The Risk of Maternal Cardiovascular Disease in Giving Birth

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Abstract: Pregnant woman have many risks include experience the cardiovascular disease during pregnancy. Cardiovascular is the most common problem in pregnancy and may cause the complication. The Purpose of this research is to find out the risks of pregnant woman who have cardiovasculsar disease. The research used observational analytic method with case-control study design. The samples consisted of 42 cases and 42 controls, taken by using consecutive sampling technique. Dependent variable was childbirth with CS and independent variables were parity and accompanied illness. The gathered data were analyzed by using univatriate analysis, bivariate analysis with chi square test, and multivatriate analysis at α = 0.05. The result of the research from multivariate analysis showed that the variables which had significant influence on childbirth with SC were parity (P = 0.006, OR = 5.801 95% CI = 1.642-19.110), accompanied illness (P = 0.03, OR = 6.382 95% CI = 1.198-33.992). The variable which had the most dominant influence childbirth with CS was accompanied illness. P-value = 97% which indicated that childbirth women with the parity > 2 had accompanied illness. Women who had accompanied illness in pregnancy almost experience cardiovascular diseases and could risk to give birth with caesarean section, the biggest risk in this research is women who diagnosed hypertention followed by obesity. It is recommended to do family planning programme, and prevent the illness during pregnant, apply ANC according to the standard, and make sure that the childbirth is safe from Period I to Period III.
Keywords: Cardiovascular Disease, Maternal, Giving Birth

Introduction

Cardiovascular disease is leading cause of death in women. Pregnancy can be viewed as a cardiovascular stress test in that the development of certain complications has the potential to reveal susceptibility of women to future vascular or metabolic disease. Cardiovascular disease, for example hypertension is the most commonly encountered disorder during pregnancy. High blood pressure has a negative impact on the mother and the foetus, which is why early diagnosis and proper control are mandatory to avoid complication (Youssef, 2019). One of the main tasks of obstetrics services is to improve the quality and quantity of services from pregnancy to childbirth, which are integrated with advances in medical science, skills, knowledge of health workers who provide health services and are supported by adequate facilities. The choice of cesarean delivery should be based on certain medical indications which are divided into indications for the baby and the indication for the mother (Sitorus, 2019)

Associations with Caesarean section are too high in number, so it is necessary to reduce this number because it can increase maternal morbidity and mortality. There is a mortality rate that is two times greater in cesarean delivery compared to vaginal disorders, plus the morbidity rate due to loss of direction, infection, and damage to internal organs is also higher in cesarean delivery (Mulyawati *et al.*, 2011). The cesarean delivery rate in women with preeclampsia has increased, whereas the labor induction rate in these patients has decreased

i.e. the cesarean delivery rate for nulliparous preeclampsia in Norway increased from 16.4 percent during 1967-1978 to 35.4. percent during 1979-1990, and to 37 percent during 1991-2003 (Pretscher *et al.*, 2020).

Based on research data at Pirngadi (2012), the number of cesarean section deliveries in 2011 was 424 out of 730 deliveries, and in 2012 it increased to 434 from 2005 deliveries. The percentage of cesarean section deliveries at the hospital in 2011-2012 was 31.37%. where the medical indication was 91% and the social indication was 9% (Siregar, 2013). Meanwhile, the rate of deliveries by Caesarean section which was established by the Ministry of Health of the Republic of Indonesia in 2000 for teaching hospitals or provincial referral hospitals, was 20% of all deliveries while private hospitals were 15%. The initial survey conducted at RSU IPI Medan revealed that the number of cesarean section deliveries in January 2016 was 52 out of 74 deliveries, thus in January 2016 it was 70%. There was a fairly high proportion of women giving birth with caesarean section at RSU IPI Medan for the beginning of 2016. Based on this background, a study was conducted with the aim of analyzing the factors of mothers who had a normal birth at risk of a C-section.

Methods

Analytical study with a case control study design (*Case control*) is a type of research used in this study, namely by selecting the case group, namely women who gave birth by caesarean surgery and control of normal birth mothers. This research was conducted at the IPI Medan Hospital, the Manda Clinic and the Nirmala clinic. This study was conducted in December 2015 May 2016. The case population was all women who gave birth by Caesarean section and had a history of normal labor ≥1 who were treated at RSU IPI Medan and were BPJS Mandiri participants. The control population was all mothers who gave normal birth ≥1 who were treated at the IPI Medan Hospital, the Manda clinic, and the Nirmala clinic and were BPJS Mandiri participants. The number of case sample is 42 cases and controls with 42 responden. Sampling was done by consecutive sampling. Univariate and bivariate data analysis used chi square, while multivariate analyzed using multiple logistic regression

Result

The effect of one independent variable on the dependent variable can be determined by performing a bivariate analysis with the chi-square test at the level of significance $\alpha < 0.05$. The cross table between age and type of delivery shows that in the case group there were 26 people (61.9%) mothers aged 20-34 years, while the control group consisted of 37 people (88.1%) for mothers aged 20-34 years. The results of statistical tests showed $p = 0.006$, so it can be concluded that there was a significant effect between age and type of delivery, where the OR = 4.554 was obtained (95% CI = 1.482-13.991).

The cross table between parity and type of delivery shows that in the case group there were 22 people (52.4%) mothers with parity> 2, while in the control group there were 36 people (85.7%) mothers with parity ≤2. The statistical test stated that the p value was <0.001, so it was concluded that there was a significant influence between parity and the type of delivery. The results of the analysis also showed that the OR = 6,600.95% CI = 2,297-18,961).

The cross-table between blood pressure and type of delivery shows that in the case group there were 24 (57.1%) mothers who were not hypertensive, while the control group contained 39 (92.9%) mothers who were not hypertensive. The statistical test shows p-value <0.001, so

it can be concluded that there is a significant influence between blood pressure and the type of labor. From the analysis results also obtained the OR = 9.750, 95% CI = 2.595-36.638).

The cross table between comorbidities and type of delivery shows that in the case group there were 23 people (54.8%) mothers who did not have comorbidities, while in the control group there were 40 people (95.2%) mothers who did not have comorbidities. The results of statistical tests obtained p value <0.001, it can be concluded that there is a significant effect between comorbidities and the type of labor. From the analysis, it was obtained that the OR value = 16.522, 95% CI = 3.525-77.427).

Table 1. Distribution and frequency of characteristic maternal

Characteristic	**Giving Birth**				***P***	**OR**
	Caesarean section		Vaginal birth			
	n-42	**%**	**n=42**	**%**		
Years						
< 20 dan ≥ 35 tahun	16	38,1	5	11,9	0,006[a]	4,554
20-35 tahun	26	61,9	37	88,1		(1,482-13,991)
Parity						
> 2	22	52,4	6	14,3	<0,001[a]	6,600
≤ 2	20	47,6	36	85,7		(2,297-18,961)
Blood pressure						
Hypertension	18	42,9	3	7,1	<0,001[b]	9,750
Normal	24	57,1	39	92,9		(2,595-36,638)
Referenced						
Yes	29	69,0	7	16,7	<0,001[b]	11,154
No	13	31,0	35	83,3		(3,933-31,631)
Accompanied diseases						
Yes	19	45,2	2	4,8	<0,001[b]	16,522
No	23	54,8	40	95,2		(3,525-77,427)
Blood pressure (before)						
Hypertension	3	7,1	1	2,4	0,616[b]	3,154
Normal	39	92,9	41	97,6		(0,315-31,622)
Accompanied diseases (before)						
Yes	3	7,1	2	4,8	1,000[b]	1,538
No	39	92,9	40	95,2		(0,244-9,714)

Table 2. Multivariat analysis

Variabel	**B**	**P-value**	**OR**	**95% CI**	
				Lower	**Upper**
Parity	0,723	0,006	5,601	1,642	19,110
Diseases	1,853	0,030	6,382	1,198	33,992
Reference	1,849	0,003	6,350	1,874	21,522

In table 2 above is the final result of the multivariate Multiple Logistic Regression analysis which shows the variables parity (p = 0.006), comorbidities (p = 0.03), and referral (p = 0.003) have a p value <0.05. Thus the three variables have an influence on caesarean surgery.

The results of the analysis also showed that the dominant variable affecting Caesarean section was the variable of comorbidities with an OR value of 6.382 at 95% CI (1.198-33,992). This

shows that the variable comorbidities have a significant effect on cesarean section in mothers who have previously given normal labor.

Discussion

Giving birth with conditions having parity above 2, presence of comorbidities, as well as referrals from primary care or midwives, and vice versa if mothers with parity less than 2, Do not have comorbidities and are not referred by a midwife, then the chance of giving birth by Caesarean section is 3%.

The study showed that there was an effect of parity with the risk of delivery of cesarean section. In this study, it was explained that mothers with parity <2 and> 3 had three times the risk of cesarean delivery compared to mothers with parity 2-3. proven by OR: 3.222 and p value = 0.017 <0.05, which means that there is an effect of parity on cesarean delivery (Hutabalian, 2011). In a study, it was stated that lower maternal parity is a strong predictor of caesarean section (Akinola *et al.,* 2014).

Sihombing's study, 2017 states that there is a relationship between parity and C-section where mothers who have a large number of deliveries or are multiparous tend to give birth by Caesarean section. Categories of safe delivery include second and third deliveries. There is a risk that will increase during delivery later in pregnancy. Mothers will have a higher risk of experiencing labor complications if they have high parity, especially postpartum hemorrhage. Uterine muscles in mothers with high parity of course often stretch, resulting in thinning of the uterine wall and causing weak uterine contractions (Manuaba *et al.*, 2007). With this condition, mothers who give birth with high parity will have the risk of complications of childbirth, so to prevent maternal death due to these complications, labor is performed by caesarean section.

Complementary disease is defined as a disease that the mother has experienced or suffered before the period of pregnancy and / or childbirth, other than that it is categorized as a comorbid disease, namely a disease that occurs during pregnancy and is not related to direct obstetric causes. This disease can be an indirect cause of maternal death, therefore, to prevent maternal death during childbirth, it is necessary to carry out labor aid measures, namely caesarean section. Research by Fibriana, 2007 shows that there is a risk of mothers with a history of experiencing maternal death, which is 210.2 times higher than that of mothers without a history of disease.

Based on data from the reproductive health division, chronic diseases such as high blood pressure, obesity, diabetes and heart disease put pregnant women at risk of pregnancy complications. (CDC, 2016). A research data states that cesarean delivery tends to be experienced by mothers who experience chronic diseases such as diabetes, heart disease and asthma after failed vaginal trials (Sihombing, 2017).

The study showed that in the case group, namely mothers who gave birth by caesarean section, the diseases suffered by the mothers included hypertension and obesity, there were 21 mothers (50%), while only 2 mothers (4.7%) in the control group suffered the disease, namely obesity. The most common disease is cardiovascular disease. The cause is the frequency of cardiovascular rate and pulse increases at 34-36 weeks of gestation an average of eighty-eight times per minute. For mothers whose heart problems can result in chordal docompensation (Aeni, 2011).

Annisa's research (2010) states that there is a relationship between cesarean delivery and patient arrival (P = 0.005). Mothers who came because they were referred from other health services had 1.84 times the risk of experiencing a cesarean delivery than mothers who came alone (OR = 1.84; 95% CI = 1.20-2.81).

Based on multivariate analysis, it turns out that the variables that have a significant effect on cesarean section are parity and referral variables. The results of the analysis showed that the most dominant variable affecting the occurrence of cesarean delivery was the reference variable with the highest odds ratio (OR) of 6.358, meaning that the referred mother would be at risk of having a cesarean section 6 times higher than the mother who came without being referred after the control. to the variables parity, age, BMI, blood pressure and comorbidities. The results of the research from the follow-up data on riskesdas in 2013 by Sihombing (2017), stated that there was a relationship between mothers who experienced pregnancy complications with caesarean section, pregnancy complications such as increased blood pressure or preeclampsia.

The results showed that mothers who were referred to RSU IPI Medan due to vaginal deliveries were feared that they could not be carried out and had indications of cesarean delivery and experienced problems that could cause labor complications such as eclampsia / preeclampsia, underdeveloped labor, percentage of infants, and repeat cesarean section.(Siregar, 2019).

Research carried out in England and Australia states that Caesarean section is caused by one of the causes of labor complications such as obstructed labor, fetal distress, and pregnancy less than 40 weeks (Premature). Meanwhile, the Tanzanian research data states that mothers who give birth receive a referral to the hospital for emergency caesarean delivery because of intrapartum complications (Sihombing, 2017).

Conclusion

The factor of the number of births or parity of mothers of less than 2 and more than 3 is more at risk of having a C-section in subsequent deliveries than mothers who have parity of 2 and or 3. Mothers with comorbidities during pregnancy are at risk of having a C-section than mothers who do not have comorbidities. Mothers who experienced labor complications and were given a referral by a midwife for delivery at the hospital tended to undergo a C-section than mothers who were not referred.

Public health officers are expected to promote and socialize to pregnant women and also couples of childbearing age about risk factors that can affect cesarean delivery so that they can prevent cesarean delivery and maintain ideal conditions for pregnant women to be able to give birth normally. To every officer in health facilities where ANC visits are made to implement and improve the quality of ANC services.To the community, families and especially pregnant women so that they can maintain the condition of their next pregnancy if they have had a normal delivery as good or better than the current condition.

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