

## ORIGINAL RESEARCH


### Maternal and neonatal outcomes in delivery with diagnosis of antepartum hemorrhage due to placenta previa at a tertiary hospital in Surabaya, Indonesia

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Article Info	ABSTRACT
<p>Received Dec 9, 2021 Revised May 19, 2022 Accepted Jun 20, 2022 Published Dec 1, 2022</p> <p><b>Corresponding author:</b> Indra Yuliati <a href="mailto:indra.yuliati@fk.unair.ac.id">indra.yuliati@fk.unair.ac.id</a></p> <p><b>Keywords:</b> Antepartum hemorrhage Placenta previa Maternal outcomes Neonatal outcomes Maternal health</p> <p>This is an open access article under the CC BY-NC-SA license (<a href="https://creativecommons.org/licenses/by-nc-sa/4.0/">https://creativecommons.org/licenses/by-nc-sa/4.0/</a>)</p> 	<p><b>Objective:</b> To identify maternal and neonatal outcomes in delivery with diagnosis of antepartum hemorrhage (APH) due to placenta previa.</p> <p><b>Materials and Methods:</b> This was a descriptive retrospective study with cross-sectional design. Samples were taken using medical records with convenience sampling technique. Deliveries with history of APH due to placenta previa at Dr. Soetomo General Academic Hospital, Surabaya, Indonesia, on January 1 until December 31, 2019, were included.</p> <p><b>Results:</b> In our study, 36 mothers were included. Maternal characteristics included age of 20–35 years in 72.2%, overweight in 50%, referral visits in 69.4%, from out of town (66.7%), bleeding onset at 3rd trimester (97.2%), primigravida (8.3%), nulliparity (13.9%), 69.4% with history of C-section, and 83.3% no hospital readmissions. Maternal outcomes included 100% mothers diagnosed with complete placenta previa and performed C-section. The mothers were mostly (69.4%) diagnosed with placenta accreta spectrum (PAS). There were 36.1% hysterectomy, 33.3% postpartum hemorrhage, 50% blood transfusions, and zero maternal mortality. Neonatal outcomes included prematurity in 80%, low birth weight (LBW) in 51.5%, while 77.1% and 85.7% of newborns had no asphyxia at 1 and 5 minutes, consecutively.</p> <p><b>Conclusion:</b> All mothers experienced complete placenta previa, and underwent C-section with most of the mothers were diagnosed with PAS. Less than half of them needed hysterectomy intervention because other patients with focal type PAS were planned for conservative surgery. Moreover, they mostly did not have postpartum hemorrhage with half of them needed blood transfusion. There was zero maternal mortality, with most newborns experienced prematurity, LBW but no significant asphyxia.</p>

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## INTRODUCTION

Bleeding during pregnancy is still the leading cause of maternal death worldwide.<sup>1</sup> The bleeding includes Postpartum Hemorrhage (PPH) and Antepartum Hemorrhage (APH). PPH is defined as bleeding  $\geq$  500 ml in vaginal delivery and  $\geq$  1000 ml in C-section delivery.<sup>1-3</sup> APH is defined as bleeding from and/or into the genital tract that occurs from 24 weeks of gestation

until before the birth of the baby.<sup>1,4,5</sup> Placenta previa, as one of the main cause of APH, is defined as an abnormally implanted placenta in the lower uterine segment that either partially or completely covers the internal os.<sup>6,7</sup>

Furthermore, pregnancies with APH due to placenta previa have been associated with many adverse maternal and neonatal outcomes. Complications of

placenta previa occur in 0.52% of pregnancies in the world with the highest incidence found in Asia with a prevalence of 1.22%.<sup>8</sup> The incidence of placenta previa in Dr. Soetomo General Academic Hospital, Surabaya, based on a study conducted by Aulidiah.<sup>9</sup> in 2014-2015 were 83 of 2,176 (3.81%) deliveries.

This study was in line with the National Mid-Term Development Plan for the period of 2020-2024, which one of the indicators of success is the decrease of the maternal mortality rate (MMR) and infant mortality rate (IMR) in Indonesia which is currently still far from the target.<sup>5</sup> In Surabaya, studies related to maternal and neonatal outcomes in delivery with history of APH due to placenta previa were still limited. Identifying the adverse maternal and neonatal outcomes would be beneficial for more effective prevention and management by medical personnel in the future. Therefore, this study aimed to identify maternal and neonatal outcomes in delivery with history of APH due to placenta previa at Dr. Soetomo General Academic Hospital, Surabaya, Indonesia.

## MATERIALS AND METHODS

This study was a descriptive retrospective study with cross-sectional design. Samples were taken using medical records with convenience sampling technique. The samples of this study were deliveries with history of APH due to placenta previa at Dr. Soetomo General Hospital on January 1 – December 31, 2019. Inclusion criteria consisted of mothers with gestational age of  $\geq$  24 weeks and had complete medical records. Data collected included sociodemographic characteristics; obstetric characteristics; maternal outcomes including placenta accreta spectrum (PAS), C-section delivery, hysterectomy, blood transfusion, postpartum hemorrhage, and maternal mortality; neonatal outcomes including preterm birth, birth weight, and asphyxia. The data in this study were analyzed using SPSS version 23. This study has obtained ethical approval from Dr. Soetomo General Hospital Surabaya in 2020 with the number of ethical clearance 0188/LOE/301.4.2/XI/2020.

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## RESULTS AND DISCUSSION

Total deliveries at Dr. Soetomo General Hospital Surabaya in 2019 was 1,358, and 133 of them had placenta previa (9.79%). In 133 deliveries with placenta previa, the researchers obtained 64 data with only 36 data met the inclusion criteria. There were 35 mothers with single pregnancies and one mother with multiple pregnancies (gemelli). Thus, the number of babies born was 37, but two babies experienced IUFD (Intrauterine

Fetal Death), so the number of live births included in this study was 35.

## Sociodemographic characteristics of mothers with placenta previa at Dr. Soetomo General Academic Hospital, Surabaya, Indonesia

Table 1. Distribution of sociodemographic characteristics of mothers with placenta previa at Dr. Soetomo General Academic Hospital, Surabaya, Indonesia, in 2019.

Sociodemographic characteristics	(n=36)	(%)
Age		
20 – 35 years old	26	72.2
>35 years old	10	27.8
Body Mass Index (BMI) (kg/m <sup>2</sup> )		
18.5 – 24.9 (ideal)	9	25
25 – 29.9 (overweight)	18	50
$\geq$ 30 (obese)	9	25
Visit		
Self-reffered	11	30.6
Referral	25	69.4
Regional Origin		
Surabaya	12	33.3
Outside Surabaya	24	66.7

Mothers with APH due to placenta previa were mostly diagnosed at the age of 20-35 years (72.2%), with most BMI were considered overweight (50%). The majority of subjects visited Dr. Soetomo General Hospital by referral (69.4%), with most of the subjects' regional origin were from outside of Surabaya (66.7%).

## Obstetric characteristics of mothers with placenta previa at Dr. Soetomo General Academic Hospital, Surabaya, Indonesia

Maternal obstetric characteristics mostly came with bleeding at the 3rd trimester (97.2%) with the lowest gestational age were at 26/27 weeks and the highest were at 37/38 weeks. There were 8.3% primigravida while the rest were multigravida and 13.9% nulliparity, and the rest are mostly multiparity. Most mothers had history of C-section delivery (69.4%), had no history of abortion (61.1%) and had no history of hospital readmissions at Dr. Soetomo General Hospital Surabaya (83.3%).

## Maternal and neonatal outcomes of mothers with placenta previa at Dr. Soetomo General Academic Hospital, Surabaya, Indonesia

In our study, it was found that all pregnant women had complete placenta previa. The results of this study were



in line with previous studies where the most common type of placenta previa was complete placenta previa, with the prevalence of 76.6% and 78.5%.<sup>10,11</sup> All pregnant women in our study underwent C-section delivery due to complete placenta previa that covered the internal os, making the baby unable to be delivered vaginally.

Table 2. Distribution of obstetric characteristics of mothers with placenta previa at Dr. Soetomo General Academic Hospital, Surabaya, Indonesia, in 2019

Obstetric characteristics	(n=36)	(%)
Gestational age at onset of bleeding		
T2 (14 – 27 weeks)	1	2.8
T3 (28 – 41 weeks)	35	97.2
Gravida		
GI	3	8.3
GII	8	22.2
G≥III	25	69.4
Parity		
P0	5	13.9
P1	15	41.7
P2	12	33.3
P≥3	4	11.1
Abortion		
A0	22	61.1
A1	8	22.2
A2	6	16.7
History of C-section Delivery		
No	11	30.6
1x	17	47.2
2x	8	22.2
History of hospital readmissions at Dr. Soetomo General Hospital Surabaya		
No	30	83.3
2x	5	13.9
3x	1	2.8

Placenta accreta spectrum (PAS) also known as abnormal placentation, is when trophoblasts invade the myometrium layer. PAS must be suspected in all mothers with placenta previa because it represents most placenta previa cases, especially in mothers with a history of C-section delivery.<sup>11</sup> In our study, 69.4% of mothers experiencing PAS with the highest proportion was placenta accreta type (33.3%). A study conducted by Sekiguchi et al.<sup>12</sup> reported that PAS was more common in complete placenta previa compared to other types, which is in line with the results of this study where all respondents experienced complete placenta previa.

However, the remaining mothers (69.4%) did not undergo hysterectomy. It could be because some of them were planned for conservative surgery instead of hysterectomy, particularly in mothers with focal type PAS where the uterine infiltration was less than 50%.<sup>15</sup>

Table 3. Distribution of maternal outcomes of mothers with placenta previa at Dr. Soetomo General Academic Hospital, Surabaya, Indonesia, in 2019.

Maternal Outcomes	(n=36)	(%)
Complete Placenta Previa	36	100
Placenta Accreta Spectrum (PAS)		
No PAS	11	30.6
PAS:		
Placenta Accreta	12	33.3
Placenta Increta	9	25
Placenta Percreta	4	11.1
C-section Delivery	36	100
Hysterectomy		
Yes	13	36.1
No	23	63.9
Blood Transfusion		
Yes	18	50
No	18	50
Postpartum Hemorrhage (PPH)		
Yes (≥1000 mL)	12	33.3
No (<1000 mL)	24	66.7
Haemoglobin (Hb)		
Hb Pre-Op (g/dL)		
<11	21	58.3
≥11	15	41.7
Hb Post-Op (g/dL)		
<11	21	58.3
≥11	15	41.7
Maternal Mortality	0	0

Table 4. Distribution of neonatal outcomes of mothers with placenta previa at Dr. Soetomo General Academic Hospital, Surabaya, Indonesia, in 2019.

Neonatal Outcomes	(n=35)	(%)
Preterm Birth		
Yes	28	80
No	7	20
Gestational Age at Birth		
Very Preterm (28 - <32 weeks)	2	5.7
Moderate to late Preterm (32 - <37 weeks)	26	74.3
Aterm (≥37 weeks)	7	20
Birth Weight		
VLBW* (<1.500 g)	1	2.9
LBW** (<2.500 g)	17	48.6
Normal (≥2.500 g)	17	48.6
Asphyxia		
Apgar Score at 1 minute		
a. Asphyxia (<7)	8	22.9
b. Not Asphyxia (≥7)	27	77.1
Apgar Score at 5 minute		
a. Asphyxia (<7)	5	14.3
b. Not Asphyxia (≥7)	30	85.7

\*VLBW = Very Low Birth Weight

\*\*LBW = Low Birth Weight

The outcome of blood transfusion showed that half of the mothers needed blood transfusions while the others did not with a ratio of 1:1. In mothers who received blood transfusions, the type of transfusion with the highest proportion was PRC with the percentage of 77.8%, followed by WB with the percentage of 27.8%. It was also observed that Hb levels before surgery and after surgery obtained the same distribution. Most of the mothers had anemia before surgery and after surgery (postpartum anemia) with Hb cut-off of <11 g/dL.<sup>16</sup> However, in our study, the timing of blood transfusion was not recorded.

The proportion of mothers who experienced PPH (33.3%) was lower than mothers who did not experience PPH (66.7%). This result was in line with our study, where only less than half of the mothers needed the intervention of hysterectomy, with half of them needed a blood transfusion. Maternal mortality can be caused by various factors, such as delays in healthcare access and poor health services. No maternal mortality was found in our study. It showed that the management of referral systems and bleeding in respondents had been well resolved.

Neonatal outcomes were primarily delivered preterm (80%). Most deliveries occurred at 36/37 weeks' gestation. Most newborns who experienced prematurity were in the moderate to late preterm category (74.3%), between 32 - <37 weeks. Complete placenta previa is more often associated with the risk of prematurity due to a higher risk of massive obstetric bleeding in complete placenta previa.<sup>12,17</sup>

The outcome of infants' birth weight was <2500 g (51.5%), which was reclassified into low birth weight and very low birth weight was slightly higher than the outcome of normal birth weight (48.6%). Infants with birth weight <2.500g were mostly delivered at 32 - <37 weeks' gestation (moderate to late preterm). This could be related to the bleeding of placenta previa that lead to inadequate oxygen supply to the fetus, which then resulted in fetal hypoxia, intrauterine growth retardation, prematurity, and low birth weight.<sup>2,18,19</sup>

The newborns' asphyxia was assessed based on the Apgar score as an initial assessment measured at 1 and 5 minutes. In our study, most newborns did not experience asphyxia at 1 and 5 minutes based on Apgar score measurement  $\geq 7$  (77.1%; 85.7%). Placenta previa was reported as a maternal risk factor for asphyxia but did not significantly affected asphyxia in newborns.<sup>20</sup>

Our study had several limitations, including the usage of secondary data in the form of medical records, a lot of subjects must be excluded due to their incompleteness

of data. This study also did not include other risk factors such as a previous history of placenta previa, infertility therapy, number of antenatal care (ANC), the location of placenta previa, cervical length, and placental thickness; and the timing of blood transfusion were not recorded due to limited data.

## CONCLUSION

In conclusion, maternal outcomes showed that all mothers experienced complete placenta previa and underwent C-section delivery with most were diagnosed with placenta accreta spectrum (PAS). Less than half of them needed hysterectomy intervention because the other patients were planned for conservative surgery, particularly in patients with focal type PAS. Moreover, they mostly did not have postpartum hemorrhage with half of them needed blood transfusion. There was zero maternal mortality. Neonatal outcomes showed that most of their newborns experienced prematurity and low birth weight but no significant asphyxia. Future studies need to consider other risk factors of placenta previa, and prospective studies are still needed to obtain more objective and accurate results.

## DISCLOSURES

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### Conflict of interest

The authors declare no conflict of interest.

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### Author contribution

All authors have contributed to all process in this research, including preparation, data gathering and analysis, drafting and approval for publication of this manuscript.



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