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Clinical Characteristics And Outcomes Of Postpartum Hemorrhage In Remote Areas Of Tual City, Maluku, Indonesia, 2024

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Abstract

Postpartum hemorrhage (PPH) is one of the leading causes of maternal morbidity and mortality worldwide. In Indonesia, PPH accounts for approximately 27% of maternal deaths, with a higher burden in remote and resource-limited areas. To describe the clinical characteristics, management, and outcomes of PPH cases in Tual City, Maluku, in 2024. This retrospective descriptive study included all PPH cases managed at RSUD Maren Hi Noho Renuat, the only referral hospital in Tual City, from January to December 2024 (total sampling). Data were extracted from medical records and delivery registers and analyzed descriptively. Most cases occurred among women aged 20–34 years (67%) and multiparous mothers (75%). Half of the women had completed senior high school. Urban mainland residents accounted for 50% of cases, followed by rural (33%) and remote island residents (17%). Deliveries were evenly distributed between health facilities and non-facility settings (50% each), including one case aboard a ferry during referral. Skilled birth attendants assisted 58% of deliveries, while 42% were attended by traditional birth attendants. Retained placenta was the most frequent cause of PPH (84%). All patients received uterotonics; 67% required blood transfusion and 25% underwent surgical interventions (17% curettage, 8% hysterectomy). Maternal outcomes were favorable, with 92% full recovery, 8% near-miss events, and no maternal deaths. Neonatal outcomes were excellent, with 100% live births and no neonatal mortality. Retained placenta was the leading cause of PPH in Tual. Improving institutional delivery coverage, strengthening referral systems, and enhancing community education are crucial to reduce preventable maternal morbidity in remote island settings.

Keywords: Postpartum Hemorrhage, Retained Placenta, Maternal Near-Miss, Traditional Birth Attendant, Remote Island.

INTRODUCTION

Postpartum hemorrhage (PPH) remains one of the leading causes of maternal morbidity and mortality worldwide, particularly in developing countries. The World Health Organization (WHO) defines PPH as blood loss of ≥500 mL after vaginal delivery or ≥1000 mL after cesarean delivery within the first 24 hours after birth [(1)]. PPH is further classified into primary postpartum hemorrhage (occurring within the first 24 hours) and secondary postpartum hemorrhage (occurring from 24 hours up to 12 weeks postpartum) [(2)].

Although preventable and treatable with appropriate interventions, PPH still accounts for approximately 25–30% of maternal deaths globally [(1,3)]. Risk factors for PPH include multiparity, a history of previous hemorrhage, multiple pregnancy, fetal macrosomia, and delays in the management of the third stage of labor [(4)].

In Indonesia, PPH is one of the leading causes of maternal death after hypertensive disorders in pregnancy. According to the Indonesian Ministry of Health (2022), hemorrhage contributed to approximately 27% of maternal deaths [(5)]. This burden is even greater in remote areas. Based on the Long Form SP2020, the lowest maternal mortality ratio (MMR) was found in the western region (Java-Bali) with 166 per 100,000 live births, whereas the highest MMR was recorded in the eastern region (Nusa Tenggara, Maluku—including Tual City—and Papua) at 350 per 100,000 live births [(6)].

This disparity reflects unequal health system capacity across regions, particularly in maternal health services. In remote areas with limited access to healthcare facilities, such as Tual City, childbirth is still often attended by traditional birth attendants, and referral processes are frequently delayed due to geographical barriers, resulting in delays in timely management.

To support the improvement of maternal health services in remote regions, this study aimed to describe the clinical characteristics, interventions, and outcomes of PPH cases in Tual City, Maluku, in 2024.

RESEARCH METHODS

Study Design: Retrospective descriptive study.
Study Setting and Period: Conducted at Maren Hi Noho Renuat Regional General Hospital, the only referral hospital in Tual, Maluku, in 2024.
Population and Sample: All women diagnosed with PPH recorded at Maren Hospital in 2024. Total sampling was applied.
Inclusion Criteria: Women diagnosed with PPH based on medical records.
Study Variables:

- Patient characteristics: age, education level, residence, parity
- Delivery characteristics: place of delivery, birth attendant
- Etiology of PPH: uterine atony, retained placenta, genital tract lacerations, coagulopathy
- Interventions: uterotonics, tranexamic acid, blood transfusion, surgical procedures
- Outcomes: maternal condition (stable, near miss, death) and neonatal condition (alive, health and death)

Data Sources: Medical records and delivery registers.
Data Analysis: Data were analyzed descriptively and presented in frequency distribution tables and percentages.
Ethics: This study received approval from the Health Research Ethics Committee and permission from the healthcare facility.

RESULTS AND DISCUSSION

Patient characteristics				
Variabel	**Category**	**n**	**(%)**	**Notes**
Age (Years)	< 20	0	0%	
	20 - 34	8	67%	
	> 34	4	33%	
Education	Primary School	1	8%	
	Junio High School	2	17%	
	Senior High School	6	50%	
	Higher Education	3	25%	
Residence	Remote island	2	17%	
	Rural mainland	3	33%	
	Urban mainland	7	50%	
Parity	Primipara	1	8%	
	Multipara	9	75%	
	Grande multipara	2	17%	
Delivery characteristics				
Place of delivery	Health facility	6	50%	
	Outside health facility	6	50%	one delivery occured on a ferry during patien referral
Birth attendant	Skilled health personnel	7	58%	
	Traditional Birth Attendant (TBA)	5	42%	

Etiology of PPH				
Etiology	Uterine Atony	1	8%	
	Retained placenta	10	84%	
	Genital tract laseration	1	8%	
	Coagulopathy	0	0%	
Interventions characteristics				
Interventions	Uterotonics	12	100%	All patients received uterotonics
	Tranexamic acid	0	0%	Not administered in all cases
	Blood Transfution	8	67%	Administered for moderate-to- severe hemorrhage or anemia
	Surgical Prosedures	3	25%	Curretage in 17% and hysterectomy in 8% of cases
Outcomes				
Maternal outcome	Stable	11	92%	
	Near miss	1	8%	
	Death	0	0%	
Neonatal outcome	Alive, healthy	12	100%	
	Death	0	0%	

Discussion

This study found that the majority of postpartum hemorrhage (PPH) cases in Tual, Maluku, in 2024 occurred among women aged 20–34 years (67%) and multiparous mothers (75%). This finding is noteworthy because it shows that PPH predominantly affects women in the optimal reproductive age group, likely reflecting the overall distribution of deliveries. These results emphasize that PPH is not limited to the extremes of maternal age (<20 or >35 years) and highlight the importance of obstetric factors and the quality of third-stage labor management in its prevention.[3,7]

The distribution of educational level showed that 75% of patients had at least a senior high school education, and 25% had attended higher education. Nevertheless, 50% of deliveries still occurred outside health facilities and 42% were assisted by traditional birth attendants. This finding highlights a gap between formal education and maternal health practices. It suggests that cultural norms, beliefs, and service accessibility have a stronger influence than educational attainment alone in determining the place of delivery and birth attendant. This is consistent with studies conducted in several remote areas of Indonesia, which reported that delivery decisions are more strongly shaped by social norms, family influence, and service accessibility than by maternal education level alone [8,9].

Based on residence, most cases originated from urban areas (50%) rather than remote islands. This may reflect two possibilities: (1) better case recording and referral systems in urban areas, leading

to more complete documentation, or (2) a higher volume of deliveries in urban areas. A unique case of delivery on a ferry during the referral process highlights the geographical challenges of Tual, Maluku, where reliance on sea transportation may delay timely interventions. Studies from other archipelagic regions of Indonesia have similarly reported that referral systems dependent on sea transport often contribute to phase II and III delays in the 'Three Delays' model [10,11].

In terms of etiology, the most common cause of PPH in this study was retained placenta (84%), which is markedly higher than global reports that typically identify uterine atony as the leading cause (60–80%) [7,12]. The high proportion of retained placenta may reflect true local epidemiological differences but could also be influenced by limitations in active management of the third stage of labor or diagnostic discrepancies, such as potential over-diagnosis of retained placenta and under-diagnosis of atony. This finding highlights the need for further evaluation of healthcare providers' skills in active management of the third stage of labor and consistency in applying diagnostic criteria for PPH causes.

The interventions provided in this study were largely in accordance with current standards, as evidenced by the fact that all patients (100%) received uterotonics as first-line therapy for PPH. This finding is consistent with WHO (2018) recommendations, which place uterotonics especially oxytocin as the first-choice drug for the prevention and management of PPH [7]. The universal use of uterotonics reflects good adherence to emergency obstetric protocols, although further evaluation is needed to ensure correct timing and dosing.

In this study, tranexamic acid was not administered in cases of postpartum hemorrhage (PPH). This was mainly due to the limited availability of coagulation tests such as CT/BT in the study setting, which made it difficult to confirm coagulopathy. This reflects a common challenge in remote and resource-limited areas, where diagnostic and therapeutic options may be restricted.

However, current evidence demonstrates that tranexamic acid significantly reduces mortality due to bleeding when administered within three hours of PPH onset, regardless of laboratory confirmation of coagulopathy[13]. The WOMAN trial showed that early administration of 1 gram intravenous tranexamic acid reduced death from hemorrhage without increasing thromboembolic risk [13]. WHO therefore recommends early administration of tranexamic acid for all women with clinically diagnosed PPH, independent of coagulation test results [14]. The absence of tranexamic acid use in our study may partly explain outcomes that could be less favorable compared to settings where this intervention is routinely implemented. This finding highlights an important opportunity for improving PPH management in remote areas.

Moreover, 67% of patients required blood transfusions, indicating that most cases presented with significant blood loss. This proportion is relatively higher compared to urban referral hospitals, which generally report rates around 40–50% (15), likely due to delayed presentation or massive hemorrhage in remote areas. Additionally, 25% of patients underwent surgical intervention (17% curettage, 8% hysterectomy) when conservative therapy failed, consistent with reports indicating that 20–30% of PPH cases require operative measures [2].

Overall, the intervention patterns observed in this study suggest that PPH management in Tual is mostly in line with international standards, with universal uterotonic use and appropriate transfusion and surgical support for severe cases. Nevertheless, the absence of tranexamic acid use remains a key gap that should be addressed, given its proven effectiveness, affordability, and mortality-reducing potential when administered according to guidelines

The outcomes of this study were generally favorable, with 92% of patients recovering. This indicates that the interventions uterotonic administration, bimanual compression, blood transfusion when indicated, and operative procedures were largely effective in controlling hemorrhage. This finding aligns with WHO recommendations emphasizing the availability of uterotonics, access to emergency obstetric care, and rapid management as key elements in reducing PPH-related morbidity and mortality [7].

Maternal near miss occurred in 8% of cases, which is relatively lower than reports from other remote regions. Say et al. reported maternal near miss rates of 15 -20% in developing countries,

particularly where delays in care or limited facility resources exist [3]. This difference may reflect good facility preparedness, effective referral systems, and skilled health personnel in the study area.

Most notably, no maternal deaths (0%) were observed in this study. This is an encouraging finding, given that WHO data indicate that PPH still accounts for approximately 27% of all maternal deaths worldwide [16], and Indonesian national data report proportions of around 30 - 35% [5]. Nevertheless, this result should be interpreted cautiously, as the absence of deaths could be influenced by the sample size, limited study period, or incomplete reporting from primary facilities.

The presence of near miss cases highlights that severe complications still occur and require ongoing attention. Factors such as referral delays, workforce limitations, and geographic challenges in this island setting may contribute. Continuous efforts are needed to strengthen emergency obstetric care, including health worker training, medical supply availability, and improved referral transport systems.

Neonatal outcomes in this study were entirely favorable, with 100% of infants born alive and in good health, and no reported neonatal deaths. This encouraging finding may indicate effective obstetric management, adequate hemorrhage prevention strategies, and timely neonatal resuscitation within the health facilities studied [17]. Similar findings have been reported in studies from other regions, where early recognition of postpartum hemorrhage and adherence to standardized management protocols were associated with improved neonatal survival rates [18,19]. These results suggest that strengthening maternal care may also have a positive impact on neonatal outcomes. However, these findings should be interpreted with caution, as they may be influenced by the relatively small sample size, potential underreporting of adverse outcomes, and the absence of long-term neonatal follow-up. Further research with larger sample sizes and comprehensive assessment of neonatal morbidity is warranted to confirm the generalizability of these results.

CONCLUSION

This study found that in Tual, Maluku, retained placenta is the predominant cause of PPH, contrasting with the global pattern where uterine atony is most common. This study highlights that the determinants of PPH in Tual are not solely related to geographic barriers but are strongly influenced by the quality of obstetric care, the efficiency of the referral system, and sociocultural factors affecting birth attendants' choice. Recommended interventions include: (1) strengthening health workers' capacity in active management of the third stage of labor and the appropriate use of tranexamic acid as per WHO guidelines, (2) improving the logistics of blood transfusion and availability of operative services at referral facilities, (3) integrating traditional birth attendants into a community-based referral network through collaborative engagement, and (4) developing maternity waiting homes in urban centers to accommodate high-risk pregnant women from remote islands, ensuring timely access to safe delivery care. These strategies may contribute to reducing PPH incidence and preventing maternal morbidity and mortality in this archipelagic region.

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