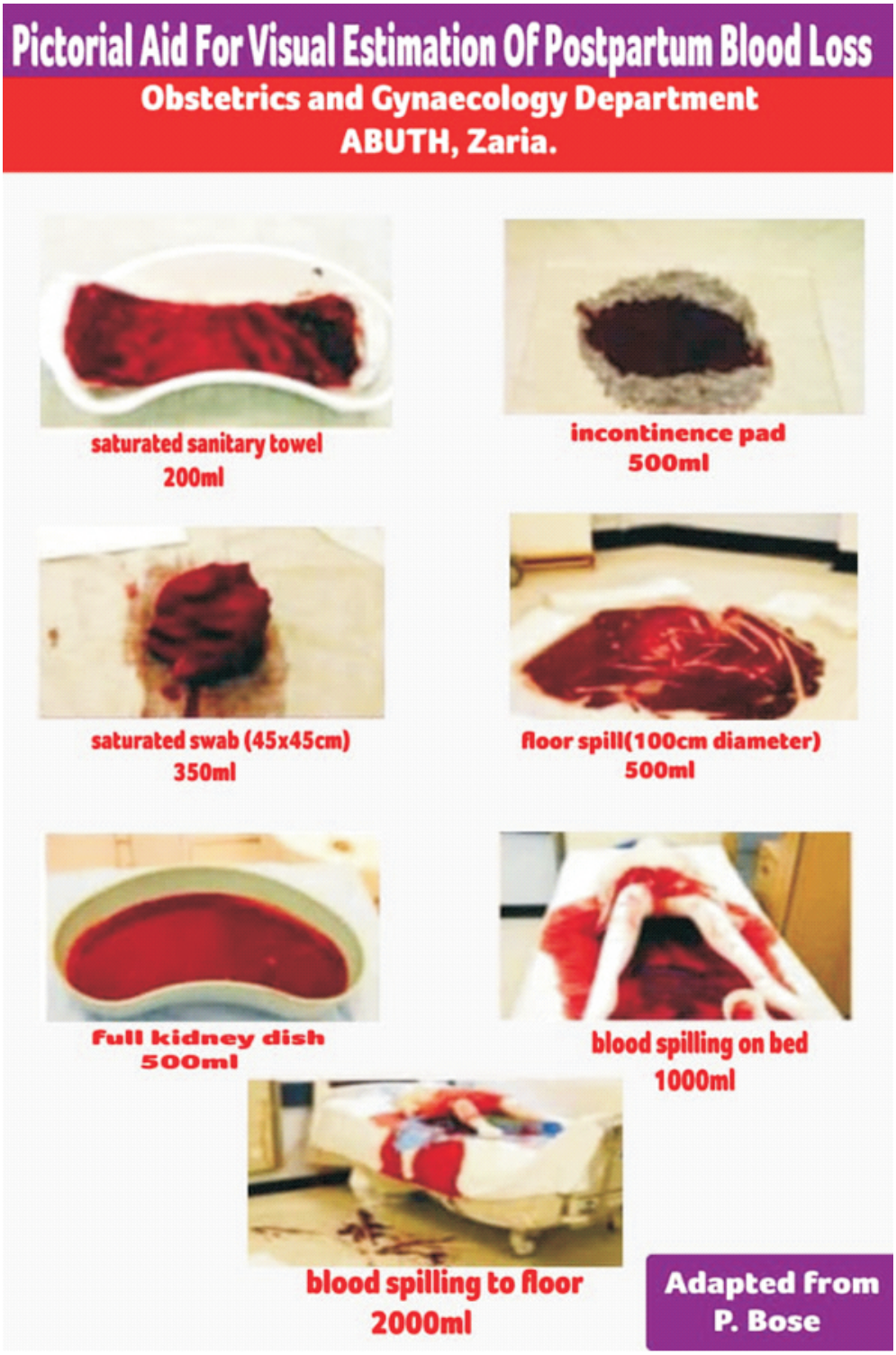
Table 2: Mean hemoglobin levels of parturients

Hb (g/dl)	VEBL	Drape	Paired t-test	P-Value
Pre-delivery	11.5	11.5	0.766	0.000
Post-delivery	10.1	10.8		

Table 3: Prevalence of PPH among parturients

Method	PPH		Independent t-test	P-Value
	Yes	No		
VEBL	9.6%	90.4%	0.173	0.68
Drape	12.5%	87.5%		

The blood loss estimated by visual estimation method ranged 100mls -2500mls with a median blood loss of 200mlswhile that of drape group ranged 100mls-2000mls with a median blood loss of 250mls there was no difference between the two groups (p=0.085).This is shown in Table 2. The total prevalence of PPH among parturients was 22.1% and prevalence did not differ by group (p = 0.68) as seen in Table 3.


Pictorial Aid For Visual Estimation Of Postpartum Blood Loss
Obstetrics and Gynaecology Department
ABUTH, Zaria.
saturated sanitary towel
200ml
incontinence pad
500ml
saturated swab (45x45cm)
350ml
floor spill(100cm diameter)
500ml
Full kidney dish
500ml
blood spilling on bed
1000ml
blood spilling to floor
2000ml
Adapted From
P. Bose

Discussion

The mean age of the parturients was similar to the findings of Gharoro and Enabudoso.[8]This was also similar to a study by Lertbunnaphong et al. Lertbunnaphong et al found an incidence of 3.5% in the visual estimation group which was lower than our finding of 9.6%.[9] This may be explained by the fact that staff were trained in our study on how to be more objective in blood loss estimation. The direct measurement with a birthing drape in their study showed an incidence of 9.1% which is comparable to that of 12.5% found in our study.

Even though the prevalence of PPH between both groups was not statistically significant, the BRASSS-V method estimated more blood loss and thus diagnosed more PPH than the visual method. This is in contrast to other studies done in Germany, Tanzania and Nigeria which showed underestimation of blood loss using visual estimate compared to change in hematocrit.[6, 10, 11]

Mean pre-delivery Hb and post-delivery Hb count were significantly differentin both groups. This was in contrast to the finding by Bellad et al who found the change in hemoglobin 24 hours after delivery was not statistically significant.[12] Gharoro found that routine hemoglobin/ hematocrit estimation in parturients with blood loss <500mls did not confer any benefit.[8]

A more precise method of estimating blood loss is photo-spectrometry, but it is labor intensive and expensive thus not readily available in poor-resource settings. Moreover, studies have shown the blood collection drape method to have similar accuracy to photo-spectrometry.[5]This finding lends strength to our study.

The mean blood loss in the visual group was 271.67±235.94 and in the blood collection drape groups was 331.8±295.1mls. A study by Tixieret al found a mean blood loss of 233.15±288.55mls in the drape group.[13] This was lower than our mean blood loss of 331.8mls.This may be due to the fact that the under-buttocks collection pouch used in their study is different from the BRASSS-V drape used in our study. Wang et al used a two-set liquid collector bag which had separate pouches for amniotic fluid and blood. They reported a mean blood loss of 372mls. [14]This was similar to our mean blood loss of 331.8mls.

In conclusion, despite drape method diagnosed more cases of PPH there was no significant difference in the postpartum blood loss in both groups. The two groups are therefore comparable with no superiority of one to the other in postpartum blood loss estimation and either can be used for this purpose. Thus, visual method still remains an acceptable and reliable method of PPBL estimation in resource constrained settings.

References

1. World Health Organization (WHO). Recommendations on Prevention and Treatment of Postpartum hemorrhage. Geneva: WHO;2012. Accessed 26th March 2020
2. Prasertcharoensuk W, Swadpanich U, Lumbiganon P. Accuracy of blood loss estimation in the third stage of labour. Int J Gynecol Obstet 2000;71:69-70.
3. Mbachu II, Udigwe GO, Ezeama CO, Eleje GU, Eke AC. Effect of on-site training on the accuracy of blood loss estimation in a simulated obstetrics environment. Int J Gynecol Obstet 2017;137:345-349.
4. Al-Kadri HM,Dahlawi H,Airan MA, Elsherif E,Tawfeeq N,Mokhele Y,Brown D,Tamim HM. Effect of education and clinical assessment on the accuracy of postpartum blood loss estimation. BMC Pregnancy Childbirth 2014;14:110
5. Diaz V, Abalos E, Carroli G. Methods for blood loss estimation after vaginal birth. Cochrane Database Syst Rev.2018; 9. https//doi.org/10.1002/14651858.CD14010980.pub14651852
6. Rath WH. Postpartum hemorrhage-update on problems of definitions and diagnosis. Acta Obstet Gynecol Scand 2011;90:421-428.
7. Palm C, Rhydhstroem H. Association of blood loss during delivery to beta-hemoglobin. Gynecol Obstet Invest 1997;44:163-168.
8. Gharoro EP, Enabudoso EJ. Relationship between

visually estimated blood loss at delivery and postpartum change in hematocrit. J Obstet Gynecol 2009;29:517-520.
9. Lertbunnaphong T, Lapthanapat N, Leetheragul J, Hakularb P, Ownon A. Postpartum blood loss: Visual estimation versus objective quantification with a novel birthing drape. Singapore Med J 2016;57(6): 325-328.
10. Peter JTW, Balandya B. Accuracy in diagnosis of postpartum hemorrhage, using visual estimation of blood loss versus change in hematocrit in a tertiary hospital in Tanzania. Tanzan J Health Res 2012; 14(2):1-9.
11. Obuna JA, Okafor I,Anikwe CC, Ejikeme BN, Eze JN. Visual estimation of blood loss post-delivery: How accurate are we in a poor resource setting. Int Res J Med Biomed Sci 2020; :24-28
12. Bellad MB, Laxmi BV, Goudar SS, Ashwath K. Standardized visual estimation of blood loss during vaginal delivery with its correlation hematocrit changes-A descriptive study.J of SAFOG 2009; 1(1): 29-34
13. Tixier H, Boucard C,Ferdynus C, Douvier S, Sagot P. Interest of using an underbuttocks drape with collection pouch for early diagnosis of postpartum hemorrhage. Arch Gynecol Obstet 2011;28:325-329
14. Wang F, Lu N, Weng X, Tiang Y, Sun S, Li B. Measurement of postpartum blood loss using a new two-set liquid collection bag for vaginal delivery: A prospective, randomized, case control study. https://doi.org/10.21203/rs.3.rs-41858/v1. Accessed September 2020.