

Caesarean Delivery Rates According to Pregnancy Characteristics and Robson Classification in Hypertension Related Pregnancy

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Abstract

Objective: The study aimed to investigate the pregnancy characteristics of patients with hypertension related pregnancy and the rate of caesarean section in hypertension related pregnancy categorized into Robson Classification system at the Mother and Children Hospital.

Methods: This cross-sectional study design was conducted from December 1st 2018 to November 30th 2019 in one of the private Mother and Children Hospital in Makassar. Total of 156 women with hypertension related pregnancy delivered. Demographics, clinical manifestation, pregnancy outcomes were collected and analyzed using the Chi-square test.

Result: Caesarean delivery was 87.8% in our study and birth weight is significantly related to method of delivery ($p=0,018$). The risk of developing asphyxia of newborn was found 5.8% with higher values for HELLP syndrome (OR=9.667), severe preeclampsia (OR=7.077) and birth weight (OR=4.154). According to Robson classification, size of group 8 (5.8%), group 10 (9%) and number of caesarean delivery in group 5 (90%) were higher (should be 1.5-2%; <5%; and 50-60% in general population, respectively). All the caesarean group rate were above the general population.

Conclusion: Clinical considerations about method of delivery need to be tailored to each individual in order to avoid maternal morbidity in later date. The Robson Classification could be one of the guiding tool to assess specific subgroups of women.

Key words: Hypertension; Pregnancy; Caesarean delivery; Robson classification.

Kejadian Seksio Sesaria Menurut Karakteristik Kehamilan dan Klasifikasi Robson Pada Hipertensi Dalam Kehamilan

Abstrak

Tujuan: Penelitian ini bertujuan untuk mengetahui karakteristik kehamilan pada pasien dan rasio seksio sesaria dengan hipertensi dalam kehamilan yang dikategorikan dalam sistem Klasifikasi Robson di Rumah Sakit Ibu dan Anak.

Metode: Desain potong lintang dilakukan pada 1 Desember 2018 hingga 30 November 2019 pada salah satu Rumah Sakit Ibu dan Anak swasta di Makassar. Total 156 perempuan dengan hipertensi dalam kehamilan mengalami persalinan. Demografi, manifestasi klinis dan luaran kehamilan dikumpulkan dan dianalisis. Rasio seksio sesaria secara umum pada tiap grup Robson dihitung, demikian pula dengan kontribusi tiap grup terhadap rasio seksio sesaria secara umum.

Hasil: Seksio sesaria ditemukan pada 87% pasien dan berat badan lahir secara signifikan terkait dengan metode persalinan ($p=0,018$). Asfiksia bayi baru lahir ditemukan 5,8% pada penelitian dengan risiko yang meningkat pada sindrom HELLP (OR=9,667), preeklampsia berat (OR=7,077) dan berat badan lahir (OR=4,154). Menurut klasifikasi Robson, ukuran grup 8 (5.8%), grup 10 (9%) dan rasio seksio sesaria di grup 5 (90%) lebih tinggi dibandingkan populasi umum. Seluruh rasio seksio sesaria lebih tinggi dibandingkan populasi umum.

Kesimpulan: Pertimbangan klinis mengenai metode persalinan perlu dikhususkan pada masing-masing individual untuk menghindari morbiditas maternal di kemudian hari. Klasifikasi Robson dapat menjadi alat kontrol untuk melakukan evaluasi pada tiap grup.

Kata kunci: Hipertensi; Kehamilan; Seksio sesaria; Klasifikasi Robson.

Introduction

Hypertension in pregnancy is defined as systolic blood pressure ≥ 140 mmHg or diastolic blood pressure ≥ 90 mmHg, or combination of both, at any time during pregnancy. This condition can be chronic (occurs before pregnancy or diagnosed before 20 weeks' gestation) or occurs later.

The global prevalence of hypertension in pregnancy is estimated at 2-10% and contributes to 18% of maternal mortality worldwide. In Asia, hypertension in pregnancy contributes 9% of maternal mortality, so its detection and management remain particular concern. In 2019, the maternal mortality rate for Indonesia was 305 per 100,000 live births and hypertension in pregnancy was still one of the leading causes. Besides risk of death to the mother due to heart, kidney, and cerebrovascular failure, the fetus is also at risk for impaired oxygen transfer from the placenta, which causes growth problems, preterm labor, and perinatal mortality. According to data from the South Sulawesi Central Bureau of Statistics of South Sulawesi, neonatal mortality rate was 13 per 1,000 live births in 2012. One of the etiologies of these mortality cases was low birth weight, which was later related to the incidence of neonatal asphyxia. In Makassar, there were at least 1,415 low birth weight babies in 2015.¹⁻⁶

There is a high risk for both mothers diagnosed with hypertension and babies during spontaneous birth, thus increasing the rate of caesarean delivery. Cochrane review showed the caesarean section rate increases to 68.2% in cases of severe preeclampsia and is associated with maternal morbidity such as postoperative HELLP syndrome as well as an increased risk of repeated caesarean section in subsequent deliveries. Another study showed a lower rate of caesarean section (32.4%) associated with a lower need for intensive care for the mother, but associated

with an increased risk of developing neonatal asphyxia. In Indonesia, the rate of caesarean section with complicating hypertension in pregnancy was found to be higher. Research carried out in Makassar in 2017-2019 in 4 hospitals with a sample size of 329 patients with preeclampsia and severe preeclampsia showed that the rate of caesarean section was still high, approximately 75.7%.^{7,8}

The World Health Organization (WHO) recommended that the caesarean section rate at 10-15% is considered effective and according to medical indications. Caesarean delivery rates have increased remarkably and cause a major public concern. WHO proposes the use of the Robson Classification system as a global standard for assessing, monitoring and comparing caesarean section rates within healthcare facilities over time. Effective medical audit of labor management can reduce caesarean section rates, however this classification doesn't specify the acceptable rates in hypertension related pregnancy.

Therefore, this study aim to investigate the pregnancy characteristics of patients with hypertension related pregnancy and the rate of caesarean section in hypertension related pregnancy categorized into Robson Classification system at the Mother and children Hospital, especially in Makassar.

Methods

This cross-sectional study design was conducted among women delivering in one private Mother and children Hospital in Makassar, South Sulawesi, Indonesia. We did the total sampling to obtain data from medical records of patient delivering from December 1st, 2018 to November 30th, 2019. Individual informed consent was not sought as data were collected at the institutional level from medical records without identifying the individual women.

Research Population The population were all deliveries that were registered as

inpatient during the study period. There were 5,487 deliveries during this study period.

Sample All deliveries that were classified as hypertension in pregnancy, including chronic hypertension, gestational hypertension, preeclampsia, severe preeclampsia, superimposed preeclampsia, HELLP syndrome, and eclampsia in the study period. A total of 156 cases were sampled as hypertension related pregnancy in the period of this study.

Statistical methods Data processing and statistical analysis were performed using Microsoft Excel version 16 and SPSS version 22. The data were analyzed using the Chi-square test. Significance level of the strength of association was determined at 95% CI (Confidence Interval) and p -value < 0.05 .

Results

During December 1st, 2018 to November 30th, 2019, there were 5,487 deliveries in the hospital. Out of 5,487 deliveries, 2,871 (52.32%) were classified as vaginal delivery and 2,616 (47.68%) were caesarean section.

During this period, 156 (2.8%) pregnancies were classified as hypertension in pregnancy. All patients diagnosed with hypertension in pregnancy during this period had live maternal and live birth outcomes, with the mean maternal age was 31.42 years, the mean gestational age was 38.47 weeks, the mean arterial pressure (MAP) was 121.01, and the length of stay in hospital (length of stay) was 3.12 days. There were 18 cases (11.5%) with complications such as blood transfusion due to anemia, follow-up care at the High Care Unit and referral to a higher level hospital for further treatment.

The demographic characteristics, clinical characteristics, and pregnancy outcomes are listed in Table 1. In this study, 32.7% of pregnancies with advanced maternal age were diagnosed with hypertension in pregnancy. Most of the patients were housewives/

unemployed (73.1%) and 39% of patients did not complete 12 years of education. 41% of pregnancies are first pregnancy (primigravida). The most common risk factors were pregestational obesity (41.7%) and nulliparity (41%). The most common symptoms were headache (17.3%). Only 41 (26.28%) cases with complications had a history of caesarean section in previous pregnancy (14.7%), malpresentation (4.5%), placenta previa (1.9%), placental abruption (0.6 %) and fetal distress (4.5%). Regarding the pregnancy outcome, preterm delivery following hypertension in pregnancy was found in 14.1% of cases, the outcome of low birth weight was 25%, 3 (1.9%) cases with 1000-1500 grams of baby weight (1.9%), and 5 (8%) cases of neonatal asphyxia. The most common method of termination was caesarean section (87.8%). About 80.1% of patients had a length of stay 3 days or longer.

Relationship between risk factors, clinical characteristics, and pregnancy outcomes to the delivery method are shown in Table 2. The method of termination by caesarean section was the choice of 87.8% of cases of hypertension in pregnancy. The correlation between infant birth weight and method of delivery was statistically significant ($p = 0.018$). The conditions of the patients considered for termination by caesarean section in this study were chest pain and/or tightness ($p = 1,000$), history of preeclampsia in previous pregnancy ($p = 0.597$), metabolic disorders ($p = 1,000$), chronic hypertension ($p = 1,000$), superimposed preeclampsia ($p = 1,000$), multiple pregnancies ($p = 0.602$), post-term gestational age ($p = 0, 741$), and all these conditions were not statistically significant. The association between the first minute APGAR and the delivery method was not significant ($p = 0.301$). Among 9 cases of neonatal asphyxia in this study, 2 had vaginal deliveries (2 of 19 total vaginal deliveries, 10.5%) compared to 7 had caesarean section (7 of 137 deliveries, 5.11%).

Table 1 Demographic, Clinical Characteristics, and Pregnancy Outcomes of Patients

	Characteristics	N	%
Demographics			
Age	<20 years	3	1.9
	20-35 years	105	67.3
	> 35 years	48	30.8
Employment status	Working	42	26.9
	Unemployed / Housewife	114	73.1
Education	Elementary School	20	12.8
	Junior High School	19	12.2
	Senior High school	62	39.7
	Diploma education	13	8,4
	Undergraduate Education	42	26.9
Parity	0	64	41
	≥ 1	92	59
Clinical			
Severity of Hypertension	Mild-Moderate	56	35.9
	Severe	100	64.1
Systolic Blood Pressure	≥ 160	96	61.5
	130 - 159	59	37.8
	<130	1	0.6
Diastolic Blood Pressure	≥ 110	52	33.3
	90 – 109	104	66.7
Mean Arterial Pressure	<126.67	102	65.4
	≥ 126.67	54	34.6
Classification of Hypertension in Pregnancy	Chronic Hypertension	2	1,2
	Gestational Hypertension	22	14.1
	<i>Superimposed</i> Preeclampsia	3	1.9
	Pre-eclampsia	42	26.9
	Severe Pre-eclampsia	86	55.1
	HELLP syndrome	4	2,6
	Eclampsia	1	0.6
Risk Factors	Nulliparity	64	41.0
	Age> 35 years	48	30.8
	Pregestational Body Mass Index (BMI) ≥ 30 kg / m ²	65	41.7
	History of preeclampsia in previous pregnancy	8	5.1
	Chronic hypertension	5	3,2
	Metabolic disorders	1	0.6
	Multiple pregnancy	9	5.8

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Symptoms	Headache	27	17.3
	Heartburn	9	5.8
	Visual disturbances	9	5.8
	Nausea and/or vomiting	6	3.8
	Chest pain and/or tightness	1	0.6
Difficulties	History of caesarean section 1 time	17	10.9
	History of caesarean section >1 time	6	3.8
	Malpresentation (breech, transverse)	7	4.5
	Placenta previa (totalis, marginalis)	3	1.9
	Placental Solution	1	0.6
	Fetal Distress	7	4.5
Pregnancy Outcome			
Gestational Age	<37 weeks	22	14.1
	37 weeks - 41 weeks 6 days	131	84.0
	≥ 42 weeks	3	1.9
Method of Delivery	Vaginal Delivery	17	10.9
	Vaginal delivery after Caesarean Section	2	1.3
	Caesarean Section	137	87.8
First Minute APGAR Score	≥7	147	94.2
	<7	9	5.8
Birth Weight	1000 – 1500 grams	3	1.9
	1500 – 2499 grams	36	23.1
	2500 – 3999 grams	106	67.9
	≥ 4000 grams	11	7.1
Length of Treatment	< 3 days	31	19.9
	≥ 3 days	125	80.1

Source: Primary Data, 2018-2019

Table 2 The Relationships of Risk Factors, Clinical Characteristics and Pregnancy Outcome with the Method of Delivery

		Method of Delivery				Total	P-value	
		Vaginal labor		Caesarean Section		n		
		n	%	n	%	n		
Risk Factors								
Nuliparity	Yes	9	14.1%	55	85.9%	64	100.0%	0.726
	No	10	10.9%	82	89.1%	92	100.0%	
Age > 35 years	Yes	5	10.4%	43	89.6%	48	100.0%	0.854
	No	14	13.0%	94	87.0%	108	100.0%	
Pregestation BMI ≥ 30	Yes	8	12.3%	57	87.7%	65	100.0%	1,000
	No	11	12.1%	80	87.9%	91	100.0%	
History of PE in Previous Pregnancy	Yes	0	0.0%	8	100.0%	8	100.0%	0.597
	No	19	12.8%	129	87.2%	148	100.0%	
Chronic Hypertension	Yes	0	0.0%	5	100.0%	5	100.0%	1,000
	No	19	12.6%	132	87.4%	151	100.0%	
Metabolic Disorders	Yes	0	0.0%	1	100.0%	1	100.0%	1,000
	No	19	12.3%	136	87.7%	155	100.0%	
Multiple Pregnancy	Yes	0	0.0%	9	100.0%	9	100.0%	0.602
	No	19	12.9%	128	87.1%	147	100.0%	
Clinical Symptoms								
Headache	Yes	3	11.1%	24	88.9%	27	100.0%	1,000
	No	16	12.4%	113	87.6%	129	100.0%	
Heartburn	Yes	2	22.2%	7	77.8%	9	100.0%	0.301
	No	17	11.6%	130	88.4%	147	100.0%	
Visual Disturbances	Yes	2	22.2%	7	77.8%	9	100.0%	0.301
	No	17	11.6%	130	88.4%	147	100.0%	
Nausea and/or Vomiting	Yes	1	16.7%	5	83.3%	6	100.0%	0.547
	No	18	12.0%	132	88.0%	150	100.0%	
Chest pain and/or tightness	Yes	0	0.0%	1	100.0%	1	100.0%	1,000
	No	19	12.3%	136	87.7%	155	100.0%	
Degree of Hypertension	Mild-Mod- erate	5	8.9%	51	91.1%	56	100.0%	0.500
	Severe	14	14.0%	86	86.0%	100	100.0%	
Classification of Hypertension in Pregnancy								
Gestational Hypertension	Yes	2	9.1%	20	90.9%	22	100.0%	1,000
	No	17	12.7%	117	87.3%	134	100.0%	
Chronic Hypertension	Yes	0	0.0%	2	100.0%	2	100.0%	1,000
	No	19	12.3%	135	87.7%	154	100.0%	

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Preeclampsia	Yes	5	11.9%	37	88.1%	42	100.0%	1,000
	No	14	12.3%	100	87.7%	114	100.0%	
Severe Preeclampsia	Yes	11	12.8%	75	87.2%	86	100.0%	0.990
	No	8	11.4%	62	88.6%	70	100.0%	
Superimposed Preeclampsia	Yes	0	0.0%	3	100.0%	3	100.0%	1,000
	No	19	12.4%	134	87.6%	153	100.0%	
HELLP syndrome	Yes	1	25.0%	3	75.0%	4	100.0%	0.408
	No	18	11.8%	134	88.2%	152	100.0%	
Eclampsia	Yes	1	100.0%	0	0.0%	1	100.0%	0.122
	No	18	11.6%	137	88.4%	155	100.0%	
Pregnancy Outcome								
Gestational Age	<37 weeks	3	13.6%	19	86.4%	22	100.0%	0.741
	37 weeks - 41 weeks 6 days	16	12.3%	114	87.7%	130	100.0%	
	≥ 42 weeks	0	0.0%	4	100.0%	4	100.0%	
Birth Weight	1000 - 1500	2	66.7%	1	33.3%	3	100.0%	0.018
	1500 - 2499	5	13.9%	31	86.1%	36	100.0%	
	2500 - 4000	12	11.3%	94	88.7%	106	100.0%	
	> 4000	0	0.0%	11	100.0%	11	100.0%	
The First Minute APGAR Score	≥7	15	11.6%	130	88.4%	147	100.0%	0.301
	<7	2	22.2%	7	77.8%	9	100.0%	

Source: Primary Data, 2018-2019

Table 3 Robson’s Classification of Hypertension Related Pregnancy

Group	Total Caesarean Section	Number of sufferers	Group size (%)	CS group rate (%)	Absolute Contribution (%)	Relative Contribution (%)
1	27	35	22.4	77.1	17.3	19.7
2	22	22	14.1	100	14.1	16.1
3	19	26	16.7	73.1	12.2	13.9
4	22	22	14.1	100	14.1	16.1
5	18	20	12.8	90	11.5	13.1
6	3	3	1.9	100	1.9	2,2
7	4	4	2,6	100	2,6	2.9
8	9	9	5.8	100	5.8	6.6
9	1	1	0.6	100	0.6	0.7
10	12	14	9.0	85.7	7,7	8.8
Total	137	156	100%	87.8%	87.8%	100%

Source: Primary Data, 2018-2019

This is an important concern even though the APGAR score at the first minute was not statistically significant ($p = 0.301$).

Table 3 shows Robson classification of hypertension in pregnancy in this study. Group 1 had the highest contribution to caesarean section (19.7%) followed by groups 2 and 4 (16.1%).

Discussion

From the results of this study, it was found that the incidence of hypertension in pregnancy at Khadijah 1 Makassar Mother and children Hospital in the period December 2018 to November 2019 was 2.8%. This value is in line with the estimated global prevalence of 2-8% with data from Indonesia’s Basic Health Research showing a higher rate, namely 12.7%. Furthermore, the classification of hypertension in pregnancy in this study consisted of severe preeclampsia (55.1%), preeclampsia (26.9%), gestational hypertension (14.1%), superimposed preeclampsia (1.9%), HELLP syndrome (2.6%), chronic hypertension (1.2%), and eclampsia (0.6%). A retrospective cohort study by Ye et al (2014) on 112,386 deliveries

in China at both general and special hospitals with secondary to tertiary levels showed a prevalence of hypertension in pregnancy of 5, 22%, which was found to be lower than in other studies conducted among African Americans (6.4%) and Brazilians (7.5%). Severe preeclampsia is the most common type of hypertension in pregnancy (39.96%) followed by gestational hypertension (31.40%), preeclampsia (15.13%), chronic hypertension (6%), superimposed preeclampsia (3.68%) and eclampsia (0.89%) have characteristics similar to this study.^{9,10}

Several risk factors for hypertension in pregnancy, especially preeclampsia have been found, including a history of preeclampsia in previous pregnancies, gemelli, chronic diseases such as chronic hypertension, diabetes mellitus, kidney disorders and autoimmune diseases which are a high risk of this condition which was also found in this study. Nulliparity is a moderate risk factor for hypertension in pregnancy, especially gestational hypertension and preeclampsia, which are caused by immune mechanisms against paternal antigens. A study in African-Americans showed an increased risk of up to 12.3 times, where this race does have a

fairly high prevalence of hypertension in pregnancy. Obesity increases the risk of preeclampsia up to three times due to insulin resistance.^{6,9,11}

Headache itself was the most common symptom (17.3%) in this study. Symptoms can appear directly proportional to the progression of hypertension. Preeclampsia causes poor organ perfusion and some of the symptoms commonly found are associated with liver involvement (heartburn, nausea and vomiting, back translucent abdominal pain) and the central nervous system (headache, mental alteration, scotoma to blindness). Headache may represent increased cerebral perfusion pressure, cerebral edema and hypertensive encephalopathy.^{1,11}

The method of delivery by caesarean section in the period of this study was 87.8%. Some of the complications that exist had a history of caesarean section in previous pregnancy (14.1%), malpresentation (4.5%), placenta previa (1.9%), placental abruption (0.6%), macrosomia (7.1%) and fetal distress (4.5%) which contributed to the increased caesarean section rate in this study. Of the 40 cases with complications, there were 2 cases of vaginal birth after caesarean section with good maternal and perinatal outcomes. Previous research in 2015 - 2017 in Makassar showed a high rate of 75.7%. Another study in China showed that the rate was also quite high, at 76.95%. When viewed from the results of the study, there are no significant clinical characteristics or outcomes. Apart from birth weight, which refers to obstetric indications, there were 4 cases of macrosomia, all of which underwent a caesarean section. Several clinical characteristics that could be reviewed by the researchers were symptoms of chest pain and/or tightness, history of preeclampsia in previous pregnancy, metabolic disorders, chronic hypertension, superimposed preeclampsia, multiple pregnancies, post-term gestational age had a tendency for caesarean section. Recommendations from

the American College of Obstetricians and Gynecologists in 2019 state that the method of delivery in patients with gestational hypertension or preeclampsia is determined based on obstetric indications and it is preferable to carry out vaginal delivery. The decision to perform caesarean section must be tailored to each individual, based on the probability of vaginal delivery and the degree of hypertension in the pregnancy suffered. Things that can be considered here are related to the high rate of caesarean section in nulliparous (85.9%) which can increase the risk of repeated caesarean section which then increases maternal morbidity. Research by Khader et al (2017) shows that the rate of caesarean section in preeclampsia cases is 59.4%, where the increase in caesarean section rate is a method to reduce further complications in the mother and fetus. Things that can be considered here are related to the high rate of caesarean section in nulliparous (85.9%) which can increase the risk of repeated caesarean section which then increases maternal morbidity. Research by Khader et al (2017) shows that the rate of caesarean section in preeclampsia cases is 59.4%, where the increase in caesarean section rate is a method to reduce further complications in the mother and fetus. Things that can be considered here are related to the high rate of caesarean section in nulliparous (85.9%) which can increase the risk of repeated caesarean section which then increases maternal morbidity. Research by Khader et al (2017) shows that the rate of caesarean section in preeclampsia cases is 59.4%, where the increase in caesarean section rate is a method to reduce further complications in both mother and fetus.^{6,9}

There were no maternal or perinatal mortality in the study at the Mother and children Hospital, as for the morbidity that arose related to other maternal complications such as the need for blood transfusions, continued care in high care units and

referrals to hospitals with a higher level of follow-up care. Preterm delivery was found in 14.1% of cases. In several studies, it was found that the prevalence of preterm delivery in hypertension in pregnancy was 8-10%. Research by Khader et al. (2017) shows that there are 32.5% of infants with low birth weight in patients with hypertension in pregnancy and 30% of preterm deliveries. In hypertension in pregnancy there is impaired uteroplacental blood flow secondary to failure of physiological transformation of the spiral arteries and/or impaired placental vascularity in the first or early second trimester, reducing uteroplacental blood flow. These conditions causing fetal growth impairment, oligohydramnios, placental abruption and fetal distress were identified in this study and contribute to an increased risk of preterm delivery.^{1,6}

Neonatal asphyxia was found in 5.8% of cases of hypertension in pregnancy with statistically significant values for HELLP syndrome (OR = 9.667; 95% CI 2.533-169.429), severe preeclampsia (OR = 7.077; 95% CI 0.863-58.02) and birth weight (OR = 4.154; 95% CI 1.056-16.342). When comparing the outcome of vaginal delivery to caesarean section, vaginal delivery had a higher prevalence of asphyxia (10.5%) compared to delivery with caesarean section (5.11%). HELLP syndrome is progressive and has an increased rate of morbidity and mortality, so if this condition is found, delivery should be performed as soon as possible regardless of gestational age. Ideally, the management of patients with HELLP syndrome requires both maternal and neonatal intensive care facilities.¹

The length of treatment itself is a factor that needs to be considered, where the high number of hospitalization cases for obstetric and obstetric cases in Makassar, especially the Mother and children Hospital. The average treatment time for patients in general was 3.12 days, with treatment time for vaginal

delivery was 2.16 days and caesarean section was 3.25 days ($p = 0.000$).

The overall 10-group classification presented in table 3. It described the number of deliveries, the number of caesarean section and the proportion of deliveries by caesarean section. From each group, the absolute and relative contribution of each group to the overall caesarean section could be calculated. Groups 1 and 2 had a rate of 36.5% according to the reference 35-42% in general population. Groups 3 and 4 had a rate of 30.8% corresponding to a mean of 30% in general population. Group 5 had a rate of 12.8%, groups 6 and 7 had a rate of 4.5% in accordance with the reference 4-5% in general population. Group 8 had a rate of 5.8% which is far above the reference 1.5-2% in general population and group 10 had a 9% which is quite high above the reference less than 5% in general population. The high rate in group 8 due to multiple pregnancy is one of the risk factors of hypertension related pregnancy and preterm delivery as one of the outcome.

Group 1 had 77.1% group rate which Robson guideline shows rates under 10% are achievable in group 1 for general population. Group 2, 4, 6, 7, 8 and 9 had 100% group rate which above the guideline in general population. Group 5 in this study had a caesarean section rate of 90%. In general, this group had a caesarean section rate of 50-60% depending on indications, and the expected maternal and perinatal outcomes was 74.4%. This rate was generally high due to the high post-caesarean section rate of 2 or more times (6 cases) and due to hypertensive conditions in pregnancy that increase the risk of trial of labor (trial of labor after caesarean delivery).

Relative contributions in groups 1, 2 and 5 generally account for 2/3 of caesarean section deliveries. In this study, it was found that the relative contribution amount was 48.9%, lower than the reference general

population of 63.7%. This rate showed that hypertension in pregnancy had several characteristics such as multiple pregnancies and preterm delivery, which have a higher rate than the general population. Group 5 has an absolute contribution of 11.5%. The high number indicates the previous high caesarean section in groups 1 and 2 with a reference population of 28.9%. The number in this study is not high considering that one of the significant risk factors for hypertension in pregnancy in this study is nulliparity.

Although this 10-group Robson Classification system had been used widely among countries worldwide, this is the first time used for hypertension related pregnancy in Indonesia. The limitations of this study were it wasn't conducted by one of principles of Robson Classification, which is that before investigating in more detail any one particular group, it is important to assess the sizes of all the 10 groups to ascertain the balance and makeup of the whole obstetric population. Through this classification, we can assess higher rate of caesarean section in hypertension related pregnancy and hopefully conduct effective medical audit based on medical records to lower the caesarean rates. Further studies need to be conducted to specifically give the recommendation rate of caesarean section in hypertension related pregnancy.

Conclusions

Hypertension in pregnancy is still a condition that needs attention because it increases maternal and perinatal morbidity and mortality in Makassar. The high rate of caesarean sections in this condition is routinely found in secondary and tertiary health facilities to avoid the risk of adverse maternal and perinatal outcomes, even though birth weight seemed to be the only one significant with method of delivery. However, in this study only a few conditions were associated with

poor maternal and perinatal outcomes, but the risk asphyxia of newborn were found higher in HELLP syndrome, severe preeclampsia and lower birth weight. Clinical considerations need to be tailored to each individual, based on the probability of vaginal delivery and the degree of hypertension in pregnancy suffered in order to avoid maternal morbidity associated with repeated caesarean section at a later date. The Robson Classification could be one of the guiding tool to assess specific subgroups of women to reduce caesarean section rate and improve outcomes.

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