# Appendix 1: Objectives and Methodologies Used in the Study.

# Top of Form

## Review of Vaginal Breech births rates

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| Objective |
| To map the incidence of vaginal breech deliveries within Israel and other healthcare systems. |
| Description |
| Review of official quantitative data published on recent rates of vaginal breech deliveries. For Israel, data was sourced, for example, from the Israeli Society of Maternal-Fetal Medicine's official website (<https://ismfm.mednet.co.il/>). For the United States, rates were derived from studies utilizing official U.S. vital statistics data (e.g., Hehir et al., 2018). |
| Tools and platforms |
| Web search and academic index search (e.g., PubMed: <https://pubmed.ncbi.nlm.nih.gov/>). |
| Selected observations |
| Collecting data from the Israeli Society of Maternal-Fetal Medicine on births from 2010 to 2012 showed that, out of the consistent low rate (3-4%) of babies reaching term in a breech position, the overwhelming majority were delivered via cesarean sections. As a direct result, the incidence of vaginal breech births decreased from 7.4% in 2010 to a mere 0.31% in 2012, totaling only a handful of cases. Intriguingly, after 2012, Israel stopped including vaginal breech delivery rates in official statistics, and the US did the same in 2009. Most reports now categorize breech presentations under "high-risk" conditions, rather than addressing them directly. This reflects a key finding: breech deliveries have become so rare they are subsumed under broader categories, indicating a further phase of collective forgetting.  |
| Limitations |
| The rates of vaginal breech deliveries may suggest neglect, but they do not provide insight into the preservation of skills, perceptions, or related factors. |

## Review of Israeli and International guidelines

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| Objective |
| Exploring the views on breech births authoritative guidelines. |
| Description |
| A close reading of the latest Israeli and international official guidelines available during the investigation, including an examination of their previous versions. For example:1. Israeli Association for Obstetrics and Gynecology: Position Paper no. 2 "Breech delivery," published: May 2017. Former versions: November 2010; March 2003; June 1998.
2. ACOG - American College of Obstetricians and Gynecologists: Committee Opinion no. 745 " mode of singleton breech delivery," published: August 2018. Former versions: Committee Opinion no. 340, July 2006; Committee Opinion no. 265, December 2001; Technical Bulletin no. 95 "Management of the breech Presentation," October 1991; 1986.
3. RCOG – Royal College of Obstetricians & Gynaecologists: Green-top Guideline No. 20b "Management of Breech Presentation," March 2017. Former versions: 2006; 2001; 1999.
 |
| Tools and platform |
| Accessing the latest guidelines was straightforward by searching obstetric association websites with relevant keywords: "breech presentation" or "breech delivery." Earlier editions were found via the Wayback Machine: <https://archive.org/> or through interlibrary loan services, often initiated by references from articles or interviewees. |
| Limitations |
| Guidelines may present a cautious or narrow perspective, influenced by a need to avoid litigation, and may not fully reflect the actual views and practices in the field.  |

## Impact of the TBT on academic literature, 1995-2018.

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| Objective |
| To perform a citation analysis of academic literature to identify the most influential publications in the debate on breech delivery (e.g., Moed, 2005). |
| Description |
| This citation analysis focused on academic literature on breech births published between 1995 (five years before the Term Breech Trial) and 2018. The year 2019 was excluded to account for the typical lag in the publication and indexing of academic papers. Data was retrieved in May 2019 from Elsevier’s comprehensive academic index, Scopus.com. The search targeted publications with 'breech presentation' or 'breech delivery' in their titles, abstracts, or keywords, while excluding those from irrelevant subject areas that used the term 'breech' in a different context. Full bibliographical metadata, including citation information, abstracts, keywords, funding details, and other relevant data, was extracted. |
| Search query – Breech Presentation OR Breech Delivery  |
| ( TITLE-ABS-KEY ( breech AND presentation ) OR TITLE-ABS-KEY ( breech AND delivery ) ) AND PUBYEAR > 1994 AND PUBYEAR < 2019 AND ( EXCLUDE ( SUBJAREA , "agri" ) OR EXCLUDE ( SUBJAREA , "vete" ) OR EXCLUDE ( SUBJAREA , "engi" ) OR EXCLUDE ( SUBJAREA , "psyc" ) OR EXCLUDE ( SUBJAREA , "immu" ) OR EXCLUDE ( SUBJAREA , "arts" ) OR EXCLUDE ( SUBJAREA , "phys" ) OR EXCLUDE ( SUBJAREA , "envi" ) OR EXCLUDE ( SUBJAREA , "comp" ) OR EXCLUDE ( SUBJAREA , "math" ) OR EXCLUDE ( SUBJAREA , "eart" ) OR EXCLUDE ( SUBJAREA , "econ" ) OR EXCLUDE ( SUBJAREA , "undefined" ) OR EXCLUDE ( SUBJAREA , "chem" ) OR EXCLUDE ( SUBJAREA , "ceng" ) OR EXCLUDE ( SUBJAREA , "dent" ) OR EXCLUDE ( SUBJAREA , "bioc" ) ) |
| Tools and platforms |
| Metadata was extracted through the Scopus interface into several .csv files and merged using Excel. OpenRefine: <https://openrefine.org/> was utilized to clean and store the dataset efficiently. e.g. to remove poor-formatted rows. Descriptive statistics of the publications were calculated and visualized using Tableau Desktop: <https://www.tableau.com/> .  |
| Selected observations |
| A total of 4,057 publications were initially retrieved. After data cleaning to remove poorly formatted and irrelevant records, 3,885 publications remained in the dataset. As is common in bibliographic academic indexes, particularly in the medical field, the majority of articles (73.3%) were published in English, with only two publications (0.05%) in Hebrew. The distribution of publications by source was more balanced, with a predominance of American and European obstetrics journals. |
| Language | English  | French | German | Spanish | Hebrew |
| 87% (3267) | 3.7% (145) | 2.14% (83) | 1.65% (64) | 0.05% (2) |
| DocumentType | Article | Review | Letter | Note | Editorial |
| 73.3% (2849) | 9.88% (384) | 6.74% (262) | 4.12% (160) | 2.19% (85) |
| Top publication sources | Obstetrics and Gynecology | 3.6% (142) |
| American Journal of Obstetrics and Gynecology | 3.5% (135) |
| Journal of Obstetrics and Gynaecology | 3.2% (125) |
| BJOG: An International Journal of Obstetrics and Gynaecology | 3.1% (121) |
| European Journal of Obstetrics and Gynecology and Reproductive Biology | 2.9% (112) |
| Top cited publications | Title | Authors | Year | Cited by |
| Planned caesarean section versus planned vaginal birth for breech presentation at term: A randomised multicentre trial | Hannah et al. | 2000 | 1232 |
|  | Method of delivery and pregnancy outcomes in Asia: the WHO global survey on maternal and perinatal health 2007-08 | Lumbiganon et al. | 2010 | 484 |
|  | Risk factors for autism: Perinatal factors, parental psychiatric history, and socioeconomic status | Larsson et al. | 2005 | 427 |
|  | Maternal mortality and severe morbidity associated with low-risk planned cesarean delivery versus planned vaginal delivery at term | Liu et al. | 2007 | 414 |
|  | Maternal and neonatal individual risks and benefits associated with caesarean delivery: Multicentre prospective study | Villar et al. | 2007 | 356 |
| Limitations |
| * Most publications were in English and predominantly from industrialized countries, particularly the United States, reflecting only part of the community.
* Academic literature may not accurately reflect actual practice, especially when it originates from countries with differing health systems and regulations. This limitation contributed to the shift in focus from the Israeli to the American case.
* While citations can gauge scientific impact, they do not always indicate agreement with the content. This is evident from the many citations criticizing the TBT, as opposed to supportive citations (e.g., Hanney et al., 2005), revealed through detailed article reviews.
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## Interviews with Israeli professionals in obstetrics

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| Objective |
|  A preliminary exploration of the views and recalls of vaginal breech births by Israeli practitioners.  |
| Description |
| During 2019-2020, 15 interviews, lasting from 20 minutes to 3 hours, were conducted with a diverse group of professionals, including obstetricians, management staff, midwives, and interns. Interviewees were purposefully selected to capture a range of perspectives. The process began with individuals known to either me or my supervisor, Nadav Davidovich. I also reached out to key figures like Prof. Mark Glezerman, recognized for his critical writings on the decline of breech delivery skills and his efforts to revive the practice in Israel (e.g., Glezerman, 2006; 2011; 2012). Additional participants were identified through a "snowball" sampling method, where existing interviewees referred others (Parker et al., 2019). |
| Tools and platform |
| Interviews were conducted face-to-face, by telephone, and online via Zoom. With the interviewee's permission, most were recorded and later manually transcribed into MS Word documents. |
| Limitations |  |
| * Recollections during the interviews may have been influenced by current dominant narratives, particularly given the focus on a collectively forgotten and controversial procedure.
* The small number of interviews limited the ability to fully explore practitioners' views and practices.

As a result, the interviews with Israeli practitioners primarily provided a preliminary introduction to the analysis.  |
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## Identifying Periods in the Breech Corpus, 1941-2018.

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| Objective |
| To track shifts in the volume of publications and identify unusual or particularly intriguing periods of academic focus on issues related to breech deliveries. |
| Description |
| * This corpus consists of literature on breech births published between 1941-2018, beginning 15 years before Wright's influential 1959 paper—a period marked by improved data collection and indexing in medical journals.
* Data was retrieved in October 2019 from Scopus.com, targeting publications that mentioned 'breech presentation' or 'breech delivery' in titles, abstracts, or keywords, excluding irrelevant fields using the term 'breech.'
* Publication counts were organized by year to identify trends in frequency.
* To determine if these trends were specific to breech deliveries or reflected broader obstetric trends, I compared the data with publications under the "Labor, Obstetrics" category in the Medical Subject Headings hierarchy at: <https://www.ncbi.nlm.nih.gov>.
* Due to size differences between datasets, z-scores (z = (x - μ) / σ) were calculated to standardize the data, allowing to compare and highlight unusual trends and outliers (Abdi, 2007).
 |
| Search query – Breech Presentation OR Breech Delivery  |
| ( TITLE-ABS-KEY ( breech AND presentation ) OR TITLE-ABS-KEY ( breech AND delivery ) ) AND PUBYEAR > 1940 AND PUBYEAR < 2019 AND ( EXCLUDE ( SUBJAREA , "AGRI" ) OR EXCLUDE ( SUBJAREA , "VETE" ) OR EXCLUDE ( SUBJAREA , "ENGI" ) OR EXCLUDE ( SUBJAREA , "PSYC" ) OR EXCLUDE ( SUBJAREA , "IMMU" ) OR EXCLUDE ( SUBJAREA , "ARTS" ) OR EXCLUDE ( SUBJAREA , "PHYS" ) OR EXCLUDE ( SUBJAREA , "ENVI" ) OR EXCLUDE ( SUBJAREA , "COMP" ) OR EXCLUDE ( SUBJAREA , "MATH" ) OR EXCLUDE ( SUBJAREA , "EART" ) OR EXCLUDE ( SUBJAREA , "ECON" ) OR EXCLUDE ( SUBJAREA , "Undefined" ) OR EXCLUDE ( SUBJAREA , "CHEM" ) OR EXCLUDE ( SUBJAREA , "CENG" ) OR EXCLUDE ( SUBJAREA , "DENT" ) OR EXCLUDE ( SUBJAREA , "BIOC" ) ) |
| Search query – Labor, Obstetrics |
| ( TITLE-ABS-KEY ( labor, AND obstetric ) OR TITLE-ABS-KEY ( labor, AND obstetric ) ) AND PUBYEAR > 1940 AND PUBYEAR < 2019 AND ( EXCLUDE ( SUBJAREA , "AGRI" ) OR EXCLUDE ( SUBJAREA , "VETE" ) OR EXCLUDE ( SUBJAREA , "ENGI" ) OR EXCLUDE ( SUBJAREA , "PSYC" ) OR EXCLUDE ( SUBJAREA , "IMMU" ) OR EXCLUDE ( SUBJAREA , "ARTS" ) OR EXCLUDE ( SUBJAREA , "PHYS" ) OR EXCLUDE ( SUBJAREA , "ENVI" ) OR EXCLUDE ( SUBJAREA , "COMP" ) OR EXCLUDE ( SUBJAREA , "MATH" ) OR EXCLUDE ( SUBJAREA , "EART" ) OR EXCLUDE ( SUBJAREA , "ECON" ) OR EXCLUDE ( SUBJAREA , "Undefined" ) OR EXCLUDE ( SUBJAREA , "CHEM" ) OR EXCLUDE ( SUBJAREA , "CENG" ) OR EXCLUDE ( SUBJAREA , "DENT" ) OR EXCLUDE ( SUBJAREA , "BIOC" ) ) |
| Tools and platforms |
| * Metadata and full-text documents (where available) were retrieved from Scopus using the 'Zotero' export format and imported into Zotero, a free, open-source bibliographic tool for collecting, organizing, and analyzing research metadata (<https://www.zotero.org/>).
* The corpus metadata was also exported to CSV files for further data cleaning using OpenRefine (<https://openrefine.org/>).
* The numbers of publications mentioning 'breech presentation' and 'labor' were exported to a single Excel table, then further analyzed and visualized using Tableau Desktop (<https://www.tableau.com/>).
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| Selected observations |
| * A total of 6,758 publications related to breech deliveries were retrieved, indicating clear overall growth in research volume. On average, 86.64 publications were produced per year, with an annual increase of 22.2 publications across the study period.
* Six distinct periods were identified, each spanning roughly a decade and showing different publication trends, with two main leaps:
	+ 1973-1987: A notable surge, averaging 89.13 publications per year—an increase of 60.18 compared to the 1950-1972 period.
	+ 2001-2012: Another significant jump occurred, with an average increase of 64.89 publications per year.
* The labor-related corpus was much larger, comprising 51,608 publications with an average of 661.64 publications per year, reflected by a much higher standard deviation (breech: 65.37; labor: 397.87).
* Comparing the breech-related and labor-related corpuses revealed insights not immediately apparent from the breech data alone. For example, while similar annual average breech publications were identified between the 1973-1987 and 1988-2000 periods (averaging 89.13 and 102.69 per year, respectively), the comparison with the labor-related corpus showed a more significant shift in trends during the earlier period, making it particularly interesting to focus on.
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| Periods in publications |
| Year | Number of records | Average no. per year | Standard Deviation | Median | Average Delta |
| 1941-1949 | 78 | 15.60 | 5.25 | 7 |  |
| 1950-1972 | 666 | 28.96 | 7.13 | 28 | 13.36 |
| 1973-1987 | 1,337 | 89.13 | 11.52 | 90 | 60.18 |
| 1988-2000 | 1,335 | 102.69 | 16.63 | 100 | 13.56 |
| 2001-2012 | 2,011 | 167.58 | 14.62 | 169 | 64.89 |
| 2013-2018 | 1,331 | 221.83 | 11.07 | 227 | 54.25 |
| 1941-2018 | 6785 | 86.64 | 64.52 | 84.5 | 22.2 |

The table shows the total publications, annual average, standard deviation, median, and average delta for six periods from 1941 to 2018. The average delta reflects changes in the yearly publication average between consecutive periods. |
| Number of Publications by Year: Breech Deliveries vs. Labor, Obstetrics, 1941-2018.

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| --- | --- | --- | --- | --- | --- | --- |
| Year of publication | No. of Pub. (Breech) | No. of Pub. (Labor) | Delta (Breech) | Delta (Labor) | Z(Breech) | Z(Labor) |
| 1941 | 11 | 2 |  |  | -1.16 | -1.66 |
| 1942 | 6 | 7 | -5 | 5 | -1.23 | -1.65 |
| 1943 | 6 | 2 | 0 | -5 | -1.23 | -1.66 |
| 1944 | 1 | 3 | -5 | 1 | -1.31 | -1.66 |
| 1945 | 4 | 37 | 3 | 34 | -1.26 | -1.57 |
| 1946 | 7 | 142 | 3 | 105 | -1.22 | -1.31 |
| 1947 | 11 | 174 | 4 | 32 | -1.16 | -1.23 |
| 1948 | 20 | 191 | 9 | 17 | -1.02 | -1.18 |
| 1949 | 12 | 205 | -8 | 14 | -1.14 | -1.15 |
| 1950 | 37 | 514 | 25 | 309 | -0.76 | -0.37 |
| 1951 | 39 | 513 | 2 | -1 | -0.73 | -0.37 |
| 1952 | 36 | 342 | -3 | -171 | -0.77 | -0.80 |
| 1953 | 20 | 453 | -16 | 111 | -1.02 | -0.52 |
| 1954 | 36 | 498 | 16 | 45 | -0.77 | -0.41 |
| 1955 | 31 | 466 | -5 | -32 | -0.85 | -0.49 |
| 1956 | 20 | 461 | -11 | -5 | -1.02 | -0.50 |
| 1957 | 32 | 459 | 12 | -2 | -0.84 | -0.51 |
| 1958 | 22 | 476 | -10 | 17 | -0.99 | -0.47 |
| 1959 | 20 | 375 | -2 | -101 | -1.02 | -0.72 |
| 1960 | 36 | 303 | 16 | -72 | -0.77 | -0.90 |
| 1961 | 28 | 291 | -8 | -12 | -0.90 | -0.93 |
| 1962 | 19 | 323 | -9 | 32 | -1.03 | -0.85 |
| 1963 | 34 | 456 | 15 | 133 | -0.81 | -0.52 |
| 1964 | 23 | 583 | -11 | 127 | -0.97 | -0.20 |
| 1965 | 40 | 402 | 17 | -181 | -0.71 | -0.65 |
| 1966 | 33 | 324 | -7 | -78 | -0.82 | -0.85 |
| 1967 | 18 | 407 | -15 | 83 | -1.05 | -0.64 |
| 1968 | 32 | 434 | 14 | 27 | -0.84 | -0.57 |
| 1969 | 36 | 514 | 4 | 80 | -0.77 | -0.37 |
| 1970 | 24 | 453 | -12 | -61 | -0.96 | -0.52 |
| 1971 | 28 | 461 | 4 | 8 | -0.90 | -0.50 |
| 1972 | 22 | 484 | -6 | 23 | -0.99 | -0.45 |
| 1973 | 74 | 588 | 52 | 104 | -0.19 | -0.19 |
| 1974 | 69 | 582 | -5 | -6 | -0.27 | -0.20 |
| 1975 | 92 | 540 | 23 | -42 | 0.08 | -0.31 |
| 1976 | 76 | 542 | -16 | 2 | -0.16 | -0.30 |
| 1977 | 86 | 557 | 10 | 15 | -0.01 | -0.26 |
| 1978 | 83 | 580 | -3 | 23 | -0.06 | -0.21 |
| 1979 | 110 | 648 | 27 | 68 | 0.36 | -0.03 |
| 1980 | 109 | 645 | -1 | -3 | 0.34 | -0.04 |
| 1981 | 101 | 588 | -8 | -57 | 0.22 | -0.19 |
| 1982 | 95 | 633 | -6 | 45 | 0.13 | -0.07 |
| 1983 | 90 | 553 | -5 | -80 | 0.05 | -0.27 |
| 1984 | 86 | 568 | -4 | 15 | -0.01 | -0.24 |
| 1985 | 93 | 613 | 7 | 45 | 0.10 | -0.12 |
| 1986 | 93 | 581 | 0 | -32 | 0.10 | -0.20 |
| 1987 | 80 | 595 | -13 | 14 | -0.10 | -0.17 |
| 1988 | 69 | 555 | -11 | -40 | -0.27 | -0.27 |
| 1989 | 84 | 578 | 15 | 23 | -0.04 | -0.21 |
| 1990 | 85 | 573 | 1 | -5 | -0.03 | -0.22 |
| 1991 | 99 | 556 | 14 | -17 | 0.19 | -0.27 |
| 1992 | 121 | 614 | 22 | 58 | 0.53 | -0.12 |
| 1993 | 101 | 658 | -20 | 44 | 0.22 | -0.01 |
| 1994 | 95 | 666 | -6 | 8 | 0.13 | 0.01 |
| 1995 | 99 | 762 | 4 | 96 | 0.19 | 0.25 |
| 1996 | 114 | 771 | 15 | 9 | 0.42 | 0.27 |
| 1997 | 120 | 833 | 6 | 62 | 0.51 | 0.43 |
| 1998 | 120 | 966 | 0 | 133 | 0.51 | 0.76 |
| 1999 | 100 | 844 | -20 | -122 | 0.20 | 0.46 |
| 2000 | 128 | 984 | 28 | 140 | 0.63 | 0.81 |
| 2001 | 147 | 958 | 19 | -26 | 0.92 | 0.74 |
| 2002 | 155 | 1064 | 8 | 106 | 1.05 | 1.01 |
| 2003 | 142 | 1031 | -13 | -33 | 0.85 | 0.93 |
| 2004 | 153 | 1071 | 11 | 40 | 1.02 | 1.03 |
| 2005 | 180 | 1021 | 27 | -50 | 1.43 | 0.90 |
| 2006 | 169 | 1110 | -11 | 89 | 1.26 | 1.13 |
| 2007 | 182 | 1114 | 13 | 4 | 1.46 | 1.14 |
| 2008 | 168 | 1052 | -14 | -62 | 1.24 | 0.98 |
| 2009 | 173 | 1155 | 5 | 103 | 1.32 | 1.24 |
| 2010 | 169 | 1154 | -4 | -1 | 1.26 | 1.24 |
| 2011 | 188 | 1234 | 19 | 80 | 1.55 | 1.44 |
| 2012 | 185 | 1288 | -3 | 54 | 1.50 | 1.57 |
| 2013 | 226 | 1267 | 41 | -21 | 2.13 | 1.52 |
| 2014 | 227 | 1498 | 1 | 231 | 2.15 | 2.10 |
| 2015 | 232 | 1614 | 5 | 116 | 2.22 | 2.39 |
| 2016 | 229 | 1697 | -3 | 83 | 2.18 | 2.60 |
| 2017 | 218 | 1689 | -11 | -8 | 2.01 | 2.58 |
| 2018 | 199 | 1663 | -19 | -26 | 1.72 | 2.52 |
| **Total** | **6,758** | **51,608** | **188** | **1661** |  |  |
| **Average** | **86.64** | **661.64** | **2.44** | **21.57** | **0.00** | **0.00** |
| **Std** | **65.37** | **397.87** | **14.05** | **76.94** | **1.00** | **1.00** |
| **Median** | **84.5** | **575.5** |  |  |  |  |

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| The table provides annual data from 1941 to 2018, showing the number of publications, the year-over-year change (delta), and the z-scores for both breech-related and labor-related publications. It also includes additional descriptive statistics for each year. |
| Number of publications. 'Breech Delivery' Vs. 'Labor, Obstetrics'. 1941-2018.The figure compares the z-scores of annual publications between breech- and labor-related topics, highlighting the unusual surge in breech-related publications during the 1970s-1980s. Visualization: Tableau. |
| Limitations |
| * The number of publications is partially influenced by changes in indexing practices, which may affect the observed trends.
* Some publications in the corpus did not directly focus on breech deliveries, instead mentioning them in the context of medical history or as a risk factor for other conditions, such as autism.
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## Roadmaps into the Breech Corpus, 1941-2018.

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| Objective - To explore trends and points of interest within the corpus, using different metadata available.  |
| Description |
| A cross-tabulation of Breech Corpus publications with additional metadata, such as Publication type, original language, Source title, Authors, affiliations, citation count funding details, and so on.  |
| Tools and platform |
| Tableau and MS Excel were used for analysis and visualization (for details, see appendix 1.5). |
| Selected observations |
| * Articles comprised 80% of the corpus, with reviews, letters, and conference papers also contributing to the discourse.
* Most publications (77%) were in English and associated with authors from the United State (19.41%). Additionally, a substantial portion of the publications (17.09%) listed no affiliations, particularly in the earlier years.
* The top two journals, American Journal of Obstetrics and Gynecology and Obstetrics and Gynecology, together account for nearly 9% of the total publications, their prominence in shaping the discourse.
* The Term Breech Trial (2000) remains the most cited publication, but others stand out in the context of their period of publications.
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| Tables |
| Publications by Document Type, 1941-2018 |
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| --- | --- | --- |
| **Document Type** | **No. of Publications** | **%** |
| Article | 5411 | 80.07 |
| Review | 460 | 6.81 |
| Letter | 369 | 5.46 |
| Note | 185 | 2.74 |
| Conference Paper | 113 | 1.67 |
| Editorial | 96 | 1.42 |
| Short Survey | 59 | 0.87 |
| Book Chapter | 40 | 0.59 |
| Null | 15 | 0.22 |
| Article in Press | 6 | 0.09 |
| Erratum | 4 | 0.06 |
| **Total** | **6758** | **100** |

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| Table X presents the number and percentage of publications by types of publications.  |
| Publications by Original Language, 1941-2018 |
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| --- | --- | --- |
| **Language of Original Document** | **No. of Publications** | **%** |
| English | 5224 | 77.30 |
| German | 390 | 5.77 |
| French | 298 | 4.41 |
| Spanish | 137 | 2.03 |
| Afrikaans, Bosnian, English; Croatian… | 84 | 1.24 |
| Japanese | 62 | 0.92 |
| Italian | 62 | 0.92 |
| Bulgarian | 53 | 0.78 |
| Polish | 51 | 0.75 |
| Dutch | 50 | 0.74 |
| Russian | 48 | 0.71 |
| Croatian | 34 | 0.50 |
| Czech | 31 | 0.46 |
| Chinese | 29 | 0.43 |
| Serbian | 26 | 0.38 |
| Norwegian | 25 | 0.37 |
| English; French | 25 | 0.37 |
| Danish | 19 | 0.28 |
| Hungarian | 15 | 0.22 |
| Portuguese | 13 | 0.19 |
| Turkish | 12 | 0.18 |
| No Language Specified | 70 | 1.04 |
| **Total** | **6758** | **100** |

 Table X presents the number and percentage of publications by their Original Language. |
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| Top 20 Sources of publications in the Breech Corpus, 1941-2018 |  |
| **Source title** | **No. of Publications** | **%** |
| American Journal of Obstetrics and Gynecology | 329 | 4.87 |
| Obstetrics and Gynecology | 266 | 3.94 |
| Acta Obstetricia et Gynecologica Scandinavica | 164 | 2.43 |
| Journal of Obstetrics and Gynaecology | 158 | 2.34 |
| European Journal of Obstetrics and Gynecology and Reproductive Biology | 153 | 2.26 |
| BJOG: An International Journal of Obstetrics and Gynaecology | 124 | 1.83 |
| International Journal of Gynecology and Obstetrics | 122 | 1.81 |
| Obstetrical and Gynecological Survey | 118 | 1.75 |
| Geburtshilfe und Frauenheilkunde | 117 | 1.73 |
| Journal of Maternal-Fetal and Neonatal Medicine | 98 | 1.45 |
| Journal de Gynecologie Obstetrique et Biologie de la Reproduction | 98 | 1.45 |
| British Medical Journal | 92 | 1.36 |
| Australian and New Zealand Journal of Obstetrics and Gynaecology | 91 | 1.35 |
| BJOG: An International Journal of Obstetrics & Gynaecology | 88 | 1.30 |
| Zentralblatt fur Gynakologie | 70 | 1.04 |
| Journal of Reproductive Medicine for the Obstetrician and Gynecologist | 62 | 0.92 |
| Archives of Gynecology and Obstetrics | 62 | 0.92 |
| Journal of Obstetrics and Gynaecology Canada | 61 | 0.90 |
| Journal of Perinatal Medicine | 60 | 0.89 |
| Midwifery today with international midwife | 56 | 0.83 |

Table X presents the number and percentage of the top 20 sources, primarily journals, of publications in the Breech Corpus. |
| Publications by Authors' Affiliation Country – United States and Others, 1941-2018 |
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|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Year** | **United States** | **Other Aff.** | **No Aff. specified** | **Year** | **United States** | **Other Aff.** | **No Aff. specified** |
| 1941 | 2 | 1 | 8 | 1980 | 22 | 63 | 24 |
| 1942 | 1 | 3 | 2 | 1981 | 22 | 57 | 22 |
| 1943 | 3 | 3 |  | 1982 | 20 | 59 | 16 |
| 1944 |  |  | 1 | 1983 | 20 | 48 | 22 |
| 1945 | 3 | 1 |  | 1984 | 25 | 47 | 14 |
| 1946 |  |  | 7 | 1985 | 24 | 60 | 9 |
| 1947 |  |  | 11 | 1986 | 23 | 50 | 20 |
| 1948 | 4 |  | 16 | 1987 | 20 | 43 | 17 |
| 1949 | 5 | 1 | 6 | 1988 | 13 | 43 | 13 |
| 1950 | 8 | 9 | 20 | 1989 | 14 | 43 | 27 |
| 1951 | 4 | 3 | 32 | 1990 | 24 | 58 | 3 |
| 1952 | 6 | 4 | 26 | 1991 | 24 | 63 | 12 |
| 1953 | 2 | 4 | 14 | 1992 | 28 | 85 | 8 |
| 1954 | 9 | 5 | 22 | 1993 | 16 | 77 | 8 |
| 1955 | 8 | 4 | 19 | 1994 | 23 | 65 | 7 |
| 1956 | 3 | 3 | 14 | 1995 | 28 | 60 | 11 |
| 1957 | 11 | 1 | 20 | 1996 | 24 | 80 | 10 |
| 1958 | 6 | 4 | 12 | 1997 | 27 | 80 | 13 |
| 1959 | 4 | 4 | 12 | 1998 | 27 | 86 | 7 |
| 1960 | 9 | 4 | 23 | 1999 | 21 | 69 | 10 |
| 1961 | 1 | 3 | 24 | 2000 | 22 | 97 | 9 |
| 1962 | 2 | 1 | 16 | 2001 | 25 | 96 | 26 |
| 1963 | 3 | 6 | 25 | 2002 | 24 | 119 | 12 |
| 1964 | 5 | 1 | 17 | 2003 | 22 | 104 | 16 |
| 1965 | 7 | 4 | 29 | 2004 | 25 | 119 | 9 |
| 1966 | 2 | 5 | 26 | 2005 | 35 | 126 | 19 |
| 1967 | 2 | 1 | 15 | 2006 | 29 | 123 | 17 |
| 1968 | 6 | 4 | 22 | 2007 | 27 | 123 | 32 |
| 1969 | 7 | 2 | 27 | 2008 | 36 | 122 | 10 |
| 1970 | 8 | 5 | 11 | 2009 | 26 | 130 | 17 |
| 1971 | 11 | 2 | 15 | 2010 | 38 | 122 | 9 |
| 1972 | 4 | 8 | 10 | 2011 | 28 | 152 | 8 |
| 1973 | 9 | 52 | 13 | 2012 | 36 | 140 | 9 |
| 1974 | 10 | 47 | 12 | 2013 | 39 | 160 | 27 |
| 1975 | 9 | 60 | 23 | 2014 | 41 | 174 | 12 |
| 1976 | 18 | 45 | 13 | 2015 | 50 | 176 | 6 |
| 1977 | 11 | 63 | 12 | 2016 | 45 | 175 | 9 |
| 1978 | 11 | 52 | 20 | 2017 | 45 | 165 | 8 |
| 1979 | 16 | 66 | 28 | 2018 | 44 | 151 | 4 |
|  |  |  |  | **Total** | **1312** | **4291** | **1155** |
|  |  |  |  | **%** | **19.41** | **63.50** | **17.09** |

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| Table X presents the distribution of publications from 1941 to 2018 based on author affiliations. Categories include U.S. affiliations, non-U.S. affiliations, and unspecified affiliations. |
| Top 50 cited publications, 1941-2018 |
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|  |  |  |  |
| --- | --- | --- | --- |
| **Title** | **Authors** | **Year** | **Cited** |
| Planned caesarean section versus planned vaginal birth for breech presentation at term: A randomised multicentre trial | Hannah et al. | 2000 | 1249 |
| Antecedents of Cerebral Palsy | Nelson et al. | 1986 | 671 |
| Method of delivery and pregnancy outcomes in Asia: the WHO global survey on maternal and perinatal health 2007-08 | Lumbiganon et al.  | 2010 | 511 |
| Risk factors for autism: Perinatal factors, parental psychiatric history, and socioeconomic status | Larsson et al.  | 2005 | 434 |
| Maternal mortality and severe morbidity associated with low-risk planned cesarean delivery versus planned vaginal delivery at term | Liu et al. | 2007 | 433 |
| Maternal and neonatal individual risks and benefits associated with caesarean delivery: Multicentre prospective study | Villar et al. | 2007 | 375 |
| Risk of respiratory morbidity in term infants delivered by elective caesarean section: Cohort study | Hansen et al. | 2008 | 333 |
| Safe prevention of the primary cesarean delivery This document was developed jointly by the with the assistance of | Caughey et al. | 2014 | 319 |
| Obstetric care consensus no. 1: Safe prevention of the primary cesarean delivery | [No author name available] | 2014 | 269 |
| The risks associated with pregnancy in women aged 35 years or older | Jolly et al. | 2000 | 266 |
| Is planned vaginal delivery for breech presentation at term still an option? Results of an observational prospective survey in France and Belgium | Goffinet et al. | 2006 | 238 |
| Outcomes of children at 2 years after planned cesarean birth versus planned vaginal birth for breech presentation at term: The international randomized Term Breech Trial | Whyte et al. | 2004 | 234 |
| Obstetric anal sphincter lacerations | Handa et al. | 2001 | 229 |
| Reproductive Performance of Women with Uterine Anomalies: An Evaluation of 182 Cases | Heinonen et al. | 1982 | 228 |
| Maternal outcomes at 2 years after planned cesarean section versus planned vaginal birth for breech presentation at term: The international randomized Term Breech Trial | Hannah et al. | 2004 | 221 |
| Obstetric outcome of in vitro fertilization pregnancies compared with normally conceived pregnancies | Tan et al. | 1992 | 220 |
| Low 5-minute Apgar score: A population-based register study of 1 million term births | Thorngren-Jerneck et al. | 2001 | 211 |
| Autism Spectrum Disorders in Extremely Preterm Children | Johnson et al. | 2010 | 204 |
| The randomized management of term frank breech presentation: A study of 208 cases | Collea et al. | 1980 | 200 |
| Complications in pregnancy, labor, and delivery with uterine leiomyomas: A population-based study | Coronado et al. | 2000 | 200 |
| The Bristol third stage trial: Active versus physiological management of third stage of labour | Prendiville et al. | 1988 | 197 |
| Reproductive performance of women with uterine malformations | Acién et al. | 1993 | 193 |
| Vaginal delivery in patients with a prior cesarean section | Lavin et al. | 1982 | 187 |
| Premature rupture of the fetal membranes. A review | Gunn et al.. | 1970 | 183 |
| Outcomes at 3 months after planned cesarean vs planned vaginal delivery for breech presentation at term: The international randomized Term Breech Trial | Hannah et al. | 2002 | 183 |
| Outcomes of planned home births with certified professional midwives: Large prospective study in North America | Johnson et al. | 2005 | 177 |
| Five years to the term breech trial: The rise and fall of a randomized controlled trial | Glezerman  | 2006 | 173 |
| Elevated risks of pregnancy complications and adverse outcomes with increasing maternal age | Luke & Brown  | 2007 | 172 |
| Patterns of brain injury in neonates exposed to perinatal sentinel events | Okereafor et al. | 2008 | 172 |
| Variation in rates of caesarean section among English NHS trusts after accounting for maternal and clinical risk: Cross sectional study | Bragg et al. | 2010 | 169 |
| Survey of obstetricians' personal preference and discretionary practice | Al-Mufti et al. | 1997 | 168 |
| Positional preference: Prevalence in infants and follow-up after two years | Boere-Boonekamp & Van Der Linden-Kuiper | 2001 | 168 |
| The effect of placental syncytiotrophoblast microvillous membranes from normal and pre‐eclamptic women on the growth of endothelial cells in vitro | Smárason et al. | 1993 | 167 |
| The epidemiology of neonatal brachial plexus palsy in the United States | Foad et al. | 2008 | 166 |
| Erb/duchenne's palsy: A consequence of fetal macrosomia and method of delivery | McFarland et al. | 1986 | 164 |
| The frequency of breech presentation by gestational age at birth: A large population-based study | Hickok et al. | 1992 | 162 |
| Moxibustion for correction of breech presentation: A randomized controlled trial | Cardini & Weixin | 1998 | 162 |
| Caesarean section for non-medical reasons at term. | Lavender et al. | 2006 | 162 |
| Prospective Study of Human Immunodeficiency Virus Infection and Pregnancy Outcomes in Intravenous Drug Users | Selwyn et al. | 1989 | 161 |
| Randomized management of the nonfrank breech presentation at term: A preliminary report | Gimovsky et al. | 1983 | 157 |
| Cesarean section delivery in the 1980's: International comparison by indication | Notzon et al. | 1994 | 157 |
| Bulimia nervosa: The impact of pregnancy on mother and baby | Lacey & Smith  | 1987 | 155 |
| Infantile torticollis: A review of 624 cases | Cheng & Au | 1994 | 155 |
| The clinical presentation and outcome of treatment of congenital muscular torticollis in infants - A study of 1,086 cases | Cheng et al. | 2000 | 154 |
| Trends in the United States cesarean section rate and reasons for the 1980-85 rise | Taffel et al. | 1987 | 153 |
| The effect of the Term Breech Trial on medical intervention behaviour and neonatal outcome in the Netherlands: An analysis of 35,453 term breech infants | Rietberg et al. | 2005 | 153 |
| ACOG committee opinion no. 340: Mode of term singleton breech delivery | [No author name available] | 2006 | 153 |
| Scientific basis for the content of routine antenatal care I. Philosophy, recent studies, and power to eliminate or alleviate adverse maternal outcomes | Vlllar | 1997 | 150 |
| Pregnancy after uterine artery embolization | Goldberg et al. | 2002 | 150 |
| Changes in maternal characteristics and obstetric practice and recent increases in primary cesarean delivery | Joseph et al. | 2003 | 150 |
|  |  |  |  |
| Table X lists the top 50 most cited publications in the breech corpus from 1941 to 2018. |
| Limitations |
| * The majority of publications were in English and originated from industrialized countries, particularly the United States, limiting the generalizability of findings to other regions.
* A significant number of early publications lacked specified affiliations, reflecting poor indexing and affecting the reliability of geographic or institutional analyses.
* Citation counts do not differentiate between internal and external citations, potentially inflating the influence of studies that mention breech births but focus on broader issues.
* High citation counts in some cases reflect influence in fields outside of obstetrics, complicating the assessment of their relevance to breech-specific research.
* The concentration of publications in a few key journals may bias the representation of the discourse within the corpus.
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## Mapping the discourse of the breech corpus.

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| Objective – To map the evolution of academic discourse on breech births by identifying unusually frequent keywords for each period between 1941-2018, as determined in previous analyses. |
| Description |
| Keyword analysis involves computational techniques to measure and rank relevant terms within a corpus by comparing the frequencies of words in the target corpus (specific periods being examined) against a reference corpus (Anthony, 2022, p. 109).* Indexed keywords (referred to as 'terms' to avoid confusion) were extracted from publications within the following periods: 1941-1950, 1951-1969, 1970-1990, 1991-2012, and 2013-2018. Each period was treated as a separate target corpus, with keywords from the entire timeline serving as the reference corpus.
* The periods of the 1990s-2000 and 2001-2010s were merged due to the similarity in discourse across both periods.
* All terms were first cleaned of special characters, case letters, and spaces to ensure they were treated as single, distinct terms (e.g., "Cesarean section" became "cesareansection").
* The relevancy of keywords was determined by their "keyness," indicating an unusual frequency in the target period compared to the reference corpus.
* Keywords were analyzed using the following settings:
	+ The Dice coefficient was used to measure effect size, indicating the magnitude of the unusual frequency in the target corpus (Anthony, 2022).
		- The log-likelihood (4-term) statistic was used to calculate "keyness" scores, representing statistical significance. A high keyness score indicates a significant relative frequency difference between the target and reference corpora (Pojanapunya & Todd, 2018).
		- A p-value threshold of < 0.05, corrected using the Bonferroni method for multiple comparisons, was applied to ensure robust findings.
 |
| Tools and platforms  |
| * Indexed keywords (terms) were extracted from publication metadata using VosViewer (<https://www.vosviewer.com/>), a tool designed for effectively parsing Scopus metadata.
* The data was exported into six text files: one for each identified period and one encompassing the entire period.
* Special characters, spaces, and other extraneous elements were removed using Notepad++ (<https://notepad-plus-plus.org/>).
* Keyword analysis, including log-likelihood (LL) and effect size calculations, was performed using AntConc 3.5.8 (<https://www.laurenceanthony.net/>).
* Results were exported to CSV files and consolidated into a single dataset using Excel.
* Visualization was completed using Tableau.
 |
| Selected observations |
| * A total of 283 statistically significant keywords were identified across all periods.
* Recent decades, particularly 2013-2018, saw a significant number of keywords (96), but these had a low effect size. This suggests either more comprehensive thesauri or diverse new issues spread across many publications without a dominant trend. In contrast, earlier periods displayed a more focused discussion, as evidenced by higher effect size scores (see Figure X).
* The most relevant terms for each period are presented in Table X. Key findings include:
	+ 1941-1950: Discussions primarily centered on pathologies, some unrelated directly to breech birth (e.g., Tumors, Spasm).
	+ 1951-1969: Marked by discussions on mortality, especially fetal deaths. Publications covered statistics, diagnostic methods, delivery techniques for breech births (e.g., pelvimetry, anesthesia, forceps), and complications, along with increased focus on cesarean sections.
	+ 1970-1990: Cesarean sections became a major topic, alongside ongoing discussions on fetal mortality. Birth weight remained relevant, with growing discourse on specific breech-related pathologies.
	+ 1991-2012: Predominance of controlled or clinical studies, with a strong focus on risk factors.
	+ 2013-2018: Discussions primarily revolved around general obstetrics terms (e.g., Pregnant-Woman, Young) and statistical methods, with continued relevance of discussions on weight.
 |
| Table X: Top 10 relevant Keywords of each period, by effect size. |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Period** | **Keyword** | **Keyness(LL)** | **Effect size** | **Freq** |
| **1941-1950** | Tibia | 32.5 | 0.0789 | 3 |
| Tumors-Teratoma | 31.0 | 0.0615 | 2 |
| Spasm | 25.4 | 0.0597 | 2 |
| Dislocations | 19.2 | 0.0513 | 2 |
| Vagina | 29.0 | 0.0506 | 4 |
| Hydroephalus | 28.6 | 0.0494 | 4 |
| Teratoma | 17.2 | 0.0460 | 2 |
| Rupture | 16.0 | 0.0421 | 2 |
| Term | 14.4 | 0.0360 | 2 |
| Neoplasms-Hormone | 15.5 | 0.0313 | 1 |
| **Total no. of Keywords: 17** |  |  |  |
| **1951-1969** | Mortality | 401 | 0.0901 | 173 |
| Statistics | 228 | 0.0521 | 68 |
| Anesthesia | 173 | 0.0502 | 72 |
| Fetal-Death | 129 | 0.0374 | 49 |
| Complications | 60 | 0.0357 | 64 |
| Injury | 161 | 0.0340 | 41 |
| Cesarean-Section | 17 | 0.0326 | 132 |
| Weight | 252 | 0.0322 | 37 |
| Forceps | 85 | 0.0302 | 40 |
| Pelvimetry | 91 | 0.0278 | 35 |
| **Total no. of Keywords: 71** |  |  |  |
| **1970-1990** | Cesarean-Section | 44 | 0.0775 | 1,253 |
| Fetus | 387 | 0.0440 | 596 |
| Therapy | 687 | 0.0395 | 521 |
| Mortality | 177 | 0.0381 | 520 |
| Major-Clinical-Study | 83 | 0.0355 | 488 |
| Diagnosis | 506 | 0.0335 | 441 |
| Complications | 107 | 0.0309 | 418 |
| Birth-Weight | 87 | 0.0270 | 362 |
| English-Abstract | 393 | 0.0255 | 333 |
| Genital-System | 429 | 0.0251 | 327 |
| **Total no. of Keywords: 92** |  |  |  |
| **1991-2012** | Journal-Priority | 3,245 | 0.0410 | 1,438 |
| Vaginal | 29 | 0.0275 | 980 |
| Controlled-Study | 48 | 0.0183 | 645 |
| Risk-Factors | 25 | 0.0113 | 395 |
| Clinical-Trial | 34 | 0.0068 | 234 |
| Controlled-Clinical-Trial | 28 | 0.0035 | 122 |
| Gynecology-Department | 27 | 0.0003 | 12 |
| **Total no. of Keywords: 7** (The Maximum Number of Significant Keywords). |
| **2013-2018** | Young | 143 | 0.0143 | 323 |
| Procedures | 167 | 0.0121 | 272 |
| Weight | 523 | 0.0096 | 214 |
| Statistics-Numerical-Data | 535 | 0.0084 | 186 |
| Cohort-Analysis | 45 | 0.0074 | 165 |
| Term | 181 | 0.0055 | 123 |
| Nuclear-Magnetic-Resonance-Imaging | 288 | 0.0045 | 100 |
| Still | 279 | 0.0044 | 97 |
| Pregnant-Woman | 25 | 0.0042 | 94 |
| Fetal-Version | 55 | 0.0041 | 91 |
| **Total no. of keywords: 96** |  |  |  |
| Table X displays the top 10 keywords for each period between 1941-2018, ranked by their effect size. These keywords highlight the most unusually frequent terms in each period, offering insight into shifts in the academic discourse on breech births. |

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| Limitations |
| * The effectiveness of measures like the Dice coefficient effect size in evaluating associations between corpora is debated (e.g., Gabrielatos, 2018).
* While keyword analysis allows for comparison across corpora of different sizes, the low frequencies of indexed keywords in earlier years may disproportionately highlight certain terms.
* The evolution and expansion of keyword thesauri over time can affect results, especially when new terms are introduced, as observed with the general terms during 2013-2018.

As a result, these measures were considered indicative rather than definitive findings. |
|  |  |

## Mapping Evolving Debates within the Breech Corpus

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| Objective |
| To trace the evolution of professional debates within the breech corpus by analyzing clusters of internal citations. |
| Description |
| Citation analysis encompasses various relational calculations based on the bibliographic references found in most academic publications. The primary use of citation analysis is to identify communities of related publications (Lean et al., 2021).* I conducted an internal citation analysis, focusing exclusively on citations within the analyzed network and plotting them chronologically. This method is effective in tracking the development of scientific corpora (ibid).
* A subset of the 2,000 most-cited publications was extracted from the breech corpus dataset and imported into the CiteNetExplorer tool.
* Since CiteNetExplorer was not designed to parse Scopus metadata, I employed an R script that transformed the dataset to the adequate format.
* Citation analysis configurations:
	+ Minimum cluster size: 10 publications (default)
	+ Resolution parameter (determines the level of detail of the clustering): 1.0.
	+ Optimization: 10 random starts (default); maximum iterations: 100; random seed: 0 (default).
	+ Citation scores: Use internal citation scores
	+ Citation counting: Fractional counting, where each citation has a weight of 1 divided by the number of outgoing citations from the citing publication (CiteNetExplorer user interface).
	+ Visualization: Plotted the top 100 publications with proportional representation of groups.
* Clustering methodology of Waltman and Van Eck (2012, 2013)
* The resulting clusters provided detailed information about the publications and their network scores, forming the basis for further systematic close reading.
 |
| Tools and platforms |
| * Initial dataset: Scopus metadata in .csv format.
* Since CiteNetExplorer does not natively support Scopus metadata, I used an R script to convert the dataset into the required format (available on GitHub: <https://github.com/MichaelBoireau/Scopus2CitNet>).
* Network analysis and visualization: Conducted using CiteNetExplorer (<https://www.citnetexplorer.nl/>).
* Clusters and network scores were exported and consolidated into a unified Excel file.
 |
| Selected observations |
| Table X: Clusters of Professional Debates within the Breech Corpus |
|

|  |  |  |  |
| --- | --- | --- | --- |
| **Cluster** | **Size**  | **Period** | **Main Discussion Topic** |
| 1 | 434 | 1945- 2018 | Cesarean section vs. vaginal breech delivery |
| 2 | 308 | 1951- 2017 | External cephalic version |
| 3 | 136 | 1972- 2018 | Cesarean section |
| 4 | 119 | 1975- 2017 | Twins |
| 5 | 85 | 1967- 2016 | Hip-related pathologies |
| 6 | 39 | 1979- 2016 | Other child-related pathologies |
| 7 | 39 | 1980- 2016 | Brachial Plexus disorders |
| 8 | 28 | 1948- 2008 | Spinal cord-related pathologies |
| 9 | 15 | 1976- 2016 | Anomalies of the uterus |
| 10 | 11 | 1970-2006 | Umbilical cord-related pathologies |

Table X lists ten clusters of publications, detailing their size (number of publications), period (from the earliest to the latest year published), and the main discussion topic within each cluster.  |
| Limitations |
| The analysis was limited to the 2,000 most-cited publications due to CiteNetExplorer’s scale constraints, potentially overlooking relevant but less-cited or mis-indexed publications. |
|  |

##