Research Article

Mode of Delivery and Neonatal Outcomes in Preterm Pregnancy

Metode Persalinan dan Luaran Neonatus pada Kehamilan Prematur

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Abstract

Objectives: To explain that mode of delivery has a correlation with neonatal outcomes in preterm pregnancies.

Methods: This study is a retrospective cohort conducted at Dr. Moewardi Surakarta Hospital, with total sampling of 484 cases divided into early preterm and late preterm from 2019 to 2021. Bivariate analysis was carried out to determine the correlation between Mode of Delivery (MOD) and neonatal outcomes.

Results: In the early preterm group, mode of delivery had a significant correlation ($p<0.05$) with birth weight, APGAR score, and neonatal mortality, however a significant correlation ($p<0.05$) in the late preterm group was only found in the APGAR score and neonatal mortality outcomes. Cesarean delivery, in both early and late preterm births had a lower rate of asphyxia and neonatal death ($p<0.05$).

Conclusion: There is a significant correlation between mode of delivery and neonatal outcomes in preterm birth. Caesarean delivery by indication can significantly reduce the risk of asphyxia, and neonatal mortality due to premature birth.

Keywords: mode of delivery, neonatal outcome, preterm.

Abstrak

Tujuan: *Menjelaskan bahwa metode persalinan sangat berkorelasi dengan luaran neonatus pada kehamilan prematur, oleh karena itu penelitian ini dapat menjadi bahan pertimbangan untuk memilih metode persalinan.*

Metode: *Penelitian ini merupakan penelitian kohort retrospektif yang dilakukan di RSUD Dr. Moewardi Surakarta, dengan total sampling sebanyak 484 kasus yang terbagi menjadi early preterm dan late preterm dari tahun 2019 hingga 2021. Analisis bivariat dilakukan dengan menggunakan analisis Chi-square dan Kruskal-Wallis untuk melihat korelasi antara metode persalinan (MOD) dan luaran neonatus*

Hasil: *Pada kelompok early preterm, metode persalinan memiliki hubungan yang signifikan ($p<0,05$) dengan luaran neonatus baik berat lahir, skor APGAR, dan kematian neonatus. Pada kelompok late preterm, hubungan yang signifikan ($p<0,05$) hanya didapatkan pada luaran skor APGAR dan kematian neonatus. Persalinan Caesar baik early maupun late preterm memiliki angka yang lebih rendah terhadap asfiksia dan kematian neonatus ($p<0,05$).*

Kata kunci: *metode persalinan, luaran neonatus, preterm.*

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INTRODUCTION

Mode of delivery is one of the essential factors in managing preterm labor. Preterm birth occurs in 5% to 10% of all pregnancies and is the most common cause of maternal and fetal morbidity and mortality worldwide. The risk to the fetus is mainly due to respiratory distress syndrome, sepsis, and low birth weight.[1,2] Recommendations for the delivery method for preterm birth are still controversial and have not been clearly defined.[2-4]

The rate of cesarean delivery (CS) has increased significantly over the past two decades, particularly in preterm deliveries. Cesarean delivery for premature babies has become an option in preterm labor. This is due to better management of postnatal care for Very Low Birth Weight (VLBW) infants. Several studies have also demonstrated significant beneficial effects of cesarean delivery (CS) in preventing neonatal death.[4,5] However, obstetricians and perinatologists still debate the optimal delivery method in preterm labor.

Studies evaluating the correlation between delivery method and neonatal outcome in preterm delivery are still lacking. Two previous studies have shown that vaginal delivery is associated with an increased likelihood of neonatal death with preterm delivery.[4,5] Several previous studies have also examined the outcome of Very Low Birth Weight neonates (<1,500g), comparing cesarean delivery with vaginal delivery and giving contrast results regarding the likelihood of intraventricular hemorrhage and neonatal death.[5,6]

A retrospective study is one of the reliable studies comparing neonatal outcomes in preterm birth related to the choice of delivery method. Therefore, this study aimed to determine the correlation between mode of delivery and neonatal outcomes in premature births at Dr. Moewardi Surakarta Hospital.

METHODS

This study is a retrospective cohort study conducted at Dr. Moewardi Surakarta Hospital. Samples were all patients with premature births, both early preterm and late preterm, at Dr. Moewardi Surakarta Hospital. A total sample of 484 patients were taken using the total sampling technique from 2019 to 2021. All samples were assessed and analyzed for characteristics and correlations between variables. The characteristics evaluated were gestational age, gravidity, maternal age, and mode of delivery.

The independent variable in this study is the mode of delivery, which is assessed on a categorical scale. The mode of delivery variable is classified into two, vaginal and Cesarian Section. In comparison, the dependent variables in this study were neonatal outcomes in Birth Weight (BW), APGAR score, and neonatal mortality. Birth Weight (BW) was assessed on an ordinal scale, classified as follows. VVLBW (Very Very Low Birth Weight, <1000 grams), VLBW (Very Low Birth Weight, 1000 - <1500 grams), LBW (Low Birth Weight, 1500 - < 2500 grams) and normal BW (Birth Weight > 2500 grams).

The outcome of neonatal was assessed based on the APGAR score at 5 minutes. The measurement of the APGAR score is in the form of an ordinal scale, with the following classification; Severe asphyxia (0-3), Moderate asphyxia (4-6), Mild or normal asphyxia (7-10) also categorical death, and still alive.

Bivariate analysis was conducted to determine the Correlation between mode of delivery and neonatal outcomes. Bivariate analysis was performed using the Chi-square to analyze the correlation between mode of delivery and neonatal mortality. In addition, the Kruskal Wallis was used to analyze the Correlation between mode of delivery and APGAR also birth weight scores. Data analysis using SPSS version 23 software.

RESULTS

A total of 484 samples were assessed and analyzed in this study. Table 1 describes the characteristics of each variables. The table explains that the total number of samples who received the vaginal delivery method was 173 people, while the other 311 received the Cesarean delivery method (CS).

Table 1. Characteristics of the Research Sample

Variable	Vaginal		Cesarean Section	
	N	%	N	%
Gestational age				
early	98	56.6	136	43.7
late	75			
Mother's age				
< 35	124	71.7	188	60.3
35	49	28.3	123	39.7
Gravide				
primigravida	51	29.5	59	19.0
multigravida	122	70.5	252	81.0
Total	173	100.0	311	100.0

source: primary data 2021

The sample was divided into early preterm (n=234) and late preterm (n=250) based on gestational age. This gestational age category was compared between early and late preterm, and bivariate was carried out to determine the Correlation between mode of delivery and neonatal outcomes in each group.

The characteristics of the sample maternal age were divided into <35 years (n=312) and ≥35 years (n=172). Meanwhile, the characteristics of gravidity were split into two categories, primigravida (n=110) and multigravida (n=374). After analyzing the characteristics of the sample, bivariate analysis was carried out to determine the correlation between the mode of delivery and neonatal outcomes. The results of the bivariate analysis are described in Table 2.

Tabel 2. Correlation Mode of Delivery and Neonatal Outcome

Variable	Early Preterm					Late Preterm				
	Vaginal		Cesarean Section		*P-value*	Vaginal		Cesarean Section		*P-value*
	N	%	N	%		N	%	N	%	
Birth Weight										
<1000	27	27.6	10	7.4	0.000	0	0.0	3	1.7	0.600
1000-<1500	33	33.7	53	39.0		5	6.7	15	8.6	
1500-<2500	34	34.7	69	50.7		48	64.0	113	64.6	
>2500	4	4.1	4	2.9		22	29.3	44	25.1	
APGAR										
Mild asphyxia	24	24.5	45	33.1	0.000	54	72.0	143	81.7	0.002
Moderate asphyxia	24	24.5	57	41.9		7	9.3	22	12.6	
Severe asphyxia	28	28.6	30	22.1		1	1.3	4	2.3	
Neonatal death										
Yes	22	22.4	4	2.9	0.000	13	17.3	6	3.4	0.000
No	76	77.6	132	97.1		62	82.7	169	96.6	
Total	98	100.0	136	100.0		75	100.0	175	100.0	

The study results showed that in the early preterm group, mode of delivery had a significant correlation ($p<0.05$) with neonatal outcomes, including birth weight, APGAR scores, and neonatal mortality. In addition, the data shows that cesarean delivery has a lower incidence of low birth weight, respiratory distress syndrome characterized by asphyxia and has a statistically lower mortality rate than vaginal delivery.

Meanwhile, a significant correlation ($p<0.05$) was only found in the APGAR score and neonatal mortality in the late preterm group. Cesarean delivery had a lower rate of asphyxia and neonatal death ($p<0.05$). The output in birth weight did not show a significant correlation with the mode of delivery in this study.

DISCUSSION

This study aims to determine the Correlation between mode of delivery on neonatal outcomes with preterm birth, which was determined by birth weight, APGAR score at 5 minutes, and neonatal mortality. This study found that cesarean delivery had a better benefit on neonatal outcomes in preterm delivery. Previous similar studies have shown mixed results and have not fully explained how the advantages of cesarean delivery are compared to vaginal delivery in preterm delivery.

This study showed a significant value in all groups, both early preterm and late preterm. Both groups showed that cesarean delivery significantly reduced the risk of neonatal death in preterm delivery. In addition, significant results were also shown in the APGAR score variable, where the group of cesarean delivery was lower in experiencing asphyxia than vaginal delivery. However, significant results were only shown in the early preterm group for the Birth Weight variable.[7,8]

Preterm pregnancies that need to be delivered may become the sign of indication that the fetal well-being is disrupted inside the womb or the fetus will have a harmful impact on the pregnancies, therefore delivering the baby as soon as possible is a preferred choice to prevent neonatal morbidity. Cesarean delivery has relatively faster than vaginal delivery in patients who have had no cervical dilation before; therefore, cesarean delivery becomes effective in saving infants' lives, including neonatal asphyxia, when they are required for medically indicated reasons. However, the assertion that cesarean delivery can reduce the risk of neonatal death in

preterm labor is still debated. Cesarean delivery is associated with increased short and long-term threats to the mother, including infection, bleeding, and future surgical complications from scarring. In addition, Cesarean deliveries are more expensive for the health care system.[9,10]

The results of this study are in line with a retrospective study and several other studies which showed that cesarean delivery was associated with a reduced probability of death within 28 days of life for neonates born before 31 weeks of gestation. In addition, the findings of this study are also in line with the study who found that cesarean delivery was associated with reduced neonatal mortality in singletons.[11,12]

This study is more complete compared to previous studies considering the relatively large sample size for rare conditions and the variation in the outcomes measured. In addition, this study also distinguished between the early preterm group and the late preterm group. This uses APGAR score at 5 minutes as the best available parameter, as it is easy to use and well known to both obstetricians and neonatologists. This parameter has also been shown to have adequate applicability in previous studies.

The nonrandomized retrospective cohort study used in this study lead to some limitations. We could not adjust the indication for delivery or classify spontaneous preterm delivery from indicated preterm birth. Thus, some of cesarean deliveries can occur in patients who require more urgent delivery and will be far worse if they undergo vaginal delivery. It is also conceivable that some cesarean deliveries may result from failed induction or trials of labour during health care. In addition, the data in this study did not contain information about the administration of steroids and antenatal pre-medication to reduce intraventricular hemorrhage and respiratory distress syndrome.

CONCLUSION

This study showed a significant correlation between mode of delivery and neonatal outcomes with preterm birth. Cesarean delivery can significantly reduce the risk of asphyxia, and neonatal death due to premature birth, but cesarean delivery should be consider those who need a more urgent indication than vaginal delivery, therefore the selection of the delivery method must be appropriate according to clinical conditions.

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