

## Original Research

# Are Children Born By Sectio Caesarea (SC) Correlated With Respiratory And Autoimmune Diseases?

Ita Yuliani<sup>1\*</sup>, Jenny Jeltje Sophia Sondakh<sup>2</sup>, Rita Yulifah<sup>3</sup>

<sup>1,2,3</sup> Department of Midwifery, Poltekkes Kemenkes Malang, Indonesia

### ABSTRACT

**Background:** The incidence of pulmonary and autoimmune diseases tends to be higher, which is hypothetically associated with the increasing trend of cesarean sections in our society.

**Methods:** This study design is analytical with a case-control approach using the odds ratio method. The study population consisted of 90 sick infants and babies, and 44 samples were obtained through a purposive sampling process with the following inclusion criteria: infants aged 0-12 months, respiratory disease (asphyxia, pneumonia, bronchopneumonia, bronchitis), autoimmune disease, rheumatoid arthritis, systemic lupus erythematosus (SLE), type-1 diabetes, multiple sclerosis (MS), Graves' disease.

**Results:** Most infants were born with the Sectio Caesarea method of delivery; almost all infants have respiratory disease; a small number of infants suffer from autoimmune disease; most mothers who give birth with the Sectio Caesarea method are at risk of giving birth to infants with respiratory diseases. Infants born via Sectio Caesarea (SC) have a 0.590 or 0.6 times greater risk of respiratory disease than infants born via vaginal delivery; a small proportion of mothers who give birth via Sectio Caesarea (SC) are at risk of giving birth to babies with autoimmune diseases. Infants born via Sectio Caesarea (SC) have a 1.696 or 1.7 times greater risk of developing autoimmune disease than infants born via vaginal delivery.

**Conclusion:** There is a relation between Sectio Caesarea (SC) and the incidence of respiratory and autoimmune diseases in infants at Kanjuruhan Hospital, Kepanjen Malang.

### ARTICLE HISTORY

Received: October 11<sup>th</sup>, 2022

Accepted: November 17<sup>th</sup>, 2022

### KEYWORDS

autoimmune, infant, respiratory disease, sectio caesarea (SC);

### CONTACT

Ita Yuliani



[itayuliani45@gmail.com](mailto:itayuliani45@gmail.com)

Department of Midwifery,  
Poltekkes Kemenkes Malang. Jl.  
Besar Ijen No.77C, Oro-oro Dowo,  
Kec. Klojen, Malang City, East  
Java 65119.

**Cite this as:** Yuliani, I., Sophia Sondakh, J. ., & Yulifah, R. (2022). Are Children Born By Sectio Caesarea (SC) Correlated With Respiratory And Autoimmune Diseases?. *Jurnal Kebidanan Dan Kesehatan Tradisional*, 148–155. <https://doi.org/10.37341/jkkt.v0i0.374>

## INTRODUCTION

Indonesia is one of the developing countries with the highest infant mortality rate (IMR). Based on BPS data, East Java IMR is 29.24 per 1.000 live births. Efforts to descend IMR in an area require efforts to reduce the infant's morbidity first. A high infant morbidity rate triggers a high infant mortality rate (IMR). Because of their weakened immune systems, infants aged 0 to 12 months have a more severe disease infection.

Respiratory and autoimmune diseases in infants can be prevented by the normal delivery process (vaginal). Infants who were born by vaginal delivery are exposed to microbiota (good bacteria) from the mother's vagina. While infants who were born with Sectio Caesarea lose their natural goodness because they were born through the abdomen babies or infants born by Sectio Caesarea (SC) are at higher risk of suffering respiratory and immune diseases (C. A. J et al., 2016).

Cesarean delivery is associated with an increased risk of asthma or another respiratory disease (S. A, J, K, & H., 2015). From a previous study, Sectio Caesarea (SC) delivery causes asphyxia in newborns (F, 2015). Delivery by the Sectio Caesarea (SC) method is associated with an increased risk of asthma or respiratory disease (S. A. et al., 2015) (MC, SE, & H, 2011). Babies born with Sectio Caesarea (SC) can still get good bacteria as in normal or vaginal delivery, namely through the C-Section method, and this method is believed to reduce the risk of asthma or respiratory disease (S. A et al., 2015) (MC et al., 2011).

Another study said that the C-Section methods is in causing the transmission of pathogenic bacteria? One case was reported to have contracted herpes simplex virus infection by the section method (H. J., P, & B, 2018). The benefits of C-Section are still debated and require further research (M et al., 2019). Previous research has shown that the Sectio Caesarea (SC) method of delivery increases the risk of asthma.

However, in this study, the Sectio Caesarea (SC) method of delivery increased the risk of respiratory tract disease not specifically in asthma but in other respiratory tract diseases, namely asphyxia, pneumonia, and bronchiolitis. Based on the background, researchers are interested in examining the correlation between children born by section Caesarea with respiratory and autoimmune diseases.

## **MATERIALS AND METHOD**

This research was conducted in February-October 2021 at Kanjuruhan Hospital. There are two research ethics Polkesma ethics and Kanjuruhan Hospital ethics. The medical record was taken after passing an ethical clearance. The design of this research is analytical with a case-control approach using the odds ratio method. The research data on respiratory and autoimmune diseases suffered by infants were obtained from medical records, processed and presented in tabular form, and analyzed descriptively.

Meanwhile, data about sectio Cesarea (CS) and the risk of respiratory and autoimmune diseases were statistically analyzed using the odds ratio test. The study population was 90 sick infants, by purposive sampling process obtained 44 samples with inclusion criteria: infants aged 0-12 months, respiratory disease (asphyxia, pneumonia, bronchopneumonia, bronchitis), autoimmune disease, Rheumatoid arthritis, Systemic lupus erythematosus (SLE), type-1 diabetes, multiple sclerosis (MS), graves' disease, psoriasis, scleroderma, pernicious anemia (PA), glomerulonephritis, thyroiditis Hashimoto, HIV-AIDS.

## **RESULTS**

Based on table 1 it is known that of the 44 respondents, most of infants (65%) were born by the Sectio Caesarea (SC).

**Table 1.** Sectio Caesarea Delivery Method

<b>Sectio Caesarea (SC) Delivery Method</b>	<b>Frequency (f)</b>	<b>Percentage (%)</b>
Yes	29	65,9
No	15	34,1
<b>Total</b>	<b>44</b>	<b>100</b>

Based on table 2 it is known that of the 44 respondents, almost all the infants 36 (81.9%) are having respiratory diseases and only a small amount 8 (18.1%) of the infants suffered from autoimmune disease.

**Table 2.** Infant Respiratory Disease and Autoimmune Disease

<b>Disease infant</b>	<b>Infant Respiratory Disease</b>		<b>Autoimmune Disease</b>	
	<b>Frequency (f)</b>	<b>Percentage (%)</b>	<b>Frequency (f)</b>	<b>Percentage (%)</b>
Yes	36	81,9	8	18,1
No	8	18,1	36	81,9
<b>Total</b>	<b>44</b>	<b>100</b>	<b>44</b>	<b>100</b>

**Table 3.** The relationship between Sectio Caesarea (SC) to the infant respiratory tract disease and the infant autoimmune disease

<b>Sectio Caesarea (SC) method of delivery</b>	<b>Infant Respiratory Disease</b>				<b>Odds Ratio</b>	<b>Infant Respiratory Disease</b>				<b>Odds Ratio</b>	<b>Total</b>	
	Yes		No			Yes		No			N	%
	N	%	N	%	N	%	N	%				
Yes	23	52,3	6	13,6	0.590	6	13,6	23	52,3	1.696	29	65,9
No	13	29,6	2	4,5		2	4,5	13	29,6		15	34,1
<b>Total</b>	<b>36</b>	<b>81,9</b>	<b>8</b>	<b>18,1</b>		<b>8</b>	<b>18,1</b>	<b>36</b>	<b>81,9</b>		<b>44</b>	<b>100</b>

Based on Table 4, it is known that of 44 respondents, 23 (52.3%) mothers who give birth by Sectio Caesarea (SC) are at risk of giving birth to babies with respiratory diseases. The odds ratio value of 0.590 means that babies born by the Sectio Caesarea (SC) have a tendency to suffer from respiratory diseases by 0.590 or 0.6 times greater than babies born normally (vaginal) and a small proportion of 6 (13.6%) mothers who give birth by Sectio Caesarea (SC) are at risk of giving birth to babies with autoimmune diseases. The Odds Ratio value of 1.69, means that babies born with the Sectio Caesarea (SC) have a tendency to suffer from Autoimmune disease of 1.696 or 1.7 times greater than babies born normally (vaginal).

## DISCUSSION

### C-Section or Sectio Caesarea (SC)

The results showed that most (65%) infants were born by Sectio Caesarea (SC). A cesarean section is an operative procedure that is performed under anesthesia so that the fetus, placenta, and membranes are delivered through an incision in the abdominal wall and uterus (Midwives, 2011). The World Health Organization (WHO) sets the average standard for sectio cases in a country at around 5–15% per 1.000 births in the world.

Although mostly pronounced in developing and western countries, this trend is now being observed in almost all countries worldwide, including the developing nations. While most cases of C-section are unavoidable and performed for clinical indications, many cases are simply due to maternal request and might impose health risks for both the mother and the newborn (Revinder Nagpal, 2018). Riset Kesehatan Dasar (Riskesdas) in 2018 reported the incidence of sectio caesarea delivery in Indonesia was 17.6% (RI, 2019).

The Sectio Caesarea (SC) delivery rate in Indonesia has passed the maximum limit of the WHO standard of 5–15%. In developing countries, a cesarean section is the last option to save the mother and fetus during a critical pregnancy and/or delivery. The maternal mortality rate due to sectio caesarea that occurs is 15.6% of 1000 mothers and 8.7% of 1000 live births in sectio caesarea while early neonatal mortality is 26.8% per 1000 live births (Schuller RC, 2014).

Some conditions that can increase the incidence of cesarean section delivery in Indonesia such as low risk pregnancy, delivery plan with normal delivery method, because at any time low risk pregnancy can become pathological (high risk pregnancy) which requires delivery by cesarean section for medical reasons.

### **Respiratory disease and Autoimmune disease**

The results of the study obtained almost all infants (81.9%) have respiratory diseases. Respiratory tract disease, including pneumonia and tuberculosis, remains the most cause of death in toddlers in developing countries. As fiction is the second highest cause of neonatal death (23.9%). Asphyxia neonatorum: In developing countries, approximately 4 million newborns suffer from moderate or severe asphyxia, of which 20% die. In Indonesia, where the incidence of asphyxia is approximately 40 per 1000 live births, a total of 110,000 neonates die each year due to asphyxia.

The age group most prone to respiratory disease is the age group under one year. This is understandable considering that cellular and humoral immunity have not been well developed. Autoimmune disease is an immune response that causes damage to the body's own tissues and also interferes with the physiological function of the body. Autoimmune diseases are influenced by several factors, including genetic factors, infections, environment, hormones, region or ethnicity, diet, and toxic or drug substances.

The results obtained a small amount (18.1 %) of autoimmune diseases in infants. The percentage of the incidence of autoimmune diseases in children at Sanglah Hospital Denpasar in the period of January 2015 to June 2016 was 0.22% (Diantini et al., 2016). The incidence of autoimmune diseases in infants and toddlers shows a small percentage. This shows that the incidence of autoimmune disease in infants and toddlers shows a small percentage.

### **The Relationship between Sectio Caesarea (SC) with the Risk of Infants Respiratory Diseases and the Risk of Infants Autoimmune Diseases**

The results showed that the majority (52.3%) mothers who gave birth with the Sectio Caesarea (SC) are at risk of giving birth to babies with respiratory diseases. The odds ratio value of 0.590 means that babies born with the Sectio Caesarea (SC) have a tendency to suffer from respiratory diseases by 0.590 or 0.6 times greater than babies who were born by normal delivery (vaginal). The microbiome of infants born by Sectio

Caesarea (SC) is thought to impair the development of the infant immune system (K & I, 2016).

This contributes to their higher susceptibility to various metabolic and immune disorders later in life (Miettinen R, Hermansson H, Merikukka M, Gissler M, 2015). Babies or infants born with Sectio Caesarea (SC) tend to be more susceptible to respiratory tract disorders. TTNB (Transient Tachypnea of the Newborn) breathing disorder. This disorder occurs because the fluid that fills the fetal lungs while in the womb is not compressed, considering that the baby with Sectio Caesarea (SC) is just "terima jadi" or in English "just accepting".

The process of vaginal delivery through the birth canal is the process that allows the fluid (that fills the lungs when the fetus is in the uterus) to be pumped out. In addition, the compression process also occurs while the periodic contractions of the mother's uterus happen. These contractions, which are getting stronger over time, will put pressure on the baby's body so that the fluid in the lungs will automatically come out.

However, in infants who were born by Sectio Caesarea (SC), the two compression processes did not occur perfectly (Erick Fransisco, n.d.). Delivery by C-section or Sectio Caesarea (SC) method causes an increased risk of hereditary obesity by 34%. Besides obesity, the Sectio Caesarea (SC) has been associated with a hereditary risk of asthma and allergies. A population-based study in Denmark found C-section or section Caesarea was associated with an increased risk of asthma or respiratory disease (S. A et al., 2015).

So, delivery by Sectio Caesarea (SC) has an impact on the health of the baby, one of which is the risk of respiratory tract disease. The same thing was said in Fadhillah's 2015 study with the title "Sectio Caesarea as a Risk Factor for Neonatal Asphyxia". It was found that the incidence of asphyxia in newborns can be caused by various factors including the delivery factor with action, namely delivery by Sectio Caesarea (SC). Delivery by Sectio Caesarea (SC) method is associated with an increased risk of asthma or respiratory disease (F, 2015).

More interestingly, infants born by C-section are often found to be at more risk for various diseases such as asthma or respiratory tract disease, obesity, diabetes, and so on (R et al., 2017). In our study on Japanese infants, we also found that the levels of propionate in infants delivered via cesarean-section remain lower intermittently during the first 6 months of life as compared to vaginally delivered babies (Revinder Nagpal, 2018). The results of the study showed that a small amount (13.6%) of mothers who give birth by Sectio Caesarea (SC) are at risk of giving birth to babies with autoimmune diseases.

The odds ratio value of 1.69 means that infants born by Sectio Caesarea (SC) have a tendency to suffer from autoimmune diseases that is 1,696 or 1.7 times greater than that of infants who were born by normal vaginal delivery. C-section or Sectio Caesarea (SC) causes immune disorders in the body or autoimmune disease (L, Q, & Y, 2015). Population-based studies in Denmark have found that C-sections or Sectio Caesarea, are associated with increased risk of asthma, systemic connective tissue disorders, adolescent arthritis, inflammatory bowel diseases, immune deficiency or autoimmune diseases, and leukemia (S. A et al., 2015).

Moreover, there is significant epidemiological evidence that infants delivered by C-section are at increased risk for a range of chronic inflammatory and metabolic conditions, with the most evidence for immune deficiencies (Autoimun) and leukemia

(Słabuszewska-Jóźwiak, et al., 2020). Babies born by Sectio Caesarea (SC) are thought to have the potential to have a weaker immune system than babies born through normal delivery and are at increased risk of suffering from autoimmune diseases and respiratory tract disease (DM et al., 2017). Association between cesarean delivery and increased risk of several chronic immune diseases or autoimmun suggests a shared environmental risk factor in early life.

However, it should be noted that this hypothesis is mostly based on association studies and is not yet supported by mechanistic evidence. One of the largest association studies to date assessed chronic immune disorders in 1.9 million Danish children, finding modestly higher rates of asthma, systemic connective tissue disorders, juvenile arthritis, inflammatory bowel disease, immune deficiencies, and leukemia in those born by Sectio Caesarea (SC). Further research is needed to clearly identify and address this risk factor (S. A. et al., 2015).

Babies born by Sectio Caesarea (SC) are thought to have the potential to have a weaker immune system than babies born through normal delivery and are at risk of suffering from autoimmune diseases (MG, 2016). So, delivery by Sectio Caesarea (SC) has an impact on the health of the baby, one of which is an autoimmune disease. According to the results from 44 respondents, most of the female babies (58.3%) have respiratory diseases, and most of the female babies (62.5%) have autoimmune diseases. Women account for approximately 75% of those suffering from autoimmune diseases (S, n.d.).

In SIRS online data, the Directorate General of Health Services 2017 shows the proportion of male patients at 54.3% and female patients at 45.7%. Based on these data, it can be concluded that autoimmune diseases can currently attack women at a productive age of 15–50 years (PUSDATIN, 2017). In comparison, the male to female sex ratio for people with autoimmune diseases is (1:2, 3). Gender differences in autoimmune diseases can be caused by differences between the immune systems of men and women. Men have a greater emphasis on immunity when compared to women.

Women have higher immune reactivity, which translates to greater resistance to infection and a variety of non-infectious diseases. However, there is a possibility that this greater immune reactivity makes women more vulnerable to experiencing autoimmune diseases (Ngo, S. T., and F. J. Steyn, 2014). According to the findings of a Swedish study, the number of type 1 diabetes events is relatively equal between men and women (Wandell, n.d.). Journal of Autoimmunity Reviews in August 2012 found that women get autoimmune diseases at a rate of around 2 to 1 compared to men, which is 6.4 percent of women compared to 2.7 percent of men (I. S. A, 2021).

## **CONCLUSION**

Most mothers who give birth by Sectio Caesarea (SC) are at risk of giving birth to babies with respiratory disease, and a small percentage of them are at risk of giving birth to babies with autoimmune diseases. Previous research has shown that the Sectio Caesarea (SC) method of delivery increases the risk of asthma. However, in this study, the Sectio Caesarea (SC) method of delivery increased the risk of respiratory tract disease not specifically in asthma but in other respiratory tract diseases, namely asphyxia, pneumonia, and bronchiolitis.

Then the delivery of a Sectio Caesarea (SC) should not be done without medical reasons or indications. A Sectio Caesarea (SC) should be done as the last alternative to save the mother and baby.

## ACKNOWLEDGEMENT

We wish to thank some parties, which are: the Midwifery Department, Poltekkes Kemenkes Malang, and Kanjuruhan Hospital, Kepanjen, Malang.

## REFERENCES

- A, I. S. (2021). 14 Jenis Penyakit Autoimun yang Perlu Diwaspadai.
- A, S., J, S., K, B., & H, B. (2015). Cesarean Section and Chronic Immune Disorders. *Pediatrics*, 135([PubMed: 25452656] Published in final edited form as: *J Law Med Ethics*. 2019 December; 47(4): 568–578.), e92–e98. <https://doi.org/10.1177/1073110519897732>.
- Diantini, D.M.A.1, Ulandari, N.L.1, Wirandani, 1, N. K. N. S., ... Kumara, K. . (2016). Angka Kejadian Penyakit Autoimun Pada Pasien Anak Di Rsup Sanglah Denpasar. *Jurnal Farmasi Udayana*, 5 no 2.
- DM, C., J, M., AL, P., KM, A., MD, S., & KM, A. (2017). Maturation of the infant microbiome community structure and function across multiple body sites and in relation to mode of delivery. *Nat Med*, 23:314–326.
- Erick Fransisco. (n.d.). Enam Risiko bayi Sesar. Retrieved from <https://tekno.kompas.com/read/2009/12/23/1126248/~Kesehatan~Anak>
- F, F. (2015). Sectio Secarea sebagai faktor Resiko Kejadian Asfiksia Neonatorium. *Majority*, 4(nomor 8), 57–67.
- J, C. A., K, S., A, D., JS, K., Eimear, B., & J, D. (2016). Vaginal seeding” of infants born by cesarean section. *BMJ Glob Health*, 352 :i227.
- J, H., P, P., & B, M. (2018). Potential Transmission of Herpes Simplex Virus via Vaginal Seeding. *The Pediatric Infectious Disease Journal* 37, (no 11).
- K, K., & I, H. (2016). Caesarea Section and disease associated with immune function. *J. Allergy Clin Immunol*, 137;587-90.
- L, H., Q, C., & Y, Z. (2015). Is Elective Cesarean Section Associated with a Higher Risk of Asthma? A Meta-Analysis. *Journal of Asthma* 52, 1, 16–25.
- M, N. T., KH, S., H, D. E., L, L., V., E. C., C, B., ... B, D. (2019). Bacterial Baptism: Scientific, Medical, and Regulatory Issues Raised by Vaginal Seeding of C-Section-Born Babies. *J Law Med Ethics*, December ;, 568–578. <https://doi.org/10.1177/1073110519897732>
- MC, M., SE, H., & H, S. (2011). Delivery by Cesarean Section and Early Childhood Respiratory Symptoms and Disorders: The Norwegian Mother and Child Cohort Study. *American Journal of Epidemiology*, 174, no. 11 (2011): 1275–1285; [PubMed: 22038100].

- MG, D.-B., KM, D. J.-L., & N, S. (2016). Partial Restoration of the Microbiota of Cesarean-Born Infants via Vaginal Microbial Transfer. *Nature Medicine*, no.3, 250–253. <https://doi.org/10.1038/nm.4039>.
- Midwives, M. textbook for. (2011). No Title. In *Buku ajar bidan Edisi :14*. Jakarta: EGC.
- Miettinen R, Hermansson H, Merikukka M, Gissler M, I. E. (2015). mode of delivery impact on risk of noncommunicable diseases. *J Allergy Clin Immunol*, 136; 1398–1399.
- Ngo, S. T., F. J. Steyn, P. A. M. (2014). Gender Differences in Autoimmune Disease. *Frontiers in Neuroendocrinology*, 35, 347–369.
- PUSDATIN, I. (2017). Situasi Lupus di Indonesia. Pusat data dan Informasi Kementerian Kesehatan RI.
- R, N., H, T., T, T., K, K., S, N., K, N., & Y, Y. (2017). Gut dysbiosis following C-section instigates higher colonisation of toxigenic *Clostridium perfringens* in infants. *Benef Microbes*, 8, 353–365.
- Revinder Nagpal, Y. Y. (2018). Gut Microbiota composition in healthy Japanese infants and young Adults born by C-section. *Ann Nutr Metab*, 73, 4–11. <https://doi.org/10.1159/000490841>
- RI, K. (2019). Profil Kesehatan Indonesia Tahun 2018.
- S, W. (n.d.). *Penyakit-Penyakit Autoimun*. Elek Media Komputindo.
- Schuller RC, S. D. (2014). Sectio caesarea: actual controversy. *Ther Umsch.*, (71(12)), 717–22.
- Słabuszewska-Jóźwiak, Szymański, M, C., B, S.-H., & G, J. (2020). Pediatrics Consequences of Caesarean Section-A Systematic Review and Meta-Analysis. *Int. J. Environ. Res. Public Health* 17. <https://doi.org/10.3390/ijerph17218031>
- Wandell, P. E. and A. C. C. (n.d.). Time Trends And Gender Differences In Incidence and Prevalence of Type 1 Diabetes In Sweden. *Curr Diabetes*, Vol. 9 (4), 342–349.