

## Literature Review

### **Review of Determinants of Nonmedical Caesarean Section in Indonesia: A Systematic Review**

#### **Review Determinan Sectio Caesarea Nonmedis di Indonesia: Sebuah Kajian Sistematis**

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#### **ABSTRACT**

Caesarean section (C-section) delivery has increased worldwide. The number of deliveries using the C-section procedure at the age of 10–54 years in Indonesia reached up to 17.6% of the total number of deliveries, due to the presence of medical and nonmedical indications. This study aims to analyze about nonmedical indications of C-section. This study uses a systematic review method. The inclusion criteria for the investigated studies were articles published in 2011–2021, written in English or Bahasa Indonesia, observational studies with case control or cohort as the design, and available to be downloaded in full text. In total, 12 articles were included in this systematic review. The nonmedical factors that influence the C-section procedure are antenatal care, the mother's level of education, residency, health insurance, socio-economics, occupation, previous birth histories, the mother's demand, the family's support and decision-making, and doctor's referral. The government, through the help of health practitioners, needs to increase the education to pregnant women and their families regarding the advantages and disadvantages of their preferred delivery methods.

**Keywords:** Caesarean section, Nonmedical indication, Determinants, Systematic review, Indonesia

#### **ABSTRAK**

Sectio caesarea (SC) telah meningkat secara global. Persalinan dengan prosedur SC pada usia 10-54 tahun mencapai 17.6% dari keseluruhan persalinan di Indonesia, yang disebabkan oleh faktor medis dan nonmedis. Artikel ini bertujuan menganalisis faktor nonmedis prosedur SC. Penulisan menggunakan metode *systematic review* dengan kriteria inklusi berupa waktu publikasi pada rentang 2011–2021, ditulis dalam Bahasa Inggris atau Bahasa Indonesia, merupakan studi observasional dengan desain *case control* atau *cohort*, dan dapat diunduh dalam bentuk teks penuh. Terdapat total 12 artikel yang dianalisis. Faktor-faktor nonmedis yang mempengaruhi kejadian SC adalah *antenatal care*, tingkat pendidikan ibu, tempat tinggal, jaminan kesehatan, sosio-ekonomi, pekerjaan ibu, riwayat persalinan terdahulu, permintaan ibu, dukungan keluarga dan pengambilan keputusan, serta rujukan. Pemerintah, melalui tenaga Kesehatan, harus mengoptimalkan edukasi kepada ibu hamil dan keluarga tentang kelebihan dan kekurangan terhadap metode persalinan yang akan dipilih.

**Kata Kunci:** Sectio caesarea, Faktor nonmedis, Determinan, Kajian sistematis, Indonesia

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## INTRODUCTION

Nowadays, delivery by Caesarean section (C-section) is at the peak of its popularity, particularly for upper-middle-class people (1). Back in the day, delivery by C-section was likely a daunting procedure for it might cause death. As time goes on and the science of medicine develops, the risk that caused by this procedure can be reduced, thus the number of C-section procedure is increasing. According to a publication by The World Health Organization (WHO) in 2021, delivery by C-section procedure will increase globally. This procedure is used for at least one out of every five deliveries (21.0%).

WHO, in 1985, in Brazil, issued a recommendation that has been used for more than 30 years about the range of C-section procedure for each country based on the population size: around 10–15% (2). According to the Indonesian Demographic and Health Surveys of 2012, the number of labors done with C-section procedure was 921.000 out of 4.039.000 deliveries, or about 22.8% of the total deliveries. However, in 2018, there was a decline of up to 17.6% of the total number of deliveries (3). Nonetheless, the C-section ratio was still higher than the target that had been recommended by the WHO. According to WHO, the average number of the happening of C-section delivery is around 5-15% (4). Based on RISKESDAS data, in 2021, the number of C-section delivery in Indonesia was 17.6%. Indonesian Demographic and Health Survey data states that, in 2021 alone, the incidence of C-section delivery in Indonesia is 17% of the total number of births in the health facilities (5).

In the present day, delivery by C-section procedure is done not only on medical indication. There are also nonmedical factors that may require the delivery to be done by C-section procedure (6). For mothers who feel burdened on giving birth normally, they may choose to do the labor by C-section procedure to minimize the trauma and anxiety of vaginal birth although delivery by C-section is five times riskier in terms of complications compared to vaginal birth (7).

For some, C-section is an alternative way to have an easy and convenient delivery. Nonetheless, C-section procedure has negative effects on the mother both physically and psychologically. Physically, C-section procedure can cause pain from the surgical wound. Psychologically, C-section procedure has an impact on anxiety and fear of the pain felt after the drugs used to relieve pain disappear (4).

Procedure of C-section may be proceeded with due to medical indications such as the maternal age, parity, high-risk pregnancy, nutritional status, maternal height, gestational age, fetal anomaly, twin births, and lack of the mother's activities during the pregnancy. Nonmedical indications that may cause this procedure to proceed are antenatal care, the mother's level of education, residency, health insurance, socio-economics, occupation, previous birth histories, the mother's demand, the family's support and decision-making, and also doctor's referral. The percentage of C-section procedure that are done due to medical indications is around 65.2%, while those done due to nonmedical indications are around 34.8%. Based on this research background, the writers are keen on analyzing and understanding more about nonmedical indications that may induce the C-section procedure in Indonesia. The purpose of this study is to identify and understand the nonmedical factors that affect the occurrence of c-sections in Indonesia, as determined by prior studies.

## METHOD

This article review focused on the nonmedical factors that cause the occurrence of C-section procedure in Indonesia. The writing technique used systematic review, involving mothers who gave birth with C-section procedure as the subjects. The nonmedical factors were analyzed using systematic review procedures.

The search for the literature was done by accessing three electronic databases, which were: Google Scholar, ProQuest, and PubMed. The key words used were "Indication AND Sectio Caesarea AND Elective AND Cohort" and then "Indication AND Sectio Caesarea AND Elective AND Case Control". The search for the literature was restricted to the articles that were published from January 2011 to August 2021 since they were relatively close to the time this article review was being written and fit the topic. The inclusion criteria used were: articles published in 2011–2021; written in English or Bahasa Indonesia; observational studies with case control and cohort as the design; and available to be downloaded in full text.

## RESULTS

Based on the inclusion criteria, there were 48 articles found, of which 20 used cohort study design and the other 28 used case control study. Then, the full texts selected based on the topic and abstract and fit the inclusion criteria were assessed with critical appraisal to determine their eligibilities. The critical appraisal types used were the JBI Checklist for both cohort study and design control study. Afterwards, there were 12 selected articles included in the systematic review.

All information was extracted using a structured template with a summary table that was made in Microsoft Excel. The summary table contains elements like: author(s), article title, year, study design, time and location of the study, population, sample size, sample choice method, variable, and result of the research.

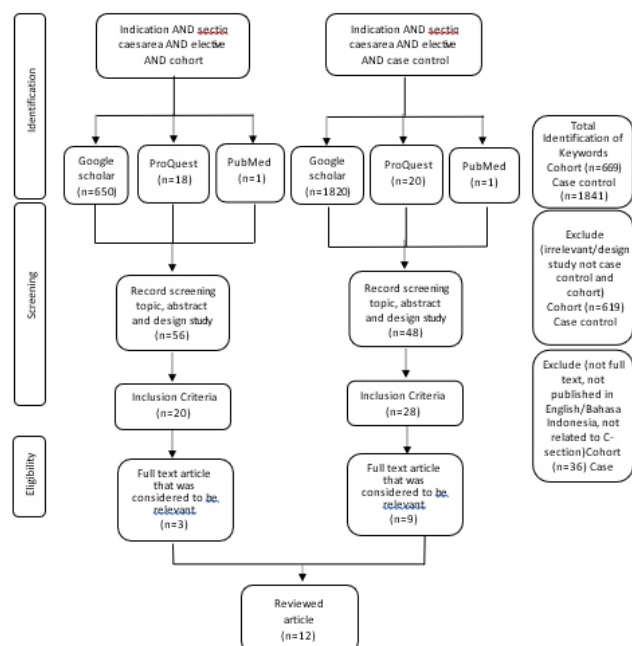


Image 1. The Process of study selection

The selected 12 articles were collected from studies conducted in Nigeria (1), Saudi Arabia (1), Rostock (the biggest city in Mecklenburg-Vorpommern, Germany) (1), Ethiopia (1) and Indonesia (8). All of these articles that were analyzed had an observational study (n=12) as the research type, where case control (n=9) and cohort (n=3) were chosen as the study designs. The articles that would be reviewed by systematic review were independently evaluated by the authors. Out of the potential 669 articles with cohort as the design study and 1841 articles with case

control, there were: 619 articles with the key word 'cohort' and 1803 articles with the key word 'case control' excluded because of their irrelevancy where case control and cohort weren't used as the research designs; 36 articles with the key word 'cohort' and 20 articles with the key word 'case control' excluded because they were published in non-full text format, not published in English or Indonesia, the dependent variable was not C-section; and 17 articles with the key word 'cohort' and 19 with the key word 'case control' excluded due to their illegibility.

**Table 1. Selected reviewed studies**

Author(s) and Article Title	Method	Determinant Variables	Conclusion
1 (Padlilah et al., 2021) Factors Leading to Cesarean Section Delivery at Tarakan Hospital, North Kalimantan	1. Study design: Case control 2. Research location: Tarakan Hospital, North Kalimantan 3. Population: All of mothers who gave birth at Tarakan Hospital 4. Sample: 200	1. Parity 2. Maternal age 3. High risk pregnancy 4. Medical indications 5. ANC history	Delivery with C-section procedure increases due to factors like multiparity, maternal age <20 years and 35 years, previous disease history, medical indications, and complete ANC history.
2 (Sihombing et al., 2017) The Determinants of C-section Delivery in Indonesia (Further Analysis of Riskesdas Data in 2013)	1. Study design: Case control 2. Research location: Indonesia 3. Population: Women at the age of 15–54 years, who gave birth from the period of January 1 <sup>st</sup> 2010 up to the period when the data was collected (3 years before the survey) and the birth rate 4. Sample: 44.673	1. Education 2. Economic status 3. Residency 4. Occupation 5. Health insurance 6. Maternal and fetal health - Gestational age - Maternal age - Maternal height - Labor-difficulting diseases - Pregnancy complications - Labor complications - ANC History	Maternal characteristics, problems of maternal and fetal health, pregnancy complications, parity, and a complete ANC history are factors that predispose the occurrence of C-section surgery.
3 (Marchorina, 2015) The Impact of Family Support on C-section Increasing Rates	1. Study Design: Case control 2. Research location: Mitra Husada Maternity Hospital, Sidoarjo 3. Population: Mothers who undergone C-section procedure on demand APS on October 2013–March 2014 4. Sample: 20	1. Respondent characteristic: - Maternal Age - Parity - Education - Occupation - Income 2. Family support	Respondents who had family support tend to choose C-section procedures seven times more often than those who do not. It is better if the doctors are willing to give a second opinion to the patient and the patient's family before they decide what medical treatment they will receive.
4 (Wulandari et al., 2014) Analysis of Sectio Caesarea Delivery at Sragen Hospital, Indonesia	1. Study design: Case control 2. Research location: Sragen Hospital 3. Population: Mothers who gave birth in 2011 4. Sample: 100	1. Cephalopelvic disproportion (CPD) 2. Preeclampsia 3. Premature rupture of membranes 4. Macrosomia 5. Fetal abnormalities 6. Twin fetus 7. Obstruction on the birth canal	C-section procedure at Sragen Hospital tend to happen because of factors like cephalopelvic disproportion, preeclampsia, premature rupture of membranes, macrosomia, fetal abnormalities, twin birth, and obstruction on the birth canal.
5 (Riyanto, 2016) Maternal Biological and Socio-economics Determinants of C-section Procedure at Wiradadi Husada Hospital	1. Study design: Case control 2. Research location: Wiradadi Husada Hospital 3. Population: Mothers who gave birth at Wiradadi Husada Hospital	1. Maternal biological factors: - Maternal age - Nutritional status - Hemoglobin level - Parity - History of labor complications - Birth spacing	The result of the research stated that history of labor complications is the most dominant variable that influence the C-section procedure at Wiradadi Husada Hospital.

Table 1. Selected reviewed studies (Cont.)

Author(s) and Article Title	Method	Determinant Variables	Conclusion
	4. Sample: 144	2. Socio-economics factors - Education - Economic status - Residency - Health insurance	
6 (Genuttis et al., 2017) Can the Rate of C-Sections Performed in a Level I Perinatal Center Be Reduced? – An Analysis of the University Gynecology Clinic Rostock, 2008-2014	1. Study design: Cohort 2. Research location: Gynecology Clinic, University of Rostock 3. Population: all recorded deliveries at Gynecology Clinic, University of Rostock 4. Sample: 19.974	1. Previous C-section surgery 2. Maternal age 3. Body Mass Index (BMI) 4. Breech presentation 5. Multiple pregnancies	This study showed that the majority of C-section procedures are caused by high-risk pregnancy, thus maternity hospitals should increase the quality of treatment for mothers with high-risk pregnancies.
7 (Al-Kadri et al., 2015) Increased Cesarean Section Rate in Central Saudi Arabia: A Change in Practice or Different Maternal Characteristics	1. Study design: Cohort 2. Research location: King Abdul Aziz Medical City 3. Population: mothers who undergone C-section procedure in 2002 and 2009 4. Sample: 198	1. Maternal and fetal characteristic 2. Previous vaginal surgery 3. Intrauterine growth restriction 4. Mother's demand 5. Decision making 6. Type of anesthesia 7. ANC History	The rate of births by C-section procedure in the studied population is increasing significantly. This escalation might have more to do with the decision made by experienced experts like doctors and midwives than the change in the mother's characteristics.
8 (Ikeanyi & Addah, 2016) Caesarean Delivery in Urban Second Tier Missionary Hospital in Nigeria	1. Study design: Case control 2. Research location: St. Philomena's Catholic Hospital Benin City 3. Population: All C-section deliveries from January 2009 to December 2013 4. Sample: 1014	1. Socio-demographic characteristics - Maternal Age - Parity - Education attainment - Booking status 2. Maternal complication - Long hospital stay - Post-partum hemorrhage - Tranfused blood - Post-partum anemia - Wound complication - Puerperal fever - Hysterectomy - Mortality case 3. Perinatal outcome - APGAR score <7 in 5 minutes - SCBU admission	The factors that predispose mothers to do deliveries by C-section procedure are socio-demographic characteristics, namely age, parity, education, and booking status. There are also complications that the mothers experienced, like long hospital stay, post-partum hemorrhage, transfused blood, post-partum anemia, wound complications, puerperal fever, hysterectomy, and mortality case.
9 (Abebe et al., 2016) Factors Leading to Cesarean Section Delivery at Felegehiwot Referral Hospital, Northwest Ethiopia: A Retrospective Record Review	1. Study design: Cohort 2. Research location: Felege Hiwot Regional Referral Hospital, Ethiopia 3. Population: All mothers who gave birth from the period of July 1 <sup>st</sup> 2012 to June 31 <sup>st</sup> 2013 4. Sample: 2967	1. Residency 2. Maternal age 3. Gravida 4. Risk factor 5. ANC history 6. HIV status 7. Abnormal presentation 8. Fetal weight 9. Previous C-section history	Obstetric factors that occur around the time of labor, like fetal dystocia and fetal distress, are the main reasons that lead to a C-section procedure instead of the background characteristics that are presumed to be risks. The research result showed that there's a necessity for screening or proper examination during the treatment period, and the decision to have a C-section procedure is based on clear justification and well supported.
10 (Emma et al., 2020) Analysis of Factors that Associate with C-section Procedure at Dr. H. Moch Ansari Saleh Hospital, Banjarmasin in 2019	1. Study design: Case control 2. Research location: Dr. H. Moch Ansari Saleh Hospital, Banjarmasin 3. Population: All mothers who gave birth in 2019 4. Sample: 130	1. Parity 2. Maternal age 3. Pregnancy complications 4. Labor complications 5. Health insurance	According to the result of the research, C-section procedures are performed due to factors like risky age, unsafe parity, existing pregnancy complications, labor-difficulting factors, and health insurance.
11 (Siregar, 2019) Analysis of Factors Affecting Mothers Who	1. Study design: Case control 2. Research location: RSU	1. Parity 2. Maternal Age 3. Blood pressure	The research result stated that women who had given birth normally with two times parity, comorbidities, and being referred to

**Table 1. Selected reviewed studies (Cont.)**

Author(s) and Article Title	Method	Determinant Variables	Conclusion
Had Normal Birth to Experience the Risk of Undergoing C-section Surgery	3. IPI Medan, Manda Clinic, dan Nirmala Clinic Population: All mothers who undergone C-section surgery and had >1 normal delivery and are the member of Social Health Insurance Administration Body (BPJS)	4. Comorbidities 5. Referral 6. Previous blood pressure history 7. Past illness	the hospital by the midwives due to medical indications were at risk for giving birth via a C-section procedure.
12 (Rahmawati et al., 2016) Analysis of Factors Affecting Childbirth with C-section Procedure in Kediri, Indonesia	1. Study design: Case control 2. Research location: Aura Syifa Hospital, Gambiran Hospital, dan Melinda Maternity Hospital 3. Population: All mothers who gave birth through C-section procedure in Kediri in April 2016 4. Sample: 100	1. Parity 2. Maternal age 3. The lack of the mother's activities during the pregnancy 4. Labor-difficulting factors 5. Personal request	There's a positive correlation, statistically very strong and significant, between labor complications and labor with C-section procedure caused by the personal demand.

Table 1 shows ten nonmedical factors chosen as variables in previous studies that were selected as the reviewed studies. This literature review used a lot of research sourced in Indonesia because it is in accordance with the aim of identifying non-medical factors that contribute to the happening of C-section procedures in Indonesia.

## DISCUSSION

Delivery by C-section may be caused by medical factors, namely medical indication, maternal age, parity, high-risk pregnancy, nutritional status, maternal height, gestational age, fetal anomaly, twin births, and lack of the mother's activities during the pregnancy. There are also nonmedical indications like antenatal care, the mother's level of education, residency, health insurance, socio-economics, occupation, previous birth histories, the mother's demand, the family's support and decision-making, and also doctor's referral.

### *Antenatal Care*

Antenatal care is a health service provided by professionals for pregnant women that include physical check-ups, laboratory tests, and basic to specific interventions. The purpose of this intervention is to provide a comprehensive, qualified, and integrated antenatal care service, such as nutritional counseling, weight monitoring, and anomaly detection during the gestational period. According to the standard set by the WHO and the Ministry of Health of Indonesia, pregnant women should have their health monitored at the very least eight times during the pregnancy, starting from the 12th week of the gestational period (8). Four out of the twelve articles that were reviewed by a systematic review discussed the correlation between antenatal care and C-section delivery (9-12). The purpose of antenatal care is to

help in case that there should be an early diagnosis and management of comorbidities of the mother and the baby during the pregnancy period (10). Mothers who did not receive any antenatal care were more likely to have high-risk complications that led to labor with a C-section procedure (13).

### *Level of Education*

The level of education of the mother predisposes her to make a decision and impacts her actions. Mothers with a higher level of education tend to have more information, knowledge and better ability to modulate birth spacing, the number of children, and the utilization of health facilities for pregnancy check-ups (antenatal care) and the labor process (14,15). Through education, mothers might gain knowledge and information concerning health. Out of three articles, one article (16), stated that there is a higher probability for those with low-level education to do the labor with C-section procedure, while the other two stated that the higher the mother's level of education, the more likely it is that she will choose to undergo a C-section procedure (12,17). Currently, the C-section procedure is mostly chosen by women with high levels of education, and it seems like it is influenced by technological and knowledge development. It can be concluded that the higher one's level of education is, the more likely they choose delivery with C-section procedure.

### *Residency*

Residency is one factor that leverages the C-section procedure to happen. A residence that is far from the health facilities could be an obstacle to having antenatal care. Two out of three articles that discussed the correlation between residency and C-section delivery stated that mothers who live in rural areas are more likely to undergo labor with a C-section procedure (6,9). One



article stated that mothers who live in urban areas tend to have a higher opportunity to deliver by C-section procedure (12). C-section deliveries have been rising in number, notably in bigger cities, because there are quite a lot of working mothers who are bound to their working time and schedules (18). Taking everything into account, mothers who live in a place where health facilities are not that easy to reach are more likely to face problems that may lead them to undergo a C-section procedure. This procedure may be needed for the safety of the mother and the baby.

#### *Health Insurance*

Because C-section birth is more costly than vaginal delivery, health insurance may have a role in influencing the decision to undergo a C-section procedure (19). Health insurance influences the rate of C-section delivery in Indonesia. This statement is proofed by the fact that the claim from this service is at the top since the National Health Insurance or also known as Jaminan Kesehatan Nasional (JKN) program was first authorized, which led it to be the higher fund contributor, provided by the Healthcare and Social Security Agency or Badan Penyelenggara Jaminan Sosial Kesehatan (BPJS-K) (20). There are three articles that support this statement (6,12,21). Other than public insurances, there are private insurances that may lead to the higher happening of the C-section procedure since private insurances tend to offer more convenience, higher offerings, and higher funding both for the hospital bills and incentive for the doctor who handles the pregnant mothers who own private health insurance (22). In summary, health insurance influences the mother's decision on C-section procedure.

#### *Socio-economic*

A decent socio-economics status will suffice for the daily needs, and it will affect the physical and psychological health of pregnant mothers on preventing them from feeling anxious about their pregnancies (23). Two articles stated that mothers who do C-section deliveries are those who have a high and decent economic status (6,12). Overall it may be said that the higher one's socio-economics status is, the more likely they will choose C-section procedure.

#### *Occupation*

Two articles stated that working mothers are apt to undergo a C-section procedure (6,17). Occupation is what people do to support their lives. Working mothers tend to have education and decent knowledge, so they tend to put more attention on their pregnancy and labor (24). Occupation could be a factor that influences the occurrence of C-section deliveries because some mothers want to adjust the labor to their spare time or the birth date that they want (25). The more engaged mothers are in the social environment, the bigger the influence of the trend to choose certain labor methods (26). To summarize, working mothers tend to choose C-section procedure since it will take shorter time to recover from the delivery.

#### *Previous Birth History*

In accordance with the reviewed articles, there is one (9) that explains about the correlation between the history of previous deliveries by C-section procedure and the future C-section procedure itself. The mother needs to be informed and given knowledge, motivation, assurance,

and the last C-section history needs to be carefully monitored. The post-surgery treatment for mothers who had undergone a C-section procedure is important because they are prone to encountering complications like uterine rupture (10). Mothers who have had previous C-section deliveries are more likely to have another C-section on their next labor than those who have never had one (27). The risks that occur as a result of previous deliveries make the history a factor that has a considerable influence on the mother's decision to choose the C-section procedure in the next pregnancy (28). The history of previous births is a picture of the mother's condition when giving birth to a previous baby. It can also determine the appropriate medical action to be given to the mother (29). In general, it can be said that mothers who have done C-section procedure tend to choose the same procedure on their next delivery.

#### *Mother's Demand*

Two articles (10,17) stated that the mother's personal demand could influence the C-section procedure to happen. Mothers may experience apprehensive feelings about the normal, painful delivery. Mother's decision also is still influenced by the personal beliefs about the relation between the child's birth and their luck in life (30). Trauma could be a factor that is considered one of the things that might cause anxious feeling for the mother when she chooses C-section procedure without any medical indication (31). Considering all this, mothers who have beliefs on certain things tend to choose C-section procedure.

#### *The Family's Support and Decision Making*

The family's support is one factor that's given to mothers who suffer anxiety before labor. One article supports this statement, saying that family support can help mothers make decisions on whether they want to have a C-section procedure (17). The family's support is formed by knowledge, morals, the law, custom, culture, practice, and the family's economic status. The decision to undergo the C-section procedure was considered more convenient, painless, and aesthetic because the process is relatively fast and instant (17). Family support has a positive impact such as building confidence in pregnant women to make decisions about C-section delivery (32). It can be said that support from the family might influence mother's decision on choosing C-section procedure.

#### *Referral*

Two articles discuss the correlation between a doctor's referral and a C-section procedure (9,33). Expectant mothers who are from a place that has a lack of facilities or health professionals and are facing problems such as prolonged labor, fetal size, fetal presentation, pregnancy complications, and hip adequacy will be referred to a more sufficient hospital and handled by doctors who are competent on the C-section procedure (9). The mothers are being referred because a vaginal delivery can't be proceeded with since it may cause risks that lead to pregnancy complications.

According to the twelve articles reviewed by systematic review, there are several indications that raise the number of C-section procedures. The nonmedical factors are antenatal care (mothers who did not receive any antenatal care were more likely to have high-risk complications that led to labor with a C-section procedure), the mother's level

of education (the higher one's level of education is, the more likely they choose delivery with C-section procedure), residency (mothers who lived in rural area are more at risks to undergo C-section procedure), health insurance (health insurance influences the mother's decision on C-section procedure), socio-economics (the higher one's socio-economics status is, the more likely they will choose C-section procedure), occupation (working mothers tend to choose C-section procedure since it might take shorter time to recover from the delivery), previous birth histories (mothers who have done C-section procedure tend to choose the same procedure on their next delivery), the mother's demand (mothers who have beliefs on certain things tend to

choose C-section procedure), the family's support and decision-making (support from the family influence mother's decision on choosing C-section procedure), and doctor's referral (when a vaginal delivery can't be proceeded with since it can cause risks that lead to pregnancy complications and the doctors will refer patients to a more sufficient hospital).

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