

BIBLIOMETRIC ANALYSIS OF RESEARCH STUDIES ON CESAREAN SECTION COMPLICATION

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ABSTRACT

The increase in the number of cesarean sections in all parts of the world is a concern for WHO. The WHO (World Health Organization) warns that cesarean section rates should not be higher than 10-15% in any region of the world. The objectives of this study are to describe the growth of research, the most prolific authors, the country with the most publications, the institution with the most publications, the type of publication and the most journals related to cesarean section complications. The documents from 2019 to 2024 (April 23, 2024) were searched, in English, Review and Article. The implementation date of the strategy was April 23, 2024. Visualization and analysis of research trends from downloaded article data in CSV format using VOS viewer 1.6.19. Bibliometric analysis was conducted on 422 articles obtained from the Scopus database, the most research growth in 2021; Thakar, R contributed the most research; The most published country is from the United States, the institution with the most publications is Karolinska institute, the most type of publication is articles (91.7%), and the most published journal from BMC Pregnancy and Childbirth. The trend of research on cesarean section complications decreased from 2021 to the present. Research opportunities related to cesarean section complications are still needed, especially those related to the pregnancy complication, delivery complication, postpartum, and pregnancy outcome are trends and opportunities for future research.

Keywords: bibliometric, cesarean section, complication

INTRODUCTION

Cesarean section *rates* in various countries range from 22-27%, namely in the United States (22%), Brazil (25%), Chile 27%) and about 17-40% in 19 Latin American countries and about 20-25% of all deliveries in the UK (1,2). The *cesarean section rate* in several countries in South and Southeast Asia ranges from 17.75-39.07%, namely Maldives (39.07%), India (23.64%), Bangladesh (21.82%), Vietnam (21.72%) and Pakistan (17.75%)(3). This shows that the number of *cesarean sections* is increasing in the world.

The increase in the number of cesarean sections is a concern for the *World Health Organization* (WHO). WHO warns that *cesarean section* rates should not be higher than 10-15% in any region of the world. *Cesarean section* should be done in an emergency or there are complications of delivery. Other studies suggest that there is an alarming relationship between maternal mortality and high rates of *cesarean section* deliveries. The figures are associated with maternal and fetal health risks and suggest that *these cesarean sections* are performed not only for medical reasons but also because of the woman's request and the doctor's discretion (4–11).

Cesarean section is associated with an increased risk of intestinal obstruction, incisional hernia, and abdominal pain. Smoking, obesity and childbirth of more than one increase the risk of complications significantly. Cesarean section can also pose a risk to the mother. Complications for the mother include tears in the uterus, serious bleeding and longer hospitalization (11,12). In addition, there is an increasingly popular concept in the community that once a cesarean section, it is always a cesarean section, so many mothers request repeated cesarean sections without considering the reproductive impact caused and without knowledge

of possible complications that even today have a high risk of morbidity and mortality, both in mother and fetus (13–15).

The novelty in this study is that this study is a bibliometric study related to cesarean section complications. Research with bibliometric analysis is a quantitative method to analyze bibliographic data in a journal. Bibliometric research can use the object of study from the database of journals. The objectives of this study are to describe the growth of research, the most prolific authors, the country with the most publications, the institution with the most publications, the type of publication and the most journals related to cesarean section complications.

METHODOLOGY

Study selection

Data were taken from a scopus database applied in bibliometric research using advanced search strategies. Data taken regarding cesarean section complications. Data taken from 2019 to 2024 (April 23, 2024), the type of language is set to English only, the type of article and review documents. The search was conducted on April 23, 2024 and the search terms and strategies are "cesarean section" OR "cesarean delivery" OR "cesarean" OR "C-section" OR "caesarean section" AND "birth complication" OR "delivery complication" OR "delivery complication".

Data collection

A total of 422 documents were collected from Scopus data and then the documents were used to make visual analysis. Article search in electronic databases is a source of information based on predetermined keywords. The choice of Scopus data base is because Scopus is the largest and well-known scientific database available and offers various source types so that the quality of the documents obtained can be guaranteed.

This study presents research growth, the most prolific authors, countries with the most publications, institutions with the most publications, types of publications and journals related to cesarean section complications quoted extracted from Scopus data through analyzed results then downloaded as needed. Visualization and analysis of research trends from article data downloaded in CSV format using VOS viewer 1.6.19. VOSviewer will create a keyword map based on the shared network.

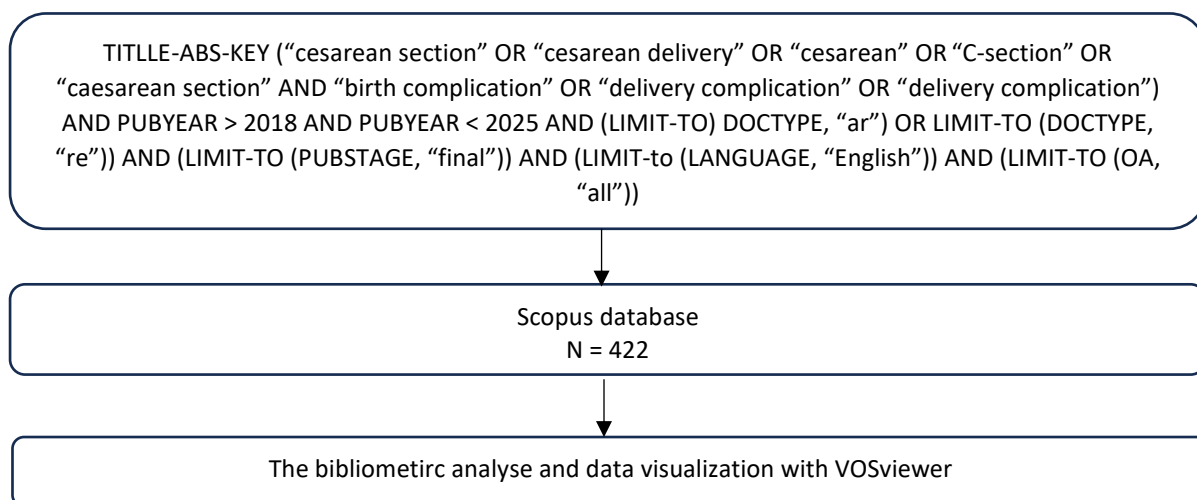


Figure 1. The data collection

RESULTS AND DISCUSSION

The results of bibliometric analysis of cesarean section complications obtained 422 documents from the Scopus database. Document taken from 2019 to 2024 (April 23, 2024).

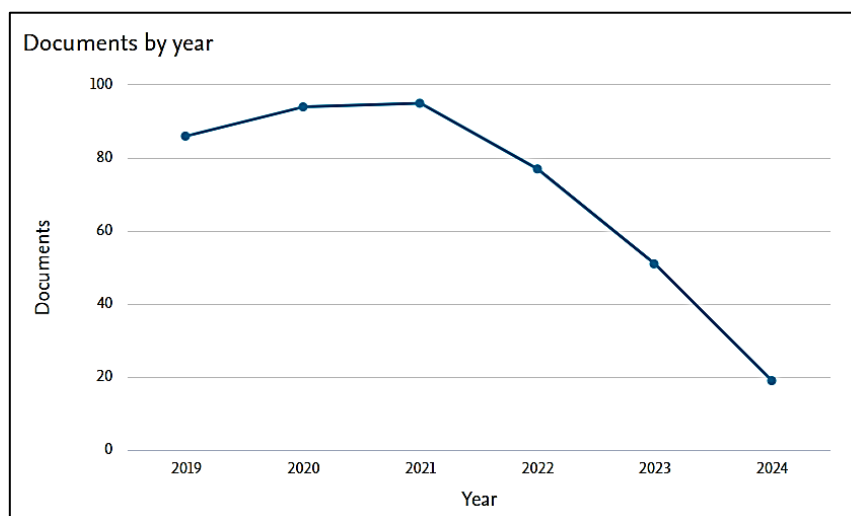


Figure 2. Growth trends in cesarean section complication from 2019-2024 (April 23, 2024)

The number of studies related to cesarean section complications was the highest in 2021, which was 95 studies. After that, the graph decreased until April 23, 2024, there were 19 studies related to cesarean section complications. There is no data that guarantees that the trend will decline by the end of 2024.

The increase in the number of cesarean sections that are of concern to WHO must be watched out by all countries in the world. WHO recommends cesarean section rates ranging from 10-15%. Cesarean section performed without any medical indication also has the opportunity to increase the number of cesarean sections and increase the risk of complications in the mother and fetus (4–11). Studies related to cesarean section must always be improved, in order to increase information in the community about the importance of knowledge related to cesarean section, especially complications of cesarean section.

Caesarean section is an intervention to reduce maternal and perinatal mortality, due to complications of pregnancy and childbirth. Efforts to ensure that a cesarean section is necessarily need to be increased. This is based on the potential complications of cesarean section. A cesarean section should be performed if there are medical indications only (16). In the United States, increased morbidity and maternal mortality rates correlate with increased significance of cesarean section rates. The three main contributors to cesarean-related maternal morbidity and mortality are bleeding complications, surgical site infection and venous thromboembolism. All women should be screened for risk factors associated with major complications during the antepartum, intrapartum, and postpartum periods to ensure availability of resources (17).

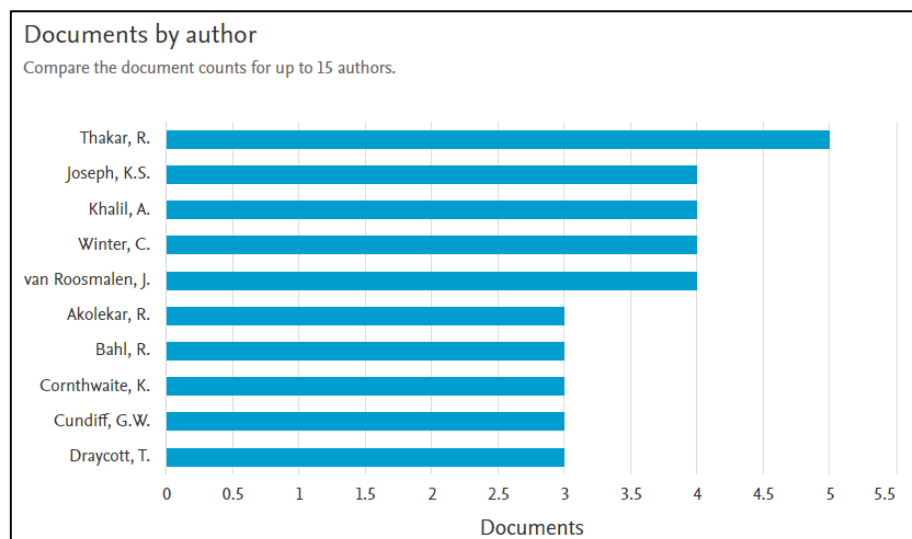


Figure 3. Top ten authors on cesarean section complication from 2019-2024 (April 23, 2024)

The data generated from the image shows that the author Thakar, Rane B contributed the most research. Thakar, Rane B has published 5 of his works in the five years. Thakar is from the University of London, United Kingdom. As for other authors such as Joseph, K.S.; Khalil, A; Winter, C; van Roosmalen, J; and 5 others published each of their scientific papers within the five years.

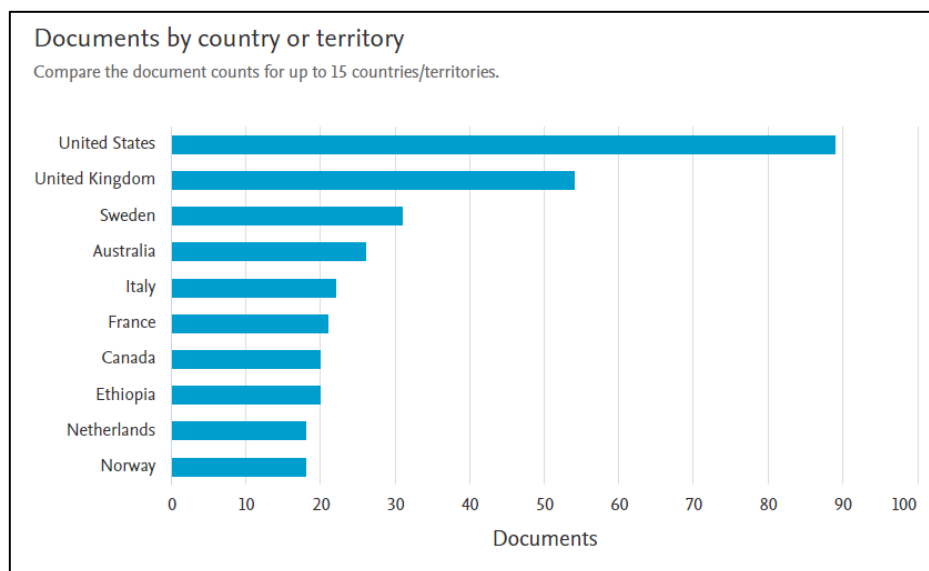


Figure 4. Top ten countries regarding on cesarean section complication 2019-2024 (April 23, 2024)

The data obtained from the figure is about which countries have produced the most publications of scientific papers over the last five years. The United States of America was country that has produced approximately 89 publications of scientific papers since the last five years. Then followed by United Kingdom, Sweden, Australia, Italy, and others.

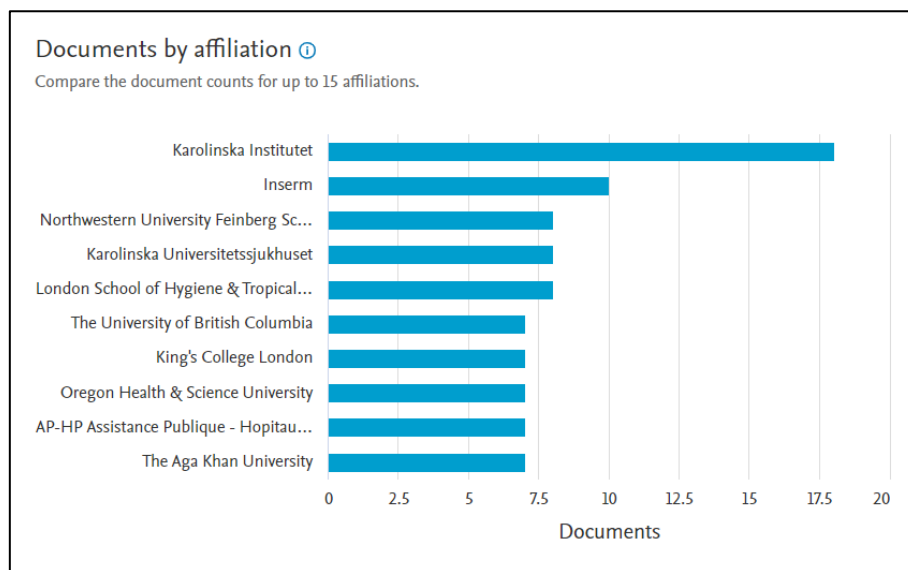


Figure 5. Top ten affiliation regarding on cesarean section complication 2019-2024 (April 23, 2024)

The institution with the most publications is Karolinska institute. Karolinska Institutet is one of the world's leading medical universities. Our vision is to advance knowledge about life and strive towards better health for all. Karolinska Institutet accounts for the single largest share of all academic medical research conducted in Sweden and offers the country's broadest range of education in medicine and health sciences. The Nobel Assembly at Karolinska Institutet selects the Nobel laureates in Physiology or Medicine. The Karolinska Institute published 18 documents relating to the complications of cesarean section. Then followed by Inserm, Northwestern University Feinberg School of Medicine, and others.

Caesarean section is one of the most widely performed surgical procedures worldwide. It is associated with high morbidity and mortality compared to vaginal delivery. Previous research stated that complications in the mother and fetus were significantly higher in the emergency cesarean section group compared to the cesarean section group (18). Further research related to the complications of cesarean section is still needed. Educational institutions, especially health, medicine, and midwifery, need to study in more detail in this regard.

Cesarean section is usually considered a simple and safe alternative to natural childbirth. In some cases, cesarean sections can be technically difficult and pose a danger to the health of the mother and fetus. Other studies have shown evidence of the most common cesarean sections that is useful for providing information on cesarean section management, possible prevention and resolution of complications (19).

Possible causes of cesarean section are divided into four categories, namely difficult access to the lower segment of the uterus, difficult fetal extraction, laceration or organ damage and abnormal placenta. It is necessary to know in advance the potential technical difficulties and risks caused by cesarean section allows the surgeon to plan the right strategy in handling the case (19).

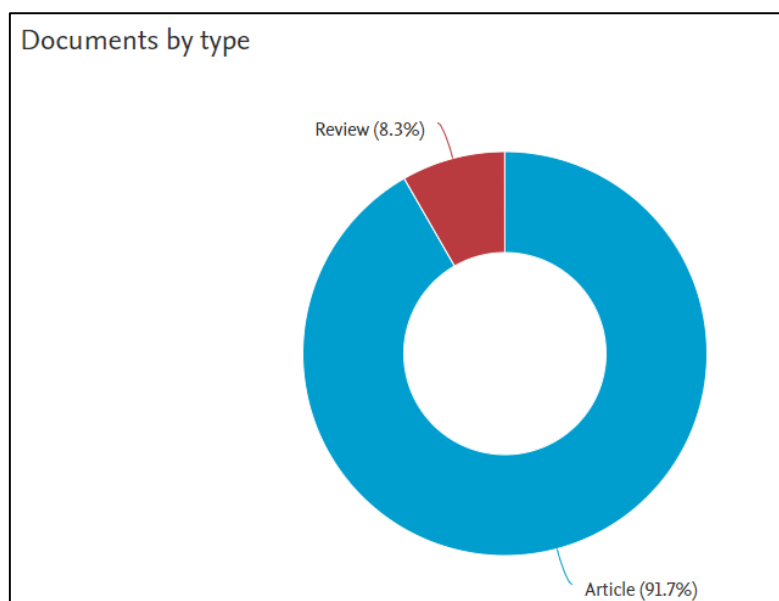


Figure 6. The types of publications on cesarean section complication 2019-2024 (April 23, 2024)

The most types of publications are articles (91.7%). Then followed by review. The article is a report on the results of research, while the review contains a discussion of the trend of research development of other authors. Bibliometric analysis of this article found that discussions related to cesarean section complications were mostly studied with the type of publication in the form of articles rather than reviews. Although reviews only discuss or review other research articles, it is needed by people who want to start research.

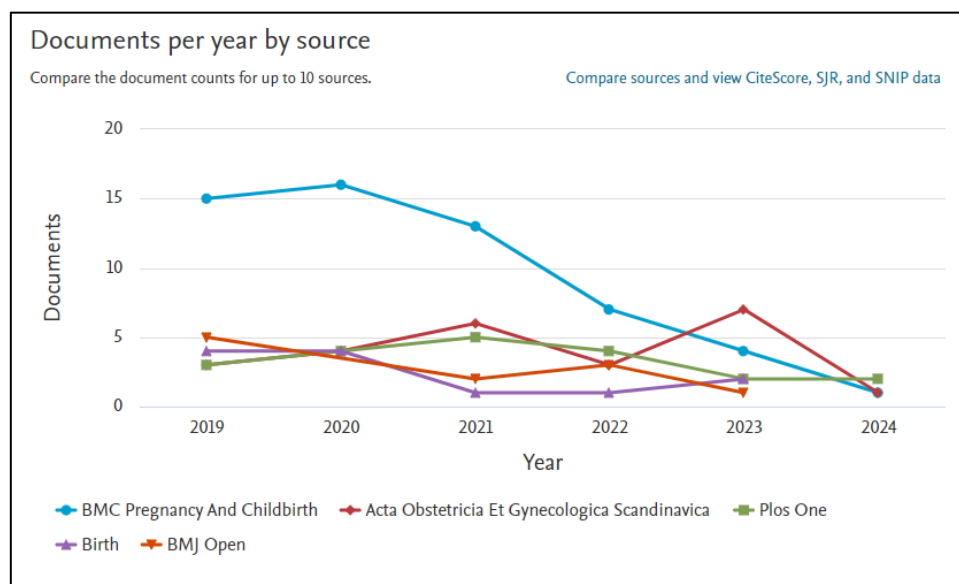


Figure 7. The types of publications on cesarean section complication 2019-2024 (April 23, 2024)

The top five journals that publish articles on cesarean section complication are BMC Pregnancy and Childbirth, Acta Obstetrica Et Gynecologica Scandinavica, Plos One, Birth, and BMJ Open. Each journal publishes a number of articles that vary each year.

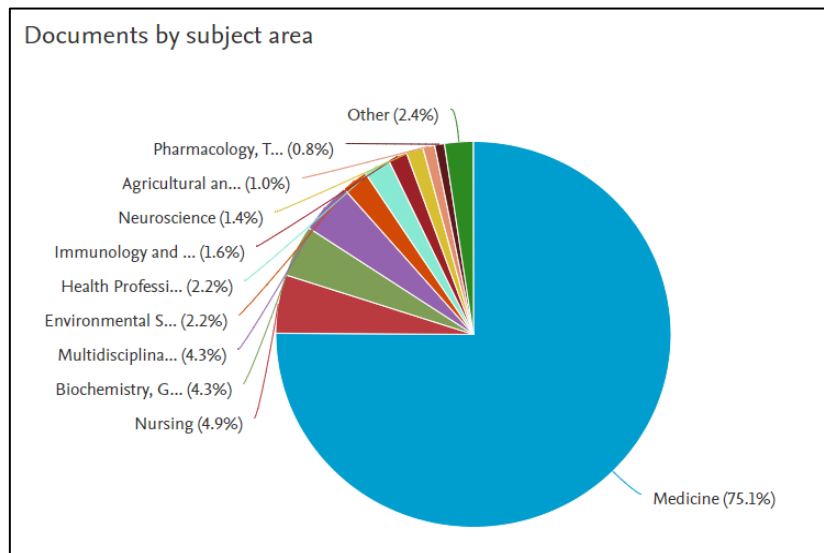


Figure 8. Fields of knowledge related to cesarean section complication 2019-2024 (April 23, 2024)

Fields of knowledge related to cesarean section complication since the last five years, namely, 1. Medicine; is the most discussed field of science with a percentage of 75.1%. Then followed by science 2. Nursing with a percentage of 4.9%. The followed by other fields of science such as biochemistry, genetics and molecular biology; multidisiplinary; environmental science; health professions; immunology and microbiology; neuroscience; agricultural and biological sciences; and others.

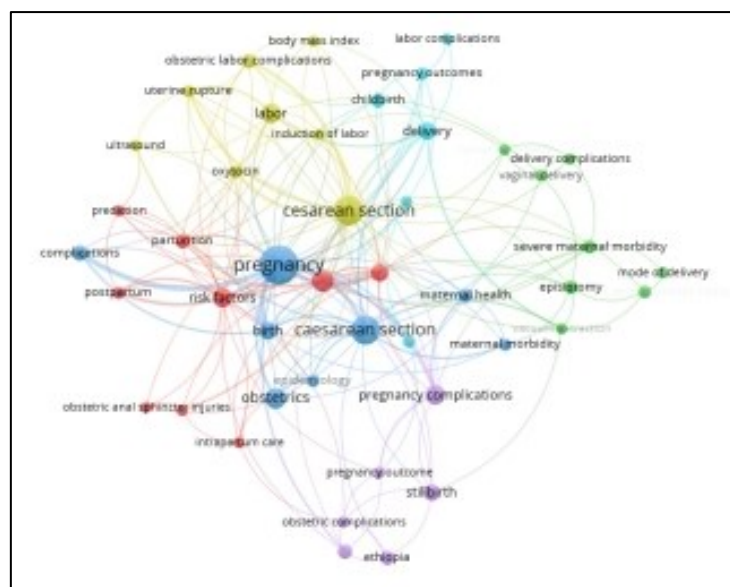


Figure 9. Network visualization of Co-occurrence on cesarean section complication 2019-2024 (April 23, 2024)

Visualization of data found related to cesarean section complication, namely pregnancy complication, delivery complication, stillbirth, uterine rupture, induction of delivery, risk factor, and many others.

Accidental expansion of the uterine incision is a known complication during cesarean section and the rate ranges from 4-8%. Independent parameters associated with unwanted incision extension of the uterus include nulliparity, vertex presentation, epidural anesthesia and cesarean section indication (20). In addition to the expansion of the uterine incision, ureteral injury can also occur in women with emergency cesarean section. Most bladder injuries occur in women who have given birth by cesarean section before with an attachment in the abdomen (21).

Another study showed that patients who underwent cesarean section experienced wound complications as much as 4.4% and underwent an average length of local wound care of 41 days (2-95 days). The results of the analysis of the study showed that there were 2 independent risk factors that were gnified, namely pre-eclampsia and premature rupture of membranes (22).

Another risk factor that affects cesarean section is multiple pregnancies. This factor is reinforced by a history of previous cesarean sections. Malpresentation of the fetus also increases the risk of cesarean section (23). Other studies also say that the risk of intrapartum rupture and cesarean section complications can be minimized, it's just sometimes too exaggerated (24). Delivery via cesarean section is indicated in case of previous uterine rupture, hysterotomy through vertical incisions, and more than two previous cesarean sections (25).

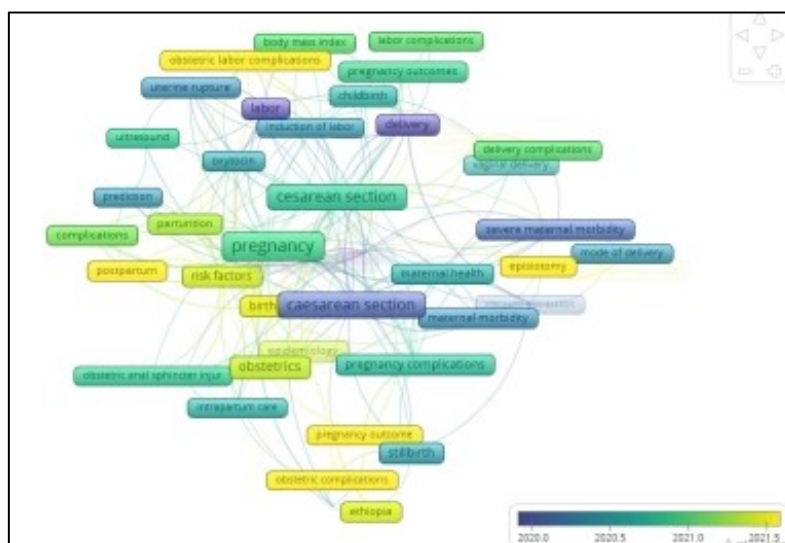


Figure 10. Overlay visualization of Co-occurrence of cesarean section complication 2019-2024 (April 23, 2024)

Pregnancy complication, delivery complication, postpartum, and pregnancy outcome are trends and opportunities for future research.

Previous studies evaluated maternal and neonatal outcomes and complications in two groups of pregnant women undergoing elective and emergency cesarean sections. Such actions are taken with the aim of reducing morbidity and mortality in the near future. The results showed that the cesarean section rate in the hospital was 30.7%. The proportion of emergency cesarean sections was 74.4% and the remaining elective cesarean sections. Emergency cesarean sections are more common in young age groups and primigravida, while elective cesarean sections are more common in the elderly and multigravida groups (18).

Another study that aims to determine and compare common complications of cesarean section with vaginal delivery in mothers shows that complications in mothers who undergo cesarean section are higher than mothers who undergo vaginal delivery. This study examined 550 mothers with a proportion of 74.2% of mothers undergoing vaginal delivery and the rest undergoing cesarean section. The most common maternal complications were postpartum hemorrhage (21.1%), prolonged labor (8.5%) and wound infection (7.6%) (26).

The most common indication for an emergency cesarean section is fetal distress and the most common indication for elective cesarean section is a previous cesarean section history with rejection of vaginal delivery after cesarean section. Complications that occur after cesarean section for mothers include postpartum bleeding, urinary tract infections, the need for blood transfusions, fever and the need for maternal intensive care. Complications that occur after cesarean section for the fetus are asphyxia, fluid mixed with meconium and the need for care in the neonatal ICU room. These complications for both the mother and for the fetus are higher in emergency cesarean sections than in elective cesarean sections (18).

There are various complications that can occur during the puerperium, including pain, bleeding, and infection. These include complications associated with cesarean section, postpartum hemorrhage and hematoma, bladder injury, torsion and dehiscence of the uterus and uterine rupture (27).

CONCLUSION

The trend of research on cesarean section complications decreased from 2021 to the present. Thakar, Ranee B contributed the most research. Most published countries of the United States. The institution with the most publications is Karolinska institute. The most types of publications are articles. Research related to cesarean section complications is most widely contained in BMC Pregnancy and Childbirth.

Research opportunities related to cesarean section complications are still needed, especially those related to the pregnancy complication, delivery complication, postpartum, and pregnancy outcome are trends and opportunities for future research.

LIMITATIONS AND FUTURE DIRECTION

This article does not discuss the reasons for the declining trend of research related to cesarean section complications. For further research, a more comprehensive study is needed related to cesarean section complications, especially matters related to pregnancy complications, delivery complications, postpartum, and pregnancy outcomes.

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DECLARATIONS

This article has no conflict of interest.

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