ORIGINAL ARTICLE

How Indonesian Midwives assess blood loss during labor?

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ABSTRACT

Background: Postpartum hemorrhage (PPH) remains the primary cause of maternal mortality in developing countries, and blood loss assessment (BLA) is a crucial factor in PPH management.
Aim: To describe how midwives undergo BLA during labor.
Methods: A sequential exploratory mixed-method study was used to answer the research question.Twenty-three midwives were involved with in-depth interviews, and 167 maternity rooms were observed.
Results: There were four methods of BLA theoretically known to midwives, but there was only one applicable method. The majority of midwives used delivery bed type A and an underpad as a delivery pad, but they did not know the brand of the underpads used. Also, the majority of them did not apply BLA during labor.
Conclusion: The BLA was not undertaken in most labors. Physiological parameters were the most applicable method for the Indonesian midwives.
Keywords: postpartum hemorrhage, blood loss assessment, visual method, gravimetric method, physiological parameters

INTRODUCTION

Maternal mortality remains the primary issue in developing countries where postpartum hemorrhage (PPH) has been reported as its leading cause[1-3].PPH is defined as a blood loss of or over 500 ml[4-6]. Its percentage is higher in developing countries (over 30%) compared to developed countries (13%)[2, 7]. In Indonesia, it caused 30.1% of maternal deaths[8].Most cases of PPH occur within two hours after the birth of the placenta, so a rapid and accurate blood loss assessment (BLA) is a crucial factor for PPH management[9]. A delay in diagnosing PPH will cause further delay in handling PPH, which can then lead to an increased risk of adverse outcomes[10], such as hypovolemic shock and death[6, 11].

The existence of a standard operating procedure (SOP) for assessing blood loss at the fourth stage of labor, as part of the normal labor and delivery care protocol, will help midwives to diagnose PPH quickly and accurately. The Indonesian government determined the mandatory protocol and training of intrapartum care for midwives. Since 1998, the protocol has been revised five times, however, there were no substantial changes or clear descriptions about the standard procedures for BLA[12-14]. Overall, the goal of this study was to determine how midwives conduct BLAs during labor.

METHODS

This study used a sequential exploratory mixed-method strategy. It was started by a qualitative study followed by a quantitative one. Research subjects were midwife practitioners who actively assist maternity women and experienced in handling PPH. Data was collected after approval from the participant based on the Helsinki declaration from March to August 2018. In the qualitative study, samples were chosen by a purposive technique. Data was collected through in-depth interviews that lasted for 40-60 minutes. The focus of this study was to explore how midwives diagnose and handle PPH. Twenty-three midwives were involved in these interviews. They were 10 midwives who work at hospitals, eight midwives from public health centers (PHCs), a village midwife, and four others were independent midwifery practices (IMPs). The data were analyzed via thematic analysis. The qualitative result analysis was then confirmed by a quantitative study with an observational study. The objects observed were BLA conducted by midwives, delivery bed types in maternity rooms, and delivery pads used by midwives during labor. The observation results were described with a frequency distribution table.

RESULTS

Qualitative data analysis
Diagnosis of PPH: All participants stated that there is no explicit protocol regarding BLA procedures. However, there were four methods of BLA theoretically known by participants, include assessing blood loss using physiological parameters, a visual method with an underpad, a kidney dish to collect blood, and underpad weighing (gravimetric). The participants did not implement the theories, as complication arose when applying those methods during labor. Some participants, who had applied the visual method, stated that this method was easy to work on, but it was challenging to interpret, inaccurate, and caused a debate between midwives. An underpad measuring 60 x 90 cm full of blood was assumed to vary by

participants ranging from 200 mL-1000 mL. Other participants, who had experience in collecting blood directly to the kidney dish, expressed that it was tough to do given its smaller size. A medium kidney dish filled with blood was also estimated differently by participants in the range of 100-500 mL. While only a few participants knew about the gravimetric method, but they had no experience with this method.

"*The visual method was easy to do, but it was difficult to be interpreted. We often argued when determining blood loss with the underpad, so it is no longer carried out. Meanwhile, collecting blood into a kidney dish was not an easy task since not all blood can be accommodated to the kidney dish.*" (Midwife of PHC)

The possible method to be applied according to the participants was a physiological parameter assessment, such as blood pressure (BP) and pulse. The participants stated that the assessment was only carried out when the patient's condition showed emergency signs. Moreover, they did not know the level of BP and pulse when classifying a hemorrhage. They only knew that if the patient's condition showed a decrease in BP and an increase in pulse from the initial levels, it meant that PPH is occurring.

"*We only assess blood loss through the BP and pulse when the patient's condition revealed emergency signs. We do not have great knowledge about the hemorrhage degree based on the level of BP and pulse. We work under doctors' supervision. If there were a decrease in BP and an increase in pulse from the initial rate, the doctors asked us to treat it as PPH.*" (Hospital midwife)

PPH management: All hemorrhage patients were given oxytocin as uterotonic drugs and intravenous liquid. The most frequent liquid used by health providers was Ringer-Lactate (RL) solution. Determining the amount of fluid was based on the patient's condition (such as general condition, BP, pulse, and hemoglobin level) and not based on the amount of blood loss.

"*During my work here, I handled five cases of PPH. We work under doctors' supervision. Determination of fluid and blood transfusion needs were usually based on the BP, pulse, and hemoglobin levels.*" (Hospital midwife)

Quantitative data analysis: A total of 167 maternity rooms were observed in 10 provinces in Indonesia include Jambi, South Sumatra, Lampung, West Java, Central Java, Yogyakarta, West Nusa Tenggara, West Kalimantan, East Kalimantan, and Southeast Sulawesi. They were 16 hospitals, eight midwifery clinics, 30 PHCs, an auxiliary health center, two village maternity posts, and 110 IMPs. The observation results can be seen in both Figure 1 and Table 1.

Table 1: Observation results (N=167)

Aspects	f (%)
BLA during labor	
Physiological parameters	7 (4.2)
Visual method used underpad	3 (1.8)
Collecting blood into a kidney dish	0 (0.0)
Gravimetric method	0 (0.0)
None	157 (94.0)
Type of delivery bed*	
Type A	96 (53.6)
Type B	51 (28.5)
Type C	32 (17.9)
Delivery pad*	
Patient's fabric	13 (7.6)
Underpad 60 cm x 90 cm**	158 (92.4)
)Brand of underpad used in labor (N=158)	
Do not know	68 (43.0)
Non-branded underpad	12 (7.6)
Sensipad	42 (26.6)
Top underpads	11 (6.9)
Oto underpads	9 (5.7)
Diapro underpads	2 (1.3)
ProCare underpads	14 (8.9)

*Note: *) Some health facilities have more than a type*

Table 2: Hemorrhage classes

Signs monitored oninitial presentation*	Class 1	Class 2	Class 3	Class 4
Blood loss (mL)	Up to 750	750-1500	1500-2000	>2000
Blood loss (% blood volume)	Up to 15%	15%-30%	30%-40%	>40%
Pulse rate	<100	>100	>120	>140
Blood pressure	Normal	Normal	Decreased	Decreased
Pulse pressure (mm Hg)	Normal or increased	Decreased	Decreased	Decreased
Respiratory rate	14-20	20-30	30-40	>35
Urine output (mL/hr)	>30	20-30	5-15	Negligible
CNS/mental status	Slightlyanxious	Mildly anxious	Anxious, confused	Confused, lethargic
Fluid replacement (3:1 rule)	Crystalloid	Crystalloid	Crystalloid and blood	Crystalloid and blood

Source: Cocchi et al.[16]

Fig. 1: Three types of delivery beds used by Indonesian midwives

Type A: Ordinary beds
Type B: Gynecological beds that functions as ordinary beds
Type C: Gynecological beds

DISCUSSION

The velocity and accuracy of BLA does not only play in the success of PPH management[9] but also for the earlier detection of a clotting disorder[15]. Unfortunately, this study found that 94% of participants did not undertake BLA during labor. While a few other participants, who estimated blood loss visually or assessed BP and pulse, did not know how to interpret the results.

BP and pulse are indicators suggested by the Advanced Trauma Life Support (ATLS) to classify the degree of hemorrhage, as illustrated in Table 2[16]. However, Mutschler et al.[17] and Guly et al.[18] questioned the validity of this classification. Although a decrease in BP and an increase in pulse were associated with increased blood loss, it was not at the level suggested by the ATSL shock classification[19]. This finding is strengthened by the Brasel et al.study[20]stating that tachycardia, which is pulse over 100 beats per minute, was not typically present after excess blood loss. Guly et al.[19]also reported that the changes in respiratory frequency were not associated with increased blood loss.

BLA is not only needed to diagnose PPH but to also determine the amount of fluid given to the patient. The fluid restoration is required to replace the intravascular fluid loss and to recharge the interstitial fluid deficits[21]. Fluid overload may cause pulmonary edema and cardiac failure[22]. The ATLS suggested the administration of Crystalloid fluid in order to restore the bleeding with a ratio of 3:1[16]. However, Cervera and Moss stated that the stability and normovolemia in arterial hemorrhage cases could only be recovered after fluid restoration with a ratio of 8:1[23].

On the other hand, participants expressed that visual BLA using underpads was easy to be implemented, but it was difficult to be interpreted, not accurate, and frequently led to a debate between midwives. The inaccuracy of visual BLA was also reported by some previous studies[6, 24-27].Nevertheless, this method is still the most frequently used by health practitioners worldwide[9, 28].Maintaining this action is futile[24, 29] since the accuracy of BLA is a critical factor to the success of PPH management[9].

Buckland and Homer reported that the use of a kidney dish in assessing blood loss was more accurate than the visual method[30].A kidney dish filled with blood equals to 500 mL[15].However, this study found that collecting blood with it was complicated due to its small size. Toledo et al.[10] recommendeda calibrated drape to collect blood during labor. The previous studies proved the accuracy of delivery drape in assessing blood loss compared to the visual method[28, 30, 31] while Lilley et al. stated that the gravimetric method was more accurate than the visual method. BLA using gravimetric correlated with a decrease in hemoglobin in PPH over 1500 mL[9].The formula for calculating blood loss volume using the gravimetric method is the volume deviation between the underpads'weight (both dry and contaminated with blood)[9, 32]divided by blood density (ρ)[33].

CONCLUSION

The BLA was not undertaken in most of the labors. Physiological parameters were the most applicable method for the Indonesian midwives. The findings of this study provide support for further research on the gravimetric methods and delivery drapes to assess blood loss during labor and encourage the government to improve BLA protocols as a part of the intrapartum care protocol.

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