

## Scientometric Analysis of The Research on The Abortion: 2015-2019

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**Abstract:** Nowadays the researchers have found the finale the soundless virus of unsafe abortion is an imperative public-health and human-rights authoritative. Furthermore, noticeable global-health issues related to abortion constitute an important debate in medical ethics. Each year, approximately 19–20 million abortions are completed by personalities lacking the necessary bits of help or in situations lower lowest medical ethics or both. As a result, we found that the greatest productive author in standings of the total number of articles, the highest mean of total citation per articles 10.02 registered in the year 2015 against 1684 number of the citation with five citable years, Foster DG is the most remarkable writer according to M-index which is the median number of cited publications. While the author only started to create in 2015, the top two journals with highly (4143 and 4110 cited a Fertil Steril, and Hum Reprod) related to abortion services research.

**Keywords:** Abortion, Scientometric Analysis, Pregnancy, Women Health, Web of Science

### Introduction

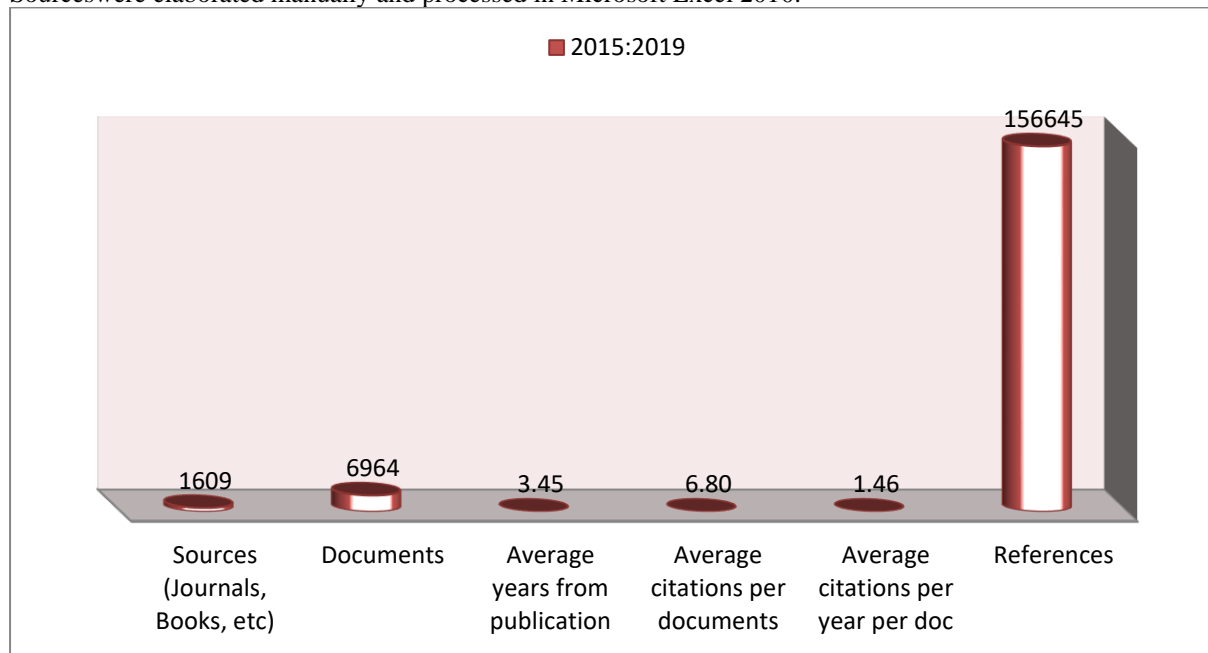
Leydesdor, L.; Milojevic, S. (2013) Scientometrics alludes to the investigation of estimating and examining logical writing. Explicit points inside this field allude to the estimation of the effect of examination papers, the comprehension of logical references, and the utilization of the aftereffects of such evaluations in approach and the board settings. Ioannidis, J. P., Fanelli, D., Dunne, D. D., & Goodman, S. N. (2015). There are covers among scientometrics and other logical fields, e.g., meta-science. Meta-science can be characterized as the utilization of examination techniques to consider and assess research itself and the regions where upgrades can be made; meta-science studies can manage techniques, detailing, reproducibility, assessment, and motivations, which are connected with execution, correspondence, confirmation, assessment, and compensating research, individually. Sivankalai S (2020) Scientometrics and meta-science papers produce new information by utilizing data in recently distributed exploration articles. Such articles present highlights and qualities of logical exploration, with the mean to create a quantitative evaluation of the underlying examination papers. They contrast from survey papers, which synopses the condition of information on a subject, without detailing new realities or completing new investigations. During appraisal of the applicable writing, writers of surveys may examine research papers and give well-qualified conclusions by consolidating discoveries and thoughts from the essential sources.

World Health Organization, (2004) early termination is lawfully allowed in numerous nations under a few conditions, like the need to save the mother's life or defend her physical as well as psychological wellness, in instances of assault or inbreeding, or of fetal impedance, or for monetary or social reasons. Roudi-Fahimi F (2002) early termination in Iran is restricted to helpful signs as characterized by the law, however even on account of illicit early terminations, postoperative care is accessible in Iran's public and private medical clinics as a feature of essential medical services. Falahian, M., & Mohammadzadeh, F. (2005) crisis contraception is additionally accessible in family arranging centers. Medical services suppliers don't feel constrained to report unlawful early terminations to specialists and these cases are not arraigned except if somebody records a complaint. The utilization of prostaglandin rather than curettage to prompt fetus removal has essentially diminished the maternal death rate in Iran, even in instances of unlawful early termination (18).

### Material and methods

The search for the scientometric analysis of the collected works on the abortion was carried out consuming the "Web of Science" database of the Clarivate: core collection, (Korean Journal database, MEDLINE, Russian Science Citation Index, and Science Citation Index-Expanded). The software used to process the WoS files (Web of Science) was Biblioshiny, it generates historical maps of bibliographic collections resulting from searches of Dataset, authors, sources Documents, Conceptual Structure, Intellectual Structure or Social Structure in the analysis. The software produces chronological historiographies that best part the most cited works in the recovered collection; other listings include classifications by authors, journals, countries, cited documents and keywords. The analysis and classification of scientific results, Annual Production during the years, Author Production Over Time, Annual Total Citation per Year, Author Impact, Most Relevant Authors, Countries Production, WordCloud, Most Cited Sources, Most Global Cited Documents, Most Local Cited

Authors, Most Relevant Affiliations, Most Relevant Countries By Corresponding Author, and Most Relevant Sources were elaborated manually and processed in Microsoft Excel 2010.



**Figure 1. Annual Production during the years in the field of abortion**

**Results**

An overall of 6964 articles was distributed within the study during the period 2015-2019, sources (journals, books, and etc 1609), documents 6964 and normal average years from publication 3.45% are shown in Fig 1. Average citations per documents 6.80%, Average citations per year per doc 1.46%, and References 156645, suggesting that research on abortion des has been decreasing in the year 2019. Similarly, the average total of articles published fluctuated over the years.

**Table 1. Annual Total Citation per Year in the field of abortion**

Year	No. of Citation	Mean Total Citation per articles	Mean Total Citation per Year	Citable Years
2015	1684	10.02	2.00	5
2016	1736	8.67	2.17	4
2017	1685	5.71	1.90	3
2018	1770	3.27	1.64	2
2019	89	0.00	0.00	1

The papers have published on abortion from 2015 to 2019 and average total citations of articles by year are shown in table 1 the highest mean of total citation per articles 10.02 registered in the year 2015 against 1684 number of the citation with five citable years, while the lowest mean of total citation per article recorded in the year 2019. The Highest Mean of citation per year (2.00) documented in 201 and the lowest mean of citation per year is 0.00 recorded in 2019.

Table 2 indicated that a total number of articles and a total number of citations, Average citations per articles, citations per author, articles per author, and citations per year, (Hirsch, J. E. 2005) H-Index and linked limits, (Leo Egghe, L. 2006) g-index (g-index), The contemporary h-index (m-index), The average annual increase in the individual h-index, The age-weighted citation frequency. Together with H and G guides' gives a specific number mixing composed journal (number) and citation marks and provides information on productivity. In the table, citations are organized in the descending order for M-Index fit into the Hirsch main than older ones. Authors are also ranked according to H-Index, G-Index, and M-Index; through the benefit of the next position development from top to bottom, impact authors are identified. The citations in the table are given in decreasing order of M-Index. From Table 2 this one is similarly detected that Winikoff B, Grossman D, Foster DG, and Gerdts C are the first position whereas Heikinheimo O, Gissler M, and Blumenthal PD are the last position according to M-Index even however their direction of standards and ranks change according to h and g indexes.

**Table 2. Top 20 Author Impact in the field of abortion**

Author	H Index	G Index	M Index	TC	Number of Papers
Winikoff b	13	16	2.17	321	38
Grossman d	12	21	2.00	496	48
Foster dg	12	20	2.00	444	35
Gerdts c	12	25	2.00	656	27
Wang y	11	18	1.83	404	45
Gemzell-danielsson k	10	17	1.67	348	34
Ganatra b	10	21	1.67	521	21
Li j	9	14	1.50	229	39
Li y	9	20	1.50	429	32
Upadhyay ud	9	17	1.50	310	28
Wang l	9	14	1.50	209	23
Zhang y	8	10	1.33	169	39
Wang j	8	10	1.33	153	31
Roberts scm	8	13	1.33	192	23
Zhang h	7	10	1.17	122	23
Liu j	7	9	1.17	105	23
White k	7	14	1.17	201	22
Heikinheimo o	6	11	1.00	142	28
Gissler m	6	9	1.00	100	25
Blumenthal pd	6	10	1.00	107	23

The material almost the authors' production is given in above the rendering to the table 3 Grossman D (48) appears to be the greatest productive author in standings of the total number of articles research of abortion. Though, when associated with the number of authors in the articles, Wang Y (46), and Zhang Y (40) have distributed the first three authors. As the number of authors in the article decreases, equal if the total number of articles of the author reductions, the fractionalized effect of the author can decrease. For example, Wang Y., who ranked 2nd according to the total number of articles contributed, raised to the 8 ranks in the latter ranking. Dyer C, Winikoff B, Aiken Ara, was not among the top 20 authors; nonetheless, they were at the highest of the list. Therefore, it is experiential that the authors of the grade have a great propensity to collaborate.

**Table 3. Most Relevant 20 Authors in the field of abortion**

Authors	Articles	Authors-frac	Articles
Grossman d	48	[Anonymous]	19.00
Wang Y	46	Dyer c	16.00
Zhang Y	40	Grossman d	11.63
Li J	39	Foster dg	10.02
Winikoff B	38	Upadhyay ud	7.29
Foster DG	35	Li j	6.82
Gemzell-Danielsson K	34	Gemzell-danielsson k	6.82
Li y	33	Wang y	6.38
Wang J	32	Gissler m	6.21
Heikinheimo O	28	Heikinheimo o	6.13
Upadhyay UD	28	Blumenthal pd	5.99

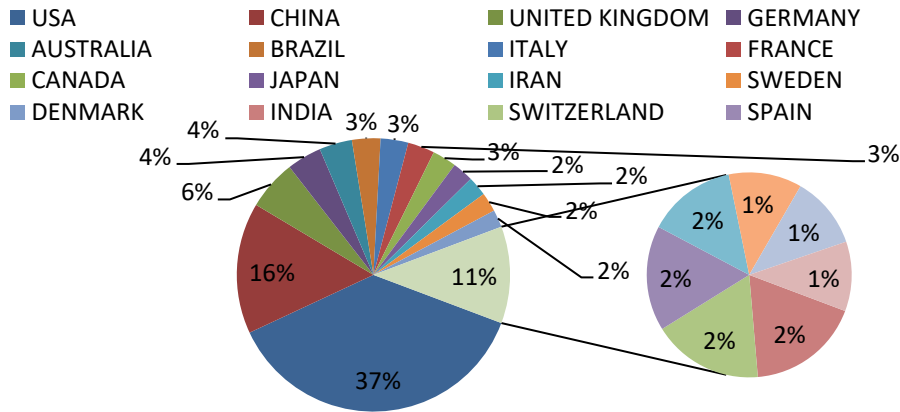
Gerdts C	27	Winikoff b	5.95
Gissler M	25	Foster am	5.73
Zhang H	24	Roberts scm	5.70
Blumenthal Pd	23	Creinin md	5.30
Liu J	23	Aiken ara	5.27
Roberts SCM	23	Zhang y	5.27
Wang l	23	Gerdts c	5.18
White k	22	Grech v	5.00
Ganatra b	21	Biggs ma	4.88

In the table 4, the making of the authors is studied rendering to time. This one is understood that the greatest productive authors have distributed their articles linked to abortion in the last two years. According to the graph, Gerdts C. is one of the greatest productive authors between authors. Table 2 confirms this by the author's impact in the table 4, Foster DG. Is the most remarkable writer according to M-index which is the median number of cited publications. While the author only started to create in 2015, his achievement is growing quickly. He is also ranked third position in the incline in positions of G-index which is further thoughtful to high-cited works and refers to the top g publications with g2 or more citations (LeoEgghe, L. 2006). Since that the number of articles is 27 and the year of start of production is 2015, it is strong-minded that this author also has active publications, and the possibility of being further active is growing as time goes on. The figure 2 showed that the field of abortion related articles more highly-cited scientific abortion papers, the USA dominated (37%) during the years, second place engaged China (16%), next position got the United Kingdom and Germany (4%), then Australia, Brazil, Italy, France, And Canada (3%), Japan, Iran, Sweden, Denmark, India, Switzerland, Spain, and Netherlands (2%) finally Norway, Turkey, and Israel.

We used the Show Word Cloud mixture in Keyword plus Evaluator to create Figure 3, which shows the word cloud of the entire number shaped on the incidence of statuses

**Table 4. Author Production Over Time in the field of abortion**

Author	year	freq	Total Citation	Total Citation per Year
Gerds c	2016	8	345	69.00
Ganatra b	2016	6	274	54.80
Ganatra b	2017	8	188	47.00
Gerds c	2017	6	149	37.25
Foster dg	2015	11	201	33.50
Gemzell-danielsson k	2015	8	170	28.33
Foster dg	2017	9	110	27.50
Gemzell-danielsson k	2017	10	92	23.00
Foster dg	2018	8	56	18.67
Gerds c	2015	7	101	16.83
Foster dg	2016	7	77	15.40
Blumenthal pd	2017	8	55	13.75
Gemzell-danielsson k	2016	9	67	13.40
Ganatra b	2018	4	22	7.33
Gemzell-danielsson k	2018	7	19	6.33
Ganatra b	2015	3	37	6.17
Blumenthal pd	2015	5	33	5.50
Blumenthal pd	2016	6	15	3.00
Blumenthal pd	2018	3	4	1.33
Blumenthal pd	2019	1	0	0.00



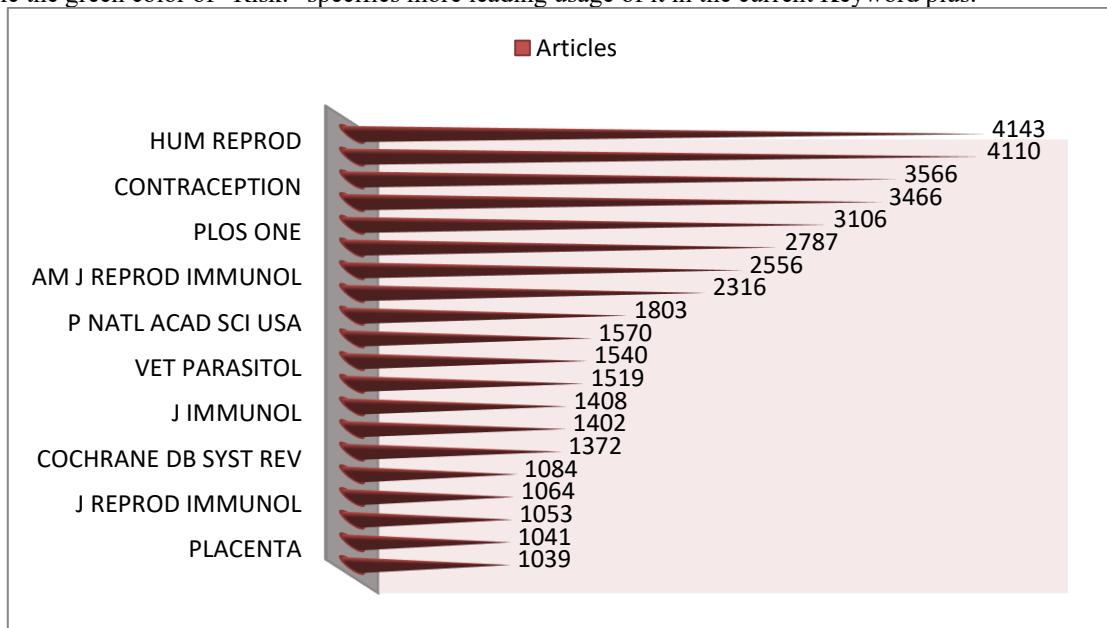
**Figure 2. Most Cited Countries in the field of abortion**

and the differences in the practice of relations completed abortion. A word's font size is larger as the position symmetry is higher. The relations with greater occurrences in the earlier abstract are publicized in the thick green color of the term women, while the ones with higher frequencies in the current abstract are shown in the green color of the term Pregnancy.



**Figure 3. Keyword plus Word Cloud in the field of abortion**

For sample, the thick blue color of the term “Abortion” specifies more regular tradition of the term previous, while the green color of “Risk.” specifies more leading usage of it in the current Keyword plus.



**Figure 4. Most Cited Sources in the field of abortion**

Figure 4. The most-cited sources of all time is a source by abortion relating a study to quantify the awareness of proteins presents some scientometric details of the top two journals with highly (4143 and 4110 cited a Fertil

Steril, and Hum Reprod) related to abortion services research. These are *Obstet Gynecol* (3566), *Contraception* (3466), *AM J Obstet Gynecol* (3106), *Plos One* (2787), *Lancet* (2556), and *AM J Reprod Immunol* (2316). These journals account for 46.21% of all highly cited articles used in this study.

According to Table 5, this one is rooted that five most useful *Finer LB, 2016, The New England Journal of Medicine* were got most global citation core 730 and total citation per year 146.00, keep an eye on by *Miner Jj, 2016 Cell* were got most global citation 453 and total citation per year 90.60, *Sedgh G, 2015, Journal of Adolescent Health* were got most global citation 282 and total citation per year 47.00, *Kassebaum Nj, 2016, The Lancet*, were got most global citation 271 and total citation per year 90.60, and *Skorpen Cg, 2016, Annals of the Rheumatic Diseases* correspondingly were got most global citation 270 and total citation per year 54.00. Therefore, it is thought that these journals will continue to dominate “abortion” by cumulative the number of journals and citations

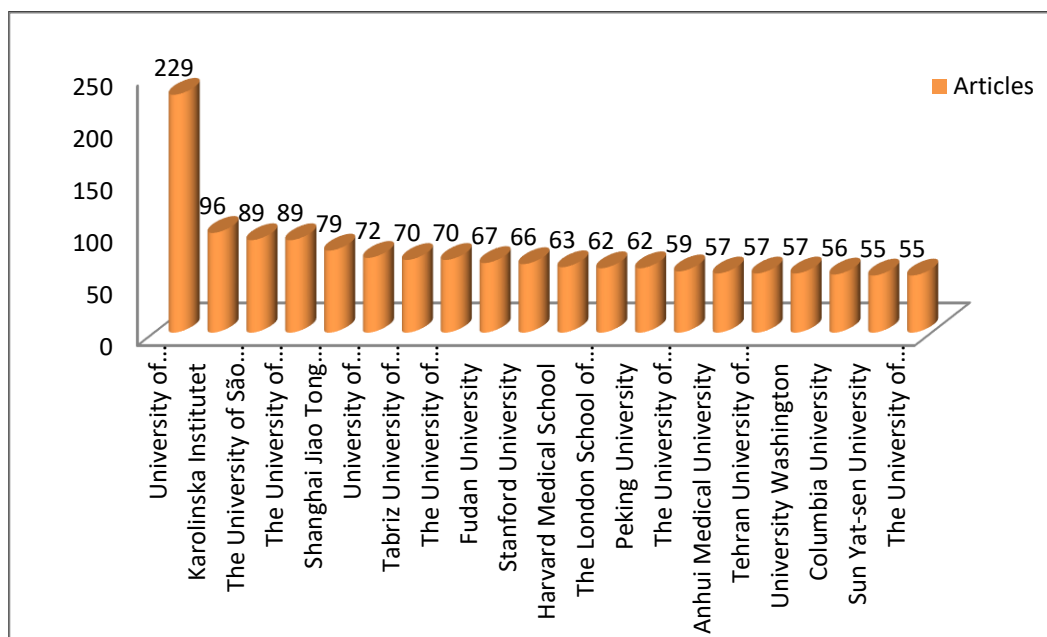


Figure 5. Most Relevant Affiliations in the field of abortion

Table5. MostGlobalCitedDocumentsin the field of abortion

Paper	Total Citations	Total Citations per Year
Finer Lb, 2016, The New England Journal of Medicine	730	146.00
Miner Jj, 2016, Cell	453	90.60
Sedgh G, 2015, Journal of Adolescent Health	282	47.00
Kassebaum Nj, 2016, The Lancet	271	54.20
Skorpen Cg, 2016, Annals of the Rheumatic Diseases	270	54.00
Sedgh G, 2016, Lancet	214	42.80
Yockey Lj, 2016, Cell	212	42.40
Sarno M, 2016, Plos Neglect Trop D	203	40.60
Agarwal A, 2016, Transl Androl Urol	191	38.20
Palinski R, 2017, J Virol	172	43.00
Martines Rb, 2016, Lancet	165	33.00
Grohskopf La, 2018, Mmwr Recomm Rep	157	52.33
Lis R, 2015, Clin Infect Dis	145	24.17
Ganatra B, 2017, Lancet	136	34.00
ZENG Y, 2016, LANCET	136	27.20
Barlow Km, 2015, Field Crop Res	133	22.17
Quansah R, 2015, Environ Health Persp	114	19.00

Bearak J, 2018, Lancet Glob Health	106	35.33
Burkard C, 2017, Plos Pathog	104	26.00
Harper Cc, 2015, Lancet	99	16.50

The top 20 Most Relevant Affiliations articles for abortion research are listed in figure 5. The University of California, San Francisco (UCSF) is research published first position (229), while second position Karolinska Institutet 96 articles published in the field, the third position occupied two organizations The University of São Paulo and The University of Toronto, the fourth position got (79) from Shanghai Jiao Tong University, the fifth position got (72) from University of California finally below 70 articles published various institutes followed by Tabriz University of Medical Sciences, The University of Michigan, Fudan University, Stanford University,

Harvard Medical School, The London School of Hygiene & Tropical Medicine, Peking University, The University of North Carolina, Anhui Medical University, Tehran University of Medical Sciences, University Washington, Columbia University, Sun Yat-sen University, and The University of Edinburg in the field of abortion.

A related design as for Multiple Country Publications authorship can be separated in Single Country Publications authored papers. For USA (0.25) and China (0.16), it is more common than the corresponding author appears in abortion for Single Country Publications authored (USA 1209, China 176, Brazil 176, United Kingdom 156, France 144, Iran 143, and India 138) papers while for Multiple Country Publications authored (USA 306, China 118, United Kingdom 113, Germany 66, Australia and Sweden 48, and Canada 46) papers the corresponding author, dominated Single Country author appears abortion. On average, in Single Country authored papers the corresponding author appears.

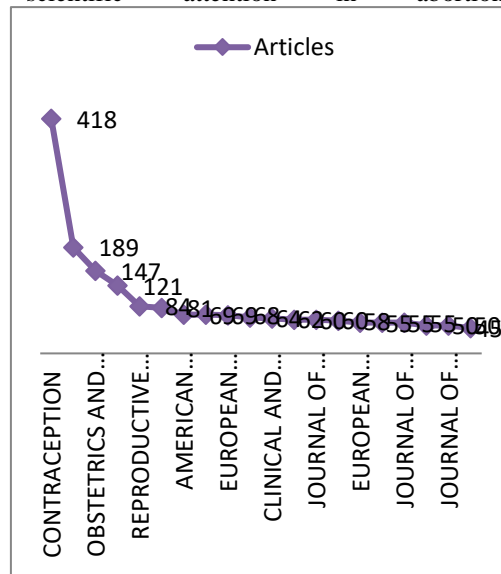
#### 1. Most Relevant Countries by Corresponding Author in the field of abortion

Country	Articles	Freq	SCP	MCP	MCP Ratio
USA	1515	0.25	1209	306	0.20
China	969	0.16	851	118	0.12
United Kingdom	269	0.04	156	113	0.42
Brazil	232	0.04	176	56	0.24
Germany	185	0.03	119	66	0.36
France	174	0.03	144	30	0.17
India	167	0.03	138	29	0.17
Italy	165	0.03	124	41	0.25
Japan	160	0.03	133	27	0.17
Turkey	160	0.03	152	8	0.05
Iran	156	0.03	143	13	0.08
Australia	151	0.02	103	48	0.32
Canada	145	0.02	99	46	0.32
Spain	99	0.02	59	40	0.40
Sweden	86	0.01	38	48	0.56
Israel	84	0.01	69	15	0.18
Switzerland	76	0.01	37	39	0.51
Korea	72	0.01	65	7	0.10
Poland	71	0.01	59	12	0.17
Denmark	66	0.01	44	22	0.33

SCP: Single Country Publications; MCP: Multiple Country Publications

Published studies on abortion from 2015 to 2019 and normal total citations of articles by year are shown in Fig 6. The global abortion WoS database involved of a popular of Research journals Contraception were produced 418 articles, Plos one were produced 189 articles, Obstetrics and gynecology were produced 147 articles, International journal of gynecology & obstetrics were produced 121 articles, Reproductive health were produced 87 articles, Fertility and sterility, and other journals below 70 articles published in the field of abortion. By taking on the Biblioshiny software, we can gain a detailed statistical result about the time distribution of research outputs in the specific field. The progression of papers published related to abortion from 2015 to 2019

has been shown above the table. As can be observed from this table that the citation begins in this area was published in 1966 and formerly there is a complete pure ascending trend for the number of articles done period, which showed that scientific attention in abortion has been growing.



6. Most Relevant Sources in the field of abortion

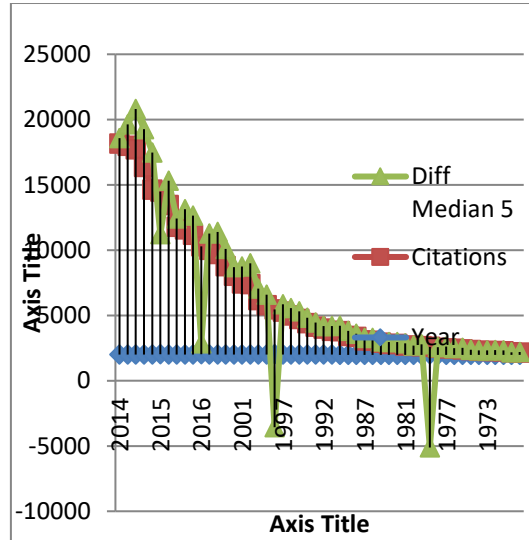


Figure 7. Reference publication year spectroscopy (RPYS) in the field of abortion

Further, the method of Reference Publication Year Spectroscopy (RPYS) has been newly making known to which is based on the investigation of the regularity with which references are cited in the journals of a particular study field in abortion. The spectrogram of the number of year-wise CRs and the 5-year median deviations for data set above the table is shown. The spectrogram features five large mountaintops at RPYs 2009-2015, 1997-2009, and 1966-1996. The fig. 7 lists the CRs which are mainly responsible for these five peaks the table provides the number of occurrences (in other years, how often the publication has been cited by abortion) in absolute terms. It is clearly visible that the result is dominated by citations. Abortion seems to have frequently based his newer publications on the footing of his earlier publications. Abortion was a pioneer and there were no other shoulders than his own, on which he could base his research. Similarly to Abortion's publication output, also his referencing style is tilted.

Table 7 Appearances the top twenty funding agencies who are economically assisting research activities in the field of abortion, this one is marked from the overhead table that the National Natural Science Foundation Of China 443 is emerging as the top funding agency in the world in the field of abortion, followed by United States Department Of Health Human Services for 293 research activities, National Institutes of Health NIH USA 275 and NIH Eunice Kennedy Shriver National Institute Of Child Health Human Development NICHD 99, respectively. Furthermore, National Council for Scientific and Technological Development CNPQ 94 research programs, Ministry of Education Culture Sports Science And Technology Japan 68, Capes 63, National Basic Research Program of China 59, European Union EU 53, and other agencies below 50 articles contributed in the field of abortion during years.



## 2. Funding Agencies in the field of abortion

Funding Agencies	records	% of 6964	Rank
National Natural Science Foundation Of China	443	6.36	1
United States Department Of Health Human Services	293	4.21	2
National Institutes of Health NIH USA	275	3.95	3
NIH Eunice Kennedy Shriver National Institute Of Child Health Human Development NICHD	99	1.42	4
National Council For Scientific And Technological Development CNPQ	94	1.35	5
Ministry of Education Culture Sports Science And Technology Japan	68	0.98	6
Capes	63	0.91	7
National Basic Research Program Of China	59	0.85	8
European Union EU	53	0.76	9
Japan Society For The Promotion Of Science	45	0.65	10
The David Lucile Packard Foundation	40	0.57	11
Medical Research Council UK MRC	39	0.56	12
National science foundation NSF	38	0.55	13
Society of family planning	35	0.5	14
Swedish research council	35	0.5	15
German research foundation DFG	33	0.47	16
Canadian institutes of health research CIHR	32	0.46	17
Swiss national science foundation SNSF	32	0.46	18
United states department of agriculture USDA	31	0.45	19
Biotechnology and biological sciences research council BBSRC	30	0.43	20

### Conclusion

This research so long as another viewpoint to the worldwide research trends in abortion studies for the duration of 2015–2019. Knowledge in several countries has made known that condition abortion is legalized, connected maternal deaths drop meaningfully but Abortion rests controlled

in various Islamic nations, and illegal abortion leftovers a topic of discussion

Larijani, B., & Zahedi, F. 2006). *Finer LB*, 2016, *The New England Journal of Medicine* were got most global citation core 730 and total citation per year 146.00 in the field, 229 were article published by The University of California, San Francisco (UCSF), Single Country Publications and Multiple Country Publications by USA and China has occupied in the field of abortion. Hence, using the effects produced from this study can support us current strong and acceptable studies on the present condition, research themes and their association, and significant words in the area of abortion. It can be concluded with the above analysis that the National Natural Science Foundation of China is highly supporting research activities in the field of abortion Furthermore, Staff and researchers can have a well sympathetic of scientometric in this area and start directions for more research. I must, of course, take this limitation into account that studied data are from the Web of Science database. Examining further databases such as Scopus or PubMed can principal to dissimilar outcomes. Accomplishment parallel researches using additional Bibliometrics and thematic methods such as sub-origination analysis, co-citation analysis, studying co-authorship, and generating scientific charts can perform as a supplement this study.

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