

ORIGINAL RESEARCH

Obstetric complications and delivery methods in Indonesia


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Article Info	ABSTRACT
<p>Received Nov 8, 2022 Revised Jan 24, 2023 Accepted Feb 3, 2023 Published Apr 1, 2023</p> <p>*Corresponding author: Hadi Ashar hadi024@brin.go.id</p> <p>Keywords: Indications Methods of delivery Cesarean section Maternal health</p> <p>This is an open access article under the CC BY-NC-SA license (https://creativecommons.org/licenses/by-nc-sa/4.0/)</p> 	<p>Objective: This study aimed to determine the delivery methods, indications and any associations between delivery methods and obstetric complications in Indonesia in 2018.</p> <p>Materials and Methods: This study analyzed data from the Basic Health Research (Riskesdas) 2018. The population and sample were married eligible women of 10 – 54 years old who had children, as many as 78,737 mothers. The variable taken in this study was the problems/complications during pregnancy as the independent variable, and the methods of delivery as the dependent variable. Chi-square test was used for comparison purposes. Logistic regression was run to relationship between complications and delivery methods.</p> <p>Results: Delivery indications were complications during the delivery process (23.23%), premature rupture of membranes (5.07%), obstructed labor (3.37%), transverse fetus (3.09%), bleeding (2.36%), and other complications (3.98%). Methods of delivery were expected delivery (81.45%), cesarean section (17.64%), and with other procedures (0.90%).</p> <p>Conclusion: Complications of labor correlate significantly with the methods of cesarean section. The cesarean section still dominated among other delivery modes, and there are still many mothers who did not have complications or no medical indications but choosing cesarean section delivery.</p>

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Highlights:

1. Nearly a quarter of pregnant women experience pregnancy complications during the delivery process.
2. Caesarean section delivery is dominant among other methods, and 8.4% of mothers do not have any complications but choosing cesarean section delivery.

INTRODUCTION

Pregnant mothers are hoped to have a healthy and smooth pregnancy, with no problems/complications that will impact their delivery process.¹ Pregnancy is a period that is vulnerable to health status, health

conditions before pregnancy also affect pregnancy, such as a history of hypertension, diabetes, and anemia. These conditions must be controlled first so there will be no more significant risk during pregnancy. A high-risk pregnancy is associated with many problems that

can affect marital well-being as well as maternal and fetal health.^{2,3}

Delivery can be by vaginal (standard), some medical assistants/procedures or surgically (cesarean section). Those methods should be based on the condition of the mother and the fetus during delivery. The vaginal delivery method is a delivery that can be done generally without any special procedures/treatments from medical staff. Vaginal delivery with procedures means delivery where the condition of the mother and the fetus requires special treatment from medical personnel using several tools or drugs such as vacuum, forceps, induction, etc. Cesarean section is a particular procedure when there is abdominal surgery by an expert doctor if vaginal delivery cannot be conducted⁴ because it is expected to endanger the mother and the fetus.⁵ Epidemiological data around the world and in Indonesia regarding complications of pregnancy and delivery methods are very limited. In Indonesia, almost 30 percent of births do not have complications during labor, while other births have one or more complications. The most dominant labor complications are prolonged labor (40.6%) and rupture of membranes (19%).⁶ Meanwhile the number of deliveries by cesarean section in most countries in the world is very high, including in Indonesia (17.64%)⁷ and in France (20.2%).⁸

Caesarean section is caused by maternal factors, fetal factors or both.⁹ Some mothers think that giving birth by caesarean section will be safer and more comfortable for both the mother and the baby. This is related to the mother's knowledge about pregnancy and delivery methods.¹⁰ Advances of technology and science, as well as medical devices, have provided alternatives for delivery process. However, this procedure is not justified considering that childbirth is a natural process if there are no complications or if there is no medical indication to caesarean section.¹¹ Sometimes, mothers prefer to choose it even though they can actually choose normal delivery. As a result, caesarean section delivery rate has increased significantly in most countries, either in low, middle, or high income countries. Based on these conditions, it is necessary to review the indications and method of delivery and the relationship between complications and mode of delivery in Indonesia.

MATERIALS AND METHODS

The data were based on a survey in Basic Health Research (Riskesdas) 2018. The population and sample in this article were eligible married women between the age of 10 – 54 years who met the inclusion and

exclusion criteria. The inclusion criteria in this study were women aged 10 – 54 who had given birth and included as the sample of Basic Health Research 2018. The exclusion criteria were the ones with incomplete data. The sample was taken using multistage stage cluster sampling method with census block as the cluster collected 78,737 samples (NIHRD, 2018).

The variables were delivery complications as the independent variables and methods of delivery as the dependent variables. Delivery complications included the transverse fetus, bleeding, seizure, premature rupture of membranes, extended delivery, umbilical cord loop, placenta previa, retained placenta, and hypertension, while the delivery methods included standard delivery, cesarean section, vacuum, forceps, induction, and others.

The data analyzed used the licensed software full term (SPSS) version 21 owned by Health Research and Development Center, Magelang, Indonesia. After data screening, descriptive analysis was conducted by cross-tabulation between pregnancy complications and delivery methods. Chi-square tests were used for comparison purposes. Logistic regression was run to relationship between complications and delivery methods. This study obtained ethical approval from the Indonesian Health Research and Development Ethics Committee Number LB.02.01/2/KE.380/2018. All parents declared their participation in a signed consent form.

RESULTS AND DISCUSSION

Table 1 shows that almost a quarter of the respondents experienced labor complications. The percentage distribution of the frequency of delivery complications, ie. the premature rupture of membranes, extended delivery, and the transverse fetus, was higher than the others. Table 1 also shows that 17.64% of respondents gave birth via cesarean section. This high cesarean rate has exceeded the maximum limit of the WHO standard. Other studies reinforce the statement that the population rate of the cesarean section above 10-15 per cent is hardly justified from a medical perspective.

Table 2 shows the cross-tabulation of labor complication indications for the delivery method. The cause of the high rate of cesarean section is a several labor complications: placenta previa, transverse fetus and hypertension. For these three labor complications the section can still be carried out generally based on data from research results that have been conducted in several countries.



Table 1. Distribution frequency of delivery complications and delivery methods in Indonesia 2018 (N=78.737)

Variables	Frequency, n (%)	
	Yes	No
Delivery complications		
Transverse fetus	2.432 (3.09)	76.305 (96.91)
Bleeding	1.858 (3.09)	76.879 (97.64)
Seizure	101 (0.13)	78.636 (99.87)
Premature rupture of membranes	3.989 (5.07)	74.748 (94.93)
Long delivery	2.656 (3.37)	76.081 (96.63)
Umbilical cord loop	1.666 (2.12)	77.071 (97.88)
Placenta previa	433 (0.55)	78.304 (99.45)
Retained placenta	453 (0.58)	78.284 (99.42)
Hypertension	1.567 (1.99)	77.170 (98.01)
Other	3.132 (3.98)	75.605 (96.02)
No issues	60.450 (76.77)	18.287 (23.23)
Delivery Methods		
Normal	64.134 (81.45)	14.603 (18.55)
Cesarean section	13.891 (17.64)	64.846 (82.36)
Vacuum	534 (0.68)	78.203 (99.32)
Forceps	53 (0.07)	78.684 (99.93)
Induction	70 (0.09)	78.667 (99.91)
Other	55 (0.07)	78.682 (99.93)

Table 2. Crosstabulation of the indications of the delivery problems/complications towards the choice of delivery methods in Indonesia 2018

Labor complication	Delivery method, n (%)						Total
	Normal	Cesarean section	Vacuum	Forceps	Induction	Others	
Transverse fetus	689 (28.33)	1.735 (71.34)	5 (0.21)	1 (0.04)	0 (0.00)	2 (0.08)	2.432 (100.00)
Bleeding	1.524 (82.02)	310 (16.68)	23 (1.24)	1 (0.05)	0 (0.00)	0 (0.00)	1.858 (100.00)
Seizure	50 (49.50)	48 (47.52)	3 (2.97)	0 (0.00)	0 (0.00)	0 (0.00)	101 (100.00)
Premature rupture of membranes	2.131 (53.42)	1.750 (43.87)	84 (2.11)	1 (0.02)	9 (0.23)	14 (0.35)	3.989 (100.00)
Long delivery	1.210 (45.56)	1.251 (47.10)	163 (6.14)	4 (0.15)	21 (0.79)	7 (0.26)	2.656 (100.00)
Umbilical cord loop	1.203 (72.21)	448 (26.89)	14 (0.84)	0 (0.00)	1 (0.06)	0 (0.00)	1.666 (100.00)
Placenta previa	75 (17.32)	355 (81.99)	3 (0.90)	0 (0.00)	0 (0.00)	0 (0.00)	433 (100.00)
Retained placenta	438 (96.69)	8 (1.77)	1 (0.22)	0 (0.00)	6 (1.32)	0 (0.00)	453 (100.00)
Hypertension	712 (45.44)	821 (52.39)	26 (1.66)	3 (0.19)	2 (0.13)	3 (0.19)	1.567 (100.00)
Others	945 (30.17)	2.085 (66.57)	73 (2.33)	7 (0.22)	16 (0.51)	6 (0.19)	3.132 (100.00)
No issues	55.157 (91.24)	5.080 (8.40)	139 (0.23)	36 (0.06)	15 (0.02)	23 (0.04)	60.450 (100.00)

Pregnant women hope that their pregnancy will be smooth and healthy until the birth process and hope that the position of the fetus is normal with head presentation. However, sometimes an abnormal fetal position, such as a transverse fetus, occurs. This makes problem in the delivery process, causing labor complications if assisted improperly.¹² Studies have shown that fetal position with pure breech presentation can still be born normally.¹³ Table 2 show that 28.33% of women gave birth normally and 71.31% of fetal transverse were born with cesarean section or other procedures. Studies showed that normal delivery can still be attempted or by procedures to reduce the number of deliveries by cesarean section. Table 3 shows the relationship between labor complications and delivery method. Transverse fetal position is significantly related to the mode of delivery by cesarean section approximately 24 times. A study in Australia showed similar

findings where there was an increase in the cesarean delivery rate which was mainly due to a more significant number of breech presentations.¹⁴ Table 3 shows relationship between several labor complications and delivery methods. Close relationship was found in placenta previa, transverse fetus and hypertension, followed by other cases.

Delivery bleeding still indicates how high maternal mortality, especially postpartum bleeding, is in Indonesia. Some efforts have been made by the Health Ministry to manage and improve the treatment of postpartum bleeding.¹⁵ This study showed that 82.0% of mothers underwent standard delivery and 16.68% were by cesarean section, meaning that mothers with labor bleeding can still be attempted to deliver typically. Table 3 shows that bleeding has the potential for delivery with cesarean section approximately two times.



Table 3. The relationship between labor complications and delivery methods in Indonesia in 2018

Labor complication	Delivery method, n (%)		OR (95% CI)	p-value
	Vaginal	Cesarean section		
Transverse fetus	697 (28.66)	1.735 (71.34)	24.74 (22.49-27.22)	<0.001
Bleeding	1.548 (83.32)	310 (16.68)	2.28 (2.01-2.59)	<0.001
Seizure	53 (52.48)	48 (47.52)	6.33 (4.35-9.21)	<0.001
Premature rupture of membranes	2.239 (56.13)	1.750 (43.87)	8.56 (7.94-9.22)	<0.001
Long delivery	1.405 (52.90)	1.251 (47.10)	9.23 (8.47-10.05)	<0.001
Umbilical cord loop	1.218 (73.11)	448 (26.89)	3.48 (3.08-3.93)	<0.001
Placenta previa	78 (18.01)	355 (81.99)	47.56 (36.46-62.04)	<0.001
Retained placenta	445 (98.23)	8 (1.77)	0.33 (0.19-0.56)	<0.001
Hypertension	746 (47.61)	821 (52.39)	10.85 (9.75-12.08)	<0.001
Other	1.047 (33.43)	2.085 (66.57)	22.78 (20.93-24.80)	<0.001
No issues	55.370 (91.60)	5.080 (8.40)	0.10 (0.99-0.11)	<0.001

CI: confidence interval; OR: odds ratio

Premature Rupture of Membranes (PROM) is one of the delivery complications. Previous studies showed that PROM is related to the delivery method of cesarean section.^{16,17} This study elaborates that the methods of delivery can be done in a balance between standard delivery and cesarean section, and PROM has the potential to deliver approximately eight times with cesarean section. The cause of PROM is yet to be identified, but it is related to age, gemeli, parity, anaemia, preterm, infection, working mother, and pregnancy interval.¹⁸

Long delivery correlates with less than usual uterus contractions. Contraction becomes less frequent, and strength of control also reduces.¹⁹ Another study showed that long delivery does not correlate with a delivery method of cesarean section.¹⁷ However, in this study there was little difference in the delivery method, 47.10% by cesarean section and 52.90% by standard delivery (Table 3). Table 3 also shows that respondents delivered with cesarean section were nine times higher.

The umbilical cord loop and placenta previa are two different cases, but the umbilical cord loop is related to placenta previa. In the case of an umbilical cord loop with the right and left winding, most cases occur in the proper umbilical cord winding. However, both have risks towards the limit of intrauterine growth and fetal death.²⁰ Standard delivery can mostly make the umbilical cord loop in the distinctive delivery handling process. However, if the placenta previa has closed most of the birth path, it will be challenging to hold a standard delivery. This study showed that 73.11% of mothers with umbilical cord loops are giving birth with standard delivery, while among mothers with placenta previa, only 18.01% had a standard delivery. Table 3 shows the association of placenta previa with the method of delivery about 47 times for cesarean section.

Some labor problems in this study showed how a mother and health staff can decide which delivery method is done with various problems. Table 1 describes that 60,450 (76.77%) mothers have no delivery problem. In contrast, less than one-fifth (23.23%) of pregnant mothers are indicated to have the issues. Health staff, especially midwives and obstetric doctors, will undoubtedly focus on the mothers with the issues so they can pass the process well without complications. The result of the previous study elaborated that this delivery problem implies the delivery methods which inflict mothers' and fathers' anxiety.^{21,22} The mother's anxiety about the delivery problem cannot be avoided and must be faced with a mature mind. Besides, it was the awareness of the mothers who had issues in delivery that there was still 8.40% of them choosing cesarean section. It can be reviewed how caesarean section delivery becomes an option for mothers who may undergo standard delivery.

In labor process in Indonesia and worldwide, caesarean section tends to increase as shown by ecological evidence. It is considered one of the most effective interventions to save both mother and fetus. Although it has been a trend, the percentage of cesarean section delivery is 10% higher than the population level. It is not automatically related to reduction of maternal and fetal mortality rate.¹¹ The options of cesarean section delivery must be considered well and it is applied when there is an apparent benefit as shown by medical indication. Other reasons are not allowed. Surgical procedures' high cost and risk/complications must be examined.¹¹ Robson's classification could help identify possibilities for decreasing cesarean section rates.²³ Cesarean section surgery can effectively prevent maternal mortality and morbidity when the reason is justified medically. However, no evidence showed benefit of cesarean section delivery methods to women not suitable for the procedure. Even the risk will

increase with limited access to the more comprehensive service.

Cesarean section delivery is categorized as a high-risk surgery with some possibilities of having complications such as postoperative bleeding, sepsis, bladder injury, ureteric injury, bowel injury, postoperative ileus, or Ogilvie syndrome.²⁴ The more severe impacts, especially to the mother's health and consequences to physical health and social-economic, will be suffered by mothers with middle and low economic levels. The result of the study using in-depth interviews shows that women are unlikely to obtain precise information about the short-term and long term complication and indications of cesarean section. It is related to the hospital facilities and infrastructure and the referral management process. Local hospitals with less equipment are different compared to referral hospitals.

The results showed that some factors affected cesarean section delivery, such as the maternal characteristics, maternal and fetal health status, delivery problems, parity, and ANC records. All of these factors increased the chance of cesarean section delivery.²⁵⁻²⁸ Another study also indicated that more women request cesarean-section delivery for medically unacceptable reasons.²⁹ Cesarean section without any indication will have harmful impacts on maternal health in both the short and long term sequelae. Before deciding to have a cesarean section to decrease the number of cesarean section delivery, interventions can be in the form of induction, partograph, or vacuum/forceps birth. As observers of maternal health, the government, the public, and the media must work together to reduce the suffering of mothers due to the high number of cesarean sections.^{30,31}

Inaccurate information on cesarean section from media about advances in science and technology in handling cesarean section delivery process and socio-cultural and medicolegal that are not conveyed completely have caused mothers choosing wrong delivery method. Intraoperative and postoperative risks of cesarean section must be considered, along with complications that could potentially affect subsequent pregnancies. Cesarean section should only be performed when it benefits the mother.²⁹ The lack of quality of the information received by mothers during ANC may need to be reviewed and conveyed clearly, a procedure that should have been taken during the preventive period.³²

Several issues raise questions about the increase in cesarean sections, including changes in pregnancy management, the availability of delivery services, and the expectations of patients or healthcare providers. In low-income countries such as Bangladesh, the rate of cesarean section in private facilities is very high at

73%.⁵ The high cost of cesarean section delivery, especially for mothers with low economic status, can negatively affect health and socioeconomic status.⁴ The probability of a woman using cesarean method varies according to each individual's characteristics, history of pregnancy, and childbirth. A study in Iran showed that women who received prenatal care from obstetricians had about 2.3 times more, and with the increased number of ultrasounds, the odds of cesarean section augmented by 25%.³³ Based on the 2017 IDHS data analysis, the use of the cesarean section method in childbirth was not only based on the presence or absence of medical indications, but many other factors have played a role in the selection of this method.^{34,35}

Cesarean section rate in Indonesia, according to 2018 Basic Health Research results, was 17.6%. This rate has passed the maximum limit of the WHO standard. Other studies corroborate the statement that population rates of the cesarean section of above 10-15% are hardly justified from a medical perspective, and it must have impact on maternal, newborn, and infant morbidity and mortality.^{11,36} A study conducted by Suryati in 2013 showed that the average characteristics of mothers living in cities, low education and poor people, and not at high-risk age were factors associated with cesarean section.³⁷

In recent years, observers of maternal health, the government, and the WHO have expressed concern about the increasing number of births through cesarean section and the potential negative consequences for maternal and infant health, and the need to review indications of whether or not cesarean section can be performed.^{11,38}

CONCLUSION

Labor complications have significant correlation with cesarean section. The method of cesarian section remains predominant among other delivery modes. Even many mothers who do not have complications or with no medical indications have chosen to give birth using cesarean section delivery.

DISCLOSURES

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Conflict of interest

The authors declared no conflict of interest in this study. Additionally, this article does not have comprehensive ethical issues, such as plagiarism, implied consent, theft, data creation and, or falsification, duplicate publication or requests, and redundancy.

Author Contribution

All authors have contributed to all processes in this research, including preparation, data gathering and analysis, drafting and approval for publication of this manuscript.

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