Supplementary Table S1. Incidence of postpartum hemorrhage of the patient cohort

Year	Total births	PPH (EBL ≥500 ml)	Incidence of PPH (95%CI)
2014	1209	90	7.44 (6.03, 9.07)
2015	1098	77	7.01 (5.57, 8.69)
2016	949	48	5.06 (3.75, 6.65)
2017	796	44	5.53 (4.04, 7.35)
2018 (until March)	722	6	0.83 (0.31, 1.80)
Overall	4774	265	5.55 (4.92, 6.24)

Abbreviations: CI, confidence interval; EBL, estimated blood loss; PPH, postpartum hemorrhage.

Supplementary Table S2. Comparison of antepartum characteristics between severe PPH cases and non-severe PPH controls (n=795).

	PPH cases (n=88)		No PPH controls (n=707)		P-value
	n	**(%)**	**n**	**(%)**	
Demographic factors					
Maternal age, (years, mean±SD)	26.3	±6.5	26.1	±5.9	0.787
Normal age pregnancy (20-34)	67	(76.1)	585	(82.3)	0.194
Teenage pregnancy (<20)	9	(10.2)	63	(8.9)	
Elderly pregnancy (≥35)	12	(13.6)	59	(8.4)	
Nationality					
Thai	11	(12.5)	166	(23.5)	0.001
Burmese	41	(46.6)	369	(52.2)	
Minority/tribes	36	(40.9)	166	(23.5)	
Obstetrics factors					
Parity					
Non-nulliparous (primiparous and multiparous)	47	(53.4)	451	(63.8)	0.062
Nulliparous	41	(46.6)	256	(36.2)	
Antenatal care history					
Have ANC history	87	(98.9)	681	(96.3)	0.348
No ANC history	1	(1.1)	26	(3.7)	
Adequacy of ANC					
Adequate (≥5 visits)	65	(73.9)	559	(79.1)	0.272
Inadequate (<5 visits)	23	(26.1)	148	(20.9)	
Gestational age					
Preterm (<37)	3	(3.4)	53	(7.5)	0.279
Term (37-41)	85	(96.6)	652	(92.4)	
Post term (>41)	0	(0)	1	(0.1)	
Presence of the following maternal risk factors					
Maternal anemia	15	(17.1)	110	(15.6)	0.756
Maternal HIV	0	(0)	6	(0.9)	1.000
History of previous PPH	7	(8.0)	5	(0.7)	<0.001
History of deliver fetal weight >3500 gm	8	(9.1)	42	(5.9)	0.245
History of instrumental delivery	7	(8.0)	18	(2.6)	0.015
Pregnancy-induced hypertension	5	(5.7)	9	(1.3)	0.013
Physical examination					
BMI at delivery, (kg/m^2, mean±SD)					
<25.0	20	(22.7)	207	(29.3)	0.004
25.0-29.9	34	(38.6)	341	(48.2)	
30.0-34.9	22	(25.0)	123	(17.4)	
≥35.0	12	(13.6)	36	(5.1)	
Fundal height, (cm, mean±SD)	35.1	±2.7	34.7	±2.4	0.210
<36.0	58	(65.9)	557	(78.8)	0.010
≥36.0	30	(34.1)	150	(21.2)	
Cervical dilation on admission, (cm)					
≤3 cm	63	(71.6)	450	(63.7)	0.366
4-7 cm	20	(22.7)	195	(27.6)	
≥8 cm	5	(5.7)	62	(8.8)	

Abbreviations: ANC, antenatal care; BMI, body mass index; HIV, Human immunodeficiency syndrome; PPH, postpartum hemorrhage; SD, standard deviation

Supplementary Table S3. Comparison of antepartum characteristics between severe PPH cases and non-severe PPH controls (n=795).

	PPH cases (n=88)		No PPH controls (n=707)		P-value
	n	(%)	n	(%)	
Intrapartum factors					
Labor augmentation	32	(36.4)	104	(14.7)	<0.001
Length of 1st stage (hour, median (IQR))	7	(4.5, 13)	7.5	(4, 12)	0.704
Length of 2nd stage in nulliparous (min, median (IQR))	8	(6, 15)	11	(5, 23)	0.568
Length of 2nd stage in non-nulliparous (min, median (IQR))	13	(6, 25)	10.5	(5, 20)	0.455
Prolonged 2nd stage	3	(3.23)	29	(4.13)	1.000
Length of 3rd stage (min, median (IQR))	9.5	(6, 24)	6	(4, 10)	<0.001
Prolonged 3rd stage	14	(15.9)	25	(3.5)	<0.001
Retained placenta	25	(28.4)	12	(1.7)	<0.001
Delivery					
Spontaneous delivery	77	(91.6)	651	(92.1)	0.154
Instrumental delivery	11	(12.5)	56	(7.9)	
Episiotomy wound					
No tear	68	(77.3)	552	(78.1)	0.825
First or second degree tear	18	(20.5)	143	(20.2)	
Third or fourth degree tear	2	(2.3)	12	(1.7)	
Fetal weight (gm, mean±SD)					
<3500	66	(75.0)	582	(82.3)	0.032
3500-4000	18	(20.5)	117	(16.6)	
>4000	4	(4.6)	8	(1.1)	

Abbreviations: IQR, interquartile range; PPH, postpartum hemorrhage; SD, standard deviation.

Supplementary Table S4. Multivariable multi-level analysis of association between antepartum characteristics and severe postpartum hemorrhage (n=795)

	Multivariable analysis			
	EBL ≥ 500 ml		EBL > 1000 ml	
	Adjusted OR (95%CI)	P-value	Adjusted OR (95%CI)	P-value
Maternal age				
Normal age pregnancy (20-34)	Reference		Reference	
Teenage pregnancy (<20)	0.93 (0.52, 1.68)	0.813	1.08 (0.47, 2.47)	0.855
Elderly pregnancy (≥35)	2.36 (1.32, 4.23)	0.004	2.02 (0.93, 4.35)	0.074
Nationality				
Thai	Reference		Reference	
Burmese	1.37 (0.87, 2.16)	0.169	2.18 (1.03, 4.63)	0.042
Minority/tribes	3.25 (2.00, 5.28)	<0.001	3.30 (1.55, 7.06)	0.002
Parity				
Non-nulliparous (primiparous and multiparous)	Reference		Reference	
Nulliparous	3.18 (2.20, 4.62)	<0.001	2.26 (1.33, 3.84)	0.003
Adequacy of ANC				
Adequate (≥5 visits)	Reference		Reference	
Inadequate (<5 visits)	1.68 (1.13, 2.51)	0.011	1.06 (0.61, 1.86)	0.831
History of previous PPH				
Absence	Reference		Reference	
Presence	23.07 (2.84, 187.11)	0.003	12.58 (3.60, 43.92)	<0.001
History of deliver fetal weight >3500 gm				
Absence	Reference		Reference	
Presence	1.44 (0.71, 2.89)	0.309	1.01 (0.40, 2.53)	0.976
History of instrumental delivery				
Absence	Reference		Reference	
Presence	1.42 (0.71, 2.86)	0.321	0.97 (0.37, 2.51)	0.948
BMI at delivery				
<25.0	Reference		Reference	
25.0-29.9	0.83 (0.55, 1.24)	0.360	1.01 (0.55, 1.86)	0.975
30.0-34.9	1.45 (0.89, 2.37)	0.135	1.84 (0.92, 3.69)	0.083
≥35.0	2.45 (1.16, 5.16)	0.019	3.08 (1.25, 7.60)	0.015
Fundal height				
<36.0	Reference		Reference	
≥36.0	2.97 (1.99, 4.44)	<0.001	1.66 (0.97, 2.85)	0.064

Abbreviations: ANC, antenatal care; CI, confidence interval; EBL, estimated blood loss; OR, odds ratio; PPH, postpartum hemorrhage.

Supplementary Table S5. Multivariable multi-level analysis of association between intrapartum characteristics and severe postpartum hemorrhage (n=795)

	Multivariable analysis			
	EBL ≥ 500 ml		EBL > 1000 ml	
	Adjusted OR (95%CI)	P-value	Adjusted OR (95%CI)	P-value
Labor augmentation				
No	Reference		Reference	
Yes	2.30 (1.53, 3.47)	<0.001	3.55 (2.03, 6.23)	<0.001
Retained placenta				
Absence	Reference		Reference	
Presence	50.15 (11.83, 212.45)	<0.001	28.94 (13.24, 63.24)	<0.001
Delivery				
Spontaneous delivery	Reference		Reference	
Instrumental delivery	2.53 (1.46, 4.40)	0.001	1.40 (0.64, 3.08)	0.404
Episiotomy wound				
No tear	Reference		Reference	
First or second degree tear	1.15 (0.77, 1.71)	0.490	1.28 (0.70, 2.36)	0.427
Third or fourth degree tear	26.35 (3.34, 207.67)	0.002	1.32 (0.27, 6.42)	0.733
Fetal weight				
<3500	Reference		Reference	
3500-4000	2.13 (1.42, 3.20)	<0.001	1.55 (0.84, 2.87)	0.162
>4000	5.87 (1.70, 20.26)	0.005	5.97 (1.62, 21.98)	0.007

Abbreviations: CI, confidence interval; EBL, estimated blood loss; OR, odds ratio.