

## Association between Intrauterine Growth Restriction and Pregnancy Hypertension

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### Abstract

**Background:** Intrauterine Growth Restriction (IUGR) certainly poses health problems that leads to increase mortality and can cause mental and physiological disturbances to the infants. Reduced organ perfusion is one of the etiologies of IUGR which is caused by placenta obstruction. This happens because of pregnancy hypertension as a risk factor. Furthermore, educational level, employment status, parity, and anemia are also its risk factors. The objective of this study was to analyze the prevalence of IUGR and association between IUGR and pregnancy hypertension.

**Methods:** A case control design was performed using medical records from Neonatology Department of Child Health at Dr. Hasan Sadikin General Hospital Bandung in 2012. Subjects were taken from 149 medical records of the mother who had IUGR and 149 normal birth weight infant information about the characteristics of the mothers and the infants. The data were collected and analyzed by calculating the Odds ratio (OR).

**Results:** The prevalence of IUGR at Dr. Hasan Sadikin General Hospital in 2012 was 149 cases (4.69%). There was association between pregnancy hypertension and IUGR with OR=1.72, 95% CI (1.044–2.836).

**Conclusions:** Pregnancy hypertension is one of the risks that generates IUGR. [AMJ.2016;3(2):212–5]

**Keywords:** Intrauterine growth restriction, pregnancy hypertension, risk factor

### Introduction

Intrauterine Growth Restriction (IUGR) is still one of the health problems and is closely related to mortality.<sup>1-3</sup> The mortality risk ratio of IUGR ranges from six to ten times higher compared to a normal infant.<sup>1</sup> The IUGR can also cause retarded physiology as well as lower intellectual scale 1 level compared to infants with normal weight.<sup>4</sup> In Indonesia, during 2004–2005, the prevalence of IUGR was 4.4%.<sup>5</sup>

The IUGR babies have been associated with cardiovascular disease in pregnancy. One of the factors that have been postulated to influence the IUGR risk among the newborn is hypertension.<sup>6-8</sup> Furthermore, educational level, employment status, parity, and anemia are among others of the the risk factors. In Pakistan, Muhammad et al.<sup>7</sup> discovered that in 2010, pregnancy hypertension had a high risk causing IUGR with OR (odds ratio)=3.8. This study was conducted to identify the association

between IUGR and pregnancy hypertension.

### Methods

This study was analytical study with case control design and used secondary data (medical records) from Neonatology Department of Child Health at Dr. Hasan Sadikin General Hospital Bandung in 2012. The criteria of IUGR interpreted by the Lubchenco Curve were inputted when the infant weight were less than 10% of the least weight that should be achieved at a particular gestational age. From 185 medical records consisting of IUGR babies data, only 149 medical records that fulfilled the inclusion criteria, namely data of patient's characteristic such as educational level, employment status, parity, anemia, and hypertension. The control group was medical records consisted of normal birth weight babies data that also met the similar inclusion criteria.

The ratio of case and control group of this

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**Table 1 Prevalence of IUGR at Dr. Hasan Sadikin General Hospital Bandung**

Intrauterine Growth	N	%
Intrauterine Growth Restriction	149	4.69
Normal and Large for Gestational Age	3025	95.3
Total	3174	100

research was 1:1. The selected control group was matched by simple random sampling based on patients age from case group (16–44 years old).

The exclusion criteria were those data of incomplete variable, double pregnancy, and infants whose weight are beyond 500 grams. Clinical criteria of pregnancy hypertension

implying BP  $\geq 140/90$  and all classifications of pregnancy hypertension were included.

The collected data were analyzed using computer and presented by frequency distribution. Statistical analysis was conducted by calculated odd ratio, confidence interval, and Chi square test.

**Table 2 Characteristics of Mothers with Intrauterine Growth Restriction at Dr. Hasan Sadikin General Hospital Bandung**

Variable	Intrauterine Growth Restriction				OR(95%CI)
	Yes		No		
	N	%	N	%	
Age (years old)					
< 18	2	50	2	50	1
18–34	111	50	111	50	
$\geq 35$	36	50	36	50	
Educational Level					
Elementary school	38	57.6	28	42.4	1.479 (0.852–2.569)
Junior high school	49	49.5	50	50.5	0.97
Senior high school	43	47.8	47	52.2	0.88
Diploma	11	52.4	10	47.6	1
Bachelor	8	36.4	14	63.6	0.547
Employment status					
Employment	31	54.4	26	45.6	1.243 (0.696–2.218)
Unemployment	118	49	123	51	
Parity					
Nullipara	65	48.9	68	51.1	0.922
Primipara	47	58	34	41.9	1.559 (1.931–2.610)
Multipara	34	42.5	46	57.5	0.662
Grand Multipara	3	75	1	25	3.041 (0.313–29.574)
Anemia					
Yes	34	22.8	34	22.8	1
No	115	77.2	115	77.2	
Gestational Age (week)	36.83(2.26)		38.34(1.8)		
Infant weight (gr)	2121.97(411.2)		2994(542.52)		

**Table 3 IUGR Cases based on Pregnancy Hypertension at Dr. Hasan Sadikin General Hospital Bandung**

Variable	Intrauterine Growth Restriction				p*)	OR(95%CI)
	Yes		No			
	(n=149)		(n=149)			
	N	%	N	%		
Pregnancy Hypertension						
Yes	54	59.3	37	40.7	0.032	1.721(1.044-2.836)
No	95	45.9	112	54.1		

Note: \*) Chi Square Test OR = Odds Ratio CI = Confidence Interval

## Results

Prevalence of IUGR at Dr. Hasan Sadikin General Hospital Bandung in 2012 was 185 cases from 3174 labor. From the total incidence of IUGR, there were 149 cases put into criteria inclusion and the others (36 cases) put into criteria exclusion because the incomplete variables were requested. So, prevalence of IUGR at Dr. Hasan Sadikin General Hospital Bandung in 2012 was 4.69%.

Mothers with low education tend to have IUGR 1.479 times compared to mother with higher education. Based on employment status, IUGR cases were discovered 1.243 times in employed mothers compared to non employed mothers. Moreover, IUGR cases were discovered in grand multipara mothers 3.041 times compared to non grand multipara cases. However, anemia was not the higher risk to generate IUGR cases because the odds ratio was 1 (Table 2).

The IUGR cases occurred more often in pregnancy hypertension cases (59.3%) (Table 3). Statistical analysis using Chi Square Test with 95% accuracy revealed that odds ratio of IUGR cases in pregnancy hypertension was 1.72.

## Discussions

The prevalence of IUGR at Dr. Hasan Sadikin General Hospital Bandung in 2012 was 4.6%. This result was similar to a study in Indonesia<sup>5</sup> during 2004-2005 that revealed the prevalence of IUGR was 4.4%.<sup>5</sup>

The result in this study showed that IUGR cases were discovered in mothers with low education. This study had result with the study conducted in Pakistan.<sup>7</sup> The study result showed that the majority of IUGR cases were from illiterate mothers (88.8%). Based on study in 2010 by Muhammad et al.<sup>7</sup>, mother

who was grand multipara was 12%. In this study, mother who was grand multipara was 75%. Study by De Farias Aragao et al.<sup>9</sup> also discovered that maternal education and parity were associated with IUGR. The percentage in mothers with anemia associated with IUGR in this study was 22.8% and this result had the similar result to the study in Pakistan that in IUGR cases, 15% mothers have anemia.<sup>7</sup>

The IUGR cases occurred more often in pregnancy hypertension cases. Pregnancy hypertension tend to have IUGR cases 1.72 times more than non pregnancy hypertension. A similar result was discovered in a study by Kalanithi et al.<sup>2</sup> in 2007, which explained that there was a significant relationship between hypertension in pregnancy and IUGR ( $p < 0.001$ ), which means a high risk of hypertension in pregnancy will cause IUGR. Another study in Norway<sup>11</sup> in 2006, discovered that severe preeclampsia, one of the classifications of pregnancy hypertension, had risk of IUGR with OR=1.8. Study from Maryland<sup>12</sup> also had a similar result that pregnancy hypertension was significantly associated with high risk of IUGR with OR=1.5 for preeclampsia-eclampsia as pregnancy hypertension. Moreover, a study conducted by Muhammad et al.<sup>7</sup> in Pakistan, discovered that hypertension in pregnancy has a higher risk of causing IUGR with OR=3.8.

The study had limitation. Using medical records as source of data has disadvantages. Not all the information requested in this study were available. From 185 medical records selected, 36 of them were excluded. It can be concluded that pregnancy hypertension is the risk to generate IUGR cases.

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