

**THE CORRELATION OF PREECLAMPSIA IN PREGNANCY WITH THE
INCIDENCE OF ASPHYXIA NEONATORUM AT THE MANGUSADA BADUNG
REGIONAL HOSPITAL IN BALI FROM JANUARY 2017 – DECEMBER 2020**

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ABSTRACT

Introduction : Preeclampsia is included as one of hypertension in pregnancy, with the prevalence still quite high now. This condition increases maternal and perinatal mortality and morbidity. Preeclampsia causes decreased oxygen supply from mother to fetus due to systemic vasoconstriction. So, it can cause the fetus to be born in a state of asphyxia (neonatal asphyxia).

Purpose: To determine the correlation between preeclampsia in pregnancy and the incidence of asphyxia neonatorum at the Mangusada Badung Regional Hospital in Bali from January 2017 – December 2020.

Method: The research used an analytic observational study with a case-control design. The sampling technique used in this research is probability sampling with simple random sampling. Sample selected from members of the population based on the inclusion and exclusion criteria that have been set. The total sample used was 268 newborns, divided into 2, the case group and the control group. The statistical test used is Spearman's rho.

Result: From 134 sample cases, 65 samples were from mothers with preeclampsia diagnosed, and 69 samples were from mothers without preeclampsia diagnosed. Of the 134 control samples, 31 samples were from mothers with preeclampsia diagnosed, and 103 samples were from mothers without preeclampsia diagnosed. The results of the test using Spearman's rho $p = 0.000$ and the results of the analysis Odds Ratio OR = 3.13.

Conclusion: There is a significant correlation between preeclampsia with the incidence of neonatal asphyxia at the Mangusada Badung Regional Hospital from 1 January 2017 – 31 December 2020.

Keyword : *preeclampsia, asphyxia neonatorum, hypertension in pregnancy*

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INTRODUCTION

Preeclampsia is categorized as hypertension in pregnancy that occurs after 20 weeks of gestation accompanied by proteinuria 300 mg for 24 hours or serum creatinine 0.3 mg or persists 30 mg (1+ dipstick) protein on random urine examination(1). The occurrence of hypertension in pregnancy is indicated by checking systolic blood pressure of ≥ 140 and/or diastolic of ≥ 90 mmHg with a minimum measurement of blood pressure carried out two times within 4-6 hours(2,3). Preeclampsia is one of the main sources of increased maternal and perinatal mortality and morbidity. The prevalence of preeclampsia in Indonesia from the Indonesian Ministry of Health data is recorded at 5.3% of cases per year(4). In comparison, the prevalence of preeclampsia at the Mangusada Badung Regional Hospital from 2017 – 2020 reached 10% of cases.

In preeclampsia, there is a decrease in maternal blood supply to the placenta due to systemic vasoconstriction. This condition affects the fetus, especially the uteroplacental blood vessels, causing the fetus to become hypoxic(5). This condition will greatly affect the welfare of the fetus if it is not treated immediately. Complications that can arise include neonatal asphyxia because of intrauterine growth restriction (IUGR), which can increase perinatal morbidity and mortality(6).

Neonatal asphyxia is the second leading cause of neonatal death after Low Birth Weight (LBW). Data from the Ministry of Health of the Republic of Indonesia in 2019 recorded 27% of neonatal deaths due to neonatal asphyxia(7). The prevalence of asphyxia neonatorum at the Mangusada Badung Hospital was 6.8% from 2017 – 2020. The parameter used to assess asphyxia infants was the APGAR score. Infants were categorized as having asphyxia if an APGAR score ≤ 6 was obtained in the first to the fifth minute of life(8). This study was conducted to determine the correlation between preeclampsia in pregnancy and the

incidence of asphyxia neonatorum at the Mangusada Badung Regional Hospital in Bali from January 2017 – December 2020.

METHOD

Design in this research uses an analytic observational, with a case-control. The total sample used was 268 newborns. Sampling in this study used secondary data, which is medical records (RM) of newborns, and a simple random sampling technique. Samples are selected from the population based on predetermined inclusion and exclusion criteria.

Inclusion criteria in this study: 1. Live newborns; 2. Single newborns diagnosed with asphyxia and non-asphyxia; 3. Neonatal born at term (gestational age: 37-42 weeks); 4. Neonatal born without severe congenital defects that interfere with vital functions (such as anencephaly, hydrocephalus, and hydrops fetalis). Exclusion criteria in this study: 1. Incomplete medical record data; 2. Mothers with comorbidities: (1). Diabetes Mellitus (DM) with GDA > 200 mg/dL or HbA1c $< 7\%$; (2). Chronic hypertension with a blood pressure of $\geq 140/90$ mmHg at < 20 weeks gestation; (3). HELLP syndrome with criteria: platelet levels $\leq 100,000$ /ml, LDH ≥ 600 IU/l, AST and/or ALT ≥ 40 IU/l.

The selected data will be processed and analyzed as univariate and bivariate using the Statistical Package for the Social Science (SPSS) version 25 application. Hypothesis testing in this study uses Spearman's rho test. The correlation is declared significant if the value of $p = < 0.05$.

RESULT

Medical records of patients included as samples in this study were 134 asphyxiated newborns and 134 non-asphyxiated newborns at the Mangusada Hospital from 2017 – 2020. Characteristics of research data can be seen in the table.

The distribution of respondent characteristics based on the weight of newborns in Table 1 shows, from the case

group, 43 neonatal were born with LBW conditions, and 91 neonatal didn't have LBW. In the control group, 18 neonatal were born with LBW conditions, and 116 neonatal didn't have LBW.

The distribution of respondent characteristics based on preeclampsia mothers in Table 2 shows, from the case group, 65 neonatal were born from mothers with preeclampsia diagnosed, and 69 babies were born from mothers without preeclampsia diagnosed. In the control group, there were 31 neonatal born from mothers with preeclampsia diagnosed and 103 babies born from mothers without preeclampsia diagnosed.

Bivariate analysis of the correlation between preeclampsia in pregnancy with an incidence of asphyxia neonatorum in Table 2, the results of the Spearman's rho correlation test, showed significant results and was associated with ($p = 0.000$) and ($C = 0.265$).

Table 1. Distribution of Respondent's Characteristics Based on Newborn Weight

LBW	Case Asfiksia n (%)	Control Non Asfiksia n (%)	Total n (%)
No	91 (44,0%)	116 (56,0%)	207 (100%)
Yes	43 (70,5%)	18 (29,5%)	61 (100%)
Total	134 (50,0%)	134 (50,0%)	268 (100%)
	$p = 0,000$	$C = 0,222$	

Table 2 Distribution of Neonatorum Asphyxia and Preeclampsia

Preeclampsia	Case Asfiksia n (%)	Control Non Asfiksia n (%)	Total
No	69 (40,1%)	103 (59,9%)	172 (100%)
Yes	65 (67,7%)	31 (32,3%)	96 (100%)
Total	134 (50%)	134 (50%)	268 (100%)
	$p = 0,000$	$C = 0,265$	

DISCUSSION

Preeclampsia is a condition that occurs during pregnancy. This situation causes a decrease in the supply of nutrients and

oxygen to the fetus. One of the complications that can occur due to preeclampsia is IUGR which can cause asphyxia neonatorum(9). Asphyxia neonatorum occurs due to spontaneous and regular breathing failure in infants during or immediately after birth. The parameter used to declare a neonatus as having asphyxia is the APGAR score. If a score ≤ 6 is obtained in the first to the fifth minute of life, the neonatus is diagnosed with asphyxia(10).

This study used 134 samples of newborns with asphyxia diagnosed and 134 newborns without asphyxia to see the mother's history of whether the baby had preeclampsia or not. The presentation of the cross-tabulation in Table 2 shows that the variable has a significant correlation. From 65 (67.7%) newborns with asphyxia were born from mothers with preeclampsia diagnosed, and 31 (32.3%) newborns were born without asphyxia from mothers with preeclampsia. The results from correlation the Spearman's rho test show the value of $p = 0.000$, which means it is significant, and $C = 0.265$, which means that the variable correlates. The Odds Ratio analysis in this study found $OR = 3.13$, which means that mothers with preeclampsia have a risk factor 3 times greater in giving birth to babies with asphyxia than those without preeclampsia at Mangusada Badung Hospital during the period January 2017 - December 2020.

This study is in line with several previous studies conducted to determine the risk factors for preeclampsia with the incidence of asphyxia neonatorum. Research conducted by M. Vivian et al. (2021) states that mothers who have preeclampsia have a risk factor of $OR = 3.071$ will bear asphyxia babies compared with mothers without preeclampsia(11). Research U. Ika et al. (2019) also stated the same thing. There is a correlation between pregnant women who experience preeclampsia with the incidence of asphyxia neonatorum, in this study with $OR = 1,688$. Pregnant women with preeclampsia, especially severe

preeclampsia, will be born babies with asphyxia conditions compared to women without severe preeclampsia(12). Research by M. Rosminah (2019) and P. Mandasari (2020) in their research also states the same thing, that mothers with preeclampsia have risk factors for born babies with asphyxia(13).

The occurrence of asphyxia neonatorum is not only influenced by maternal factors such as preeclampsia but can also be influenced by fetal factors. The gestation period is important and most often affects the baby's weight. The younger the gestation period, and fewer nutrients will be obtained and will increase the growth and development of the fetus. Low gestational age can increase the occurrence of LBW. This condition will also affect the development of the baby's respiratory organs and muscles and can cause a lack of surfactant in the alveoli. These causes make the baby difficult to breathe and ultimately increase the occurrence of asphyxia(14). Table 1 from this study shows 43 (70.5%) case samples to LBW, and 18 (29.5%) control samples experienced LBW.

Limitations in this study:

1. Not all samples can be respondents, because some do not meet the inclusion criteria and enter the exclusion criteria.
2. There is no difference between the diagnosis of preeclampsia and severe preeclampsia, and all fall into the category of preeclampsia. So the comparison of the occurrence of asphyxia neonatorum in preeclampsia and severe preeclampsia is not known.
3. The exclusion criteria of the sample are still incomplete to reduce bias. Lack of delivery method, and fetal position that can affect the occurrence of asphyxia, are not included in the exclusion criteria.

CONCLUSION

The results from this study entitled "The Relationship between Preeclampsia in Pregnancy and the Incidence of Neonatal Asphyxia at the Mangusada Regional Hospital in Badung in January 2017 -

December 2020" showed there is a significant correlation between preeclampsia during pregnancy with the incidence of asphyxia neonatorum at the Mangusada Badung Hospital from January 2017 – December 2020.

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