

A bibliometric analysis of global scientific production on cesarean and anesthesia

Sezaryan ve anestezi ile ilgili global bilimsel üretimin bibliyometrik analizi

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Abstract

Aim. Bibliometric studies can be performed to evaluate the quantitative scientific performance on a specific topic via evaluating the accumulation of scientific data. Interpreting quantitative performance of a country with respect to bibliometric analyses is also an important way to assess the quality and quantity of that country's contribution to the distribution of medical data about a topic. In this study, we aimed to make a quantitative analysis of the scientific publications related to anesthesia and cesarean delivery; and also to investigate publications originating from Turkish institutions and authors, which are published in Expanded covered medical journals. **Method.** We retrospectively searched papers published in the field of anesthesia and cesarean delivery up to November 2012 by using the Web of Science software. Papers that were published in Science Citation Index Expanded covered journals were taken into account. **Results.** Web of Science based search through the database of SCI Expanded up to November 2012, revealed 4637 English scientific documents related to anesthesia and cesarean delivery. Among 4637 English publications, we found that 1262 (27.2%) from United States of America, followed by England (16.9%), Canada (6.5%), Germany (5.6%), France (4.2%), Australia (4.1%), and Turkey (3%). All other countries had a contribution smaller than 3%. Turkey had 458 (3%) publications and ranked 7 in this list. The international scientific repertory was relatively poor on our topic before 1991. On the other hand, we observed an international acceleration with respect to the publication number after 2000s. Publications from Turkey showed up only after 1996. Turkey's contribution to international repertory seems to speed up after 2002. The document types up to the date of the study (November 2012) classified by Web of Science in English SCI Expanded-based were mostly articles (71.8%) and letters (9.7%). The main source of publications from all over the world was the university hospitals. **Conclusion.** In conclusion, we observed that the quantity and quality of research in the field of anesthesia for cesarean delivery has increased rapidly in the last decade. Turkey made a remarkable contribution to this repertory especially during the last decade. Anesthesia for cesarean section as a unique procedure having a potential to be harmful for mother and fetus still needs several investigations to improve maternal and neonatal health.

Keywords: Bibliometric analysis, anesthesia, caesarean section, regional anesthesia, general anesthesia

Özet

Amaç. Bibliyometrik çalışmalar, spesifik bir konu ile ilgili birikmiş bilimsel verileri inceleyerek, o konu ile ilgili nitel bilimsel performansını değerlendirmek için gerçekleştirilir. Bir ülkenin belli bir konu hakkındaki nitel performansının bibliyometrik analiz açısından yorumlanması, o ülkenin medikal veri sunumuna katkısının nitel ve nicel olarak değerlendirilmesinde önemli bir yoldur. Bu çalışmada, anestezi ve sezaryen ile ilgili bilimsel verilerin nitel analizini yapmayı, ayrıca Türk kurumları ve yazarları tarafından yayınlanarak Science Citation Index Expanded kapsamındaki tıbbi dergilerde yer almış yayınları araştırmayı amaçladık. **Yöntem.** Web of Science yazılımını kullanarak, Kasım 2012'ye kadarki süreçte anestezi ve sezaryen alanında yayınlanmış makaleleri retrospektif olarak araştırdık. Bu amaçla Science Citation Index Expanded kapsamındaki dergilerde yayınlanmış olan makaleler dikkate alındı. **Bulgular.** Kasım 2012'ye kadarki SCI Expanded veritabanında yapılan Web of Science temelli araştırmada, anestezi ve sezaryen ile ilgili 4637 adet İngilizce bilimsel dokümana ulaşıldı. 4637 İngilizce yayının arasında, 1262 (%27,2) tanesi Amerika Birleşik Devletleri'nden idi. Bunu, İngiltere (%16,9), Kanada (%6,5), Almanya (%5,6), Fransa (%4,2), Avustralya (%4,1) ve Türkiye (%3)'nin takip ettiği saptandı. Bütün diğer

ülkelerin katkısı %3'ten daha az idi. Türkiye'nin 458 adet (%3) yayını mevcut olup, listede 7.nci sırada yer aldığı görüldü. Bu başlık üzerine uluslararası bilimsel repertuar 1991'den önce göreceli olarak yetersizdi. Diğer taraftan, 2000'lerden sonra yayın sayısında uluslararası bir artış olduğunu gözlemledik. Türkiye kökenli yayınlar ise 1996 yılı itibariyle görülmeye başladı. Türkiye'nin uluslararası repertuara katkısı 2002 itibariyle artış göstermeye başladı. İngilizce SCI Expanded bazında yapılan araştırma süresi içerisinde (Kasım 2012'ye kadar), Web of Science aracılığıyla yapılan sınıflandırmada saptanan doküman tipleri daha çok makaleler (%71,8) ve mektuplar (%9,7) idi. Dünya genelinde yayınların temel kaynağının üniversite hastaneleri olduğu saptandı. **Sonuç.** Sezaryen anestezisi alanındaki araştırmaların nitelik ve niceliği son 10 yılda hızlı bir artış göstermiştir. Türkiye, bu repertuara özellikle son 10 yılda önemli katkıda bulunmuştur. Sezaryen anestezisi, hem anne hem de bebek için zararlı olma potansiyeline sahip yegane girişim olup, anne ve yenidoğanın sağlığını geliştirmek açısından pek çok araştırma gerektirmektedir.

Anahtar sözcükler: Bibliyometrik analiz, anestezisi, sezaryen seksiyon, rejyonel anestezisi, genel anestezisi

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Introduction

Cesarean delivery refers to the delivery of a baby through surgical incisions in the abdomen and uterus. Cesarean deliveries are categorized as either primary as first cesarean delivery or repeat as after a previous cesarean birth. The total cesarean delivery rate is the sum of these two components. Cesarean section (CS) is increasingly becoming a popular mode of child delivery globally. Rates of CS are of concern in both developed and developing countries. The cesarean delivery rate worldwide is 15 percent of births. In 47.2% of the countries, the CS rate exceeded 15% [1, 2]. Countries of Latin America and the Caribbean along with Europe, North America, and Oceania had the highest values. The analysis showed an inverse association between CS rates and maternal mortality and neonatal mortality for all geographical areas except for Europe. The greatest association was observed in lower-middle-income countries. In developing countries only 50% of childbirths occur in medical facilities and only half of these are seen by medical, nursing, and obstetrical staff. Age of the mother appears to influence the outcome and choice of delivery type [2].

Anesthesia for CS has important differences from those for other types of operations. An understanding of maternal and fetal physiology is necessary to provide optimal anesthesia without compromising maternal and fetal health. Both regional anesthesia and general anesthesia are acceptable approaches to provide anesthesia during cesarean operation; however, they have several advantages and disadvantages [3]. In a review of related literature by Afolabi and Lesi [3], they are compared for their features, and authors concluded that there was no evidence showing superiority of regional anesthesia to general anesthesia in terms of major maternal and neonatal outcomes. However, the use of general anesthesia has fallen dramatically in the past few decades as regional anesthesia becoming the preferred procedure and now accounts for only about 5 percent of cesarean deliveries in the United States and United Kingdom [4, 5].

The three categories of regional anesthesia currently performed for CS are spinal, epidural, and combined spinal-epidural anesthesia. While most cesarean deliveries are performed under regional anesthesia, general anesthesia should always be a consideration as it is occasionally necessary. There are two important problems related to this technique in pregnancy as increased risk of aspiration of gastric content and failed endotracheal intubation compared to other surgical patients. General anesthesia is preferred especially

for emergency cesareans because it provides anesthesia more quickly and the patient is sedated. Certain diseases causing bleeding tendencies may also preclude the use of a regional anesthesia. In addition, general anesthesia is a requirement when a regional anesthesia is not successful to provide the proper amount of anesthesia necessary to perform cesarean operation [6-13].

Over the last decade, the increase in CS rate in the developed world has increasingly caused discussion of best anesthetic technique in obstetric practice [14-15]. Nowadays, there are several factors influencing decision for method of anesthesia for cesarean delivery. As with all anesthetic procedures, there is a risk/benefit balance that must be considered as taking into account all related factors determined by mother and fetus such as maternal preference; presence of effective labor epidural anesthesia; maternal conditions precluding regional anesthesia (preeclampsia, clotting abnormalities); airway considerations (potential or previous difficult intubation); urgency of cesarean delivery; and experience and preference of attending anesthetists. Bibliometric analysis is a research method used in information science to evaluate research performance of scientific areas including medicine. With bibliometric analysis, it is possible to assess publication patterns in a medical given topic. The increasing use of bibliometric analysis by institutes and journals indicates its importance to determine trends in a medical subject. Close evaluation of the literature provides information to researchers for planning of future studies, and publication output in a certain discipline or topic can represent its previous, current, and future research trends or focus to increase the quality of scientific knowledge [16, 17]. One common method for carrying out bibliometric research is to use the Science Citation Index (SCI), which is published by the Institute for Scientific Information (ISI), Philadelphia, PA, USA, to trace citations [17].

In this investigation, we attempted to gain insights into the quantity and quality of research in the area of anesthesia for cesarean delivery by analyzing the SCI database. The results of this study will be of value to researchers in various fields, including anesthesiology, perinatology, and obstetrics, who seek information about the current trends and future directions in anesthesia for cesarean delivery.

Material and methods

This bibliometric analysis was conducted in November 2012 using the Web of Science database (<http://apps.webofknowledge.com>) to investigate the scientific publications about anesthesia and cesarean delivery. We retrospectively searched papers published in the field of anesthesia and cesarean delivery. We evaluated the papers that are published in the journals covered by Science Citation Index Expanded. We used the following search entries in the search field: Anesthesia and cesarean. All matched results were first refined in English language. "Analyze" function of the software was then used to investigate the contribution of the countries, distribution of the publications among years, type of the documents, name of the journals, institutions, and the authors. This analysis was also performed for investigating the Turkey's contribution separately. Publications and the cited papers from Turkey were also analyzed according to the study years. Data were presented as number and/or percentage of publications.

Results

Web of Science based search using the defined entries as anesthesia and cesarean through the database of SCI Expanded up to November 2012, revealed 4637 English scientific documents. We made our analysis in this group of publications. Among 4637 English publications, 1262 (27.2%) were from United States of America, followed by England (16.9%), Canada (6.5%), Germany (5.6%), France (4.2%), Australia (4.1%), and Turkey (3%). All others had a contribution smaller than 3%. Turkey had 458 (3%) publications and ranked 7. Figure 1 presents the contribution of first 10 countries to the field of anesthesia and cesarean.

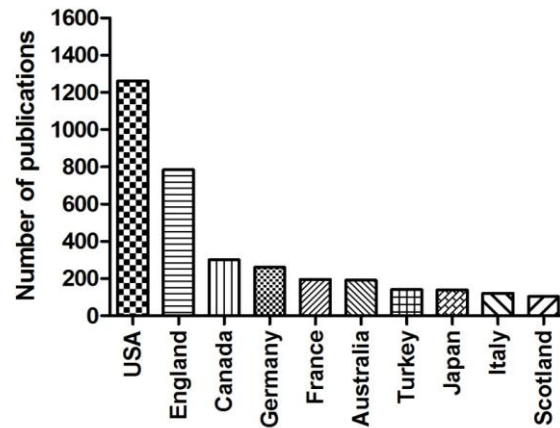


Figure 1. Contribution of first 10 countries to the scientific repertory on the field of anesthesia and cesarean delivery.

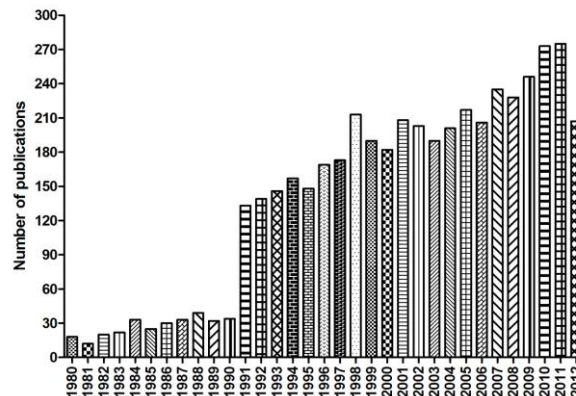


Figure 2. Global trend of publication numbers per years in the field of anesthesia and cesarean delivery with respect to years.

The international scientific repertory on anesthesia and cesarean was relatively poor before 1991. On the other hand, we observed an international acceleration with respect to the publication number after 2000s. Publications from Turkey on the other hand showed up only after 1996. Turkey's contribution to international repertory of anesthesia and cesarean delivery research seems to speed up after 2002. There were 13 (9.3%) and 127 (90.7%) papers published by Turkish authors between 1996-2002 and 2003-2012, respectively. Distribution of publications from Turkey according to years is presented Figure 3.

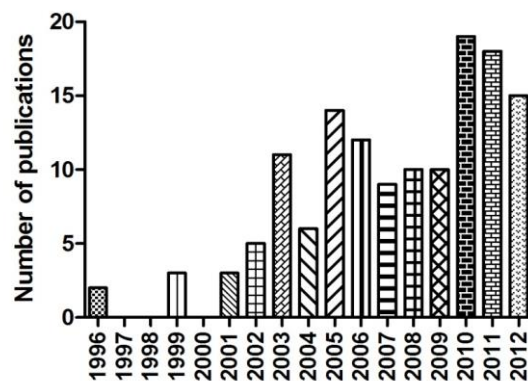


Figure 3. Publications from Turkey in the field of anesthesia and cesarean with respect to years.

The document types up to the date of the study (November 2012) related to anesthesia and cesarean delivery, classified by Web of Science in English SCI Expanded-based were mostly articles (71.8%) and letters (9.7%). The top 10 journals publishing the papers related to anesthesia and cesarean delivery are presented in Figure 4. Most of the papers were published in *Anesthesiology* (69.3%) and *Obstetrics and Gynecology* (26.2%).

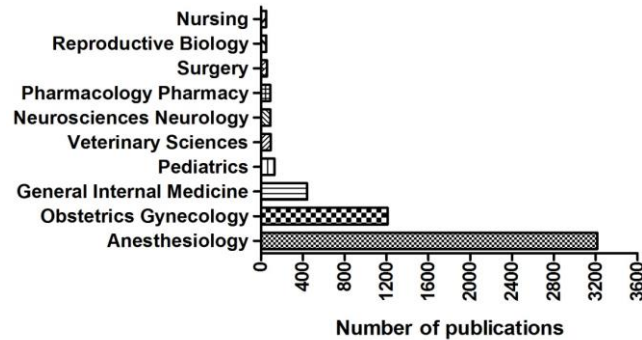


Figure 4. The top 10 journals publishing the papers on the field of anesthesia and cesarean delivery.

The main source of publications from all over the world was the university hospitals. Figure 5 presents top ten organizations. Harvard University is the first university of overall (n=93, 2%). The main source of the publications from Turkey was also the universities and university hospitals.

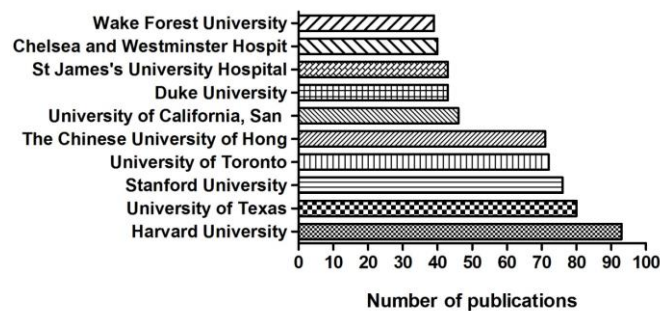


Figure 5. Presents top ten organizations.

Discussion

The type of anesthesia used and the care with which it is administered is an important determinant of the outcome of cesarean delivery with respect to the maternal and perinatal health. Cesarean operation requires effective anesthesia provided as a regional (epidural or/and spinal) or general anesthetic procedure. With epidural anesthesia, the anesthetic drug is infused into the epidural space, and with spinal anesthesia, the drug is administered as a single dose into the subarachnoid space. With those techniques, the mother is awake during the birth of baby; however, numbed from the waist down. With general anesthesia, the mother is unconscious during the birth of baby with the anesthetic affecting her whole body [18]. These techniques have several features complicating to reach a conclusion about their superiority; generally, they are procedure of choice in a pregnant woman with obstetrical or general complications [19-23].

Cesarean delivery is preferred when the clinician and/or patient feel that abdominal delivery is likely to provide a better maternal and/or fetal outcome than vaginal delivery. It is either "indicated" or "on maternal request". The decision to perform an indicated

cesarean delivery may be made antepartum or as a result of concerns identified after labor has begun as an unscheduled procedure). The terms "scheduled cesarean delivery" are used when the decision to perform a cesarean delivery does not occur as a consequence of a complication of labor, but is planned antepartum, such as in the case of repeat cesarean delivery, fetal malpresentation, or placenta previa [24]. Although there are several indications for CS [14, 15, 25-27] the four most common indications for cesarean delivery account for approximately 80 percent of these deliveries as the following [28]:

1. Failure to progress during labor (30%).
2. Previous hysterotomy (usually related to cesarean delivery, but also related to myomectomy or other uterine surgery) (30%).
3. Non-reassuring fetal status (10%).
4. Fetal malpresentation (11%).

The obstetrician is under an obligation to share the evidence about optimum mode of delivery with the pregnant woman and her birth attendants to allow the woman to make wise decisions about her management.

In conclusion, we found that the quantity and quality of research in the field of anesthesia for cesarean delivery has increased rapidly in the last decade. Turkey achieved a remarkable contribution to this repertory especially during the last decade. The ultimate goal of scientific research and publication in medicine is to make an impact in the clinical management of patients, which can be called "clinical impact factor". This aim can be achieved by efficient contribution of the medicine-based evidence especially via publication to the physicians. Bibliometric analysis provides important information with monitoring the scientific activity in a specific topic. Our results indicate that there is a positive trend in both globally and in Turkey for disseminating the findings in the field of anesthesia for cesarean delivery. Anesthesia for CS as a unique procedure having a potential to be harmful for mother and fetus still needs several investigations to shed light for determining optimal types of anesthetic procedures for laboring women.

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