

# Trends analysis of cancer topic of Cochrane systematic reviews: a bibliometric analysis

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## Research article

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# Abstract

Purpose: To analyze the scientific outputs of the cancer topic of Cochrane systematic reviews (Cancer-CSR) in order to have a comprehensive understanding and lay the foundation for the following research.

Patients and methods: Cochrane Database of Systematic Review and Web of Science Core Collection were retrieved limited from Jan. 1, 2009 to Dec. 12, 2018. CiteSpace IV and Excel 2018 were applied to analyze and visualize the literature information.

Results: Ultimately, 607 Cancer-CSR were retrieved, 32 countries, 179 institutions and 260 authors involved. The number of publications in Cancer-CSR has been increasing over the past decades (25(2009)-77(2018)). UK, USA, Canada, Australia, and Germany worked closely with other countries, especially the UK (n=361) has taken the lead in this field. The top 10 contributive institutions, which were almost came from developed countries, collaborated closely with other institutions. *Cochrane Database Syst Rev*, *C Hdb Sys* and *J Clin Oncol* were the top three journals with the highest co-citation. The top three co-cited references were the two different version of Cochrane handbook for systematic reviews and the guidelines of Review Manager. The biggest cluster of keywords “cytoreductive surgery (CRS)” and the latest clusters “visual inspection” and “non-steroidal anti-inflammatory drug” were the most promising hotspots.

Conclusions: Cancer-CSR has been increasing. Most of the reviews were came from the developed countries as well as the institutes in these countries. The knowledge base of was the methodology studies of systematic review, epidemiological data of cancer, and the reporting guideline of systematic reviews. The adjuvant therapy combined CRS, the screening of skin cancer and the management of cancer-related pain were the hotspots. Reasons that influence the author's preference for Cancer-CSR also deserve further investigation.

## 1. Introduction

With the development of evidence based medicine, the systematic review has been gradually considered as the high quality evidence<sup>(1)</sup>. The Cochrane Database of Systematic Reviews (*Cochrane Database Syst Rev*) is a database of systematic reviews and meta-analyses which summarize and interpret the results of medical research, as well as contains different types of high-quality, independent evidence to inform healthcare decision-making<sup>(2-4)</sup>, and the 2017 Impact Factor of which is 6.754<sup>(5)</sup>. Cochrane systematic review is a systematic review of research in health care and health policy that is published in the *Cochrane Database Syst Rev*, which bases the findings on the results of studies that meet certain quality criteria and adopts several methods to reduce the impact of bias across different parts of the review process<sup>(4, 6)</sup>.

The scientific research of cancer in *Cochrane Database Syst Rev* has never stopped. Cancer affects all of humankind, from a global perspective, which is the second leading cause of death worldwide. By 2018, nearly one in six deaths were caused by cancer (9.5 million)<sup>(7, 8)</sup>. It is worth noting that the burden of chronic diseases is disproportionately increasing in low-income countries and populations, and it is reported that nearly 80% of non-communicable disease-related deaths in low- and middle-income countries are caused by chronic diseases<sup>(9)</sup>. The total annual economic cost of cancer care in the United

States in 2017 is 147370 million, up 15.4 percent compared to 2010, according to Cancer Prevalence and Cost of Care Projections in NIH<sup>(10)</sup>. Giving to the grave situation, cancer threatens the whole humankind and puts a huge economic burden on every country.

In order to assess trends in research activities of the cancer topic of Cochrane systematic reviews (Cancer-CSR), bibliometric analysis has been used, which is a quantitative analysis combining mathematics and statistics<sup>(11)</sup>. The bibliometric analysis focuses on the bibliometric characteristics of research in a particular field, helping investigators grasp the development priorities and trends in the field and guiding their follow-up work<sup>(12)</sup>.

This study performed a bibliometric analysis of the Cancer-CSR to establish the current knowledge visualization map, analyze the characteristics and trends of research topics in this field, compare the composition of topics in different dimensions, and find the research hotspots of keywords cluster analysis.

## 2. Materials And Methods

### 2.1 Data source and collection

All the records, identified in Cancer-CSR via Cochrane topic taxonomy, were retrieved one by one through the Web of Science Core Collection (WoSCC) database from Jan. 1, 2009 to Dec. 12, 2018. All retrievals were done within one day in order to avoid the bias caused by the updating of the daily database. The data from WoSCC were checked with the records in *Cochrane Database Syst Rev* by two reviewers (Yang KL and Gao Y) independently.

### 2.2 Tools and methods

EndNote X8 (Thomson Reuters (Scientific) LLC•Philadelphia, PA, US) was applied to manage the retrieved data. CiteSpace IV and Excel (Microsoft, 2016) were applied to analyze and visualize the literature information.

CiteSpace IV , developed by Prof. Chaomei Chen, is a Java application that combines information visualization methods, bibliometrics, and data mining algorithms in an interactive visualization tool for extracting patterns from citation data, which is to facilitate the analysis of emerging trends in a knowledge domain<sup>(13, 14)</sup>. Clusters of the same color represent co-citations or keywords made within the same time slice. The size of the node can reflect the number of the node is cited or appeared, and the links between nodes represented relationships such as collaboration, co-occurrence or co-citations<sup>(14, 15)</sup>. The tree ring history of the node represents the number of papers published in different years. The wider the ring is in a certain year, the more frequently it is cited or appeared in the corresponding year. The larger the size of the cluster (that is, the more members contained in the cluster), the smaller the number of the labels<sup>(16)</sup>. The following index was focused on analysis:

(1) Centrality<sup>(16)</sup>: The centrality of a node is a graphical theoretical property quantifying the importance of a node's position in the network. A commonly used centrality metric is the "betweenness centrality", which measures the percentage of the shortest path in the network to which a given node belongs. The high centrality node is around by the purple circle in the visualization.

(2) Visually salient nodes<sup>(14, 16)</sup>: a. Landmark node: the landmark node can be rendered by different visual space attributes such as size, height, or volume, which are commonly used in network visualization; b. Pivot node: the pivot node, which joints between different networks, is either the common nodes shared by two networks or the gateway nodes that are connected by internetwork links.

## 2.3 Data analysis and Visualization

The retrieved data were analyzed for the annual growth, co-citation analysis, and co-occurrence of countries, institutes, and keywords. In this study, the parameters of CiteSpace used were as follows: the time slicing was 2009-2018, the selection criteria was the 50 most highly cited papers in a one-year slice, the cluster labels were showed by the log-likelihood ratio (LLR), and the visualization was chosen as cluster view-static and show merged network.

# 3. Results

## 3.1 The basic characteristics

Ultimately, 607 documents were selected, published between 2009 and 2018. The number of publications has kept rising, with annual publications increasing from 25 in 2009 to 77 in 2018, with the 81 documents being published in the highest-producing year 2015. Moreover, the number of publications in the adjacent years increased significantly, reaching over 10 per year from 2009 to 2013. The polynomial curve fitting of publication growth in Cancer-CSR has significant correlation between publication year and the number of publications (the coefficient of determination ( $R^2$ )=0.8285). **Fig. 1** depicted the number of publications.

According to the content of which, the included reviews were classified into different topic categories. "Gastroenterology & hepatology"(n=111(18.3%)), "Gynaecology" (n=99(16.3%)), and "Blood disorders" (n=62(10.2%)) were the top three category among them. In addition, on the basis of the "review type" of Cochrane Library, most of the included reviews focused on Intervention, and only two of the included records were overview (**Table 1**).

Table 1 Descriptive Characteristics of the included Cancer-CSR

Category	Characteristic	Number (N=607, n (%))
Topic categories*	Gynaecological	99 (16.3%)
	Breast	50 (8.2%)
	Colorectal	47 (7.7%)
	Neurological	36 (5.9%)
	Lung	26 (4.3%)
	Skin	24 (4.0%)
	Liver	20 (3.3%)
	Head & Neck	19 (3.1%)
	Stomach	16 (2.6%)
	Urological	15 (2.5%)
	Pancreas	15 (2.5%)
	Male genitourinary system	13 (2.1%)
	Oesophagus	13 (2.1%)
	Oral	12 (2.0%)
	Soft issue sarcoma	3 (0.5%)
	Small bowel	3 (0.5%)
	Others	196 (32.3%)
Publishing status	New research	105(17.3%)
	Conclusions changed	32(5.3%)
Review types	Intervention	577(95.1%)
	Diagnostic	28(4.6%)
	Overview	2(0.3%)

\*Based on the content of *Cochrane Database of Systematic Reviews*.

### 3.2 Distribution of countries and institutes

The selected reviews encompassed 32 countries. In the light of the list of top 10 countries launching Cochrane review in cancer field (**Table 2**), the publication of UK took up the most number (318(33.8%)), followed by the USA (97(10.3%)) and Australia (75(8.0%)). Among these 10 countries, the centrality of China (publications=52, centrality=0.05) was only a quarter of the centrality of Canada (publications=51, centrality=0.21) which had nearly the same number of publications as China. As was shown in **Fig. 2A**, the tree ring history of UK was the biggest one and was the richest in color. The nodes around by purple circle were UK, Canada, USA, Australia, and Germany, and the latest countries firstly published in 2018 were Austria and Egypt.

Table 2 The top 10 countries that published Cancer-CSR (N=940)

Rank	Country	Frequency (n (%))	Centrality
1	UK	318(33.8%)	0.39
2	USA	97(10.3%)	0.39
3	Australia	75(8.0%)	0.27
4	Germany	71(7.6%)	0.13
5	Netherlands	67(7.1%)	0.07
6	China	52(5.5%)	0.05
7	Canada	51(5.4%)	0.21
8	Italy	33(3.5%)	0.07
9	Denmark	18(1.9%)	0
10	Brazil	17(1.8%)	0.01

The total of 178 institutes has involved in the co-occurrence network of institutes, as indicated in **Table 3**. Among the top 10 institutes publishing reviews, seven were located in the UK, one in Germany, one in Holland, and one in China. *Newcastle University* contributed most (52(6.1%)), with the biggest node in **Fig. 2B**, followed by *Oxford University* (39(4.5%)), *University Hospital of Cologne* (28(3.3%)), *Royal United Hospital* (25(2.9%)), *Churchill Hospital* (22(2.6%)) and *Manchester University* (22(2.6%)). The nodes of all these six institutes were around by purple circle, and the centrality of the *University of Birmingham* (centrality=0.39) was the highest.

Table 3 The top 10 institutions that published Cancer-CSR ((N=828))

Rank	Institution	Country	Frequency (n (%))	Centrality
1	Newcastle University	UK	52(6.1%)	0.24
2	Oxford University	UK	39(4.5%)	0.38
3	University Hospital of Cologne	Germany	28(3.3%)	0.13
4	Royal United Hospital	UK	25(2.9%)	0.31
5	Churchill Hospital	UK	22(2.6%)	0.2
6	Manchester University	UK	22(2.6%)	0.18
7	Emma Children's Hospital	Holland	19(2.2%)	0.11
8	Sichuan University	China	17(2.0%)	0.06
9	University of Birmingham	UK	16(1.9%)	0.39
10	University of Nottingham	UK	14(1.6%)	0.01

### 3.3 Analysis of co-cited journals and references

There were 138 co-cited journals included. Among the top 10 co-cited journals/books, seven journals/books were from UK and three were from USA (**Table 4**), including the world-class top journals *Lancet*, *BMJ*, and *Ann Oncol*. What could inform from **Fig. 3** was that *Cochrane Database Syst Rev* was on the most prominent spot viewed as landmark node, with the highest citation (471). The nodes of *Cochrane Database Syst Rev*, *Trials*, *J Clin Epidemiol*, *Ann Intern Med* and *Brit J Surg* were around the purple circle. The latest co-cited journals were listed in the figure.

Table 4 The top 10 co-cited journals/books in Cancer-CSR

Rank	Co-cited journal/book	Co-citation	Centrality	IF (2018)*	Country
1	Cochrane Database Syst Rev	471	0.11	6.754	UK
2	C Hdb Sys**	428	0.01	/	UK
3	J Clin Oncol	408	0.04	26.36	USA
4	BMJ	367	0.08	23.562	UK
5	Lancet	349	0.02	53.254	UK
6	Cancer	329	0.09	6.537	USA
7	N Engl J Med	318	0.05	79.260	USA
8	Ann Oncol	286	0.08	13.930	UK
9	Stat Med	279	0.03	1.932	UK
10	Eur J Cancer	263	0.07	7.191	UK

\* IF was identified according to the website <http://www.letpub.com.cn/index.php?page=journalapp>

\*\* C Hdb Sys is Cochrane handbook of systematic review of interventions, therefore there is no IF.

As for the co-cited references, 672 references were divided into seven clusters (**Fig. 4A**). Due to the limitation of the software, the system automatically displayed the clustering with more than 10 members, while the clustering that did not meet this condition would not be displayed. The clusters were listed from 2007 to 2012: "psychosocial intervention" (#23, n=5), "active treatment" (#8, n=16), "cancer survivor" (#0, n=69), "hiv-1 infection" (#12, n=13), "liver metastases" (#2, n=39), "following computed tomography" (#15, n=9), and "cancer pain" (#3, n=35). The landmark node was *Higgins JPT, 2011* and the pivot nodes were labelled in the figure. The top 10 co-cited references were listed in **Table 5**. The references firstly co-cited in 2018 were listed in **Fig. 4B**.

### 3.4 Analysis of keywords

Three hundred and nine keywords derived from the 50 most highly cited papers in a one-year slice were classified into 12 clusters. The landmark nodes "randomized controlled trial" (n=223), "humans" (n=203) and "quality of life" (n=146) were in the center of **Fig. 5**. The clusters were listed in 2012 to 2015: "cytoreductive surgery" (#0, n=44), "preventing bleeding" (#1, n=42), "resectable thoracic esophageal cancer" (#2, n=37), "lung cancer" (#3, n=37), "hiv-infected adult" (#8, n=17), "liver metastases" (#4, n=29), "haematopoietic stem cell transplantation" (#6, n=21), "preventing bleeding" (#9, n=16), "perioperative thromboprophylaxis" (#5, n=25), "adult palliative care patient" (#11, n=4), "visual inspection" (#7, n=21), and "non-steroidal anti-inflammatory drug" (#10, n=9). The keywords contained in Claster#0 (the biggest) and Claster#7 and #10 (the latest) were shown in the figure.

Table 5 The top 10 co-cited references in Cancer-CSR

Rank	Citations	Co-citation
1	Higgins JPT, 2011, The Cochrane Collaboration, Version 5.1.0. <sup>(17)</sup>	534
2	Review Manager (RevMan), 2014, The Cochrane Collaboration , Version 5.3. <sup>(18)</sup>	140
3	Higgins JPT, 2008, The Cochrane Collaboration, Version 5.0.0. <sup>(19)</sup>	66
4	Tierney JF, 2007, Trials, V8, P16. <sup>(20)</sup>	51
5	Review Manager (RevMan), 2011, The Cochrane Collaboration, Version 5.1. <sup>(21)</sup>	45
6	Higgins JPT, 2003, BMJ, V327, P557. <sup>(22)</sup>	31
7	Higgins JPT, 2009, The Cochrane Collaboration, Version 5.0.2. <sup>(23)</sup>	29
8	Jemal A, 2008. CA-Cancer J Clin, V58, P15. <sup>(24)</sup>	29
9	Wood L, 2008, BMJ, V336, P601. <sup>(25)</sup>	27
10	Moher D, 2009, J Clin Epidemiol, V339, Pb2535. <sup>(26)</sup>	25

## 4. Discussion

### 4.1 General information

In this study, the bibliometric analysis of Cancer-CSR was performed. A total of 607 publications in Cancer-CSR were retrieved using the online WoSCC database, covering many fields in cancer, such as gastrointestinal tumors<sup>(27)</sup>, gynecological oncology<sup>(28)</sup>, haematological malignancies<sup>(29)</sup>, palliative and supportive care<sup>(30)</sup>, and so on. Compared with other disciplines, the number of publications of cancer was higher than that in other topics in *Cochrane Database Syst Rev*<sup>(5)</sup>. This might be due to the Cochrane Review Group in Cochrane Library, which contained a variety of cancer groups, such as colorectal cancer group, breast cancer group, lung cancer group and so on<sup>(31)</sup>. Interestingly, according to the Global Cancer Statistics 2018, lung cancer is the most commonly diagnosed cancer (11.6% of the total cases) and the leading cause of cancer death (18.4% of the total cancer deaths), but the number of Cochrane SRs about lung cancer took only 4.3% of total<sup>(24)</sup>. Breast cancer and colorectal cancer are among the top five in incidence and mortality, so automatically more publications are focused in this field. For women, the cumulative incidence of cervical cancer (6.6%), endometrial cancer (4.4%), and ovary cancer (3.4%) are less than breast cancer, but there are 16.3% of Cochrane SRs concentrate on gynecological cancer. To some extent, the incidence and mortality of cancer may influence the preference of Cochrane SRs. Nonetheless, uneven development among Cochrane review group, completion of protocols, and preference of authors themselves may also contribute to these results<sup>(6)</sup>.

UK, USA, Canada, Australia, and Germany were the countries with high centrality and production, which worked closely with other countries. Unlike other bibliometric studies in cancer field, UK rather than USA ranked first in productivity, with the highest centrality, containing more than half of the top 10 contributive institutes<sup>(32, 33)</sup>. This may be due to the publication country of *Cochrane Database Syst Rev* is UK. In 1993, British physician and epidemiologist Archie Cochrane and his colleagues developed the Cochrane Collaboration, which represents the watershed movement responsible for the biggest advances in systematic review methodology<sup>(34, 35)</sup>. Although the publications of USA were only one-third of UK, the centrality was almost the same. China and Brazil were the only two developing countries among the top

10 contributive countries. However, as for the centrality, China was the last but one among the top 10 contributive countries, which indicated that the importance of the studies we Chinese researchers involved in was not high. On the other hand, the overall methodological and reporting quality of systematic reviews by authors from China were similar to those from the USA<sup>(1)</sup>. So, the possible reason may be that the topics of the Chinese Cancer-CSR studies are not attractive and innovative enough. Egypt and Austria were the first time to publish the reviews in Cancer-CSR during the latest ten years, which focused more on the chemotherapy and multimodality therapy in cancer field<sup>(36, 37)</sup>.

With respect to the institutes involved, *Newcastle University*, one of the Ivy League schools and has the top medical school in UK, which was founded in 1834 as the College of medicine and surgery, was the most productive institution. The reviews of *Newcastle University* focused on surgical treatment<sup>(38)</sup>, chemotherapy<sup>(39)</sup> and prognosis<sup>(40)</sup> of gynecological cancer. The most cited review was the evaluation of the efficacy, safety, and cost-effectiveness of primary cytoreductive surgery in patients with advanced epithelial ovarian cancer surgery<sup>(41)</sup>, published in 2011. The top 10 contributive institutions collaborated closely with other institutions, except for the Sichuan University and the University of Nottingham. Checking the incidence rate of the districts of top 10 institutes and 10 countries, we also found that the incidence of all kinds of cancer in these districts was above the world average level (197.9)<sup>(42)</sup>.

## 4.2 Citation information

Among the top 10 co-cited journals/books, different journals usually favored publication on different scientific subjects. For example, *J Clin Oncol*, *Cancer*, *Ann Oncol* and *Eur J Cancer* preferred every respect of cancer, from epidemiology, carcinogenesis and biology through to innovations in cancer treatment and patient care; *Lancet* preferred surgical oncology; *Cochrane Database Syst Rev*, *BMJ*, and *N Engl J Med* were comprehensive journals; *Stat Med* focused on statistical the methods to a particular medical problem, and *C Hdb Sys* was the most significant book to all the researchers who intended to conduct systematic reviews, which is the official guide that describes in detail the process of preparing and maintaining Cochrane systematic reviews on the effects of healthcare interventions

The co-cited references were usually considered as the basics of the subject. Being-in Top 10 co-cited references, three versions of *C Hdb Sys* (*Higgins JPT*, 2011; 2009; 2008) were included, owing to the Cochrane collaboration has driven the greatest advancement in system review methods, which has brought together more than 13,000 members and over 50,000 supporters come from more than 130 countries dedicated to systematic review<sup>(6)</sup>. The second most co-cited reference was about *Review Manager (RevMan)*<sup>(18)</sup>, the most frequently used tool in meta-analysis, which facilitated preparation of protocols and full reviews, including characteristics of studies, comparison tables, study data and so on, and was also appropriate to the reviews of diagnostic test accuracy studies, reviews of studies of methodology and overviews of reviews. The rest top 10 co-cited references including methodology studies<sup>(20, 25)</sup>, epidemiological data of cancer<sup>(24)</sup>, and the reporting guideline of systematic reviews<sup>(26)</sup>.

The latest co-cited references were focused on the diagnosis and treatment of skin cancer in adults<sup>(43-45)</sup>. All these co-cited references constituted the knowledge base of this field.

#### 4.3 Research hotspots

The cluster of keywords could be used for detecting research hotspots, and monitoring the study frontiers transitions in a certain field<sup>(46)</sup> Here, we listed three hotspots of Cancer-CSR as follows:

#0 Cytoreductive surgery: Cytoreductive surgery (CRS) is a surgery which removes all visible lesions as much as possible and used to reduce tumor burden of patients and prolong survival, which has been applied in many kinds of cancer<sup>(47-49)</sup>. Because of the unsatisfactory effects of traditional treatment, better treatment regimens were needed<sup>(50)</sup>. The included studies about CRS covered ovarian cancer<sup>(51-53)</sup>, colorectal cancer<sup>(54)</sup>, neuroblastoma<sup>(55)</sup>, breast cancer<sup>(56)</sup> and lung cancer<sup>(57)</sup>, which mostly focused on the different adjuvant therapy, different chemotherapeutic drugs and different dose of chemotherapy. However, the evidence found was insufficient in these aspects, so new clinical trials are needed to solve these problems.

#7 visual inspection: Nonmelanoma of skin cancer (NMSC) accounted for 5.8% of all new cancer cases in 2018 as well as melanoma of skin accounted for 1.6%. There were an estimated 1,000,000 new cases and 65,000 deaths worldwide, and the male incidence was about twice that of women. One burgeoning approach that has impacted skin cancer detection was reflectance confocal microscopy (RCM), which noninvasively shows nuclear and cellular-level morphology in human skin *in vivo*<sup>(58, 59)</sup>. Compared with the dermoscopy, RCM had similar sensitivity but the specificity was two times superior, and it could reduce the number of biopsies of benign lesions as a second-level examination following dermoscopy<sup>(60-62)</sup>. Nevertheless, there were some pitfalls. For example, the differentiation of melanocytes from langerhans cells in melanocytic lesions lacks specificity, the misdiagnosis due to specific lesion or missed detection because of sampling error, as well as the clinical experience of the doctors<sup>(63)</sup>. There were four records in Cancer-CSR concentrated on the applying of RCM for diagnosing skin cancer in adults with any suspicious lesion which was all published in 2018<sup>(64-67)</sup>.

#10 Non-steroidal anti-inflammatory drug: Increased survival rates for cancer patients, coupled with the increasing complexity of cancer and the introduction of new therapies, made pain treatments more challenging<sup>(68, 69)</sup>. Non-steroidal anti-inflammatory drugs (NSAIDs) were widely used to treat postoperative fever and surgical pain. What's more, there was increasing evidence that non-steroidal anti-inflammatory drugs have anticancer activity which could reduce the risk of cancer<sup>(70, 71)</sup>. However, there was no sufficient evidence of the included records about reducing cancer-related pain in children and adolescents<sup>(72)</sup>, and no high-quality evidence to support the use of NSAIDs alone or in combination with opioids for the three step WHO cancer pain ladder<sup>(73)</sup>.

#### 4.4 Strengths and limitations

To the best of our knowledge, this study is the first bibliometric analysis of the Cancer-CSR. The research trends and hot spots of Cancer-CSR reflected that in systematic reviews in the cancer field to some extent, but it was not comprehensive enough, for the Cochrane collaboration had greater scrutiny for systematic reviews, so there were not a lot of publications.

## 5. Conclusions

Cancer research is increasing in Cochrane Database Syst Rev. Most of the reviews came from the developed countries as well as the institutes in these countries, like UK and USA. Co-cited references including *C Hdb Sys* and the guidelines of *RevMan* constituted the knowledge base of Cancer-CSR in the aspect of the methodology studies of systematic review, epidemiological data of cancer, and the reporting guideline of systematic reviews. The adjuvant therapy combined CRS, the screening of skin cancer and the management of cancer-related pain were the hotspots which needed more sufficient evidence to support the clinical decision making. What's more, reasons that influence the author's preference for Cancer-CSR also deserve further investigation.

## Abbreviations

Cancer-CSR=cancer topic of Cochrane systematic reviews; CRS=cytoreductive surgery; LLR=log-likelihood ratio; WoSCC=Web of Science Core Collection

## Declarations

Ethics approval and consent to participate: Not applicable

Consent for publication: Not applicable

Availability of data and material: The datasets used and analyzed during the current study are available from the corresponding author upon reasonable requests.

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Authors' contributions:

KLY, JHZ, and JHT led the study design, data collection, statistical analysis, drafting and editing of the manuscript, and supervision. YG, YTC, ML, and CCL participated in the study design, and revised the article for important intellectual content. All authors read and approved the final manuscript and agreed on its submission

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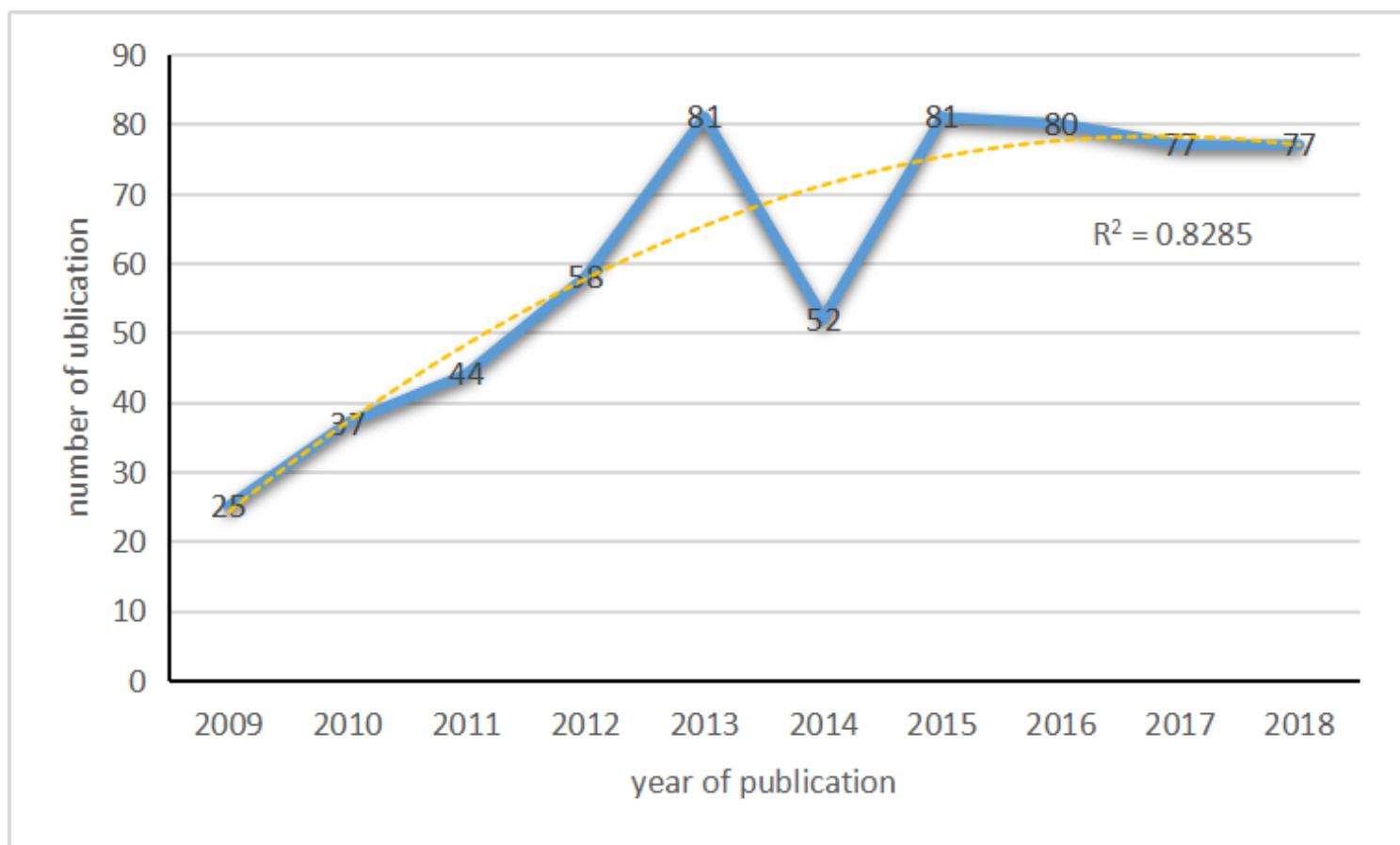
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## Figures



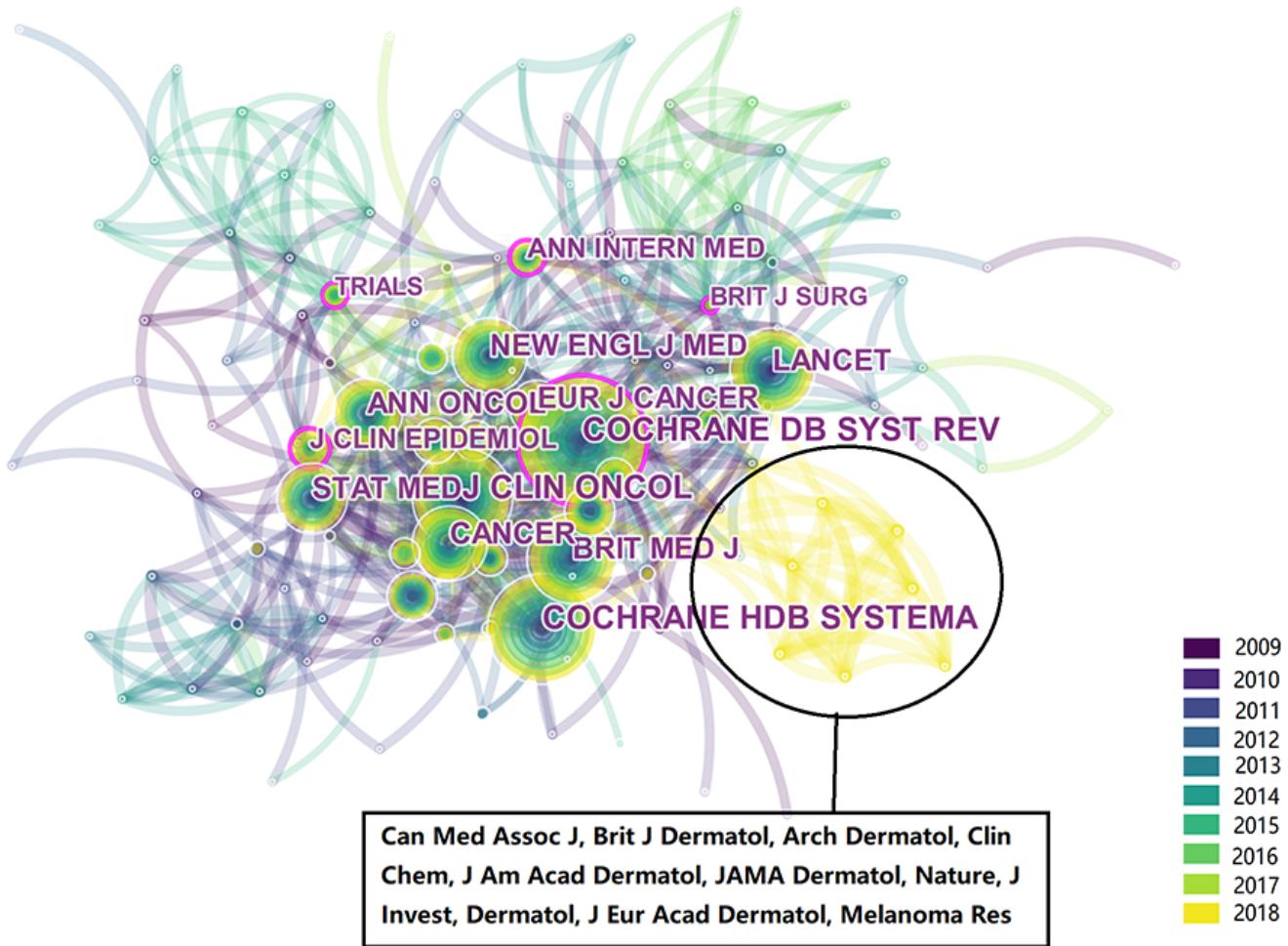
**Figure 1**

The publication trend of Cancer-CSR during 2009-2018.



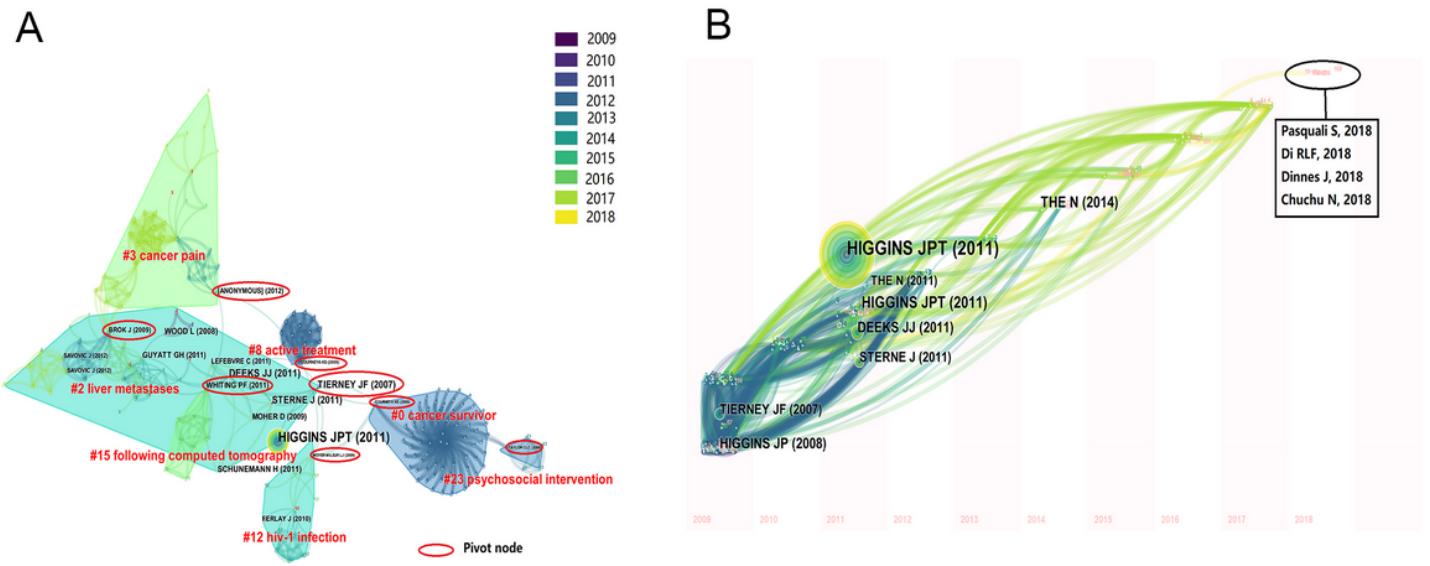
**Figure 2**

The distribution of countries and institutes. (A)The network map of countries involved in Cancer-CSR; (B) The network map of institutes involved in Cancer-CSR



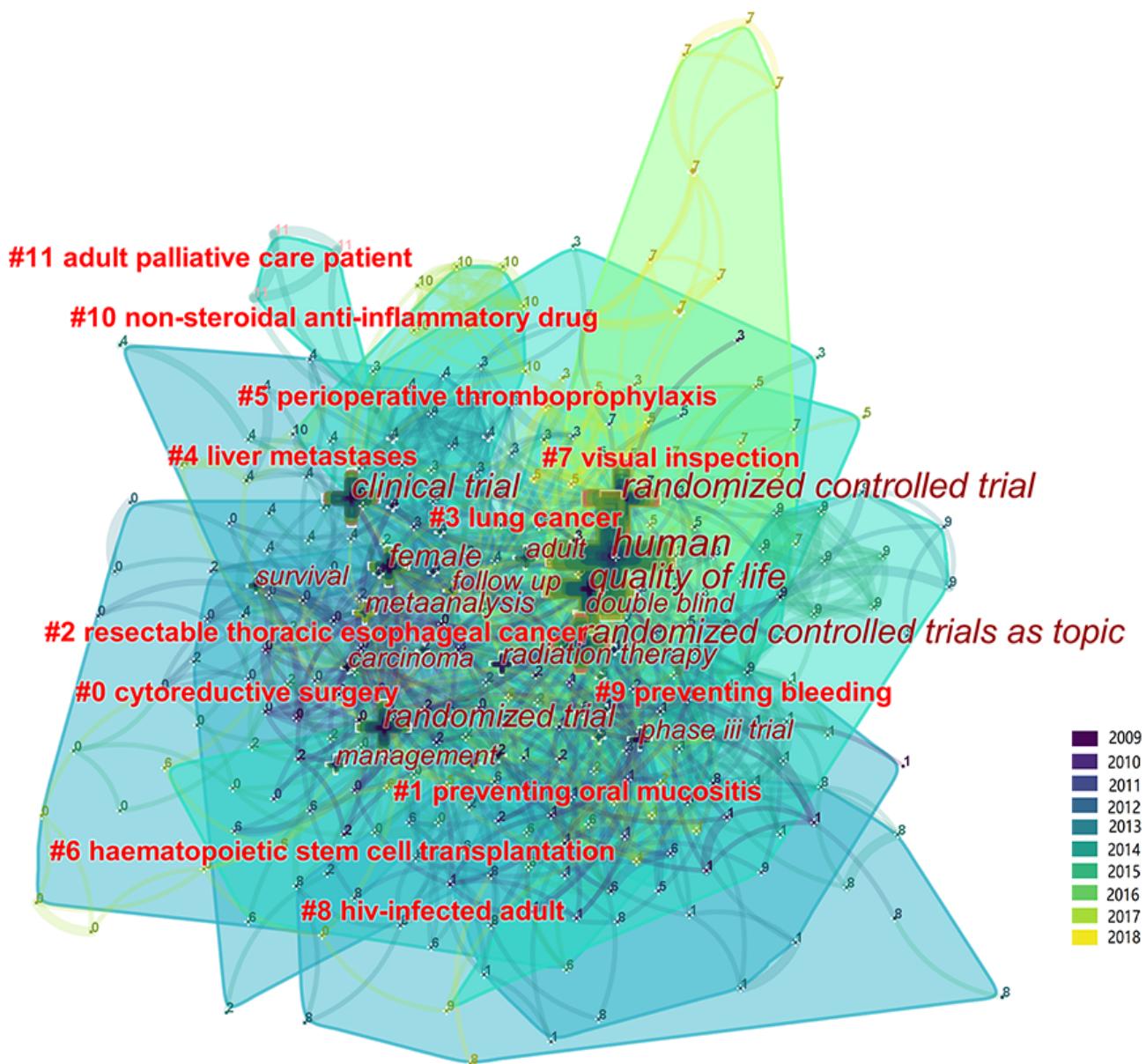
**Figure 3**

The co-citation map of journals from the reviews in Cancer-CSR



**Figure 4**

The analysis of references. (A) The co-citation map of references from reviews in Cancer-CSR, (B) The timezone view of co-cited references from reviews in Cancer-CSR



**Figure 5**

The network map of keywords from reviews in Cancer-CSR