The Magnitude and Maternal Outcome of Primary Postpartum Hemorrhage among Mothers Who Received Postnatal Care at Alemata General Hospital, Northern Ethiopia: A Cross-sectional Study

Getachew Muluye (MSc)[1*], Biniam Girma (MSc)[2]

[1] Lecturer, Department of Midwifery, College of Health Science, Mekelle University, Mekelle, Ethiopia
[2] Clinician, Department of Integrated Emergency Surgery and Obstetrics, Amdework Primary Hospital, Waghimera Zone of Amhara Region, Ethiopia

ARTICLE INFO	ABSTRACT
Article type: Original article *Article History:* Received: 19-May-2022 Accepted: 09-Oct-2022 *Key words:* Maternal Outcome Postpartum Hemorrhage Postnatal Care	***Background & aim:*** Postpartum hemorrhage continues to be a major cause of maternal mortality and serious morbidity and the majority of cases occur in low and middle-income countries. Data related to postpartum hemorrhage are needed for strategic policy and program development to ensure the implementation of effective interventions for lowering the burden of PPH. Therefore, this study aimed to assess the magnitude and maternal outcome of primary postpartum hemorrhage. ***Methods:*** Institutional-based cross-sectional study using retrospective chart review design was conducted at Alemata General Hospital northern Ethiopia from 1st -5th January 2020. Data were collected using a pre-tested structured and standardized checklist from one-year records of the mothers and their neonate's charts, delivery registration logbooks, and operation registration logbooks. A total of 185 delivery records were selected by systematic sampling method and reviewed. Texts, figures, and tables were used to summarize and present the overall result. ***Results:*** This study revealed that the magnitude of postpartum hemorrhage was 16 (8.6%), and the most common cause identified was uterine atony. Moreover, maternal vital sign derangement and anemia were the common complications secondary to postpartum hemorrhage. ***Conclusion:*** The magnitude of primary postpartum hemorrhage in the study area was relatively high and it results in serious postpartum morbidities. Uterine atony was found to be the most common cause. To prevent postpartum hemorrhage and accompanying consequences, special attention should be paid to the universal use of active management of the third stage in all labors and early detection and management if a complication arises.

Introduction

The term "primary postpartum hemorrhage" (PPH) refers to blood loss that occurs within 24 hours of giving birth and involves either blood loss of 1000 ml or more or blood loss that is accompanied by hypovolemia-related signs or symptoms (1). It is the significant cause of maternal mortality, accounting for one-quarter of all maternal deaths worldwide (2-3), and many experiences acute and long-term serious morbidities and disabilities such as anemia, organ failure, coagulopathy, complications of multiple blood transfusions, peripartum hysterectomy and loss of fertility, postpartum sepsis, longer hospital stay, and a psychological sequel, as well as poor growth and development of their children (2, 4-6).

Although PPH occurs worldwide, most maternal deaths as a result of PPH occur in

* *Corresponding author*; Getachew Muluye, Lecturer, Department of Midwifery, College of Health Science, Mekelle University, Mekelle, Ethiopia. Tel: +251925881230 Email: getachew.muluye21@gmail.com

middle and low-income countries (7, 8). PPH is a major cause of maternal morbidity and mortality, accounting for about one-third of all pregnancy-related deaths in Africa and Asia (9). The average magnitude rate of postpartum hemorrhage was approximately 6% in the globe and about 10.5% in Africa (10). The commonest etiology of primary PPH is uterine atony (2, 5), (11-13).

In Ethiopia, the maternal mortality rate (MMR) is high at the national and 25-30% is attributed to PPH (10) but Postnatal care (PNC) service usage is among the lowest of all maternal and child health care services in the health care delivery system and the most neglected period for the provision of quality care (14).

The main thing in the adverse outcomes associated with hemorrhage is the delay in detecting it and taking an appropriate intervention and it could be avoided through the use of timely and appropriate management (15-16). Interventions like routine use of active management of the third stage of labor (AMTSOL) (15-18), providing immediate PNC, and encouraging all delivering women to stay in the health institution during the first 24 hours of delivery could play a great role in reducing or avoiding postpartum hemorrhage and associated complications (14).

Although data for the causes of maternal deaths are necessary to inform strategies to improve the maternal health care delivery system (16), it has been a challenge due to the scarcity of consistent and accurate data on maternal mortality specifically in middle and low-income country settings where maternal mortality is high (7). Thus it is very crucial to assess the magnitude of postpartum hemorrhage and the maternal outcome so that policies and strategies will be designed accordingly to end or minimize the mortality and morbidity of women due to postpartum hemorrhage and its complication. Data related to PPH in Ethiopia particularly in the study area is scarce. Therefore, this study aimed to assess the magnitude and maternal outcome of primary postpartum hemorrhage among mothers who receive postnatal care at Alemata general hospital, Northern Ethiopia, and come up with possible recommendations. Determining the magnitude and maternal

outcomes of primary PPH would help health care providers, stakeholders, and policymakers create initiatives to enhance the health care service utilization of women to lessen the burden of primary PPH and its consequences.

Materials and Methods

An institutional-based cross-sectional study using retrospective chart review design was employed at Alemata general hospital from January 1st to 5th, 2020. Ethical clearance was obtained from Mekelle University Health Research Ethics Review Committee(HRERC) (Reference number: ERC 1381/2019).The retrospective record review, also known as medical record review, patient record review, clinical record review, or retrospective chart review is a well-established research design in which obtaining prerecorded, patient-centered data are thoroughly reviewed to answer one or more research questions or clinical queries (17). Alemata gener*al* hospital is located in the southern zone of Tigray region 666 km away from Addis Ababa and 180 kilometers from Mekelle, the capital city of the region. In Alemata town, there is one general hospital, one health center, and private clinics. According to the southern zone health department report, the hospital gives services to a population of more than 59,915 people with different departments like medical, surgical, pediatrics, and obstetrics and gynecology. Maternity services along with other services are available in the hospitals.

Charts of all mothers who received postpartum care in Alemata general hospital from January 1 to December 30, 2019, made up the study population. Incomplete Maternal charts were excluded from the study.

The sample size was determined by using a single population proportion formula n = $(Z\alpha/2)^2$ P $(1 - P)/d^2$ with the assumption of 7.6% of the population proportion of magnitude of PPH in the previous study (19), confidence interval of 95%, the marginal error of 4%, and adding 10% non-response rate finally gave us a sample size of 185. The sampled mothers' chart was selected using systematic random sampling.

Data were collected from the client's medical record review technique by using a pretested structured and standardized checklist and it was prepared after reviewing different works of literature. Three BSc degree holder midwives

were recruited to collect the data. The questionnaire had two parts which were the socio-demographic and obstetrical & gynecological part.

A pretest was conducted among 10% of the sample size at a nearby hospital (Woldia General Hospital) which was not included in the study to see the appropriateness of the tool and feedback was incorporated accordingly. The one-day training was given to the data collector and supervisor on general information on the objective of the study, techniques of sampling, and data collection. In addition to this, data was checked before and after the data, entry stage to verify its completeness and double data entry was done.

Primary PPH- were all postnatal mothers diagnosed as having primary PPH by attending health care providers and documented on the chart during the study period.

The collected data was checked manually for completeness and consistency. After then, the data were coded, cleaned, and entered into Epi data, software version-4.6.0.0. Finally, the data was analyzed using SPSS Version-23. Findings were summarized and presented using figures and tables.

Ethical clearance was obtained from the institutional review board (IRB) of Mekelle University, which certifies that the study was performed per the ethical standards. An official letter obtained from the Tigray regional health bureau was submitted to each hospital and data was collected after permission was obtained from the medical director of the hospital. Anonymity and confidentiality were maintained by excluding personal identifiers from the data collection tool and the records of the study were kept strictly confidential.

Results

Socio-demographic characteristics

A total of 185 mothers' charts were reviewed with a response rate of 100%. The mean age and standard division of the study participants were 27.7 and 6.2 respectively. It was found that only 6.5% of the mothers were in the age group of 15-20 years. Two-thirds of the women (68.6%) belonged Tigray ethnic group. Moreover, the majority of mothers (64.6%) were from rural backgrounds (Table 1).

Obstetric and gynecological history of the study participants of a total of 185 mothers, 16 (8.6%) of mothers were diagnosed with primary PPH. Among mothers who had developed PPH, 37.6% were in the age group of 30-34 and 87.5% were from rural residences. Among mothers whose charts were reviewed, 66.5% of them were multiparous (had given birth two to four times).

Table 1. Socio-demographic characteristics of postnatal mothers who received postnatal care in Alemata General Hospital, Northern Ethiopia, 2020 (n=185)

Variables	Frequency (%)
Age	
15–19	12 (6.5)
20–24	55 (29.7)
25–29	45 (24.3)
30–34	49 (26.5)
≥ 35	24 (13.0)
Residence	
Urban	66 (35.7)
Rural	119 (64.3)
Ethnicity	
Tigre	127 (68.6)
Amhara	52 (28.1)
Others	6 (3.3)

Others; Afar-4, Oromo- 2

Moreover, the majority (88.6%) of study participants had ANC follow-up, were institutional delivery and about 88.6% of study participants had received AMTSOL (Table 2).

Table 2. Obstetric and gynecological history of postnatal mothers who received postnatal care in Alemata General Hospital, Northern Ethiopia, 2020 (n=185)

Variables	Frequency (%)
History of Abortion	
Yes	45 (24.3)
No	105 (56.8)
Previous PPH (n=143)	
Yes	(3.8)7
No	136 (73.5)
Current primary PPH	
Yes	16 (8.6)
No	169 (91.4)
Parity	
Primiparous	42 (22.7)
Multiparous	123 (66.5)
Grand multipara	20 (10.8)
ANC visit	
Yes	164 (88.6)
No	21 (11.4)
Complications during last pregnancy	

Variables	Frequency (%)
Yes	55 (29.7)
No	130 (70.3)
Place of Birth	
Institution	177 (95.7)
Home	8 (4.3)
Type of admission	
Non referral	155 (83.8)
Referral	30 (16.2)
Gestational age (n=183)	
Preterm	16 (8.6)
Term	153 (82.7)
Post-term	14 (7.6)
Mode of delivery	
Vaginal delivery	153 (82.7)
Cesarean Section	32 (17.3)
Labor Duration(28)	
<24	172 (93.0)
>=24	13 (7.0)
AMTSOL done	
Yes	165 (89.2)
No	20 (10.8)

Causes of primary postpartum hemorrhage

According to this study, the most common cause of postpartum hemorrhage was uterine atony (50.0%) followed by retained placenta (25.0%) and genital tract trauma (18.75%) (Figure 1).

**Feto-maternal complication secondary to primary postpartum hemorrhage**

This finding revealed that three fourth of patients had complications associated with PPH and the most common complication encountered was maternal vital sign (V/S) derangement (falling blood pressure and raising of heart rate) (68.8%), followed by postpartum anemia (56.3%). There was no observed maternal death in our study sample. It was also found that 2.1% of patients had stillbirth which indicates that the cause of PPH was a uterine rupture (Table 3).

Table 3. Complications secondary to postpartum hemorrhage among mothers who received postnatal care at Alemata general hospital, Northern Ethiopia, 2020 (n=16)

Variables	Frequency (%)
V/S derangement	
Yes	11 (68.8)
No	5 (31.3)
Anemia	
Yes	9 (56.3)
No	7 (43.8)
Hysterectomy	
Yes	1 (6.3)
No	15 (93.8)
Stillbirth	
Yes	2 (12.5)
No	14 (87.5)

V\S: Vital Sign

Figure 1. The causes of primary postpartum hemorrhage mothers who received postnatal care at Alemata general hospital, Northern Ethiopia, 2020 (n=16)
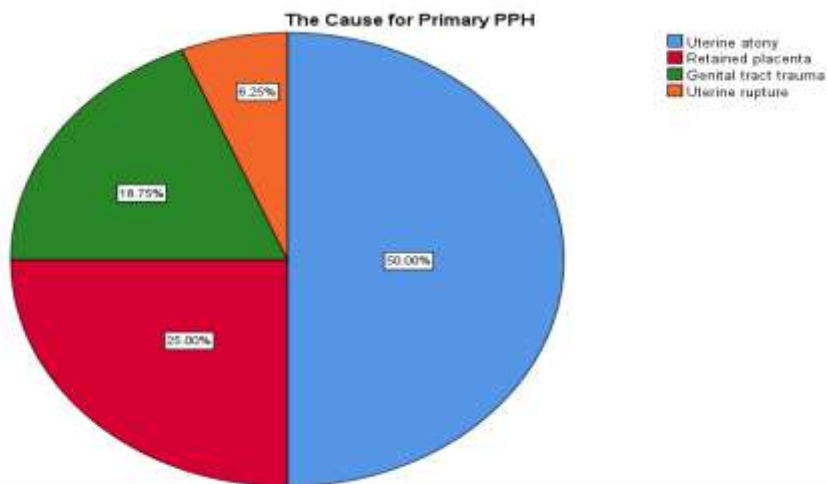
PPH; Postpartum Hemorrhage

Discussion

Postpartum hemorrhage is a significant cause of maternal morbidity and mortality worldwide. Women in low and middle income countries have an increase likelihood of severe PPH and of dying from PPH related consequences. However, information related to PPH is scarce in developing countries in general. So this study aimed to assess the magnitude and maternal outcome of postpartum hemorrhage among mothers who received postpartum care at Alemata general hospital. Accordingly, the current study found that the magnitude of postpartum hemorrhage was 16 (8.6%) which is in line with studies done in Uganda (20) and Japan (21). This report was also comparable with a study conducted in Debre Tabor General hospital (18) and Bedele hospital (22) and with the average magnitude of PPH in Africa (10).

However, the finding of the current study showed a lower rate of PPH compared with the previous studies conducted in Gondar town (23) and southern Ethiopia (24). The difference could be due to the difference in study period and improvement in the utilization of maternal health care services through time.

Similarly, the rate of PPH in this study was lower than those of earlier studies done in Pakistan (25) and Cameroon (26). The discrepancy might be due to the variation in blood loss estimation between countries, since in the current study setting there are no standard methods for quantifying the amount of blood loss after child birth. The variation might also be due to the difference in the data recording and documentation system. The current study used PPH cases which was diagnosed by the attending clinician so there might be underestimation and under reported of the case.

On the other hand, the result of the current study with respect to the rate of PPH was higher than studies conducted in Zimbabwe (2), Egypt (5), Nigeria (11) and Afghanistan (12). The possible reason for the difference may be sample size differences, obstetrics factors, socio-demographic differences, and study area and the maternal health services delivering system (accessibility) and variation in blood loss estimation between countries. The current study was carried out on small sample sizes and most of the mothers were from rural and multipara.

According to this study, the most common cause of postpartum hemorrhage was uterine atony followed by retained placenta and genital tract trauma. This is in line with different studies, where atonicity was the most common cause of PPH (2,5,11-13,24), followed by the retained placenta as the second most common cause of PPH (3). However, this is in contrast to a study conducted in Nigeria, which identified retained placenta and placental tissue were the major causes of PPH (27). So based on the findings of this study, we can infer that the active management of the third stage of labor with uterotonics can reduce the occurrence of postpartum hemorrhage.

In our study, the commonest complication encountered in patients with PPH was maternal vital sign derangement followed by anemia. This finding is in line with a study conducted in Egypt that showed that 67.5% of patients have a moderate degree of shock.

Moreover, the current study revealed that 6.3% of the patient had a hysterectomy. This is consistent with a study done in Afghanistan (12) which reported that 6% of the patient had a hysterectomy.

In contrast to previous studies conducted in Zimbabwe (2) and Afghanistan (12) which revealed maternal death due to PPH, there was no recorded maternal death in this study. The majority of PPH cases seemed to be early detected and quickly stopped soon after diagnosis before the patients lost too much blood and risked maternal life. Rapid recognition and early diagnosis of PPH is important for successful management and favorable outcome.

The study might not be a true representative of the population since the study was institution-based and used chart review methodology. Since we used secondary data, there might be missed cases and variables.

Conclusion

The magnitude of primary postpartum hemorrhage in the study setting was found to be 16 (8.6%). The current study concludes that the magnitude of primary PPH in this study area is approximately similar to the average magnitude of PPH in Africa. Other findings such

as causes of primary PPH and maternal morbidity data also agree with most national and international studies on this topic. Although there was no recorded maternal death in this study, it was responsible for serious postpartum morbidities. So special emphasis should be given to the universal use of AMTSOL for all labors and timely detection and appropriate management of complications related to childbirth to avoid or decrease postpartum hemorrhage occurrence and its associated complications.

Acknowledgements

Conflicts of interest

Authors declared no conflicts of interest.

References

1. Shields LE, Goffman D, Caughey AB. ACOG practice bulletin: Clinical management guidelines for obstetrician-gynecologists. Obstetrics and gynecology. 2017; 130(4): e168-e186.
2. Ngwenya S. Postpartum hemorrhage: incidence, risk factors, and outcomes in a low-resource setting. International Journal of Women's Health. 2016; 8: 647.
3. Tort J, Rozenberg P, Traoré M, Fournier P, Dumont A. Factors associated with postpartum hemorrhage maternal death in referral hospitals in Senegal and Mali: a cross-sectional epidemiological survey. BMC pregnancy and childbirth. 2015; 15(1): 1-9.
4. Sebghati M, Chandraharan E. An update on the risk factors for and management of obstetric haemorrhage. Women's Health. 2017; 13(2): 34-40.
5. Ahmed AR, Saleh AA, Abd Elhameid AAE, Badr MS. Incidence and outcome of primary postpartum hemorrhage at Zagazig University Hospitals. Zagazig University Medical Journal. 2020; 26(6): 970-980.
6. Marshall AL, Durani U, Bartley A, Hagen CE, Ashrani A, Rose C, et al. The impact of postpartum hemorrhage on hospital length of stay and inpatient mortality: a National Inpatient Sample–based analysis. American Journal of Obstetrics and Gynecology. 2017; 217(3): 344. e1-.344. e6.
7. Devi KP, Singh LR, Singh LB, Singh MR, Singh NN. Postpartum hemorrhage and maternal deaths in North East India. Open Journal of Obstetrics and Gynecology. 2015; 5(11): 635.
8. Maswime S, Buchmann E. A systematic review of maternal near miss and mortality due to postpartum hemorrhage. Open Journal of Obstetrics and Gynecology. 2017; 137(1): 1-7.
9. Sheldon W, Blum J, Vogel J, Souza J, Gülmezoglu A, Winikoff B, et al. Postpartum haemorrhage management, risks, and maternal outcomes: findings from the World Health Organization Multicountry Survey on Maternal and Newborn Health. An International Journal of Obstetrics & Gynaecology. 2014; 121(1): 5-13.
10. Kumar N. Postpartum hemorrhage; a major killer of woman: review of current scenario. International Journal of Gynecology & Obstetrics. 2016; 4(4): 00116.
11. Green KI, Ojule JD, Faith MC. Primary postpartum haemorrhage at the university of Port Harcourt teaching hospital: Magnitude and risk factors. Nigerian Health Journal. 2015; 15(3): 111-117.
12. Shahbazi Sighaldeh S, Nazari A, Maasoumi R, Kazemnejad A, Mazari Z. Prevalence, related factors and maternal outcomes of primary postpartum haemorrhage in governmental hospitals in Kabul-Afghanistan. BMC pregnancy and childbirth. 2020; 20(1): 1-9.
13. Rangel RdCT, Souza MdLd, Bentes CML, Souza ACRHd, Leitão MNdC, Lynn FA. Care technologies to prevent and control hemorrhage in the third stage of labor: a systematic review. Revista Latino-Americana de Enfermagem. 2019; 27: 1-10.
14. Organization WHO. WHO recommendations on postnatal care of the mother and newborn: World Health Organization; 2014.
15. Organization WH. WHO recommendations for the prevention and treatment of postpartum haemorrhage: World Health Organization; 2012.
16. Taylor U, Delorme P, Miller S. FIGO guidelines: prevention and treatment of postpartum hemorrhage in low-resource settings. International Journal of Gynecology and Obstetrics. 2012; 117(1): 108-118.
17. Latifnejad Roudsari R. Methodological Issues in Conducting Retrospective Record Reviews. Journal of Midwifery and Reproductive Health. 2020; 8(4): 2383-2384. DOI: 10.22038/jmrh. 2020.16739
18. Evensen A, Anderson JM, Fontaine P. Postpartum hemorrhage: prevention and treatment. American Family Physician. 2017; 95(7): 442-449.
19. Habitamu D, Goshu YA, Zeleke LB. The magnitude and associated factors of

postpartum hemorrhage among mothers who delivered at Debre Tabor general hospital 2018. BMC research notes. 2019; 12(1): 1-6.

20. Ononge S, Mirembe F, Wandabwa J, Campbell OM. Incidence and risk factors for postpartum hemorrhage in Uganda. Reproductive health. 2016; 13(1): 1-7.

21. Fukami T, Koga H, Goto M, Ando M, Matsuoka S, Tohyama A, et al. Incidence and risk factors for postpartum hemorrhage among transvaginal deliveries at a tertiary perinatal medical facility in Japan. PloS one. 2019; 14(1): e0208873.

22. Tatek A, Bekana K, Amsalu F, Equlenet M, Rogers N. Prospective study on birth outcome and prevalence of postpartum morbidity among pregnant women who attended for antenatal Care in Gondar Town, north West Ethiopia. Andrology-open Access. 2014; 3(2): 1-125.

23. Tatek A, Bekana K, Amsalu F, Equlenet M, Rogers N. Prospective study on birth outcome and magnitude of postpartum morbidity among pregnant women who attended for antenatal Care in Gondar Town, north West Ethiopia. Andrology-open Access. 2014; 3(2): 1-125.

24. Kebede BA, Abdo RA, Anshebo AA, Gebremariam BM. Magnitude and predictors of primary postpartum hemorrhage: An implication for designing effective intervention at selected hospitals, Southern Ethiopia. PloS one. 2019; 14(10): e0224579.

25. Gani N, Ali TS. Magnitude and factors associated with maternal postpartum haemorrhage in Khyber Agency, Pakistan. Journal of Ayub Medical College. 2013; 25(2): 81.

26. Halle-Ekane G, Emade F, Bechem N, Palle J, Fongaing D, Essome H, et al. Magnitude and risk factors of primary postpartum hemorrhage after vaginal deliveries in the Bonassama District Hospital, Cameroon. International Journal of Tropical Disease & Health. 2016; 13(2): 1-12.

27. Olowokere A, Adekeye O, Ogunfowokan A, Olagunju O, Irinoye O. The prevalence, management and outcome of primary postpartum haemorrhage in selected health care facilities in Nigeria. International Journal of Nursing and Midwifery. 2013; 5(3): 28-34.