

COMPARISON OF OBSTETRIC BLOOD LOSS USING PICTOGRAM VISUAL AID AND GRAVIMETRIC

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Abstract:

Objective: To Know whether there are differences in the estimation of the amount of obstetric haemorrhage by using visual aid and gravimetric pictogram and whether the use of pictogram visual aid.

Method: The design of this study was a prospective cross-sectional study conducted in H.Adam Malik General Hospital , Pirngadi General Hospital, Army Hospital, Haji Hospital and Sundari Hospital in Medan. This study was conducted from April 2017 - July 2017. Respondents were obstetric patients with term gestational age who gave birth both via Vaginal Spontaneous Delivery (VSD) and Caesarean Section (SC) with any indication in H.Adam Malik Hospital, Pirngadi General Hospital, Army Hospital, Haji Hospital and Sundari Hospital. **Results:** Based on this study, found that the amount of blood loss in VSD group which estimated with a pictogram (309.50 ± 165.03 ml), differed statistically when compared to gravimetric estimation which was greater with the mean of blood loss 326.67 ± 130.75 ml ($p < 0.05$) **Conclusion:** there was a difference in the amount of obstetric blood loss using visual aid pictogram and gravimetric both in VSD and CS delivery

Keywords: Obstetric Blood Loss, Pictogram Visual Aid, Gravimetric.

Introduction

The incidence of postpartum hemorrhage in developed countries is around 5% of all deliveries, whereas in developing countries it can reach 28% of deliveries and is a major problem in maternal death. In Indonesia, there are an estimated 14 million cases of haemorrhage in pregnancy. Every year at least 128,000 women experience complication in pregnancy from haemorrhage until death. According to the Indonesian Ministry of Health in 2010, the three main factors of maternal mortality were bleeding (28%), eclampsia (24%) and infection (11%).¹

Most complications of Post Partum Haemorrhage (PPH) are associated with late diagnosis and final management of bleeding. The final diagnosis can be related to estimates of blood loss during delivery. The most common approach to estimating blood loss is the visual estimation method.²

Bose et al. use pictogram as a measuring tool for the Obstetrics Department. He concluded that the results were less accurate than visual estimates and emphasized the need for education on this subject. Therefore, it is necessary to use a more effective method for estimating postpartum hemorrhage.^{2,3}

Another method for estimating blood loss is the gravimetric method. The direct method (weighting) is one of the ancient methods for estimating the correct amount of bleeding, but requires a longer time than visual estimation.^{4,5}

Delay in estimating of the amount bleeding can delay the management in cases of obstetric and would affect the outcome. Inaccuracy of medical personnel in estimating the amount of bleeding causes many disadvantages.⁶

Assessment of the amount of visual bleeding or through pictogram is one simple and routine quantitative method used to assess the amount of bleeding. However, these visual estimation tend to cause underestimation and often overestimation.⁷ Through this study we aim to assess accuracy in estimating the amount of blood loss based on pictogram compared to gravimetric.

Research purposes

Knowing whether there are differences in the estimation of the amount of obstetric haemorrhage by using visual aid and gravimetric pictogram and whether the use of pictogram visual aid can help to improve the prediction of the amount of haemorrhage in obstetric cases.

Research methods

The design of this study was a prospective cross-sectional study conducted in H.Adam Malik General Hospital , Pirngadi General Hospital, Army Hospital, Haji Hospital and Sundari Hospital in Medan. This study was conducted from April 2017 - July 2017. Respondents were obstetric patients with term gestational age who gave birth both via Vaginal Spontaneous Delivery (VSD) and Caesarean Section (SC) with any indication in H.Adam Malik Hospital, Pirngadi General Hospital, Army Hospital, Haji Hospital and Sundari Hospital. The inclusion criteria were willing to take part in research through informed consent, while the exclusion criteria were recurrent antepartum haemorrhage.

To calculate the size of the research sample, the following formula was used:

$$N = Z\alpha^2PQ/d^2$$

Based on Phutchjirah, et al⁶ found a total sample of 60 people. Taking into account respondents who drop out was around 10%, so the total number of patients needed was 66.

After obtaining approval from the ethics commission to conduct research, the study began by recruitment the research subjects according to inclusion and exclusion criteria. Demographic data will be analyzed descriptively to see the frequency distribution of the variables studied in the form of number (n) and percentage (%) while the amount of blood loss using visual aid pictogram and gravimetric will be assessed by paired T-test, Mann Whitney test and Wilcoxon signed rank test. P value <0.05 was used as a significant level.

Results

Research has been conducted on 66 people, with demographic data and several tables of research results shown below.

Table 1. Characteristics of Research Subjects

Demographic data	Frequency (n)	Percentage (%)
Age		
< 20 year	4	6,1
20 – 35 year	49	74,2
≥ 35 year	13	19,7
Parity status		
Primigravida	14	21,2
Multigravida	52	78,8
Method of delivery		
VSD	15	23
CS	51	77
Total	66	100

VSD = vaginal spontaneous delivery, CS = caesarean section

There were 4 subjects (6.1%) patients < 20 years old, 49 people (74.2%) were 20-35 years old and the rest patients ≥ 35 years were 13 people (19.7%). A total of 14 patients (21.2%) were primigravida while the remaining 52 patients were multigravida. As many as 15 patients (23%) underwent VSD and the remaining 51 patients (77%) underwent CS.

Table 2. Differences in the number of blood loss between pictogram and gravimetric based on the method of delivery

Delivery method	Estimation method	N	Mean (ml)	Std. Deviation	p Value**
VSD	PIKTOGRAM	15	309,50	165,03	0,03*
	GRAVIMETRIC	15	326,67	130,75	
CS	PIKTOGRAM	51	947,99	701,75	0,001
	GRAVIMETRIC	51	871,57	679,65	

**Wilcoxon test

Based on the table above shows in the group delivery via VSD, the the estimation of blood loss using pictogram was slightly lower compared to gravimetric. While in the group of CS, the blood loss estimation with pictogram was slightly higher than gravimetric. The two results above showed a significant difference statistically by the Wilcoxon test in pictogram and gravimetric measurement ($p < 0,05$).

Table 3 Laboratory Blood Test Results

Blood Assay	Mean	Median	Std. Deviation	Minimum	Maximum	p Value
HB1	11,758	11,7	1,5353	6,5	14,8	0,001*
HB2	10,921	10,9	1,6007	6,4	14,4	
HCT1	34,753	35	4,5557	21	45	0,001*
HCT2	32,538	33	6,0307	3	43	

HB = haemoglobin, HCT = haematocrite

Based on the above table, it showed the mean Hb level at admission was 11.76 ± 1.53 and decreased within 24 hours after the baby was born to 10.92 ± 1.60 . Statistically the t-test shows a significant difference ($p < 0.05$). Likewise the mean HCT level at admission was 34.75 ± 4.55 and decreased within 24 hours after the baby was born to 32.54 ± 6.03 . Statistically the Wilcoxon test showed a significant difference ($p < 0.05$).

Based on the calculation of the amount of bleeding with pictogram, estimated blood loss with an average of 802.88 ± 676.29 ml was lesser than the blood loss with gravimetric, with a mean of 747.73 ± 641.84 ml. Statistically the Wilcoxon test also showed a significant difference ($p < 0.05$).

Table 4 Decrease in Hb levels based on the methods of delivery

Method of delivery	N	Decrease in Hb level		p Value*
		Mean	Std. Deviation	
VSD	15	0,3000	0,30706	0,001
CS	51	0,9941	0,82980	

*Mann-Whitney test

The table above explains that the average decrease in Hb levels in VSD group was lower (SD 0.30 ± 0.31) compared to CS group (0.9 ± 0.83). Statistically the Mann-Whitney test showed significant differences ($p < 0.05$).

Discussion

Based on this study, found that the amount of blood loss in VSD group which estimated with a pictogram (309.50 ± 165.03 ml), differed statistically when compared to gravimetric estimation which was greater with the mean of blood loss 326.67 ± 130.75 ml ($p < 0.05$). While estimation the amount of blood loss in CS delivery with a pictogram of 947.99 ± 701.75 was slightly more than that of gravimetric 871.57 ± 679.65 . This statistically showed a significant difference ($p < 0.05$).

Pritchard et al. in their study showed that the volume of blood loss in the VSD and CS, study subjects was relatively the same with this study which showed that the average of blood loss with vaginal delivery and caesarean section was 500 and 1000 ml.^{8,9}

This study also showed that there was a decrease in Hb levels significantly within 24 hours after the baby was born compared to Hb before delivery (7%). Similar to the decrease in HCT values within 24 hours after the baby was born, there was a decreased by 6% and statistically also significant ($p < 0.05$). Experts argue that PPH is a 10% change in hematocrite.^{8,9} Evaluating the HCT value from this study, the study subjects showed an average blood loss approximately less than 500 ml.

The application of weighting all the materials that used in the delivery process, requires an accurate and time-consuming scale. On the other hand, visual estimation methods are one of the most common and ancient methods of measuring postpartum blood loss. Visual assessment is only used for routine measurements of blood loss in low-resource health services. However, visual estimation of blood loss is not sensitive to detect postpartum hemorrhage. Patel et al showed that visual assessment only had an accuracy rate of 33% in assessing postpartum blood loss compared to assessment with the drape method.^{3,10}

Visual estimation is the method most commonly practiced in determining blood loss during childbirth in the United States and the results are usually included in documentation of all deliveries. This method is still used even though repeated studies show inaccuracies.^{4,11}

Estimated blood loss with pictograms is the use of simple tools to improve the accuracy of assessing blood loss in delivery and may be useful for hospitals with limited resources that cannot use complex instruments for the purpose of accurate estimation. This is quite easy to do by health care providers. There is no need to remember how much blood volume in the area with different absorption of general surgical materials used in the field of delivery. Furthermore, this simple tool can be applied for evaluation of blood loss in other surgical situations.^{12,13}

Bose et al. develop the same pictogram to be used as a teaching tool on the delivery ward. Twelve clinical station of a general obstetric scenario were created which involved blood loss. Six types of health care providers significantly underestimated blood loss in 5 of the 12 station. This station was used to develop pictogram as potential teaching tools. It showed weak visual estimation results and the need for education regarding this matter.³

Education through simulation exercises can increase the ability of health care providers to estimate the amount that has been determined from the volume of blood in clinical scenario simulation materials. But estimation are still less accurate, especially with large bleeding volumes. Sukprasert et al. also reported a percentage increase in visual estimation accuracy after attending an education program.^{13,14}

The limitation in this study were regarding factors that affected the estimation of the blood loss. We found some fluids such as amniotic fluid, urine, vaginal discharge and any others discharge that can make blood stains fade on materials commonly used during delivery. This causes the estimation of blood loss through pictogram to be less accurate, so that results were different from the research hypothesis.

Conclusion

In this study, there was a difference in the amount of obstetric blood loss using visual aid pictogram and gravimetric both in VSD and CS delivery. To increase the estimation of blood loss using visual aid pictograms, education and simulation training can be done so that later it can be used as a tool to determine the amount of blood loss which is very easy, inexpensive and simple to implemented in all health services, especially with limited resources.

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