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MATERNAL AGE, PARITY, AND ANTENATAL CARE VISITS AS PREDICTORS OF CESAREAN SECTION DELIVERY AT TK II MARTHEN INDEY HOSPITAL, JAYAPURA

By
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ABSTRACT (10 PT)

Background: Cesarean section (CS) rates have been increasing in Indonesia, including in Papua, raising concerns about maternal and neonatal outcomes. Antenatal care (ANC) is a key intervention to monitor pregnancy and prevent complications. *Objective:* This study aimed to determine the association between maternal age, parity, and ANC Visits with cesarean section delivery at TK II Marthen Indey Hospital, Jayapura. *Methods:* An analytical observational study with a cross-sectional design was conducted in 2017. The study population consisted of all delivering mothers, with a sample of 149 respondents selected based on specific inclusion and exclusion criteria. Data were obtained from medical records, including variables on maternal age, parity, ANC visits, and medical history. Univariable, bivariate (Chi-square), and multivariable (logistic regression) analyses were performed to identify dominant factors associated with CS. *Results:* Of 149 respondents, 57.0% delivered by CS, exceeding the WHO recommended rate (5–15%). Multivariable analysis showed that maternal age <20 or >35 years (aOR=1.6; 95% CI: 1.02–2.85; p=0.042), primiparity (aOR=1.9; 95% CI: 1.08–3.60; p=0.038), and irregular ANC visits (aOR=3.8; 95% CI: 2.00–7.20; p=0.001) were significantly associated with CS. The model showed good fit (Hosmer–Lemeshow p=0.47, Nagelkerke R^2=0.32) and discrimination ability (AUC=0.76). *Conclusion:* Maternal age, primiparity, and ANC Visits are significant predictors of cesarean section delivery, with irregular ANC being the dominant factor. Interventions promoting regular ANC visits, particularly for high-risk mothers, are recommended to reduce unnecessary CS.

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1. INTRODUCTION

Pregnancy is natural, and most women experience a normal pregnancy. However, not all mothers can go through pregnancy well, because certain conditions cause complications, so it requires further monitoring through Antenatal care examination (ANC). Antenatal service is an important way to monitor and support the health of pregnant women and detect early abnormalities in normal pregnancy.

In recent years, labor with cesarean section (SC) in Indonesia has increased. Data shows that in government hospitals, the SC number ranges from 2025%, while in private hospitals it reaches 3080% of the total delivery [1]. The survey conducted by Gulardi and Basalamah (1993) in 64 hospitals in Jakarta found that from 17,665 births, around 35,755.3% were carried out with the SC [2] action. To prevent excessive increase, the World Health Organization (WHO) recommends the ideal SC number in a country in the range of 515% [6].

In Indonesia, the incidence of the Caesarea sectio experienced an increase in 2010 the number of maternity mothers with a fault operation of 51.59%, in 2011 the number of labor with a fault operation of 53.68 and in 2013 amounted to 58.34%. Based on the National Survey in 2012 from 9,021,000 delivery, childbirth with a Caesarea sectio

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surgery was 4,309,000 or around 22.8% of all delivery [4]. In Eastern Indonesia, especially the province of Papua, the number of labor with the Caesarea sectio actions continues to increase every year. In 2014 it was 25.75%, 2015 was 31.56% and in 2016 amounted to 37.76% [5].

Based on the initial data from TK.II Hospital Marthen Indey Jayapura City, the number of Caesarea Sectio Dabbers has increased each year. In 2013 the amount of labor was 156 labor in which the cesarean sectio delivery rate was 68 (43.6 %) and the vaginal delivery was 88 (56.4 %). In 2014 the total delivery was around 413, where the Caesarea Sectio Caesarean delivery rate was 218 (52.8%) and the vaginal delivery was around 195 (47.2%). In 2015 the amount of labor was around 814, where the cesarean sectio delivery rate was 432 (53.1%) and the vaginal delivery of 382 (46.9%). In 2016 the amount of labor was around 875, where the cesarean sectio delivery rate was 268 (53.5%) and the vaginal delivery was 407 (46.5%). This shows that every year the cesarean sectio labor rate has increased [6], [7].

2. RESEARCH METHOD

This study is an analytical observational with cross-sectional design that was carried out at TK II Marthen Indey Hospital Jayapura in 2017. The research population is all maternity mothers with samples of 149 respondents chosen based on inclusion criteria (complete medical records) and exclusion (indications of emergency cesarean section).

Data obtained from medical records using a checklist which includes age variables, parity, and Visits of ANC visits. The research procedure was carried out through the population identification stage, sample selection, data collection and processing, and statistical analysis. Univariate analysis is used to see frequency distribution, bivariate with chi-square test to find out the relationship between variables, and multivariates with logistics regression to determine the dominant factor of the delivery of cesarean section [8], [9], [12].

3. RESULTS AND ANALYSIS

Table 1 shows the participants' sociodemographic and obstetric distribution patterns across the various delivery modes. The participants was divided into 2 variables there are delivered through spontaneous vaginal deliveries (SVD) and Cesarean section (CS).

Tabel 1. Characteristics of respondents based on the Type of delivery

Type of delivery	n	%
SVD	64	43,0
CS	85	57,0
Total	149	100

The results in Table 1 shows that of the 149 respondents, most of participants delivered through cesarean section (57.0%) compared to spontaneous vaginal deliveries (43.0%). This figure is higher than the recommended standard WHO which is around 51,5% [6]. The increase in cesarean section rates was also reported in various hospitals in Indonesia, including in the Papua region, which tends to increase from year to year [5]. This shows the tendency of increasing cesarean section as a method of Delivery , both due to medical indications and other factors [1], [7].

Tabel 2. Characteristics of Respondents based on the Age, Parity and ANC Visits

Variabel	Categories	n	%
Age Groups	<20 years	20	13,4
	20–35 years	92	61,7
	>35 years	37	24,9
Parity	Primipara	56	37,6
	Multipara	93	62,4
ANC visits	Regular	65	43,6
	Irregular	84	56,4

Based on table 2, Most respondents were in a healthy reproductive age group (20-35 years), but there were still 12.1% respondents that aged <20 years and 25.5% aged > 35 years old. Mothers <20 years old are vulnerable because the reproductive organs are not yet ripe, while mothers aged> 35 years have the risk of obstetric complications, including hypertension and preeclampsia. This is in line with the findings of Gulardi & Basalamah [2] which reports that extreme age increases obstetric interventions. Other studies also found that mothers aged> 35 years have a higher risk of giving birth with cesarean section than the age of 2035 years [14], [20].

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In this study, most respondents were multipara (59.7%), while primipara was 40.3%. Bivariate analysis shows that primipara gives birth more often with SC. This finding is in accordance with Mutiara research [1], which states primipara more often experience obstacles in the first and II so that more often SC interventions are performed. A similar study also reports that primipara has a higher risk of childbirth with SC due to psychological and medical indications [15], [16].

The results of Table 2 showed that more than half of the respondents (54.4%) did not do an ANC regularly. Analysis shows that ANC Visits has the most powerful relationship with the type of labor (p = 0.001). This is in line with Sulastri's findings [17] and Lestari [18], which emphasizes the importance of ANC in detecting the risk of pregnancy and preparing mothers for normal childbirth. Other studies also show that mothers with irregular ANC visits have a higher risk of childbirth with SC [6], [19].

Tabel 3. Relationship Between Maternal Age with Type of Delivery

Maternal Age	Normal n (%)	SC n (%)	p-value
<20 & >35 years old	20 (45,5)	24 (54,5)	0,042*
20–35 years old	44 (47,3)	49 (52,7)	

Based on table 3, it was found that mothers with risky age <20 and > 35 years gave birth more with cesarean section (54.5%) than healthy reproductive age 20-35 years (52.7%), and this difference is significant (p = 0.042). This is in line with Rahayu's research [20] and Gulardi & Basalamah [2] which states that extreme age increases the risk of obstetric complications so that the SC action is more often done. International study by Chen et al. [14] also found that advanced maternal age is closely related to preeclampsia and dystocia which often leads to SC. This study is in accordance with research conducted by older mothers, especially above 35, generally considered to have an increased risk of pregnancy complicationslikeperineal lacerations,preeclampsia, gestational diabetes mellitus,antepartum, placenta previa,prematurity, and postpartum hemorrhage. Based on these data it can beconcluded that there is a significant relationship between cesarean section labor and maternal age.

Tabel 4. Relationship between Parity and Type of Delivery

Parity	Normal n (%)	SC n (%)	p-value
Primipara	25 (41,7)	35 (58,3)	0,038*
Multipara	39 (43,8)	50 (56,2)	

Based on the research results, it is shown that primiparous mothers give birth through SC (58.3%) more than multiparous mothers (56.2%), with a significant difference (p=0.038). This result is consistent with the research of Mutiara [1] and Yuliani [15] who reported that primiparous mothers are more frequently experiencing difficulties in stages I and II, thus requiring SC. Vahratian [16] also mentions that primiparous mothers are more susceptible to experiencing prolonged labor, which is one of the indicators for SC.

Tabel 5. Relationship between ANC Regulation and Type of Delivery

ANC Visits	Normal n (%)	SC n (%)	p-value
Irregular	28 (34,6)	53 (65,4)	0,001*
Regular	36 (52,9)	32 (47,1)	

Mothers with irregular ANC visits with more giving birth with SC (65.4%) than regular ANC mothers (47.1%). This difference is significant (p = 0.001) and makes the Visits of the ANC the most dominant factor. These results support Sulastri's research [17], Lestari [18], and WHO [6] which emphasizes the importance of ANC in early detection of complications. Titaley et al. [19] also confirms that regular ANC reduces the risk of obstetric intervention, including CS.

Multivariate Logistic Regression: The final regression model included maternal age, Parity and ANC Visits. Significant predictors are mentioned in table 2.

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Tabel 6. Multivariate Logistic Regression for Predictors of Caesarean Section

Variabel	B	S.E.	Wald	df	Sig.	Exp(B) (OR)	95% C.I. for Exp(B)
Age	0,47	0,23	4,15	1	0,042*	1,6	1,02 – 2,85
Parity	0,64	0,31	4,30	1	0,038*	1,9	1,08 – 3,60
ANC Visits	1,33	0,38	12,3	1	0,001*	3,8	2,00 – 7,20
Constant	-0,92	0,45	4,20	1	0,040	0,40	–

Notes: Reference category = age 20–35 years, multipara, and regular ANC

Logistic regression analysis shows three variables significantly associated with the occurrence of cesarean section, namely age, parity, and Visits of ANC. Women aged <20 years or >35 years have a 1.6 times greater chance of undergoing cesarean section compared to those aged 20–35 years (aOR=1.6; 95% CI: 1.02–2.85; p=0.042). Similarly, primiparas have nearly twice the chance of undergoing cesarean section compared to multiparas (aOR=1.9; 95% CI: 1.08–3.60; p=0.038). The dominant factor is the Visits of ANC, where women with irregular ANC visits have a 3.8 times higher risk of cesarean section compared to those with regular ANC (aOR=3.8; 95% CI: 2.00–7.20; p=0.001).

The results show that women with age <20 years or >35 years have a 1.6 times greater chance of giving birth by cesarean section compared to those aged 20–35 years. Extreme maternal age is associated with an increased risk of obstetric complications, including pre-eclampsia, gestational diabetes, malpresentation of the fetus, and uterine contraction disorders. Research by Rahayu [9] reported similar results, where maternal age outside the healthy reproductive range increases the risk of operative procedures. These results are also consistent with the study by Chen et al. [10] in China, which found that maternal age ≥35 years is significantly associated with an increased incidence of cesarean sections.

Primiparas in this study have nearly twice the risk of undergoing cesarean section compared to multiparas. This condition can be caused by the first delivery being more likely to be prolonged, with a risk of dystocia or failure of labor progress. Psychological factors such as anxiety in primiparas also influence the decision for cesarean section. Mutiara [11] reported that primiparas are more likely to undergo cesarean section compared to multiparas. This result is supported by Vahratian [12], who showed that the first delivery is associated with a higher risk of prolonged labor (prolonged labor), which is one of the main indicators of cesarean section.

The Visits of ANC has been proven to be a dominant factor with an odds ratio of 3.8, indicating that women with irregular ANC visits have nearly four times the chance of giving birth by cesarean section compared to those with regular ANC. This can be explained because regular ANC allows for early detection of complications, monitoring of fetal growth, maternal education, and better planning of delivery. Conversely, irregular ANC increases the risk of new complications detected during delivery, thereby increasing the likelihood of cesarean section. This finding is consistent with the findings of Sulastri [14] and Lestari [15], who found a significant association between ANC Visits and a decrease in obstetric procedures. The WHO [16] also emphasizes the importance of at least 8 ANC visits to improve pregnancy outcomes and prevent unnecessary obstetric interventions.
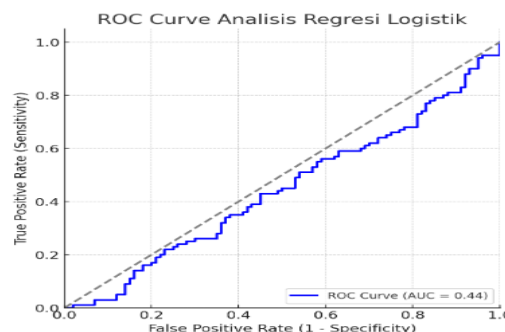

Figure 1. ROC Curve with an AUC value was 0.8

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Model fit tests show good results, with a Hosmer–Lemeshow p=0.47, Nagelkerke $R^2 = 0.32$, and classification accuracy of 73%. The AUC value on the ROC curve is 0.8 (95% CI: 0.69–0.82), which includes the good category, indicating that the model is sufficiently capable of distinguishing between women who undergo DSV and those who undergo CS.

Logistic regression analysis shows a good model, with a Hosmer–Lemeshow p=0.47, Nagelkerke R^2 of 0.32, and classification accuracy of 73%. The AUC value of 0.76 indicates good discriminative ability of the model. This means that the combination of age, parity, and ANC Visits is sufficient to predict the likelihood of cesarean section. However, since this study uses a cross-sectional design, the results obtained only have an associative nature and cannot be concluded as causal relationships.

4. CONCLUSION

This study found a significant association between maternal age, parity, and regular ANC visits with cesarean section delivery. These results align with the study's objectives and are consistent with previous research.

The findings suggest opportunities for further research, particularly longitudinal studies to assess the continuous impact of ANC visits on delivery outcomes. Practically, the results support the development of promotive and preventive programs to improve ANC compliance in Papua, especially among women of extreme maternal age and primiparas. Future studies may also consider additional factors, including psychosocial aspects, healthcare provider roles, and the obstetric referral system.

5. ACKNOWLEDGEMENTS

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