



A SCIENTOMETRIC ANALYSIS ON CARDIAC ECHINOCOCCOSIS

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Abstract: Cardiac echinococcosis is a rare but mortal disease. The primary goal of this study was to quantitatively examine, using bibliometrics tools, the publications and assess the hot issues and new directions in cardiac echinococcosis research from 1970 to December 2021. We only included "journal articles" and "reviews" in the study. The keywords "cardiac echinococcosis", "cardiac hydatid disease" or "echinococcal heart disease" were used for the search. The search covered the years 1970 through December 2021. The data was extracted from the Web of Science database. Vosviewer software was used for network mapping. The research findings, which were based on the search strategy used, showed that between 1970 and 2022, there were 425 articles and reviews on cardiac echinococcosis that had been indexed in the Wos database. Most of the papers were from Türkiye (n=152), India (n=29), Iran (n=29), Tunisia (n=26) and France (n=22) were the other top publishing countries. The first publication was published in 1991. Although the number of publications increased after 1996, it emphasizes an irregular distribution. The publications were cited 3900 times in total and 9.18 times per publication, and the mean H-index was 28. There was an increase in the number of citations after 1995. There were 151 publications from Türkiye, and these publications were cited 1,327 times total, 8.79 per publication, and the mean H index was 18. The number of publications was not at the expected rate. The findings of our study may be helpful to researchers researching cardiac echinococcosis.

Keywords: Bibliometrics, Cardiac echinococcosis, Publications

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1. Introduction

Echinococcosis is a chronic helminth infection that affects both humans and animals. It is brought on by tapeworm larvae from the genus *Echinococcus*. It is a disease that is widespread around the world and is a significant socioeconomic and public health issue in many low-and middle-income countries (Ma et al., 2019).

Echinococcus granulosus is a parasite that exclusively inhabits the digestive tracts of dogs. As unintentional hosts, humans can become infected by consuming eggs, in vegetables or water tainted with dog feces (Pakis et al., 2006; Soleimani et al., 2008; Wadhawa et al., 2018). *E. granulosus*, occasionally manifests as cardiac echinococcosis. Only 0.5-2% of cystic echinococcosis patients have cardiac involvement (Carrascal et al., 2012; Kahlfuß et al., 2016), which is usually univesicular (Hidron et al., 2010) but occasionally multiple (Tascanov and Uğur, 2019).

In the Middle East, South America, Australia, and New Zealand, as well as in developing nations, hydatid illness is endemic (Pakis et al., 2006; Soleimani et al., 2008). Additionally, the number of cystic echinococcosis cases

reported in Western Europe over the preceding years remained largely unchanged. However, it is hypothesized that as more refugees leave endemic regions like Southern Europe, Eastern Europe, and the Middle East, the number of cases of cystic echinococcosis in Western Europe will rise (Kahlfuß et al., 2016). Given the accessibility of international travel, the emigration of refugees, and the rise in patients with immunocompromising conditions, echinococcosis can be found everywhere in the world (Akar, 2019).

The left ventricular free wall, right ventricle, and interventricular septum are where cardiac involvement most frequently occurs (Tascanov and Uğur, 2019). Depending on the size, location, and integrity of the cysts, the majority of individuals present asymptotically. Precordial discomfort is the most frequent symptom and is typically nebulous and non-anginal. Heart block, dyspnea, syncopal episodes, and palpitations are also common (Sabzi and Faraji, 2014). Cyst rupture, which can result in anaphylactic shock, pulmonary or systemic embolization, and sudden death, is the most terrifying complication of cardiac echinococcosis (Mirijello et al., 2016). The ideal initial imaging modality is



echocardiography because of its great sensitivity and widespread availability. The only diagnostic feature of a hydatid cyst is a detached membrane, which is observed as a mixed echogenic mass (Vurdem et al., 2015). Surgical management is regarded as the gold standard for treatment and primarily affects the lungs (30%) and liver (60–70%). The most frequent complication of disease, aside from anaphylactic reactions, is rupture into neighboring structures, frequently affecting the bronchi, gastrointestinal tract, and peritoneal/pleural cavities, depending on where it is located (Erkoç et al., 2014). The primary goal of this study was to quantitatively examine, using bibliometrics tools, the publications and assess the hot issues and new directions in cardiac echinococcosis research from 1970 to December 2021.

2. Materials and Methods

Bibliometric techniques, also known as "analysis," are now well-established as scientific specialties and play an important role in research evaluation methodology, particularly in the scientific and applied fields. A growing number of scientific studies are using these techniques, and they are also used to rank institutions and universities globally. It is now possible to analyze the bibliometric approach using its own methodology when a sufficient number of investigations have been performed and the resulting literature has been produced (Ellegaard and Wallin, 2015). The Web of Science (WoS) (Clarivate Analytics) was used to extract the bibliometric literature for this investigation. The Web of Science Core Collection databases (WoSCC^d), including SSCI, SCI-Expanded, CPCI-S, A&HCI, ESCI, CPCI-SSH, CCR-Expanded, and IC, provided the data for this research project.

The WoS database includes a very thorough and in-depth search engine and the study is based on the article topic. The journals that will be utilized must be chosen before the bibliographic data can be analyzed. The WoS database is now held by Thomson and Reuters, and makes possible the analysis of bibliographic data (Torres-Salinas et al., 2012). Therefore, we only included "journal articles" and "reviews" in the study, which

reduced the total number of publications in order to concentrate on the most representative research items that were accessible in WoS. Reviews are occasionally not regarded as significant scientific contributions, but we have included them since they offer a compelling viewpoint on a subject that typically influences future study (Merigó and Yang, 2017).

The article's language was not restricted. The keywords "cardiac echinococcosis", "cardiac hydatid disease" or "echinococcal heart disease" were used for the search. The search covered the years 1970 through December 2021. The data extraction was done on a single day at August 1, 2022.

After that, Vosviewer software version 1.6.18 was used to evaluate the references in order to create knowledge network maps. A bibliometric study of nations, institutions, authors/co-cited authors, journals/co-cited journals, keywords, and co-cited references may be done quickly and easily with the help of the Vosviewer software (URL 1).

3. Results

The research findings, which were based on the search strategy used, showed that between January, 1970 and December, 2021, there were 425 articles and reviews on cardiac echinococcosis that had been indexed in the WoS database. Most of the papers were from Türkiye (n=152). India (n=29), Iran (n=29), Tunisia (n=26) and France (n=22) were the other top publishing countries (Figure 1).

94.353% of the publications were articles, and 5.647% of them were review articles. 77.647% was published in SCI-EXPANDED, and 21.882% in ESCI indexed journals. Over the time period under investigation, it was discovered that there were more publications having a nonlinear correlation. The first publication was published in 1991. Figure 2 provides a visualization of the period studied in cardiac echinococcosis. Although the number of publications increased after 1996, it emphasizes an irregular distribution. The average number of published articles was 11 in 2013 (n=11).

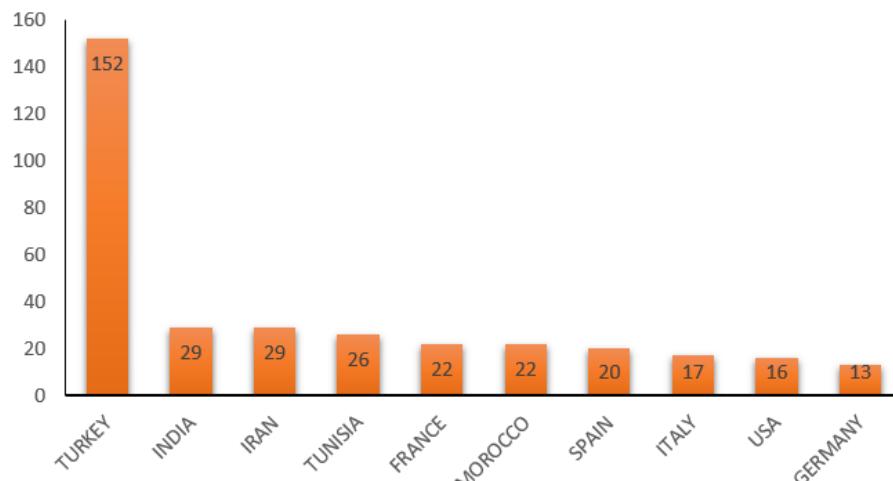


Figure 1. The mostly publishing countries on cardiac echinococcosis.

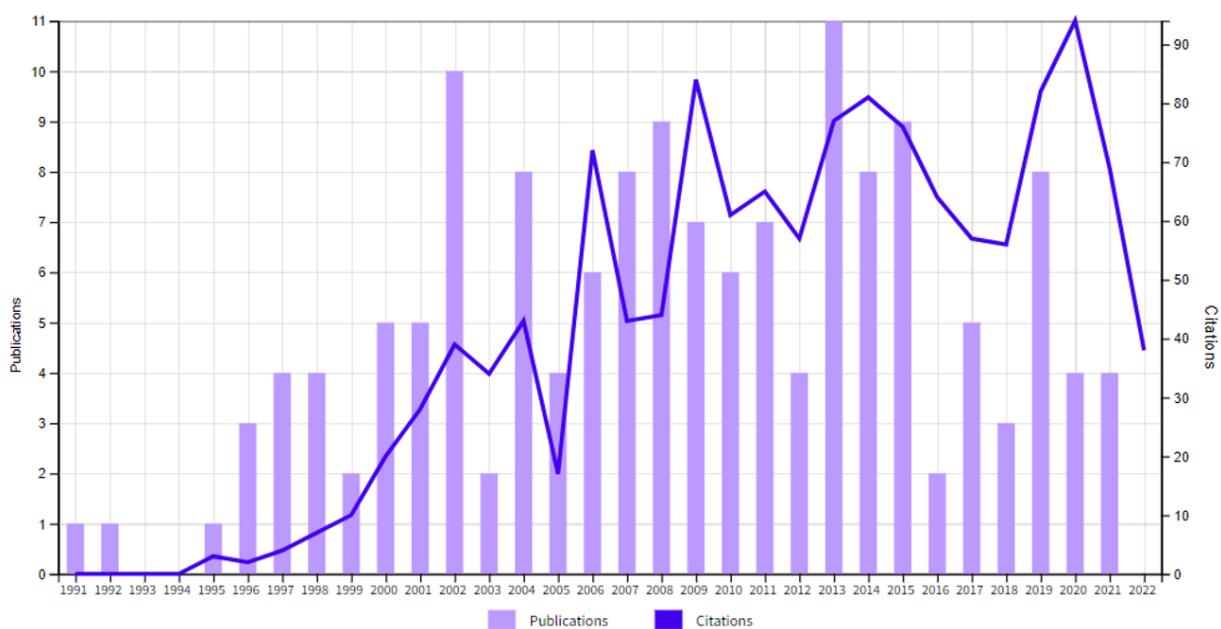


Figure 2. Trends of publications and citations over the years.

The publications included in the study were cited 3900 times in total and 9.18 times per publication, and the mean of H-indexes was 28. There was an increase in the number of citations after 1995 (Figure 2). There were 151 publications from Türkiye on cardiac echinococcosis. And these publications were cited 1327 times total, or 8.79 per publication, and the mean H index was 18. The article written by Kaplan and colleagues (Kaplan et al., 2001) had the highest number of citations ($n=78$) on cardiac echinococcosis.

The cardiovascular system/cardiology (48.235%) and surgery (24.941%) field domains accounted for the majority of the articles (Table 1).

Table 1. Articles according to research areas

| Research Areas | n | % |
|--|-----|--------|
| Cardiovascular System Cardiology | 205 | 48.235 |
| Surgery | 106 | 24.941 |
| General Internal Medicine | 52 | 12.235 |
| Radiology Nuclear Medicine Medical Imaging | 39 | 9.176 |
| Respiratory System | 33 | 7.765 |
| Pediatrics | 23 | 5.412 |
| Legal Medicine | 15 | 3.529 |
| Infectious Diseases | 12 | 2.824 |
| Parasitology | 12 | 2.824 |
| Neurosciences Neurology | 10 | 2.353 |

*Showing 10 out of 30 entries.

Hacettepe University (Türkiye) was found to be the most productive institution in cardiac echinococcosis publications. In addition, the majority of the organizations publishing on cardiac echinococcosis originated from Türkiye (Table 2).

Most of the publications were published in the journals which were published by 3 publishers (Elsevier, Springer Nature, and Wiley) (Table 3).

Table 2. The list of top publishing affiliations/organizations on cardiac echinococcosis

| Affiliations/ Organizations | n | % |
|--|----|-------|
| Hacettepe University | 13 | 3.059 |
| Türkiye Specialized Higher Education Research Hospital | 13 | 3.059 |
| Istanbul University | 11 | 2.588 |
| Udice French Research Universities | 11 | 2.588 |
| Hassan II University Of Casablanca | 9 | 2.118 |
| Ibn Rochd University Hospital Center Of Casablanca | 9 | 2.118 |
| Selcuk University | 9 | 2.118 |
| Cukurova University | 8 | 1.882 |
| Universite De Sousse | 8 | 1.882 |
| Assistance Publique Hopitaux Paris Aphp | 7 | 1.647 |

Showing 10 out of 453 entries, 3 record(s) (0.706%) do not contain data in the field being analyzed.

Table 3. The list of top publishers on cardiac echinococcosis

| Publishers | n | % |
|---|----|--------|
| Elsevier | 77 | 18.118 |
| Springer Nature | 43 | 10.118 |
| Wiley | 32 | 7.529 |
| Lippincott Williams & Wilkins | 17 | 4 |
| Texas Heart Inst | 12 | 2.824 |
| Oxford Univ Press | 11 | 2.588 |
| Expansion Sci Francaise | 10 | 2.353 |
| Iranian Scientific Society Medical Entomology | 10 | 2.353 |
| Edizioni Minerva Medica | 9 | 2.118 |
| Baycinar Medical Publ-Baycinar Tibbi Yayıncılık | 8 | 1.882 |

Showing 10 out of 114 entries.

The vast majority of the publications on cardiac echinococcosis were published in the journals Echocardiography: A Journal of Cardiovascular Ultrasound and Allied Techniques (3.529%), the Texas Heart Institute Journal (2.824%) and The Annals of Thoracic Surgery (2.353%) (Table 4).

The mapping of the publications on cardiac

echinococcosis is shown in Figure 3 and Figure 4.

Cardiac imaging techniques and methods (especially computed tomography and magnetic resonance imaging) for echinococcosis, diagnosis, and surgery were the hot topics for cardiac echinococcosis according to keyword mapping (Figure 3). Figure 4 depicts the bibliographic coupling among the authors.

Table 4. The list of journals with more than 5 publications on cardiac echinococcosis

| Journals | n | % | 2021 Journal Citation Indicator (JCI) * |
|---|----|-------|---|
| Echocardiography A Journal of Cardiovascular Ultrasound and Allied Techniques | 15 | 3.529 | 0.34 |
| Texas Heart Institute Journal | 12 | 2.824 | 0.23 |
| Annals of Thoracic Surgery | 10 | 2.353 | 1.27 |
| Turkish Journal of Thoracic and Cardiovascular Surgery | 9 | 2.118 | 0.20 |
| Journal of Cardiovascular Surgery | 8 | 1.882 | 0.39 |
| Journal of Cardiac Surgery | 7 | 1.647 | 0.44 |
| American Journal of Forensic Medicine and Pathology | 6 | 1.412 | 0.38 |
| Cardiology in the Young | 6 | 1.412 | 0.31 |
| Cureus | 6 | 1.412 | 0.26 |
| Indian Journal of Thoracic and Cardiovascular Surgery | 6 | 1.412 | 0.06 |
| Iranian Journal of Parasitology | 6 | 1.412 | 0.27 |

* Web of Science 2021 data.

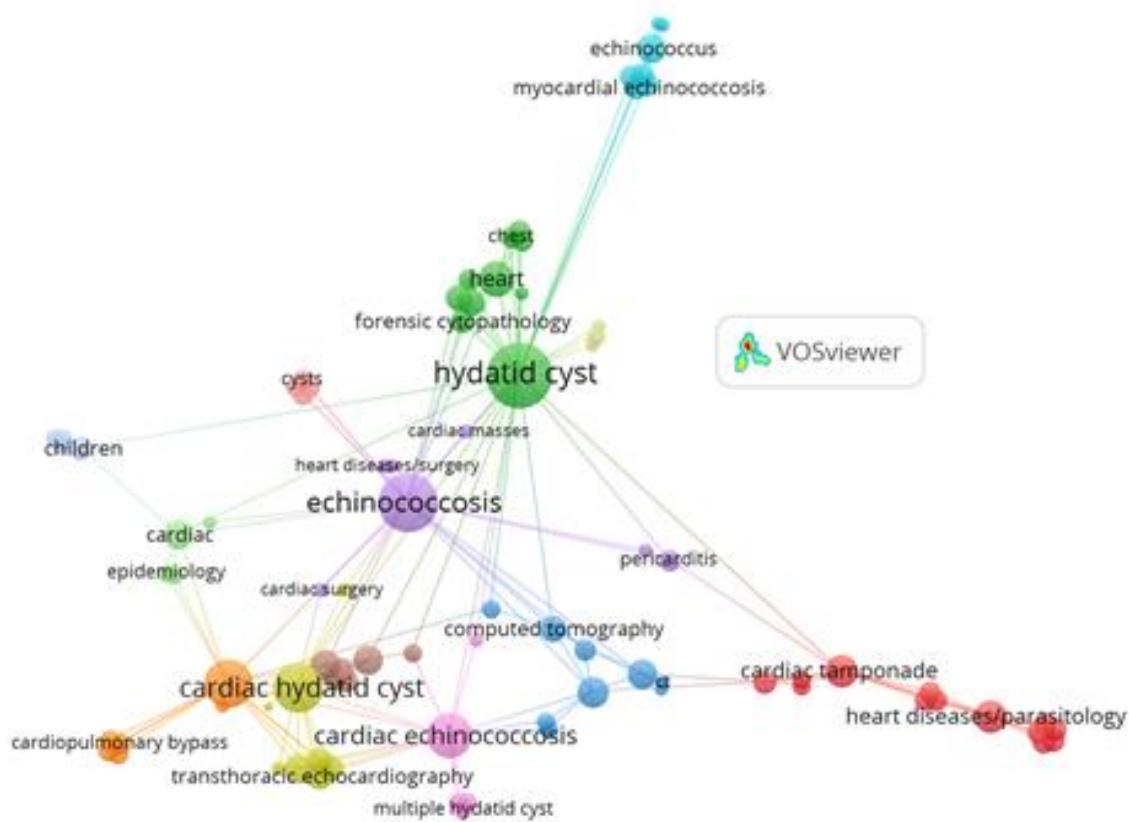


Figure 3. Keyword mapping.

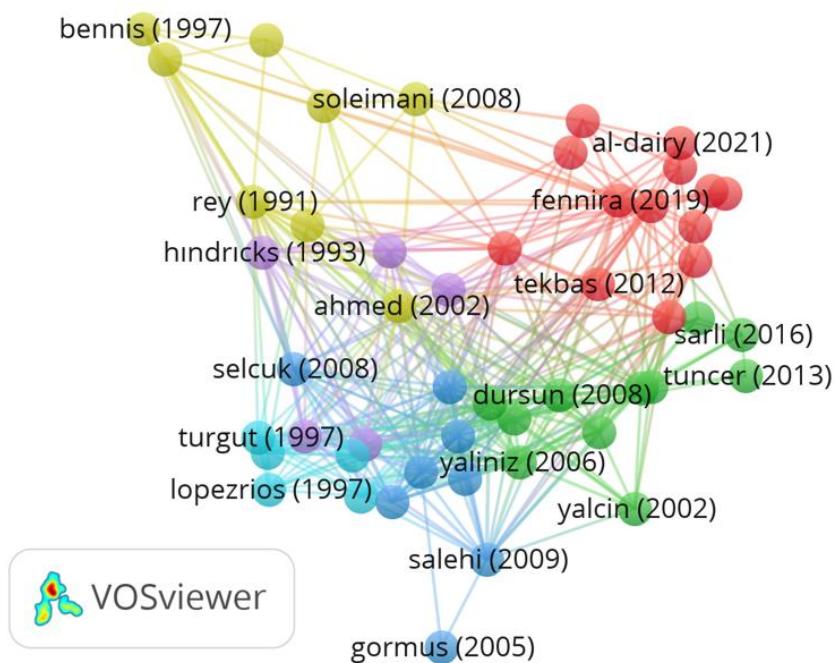


Figure 4. Bibliographic coupling among the authors.

4. Discussion

Cardiac echinococcosis is a rare disease of the heart and is endemic to some developing countries. A multidisciplinary approach is required for the diagnosis, treatment, and management of this disease. Although there are limited bibliometric studies on echinococcosis (Ma et al., 2019; Fakhar et al., 2021; Durgun et al., 2022), no similar studies were found in the literature available on cardiac echinococcosis. The goal of this study was to compile a bibliometric overview of the literature on cardiac echinococcosis between 1970 and 2021.

Bibliometric analysis is a well-liked and accurate technique for exploring and analyzing vast amounts of scientific data. It enables us to explore the subtleties of a particular field's evolutionary history while illuminating its frontiers. Its use in data analysis, however, is still quite new and frequently underdeveloped (Donthu et al., 2021). There is limited bibliometric analysis studies from medicine too (Dindar Demiray et al., 2021; Gürler et al., 2021; Akyüz et al., 2022; Ceylan and Özlü, 2022; Durgun et al., 2022; Ekici et al., 2022; Köylüoğlu and Aydin, 2022; Özlü and Ceylan, 2022; Öztürk, 2022; Şahin, 2022).

A related study on echinococcosis (Ma et al., 2019) found that Türkiye had the most publications (1133), followed by France (582), China (574), the United States (521), and England (485). Other studies' results were similar and they reported that their results indicate that from 2000 to 2019, Türkiye, China, Iran, Germany, and the United States were the top 5 nations in echinococcosis (Fakhar et al., 2021). Our findings showed that Türkiye was where the majority of the articles were published. These differences may be different depending on different keywords or databases used. However, similar to these two studies, in our study, Türkiye took the first place.

One of the most popular measures of a researcher's influence in an area is the H-index (Fakhar et al., 2021). Despite the fact that Turkish scholars had the most publications, the average number of citations was not very high, according to our findings.

Hot topics may be suggested by the knowledge map of keyword co-occurrence, and frontier themes can be reflected by burst keywords (Ma et al., 2019). In our study, by using Vos Viewer, the strongest citation burst keywords were also found and examined. Cardiac imaging techniques and methods (especially computed tomography and magnetic resonance imaging) for echinococcosis, diagnosis, and surgery were the hot topics for cardiac echinococcosis according to keyword mapping.

The Journal Effect Factor (JIF) TM has evolved into a common method to assess the citation impact of a journal since the release of the first Journal Citation Reports (JCR) TM in 1976. The Science Citation IndexTM's article citation network was aggregated to form the JCR, which was developed to characterize and define the network of journals. It was designed to give an unbiased assessment of the scholarly usage of journals to aid both libraries and writers in the appraisal of their publications. The JIF is straightforward and quick to compute; all you need to know is how many academic works—also known as citable items—a journal produced in the previous two years and how many citations those works got from papers published in the JCR data year (URL 2). We used JIF values to compare the most published journals on cardiac echinococcosis.

5. Conclusion

In conclusion, this report offers historical perspectives on research trends related to cardiac echinococcosis. Vos

Viewer software was used to construct the visible network and co-citation analysis of the reference in the field of cardiac echinococcosis study. Türkiye (n=52), India (n=29), Iran (n=29), Tunisia (n=26), and France (n=22) were the top five most producing nations. Türkiye also produces some of the highest-producing institutions. Nevertheless, we used a quantitative analysis method to look into the development of knowledge in the field of cardiac echinococcosis using literature mining techniques, which can help us see the patterns and trends in the field. The number of articles published since 1995 has increased, but not to the desired level. Researchers studying cardiac echinococcosis, organizations providing funding, and health management may find the results of our study useful. Future multi-national collaborative research initiatives in this area should make encouraging strides.

Limitations

The use of a single database and the use of selected keywords in this study may have caused some publications to be overlooked. In addition, the lack of content analysis was the limitation of the study.

Author Contributions

The percentage of the author(s) contributions is present below. All authors reviewed and approved final version of the manuscript.

| | C.U. | E.K.D.D. | S.O.M. | M.S.Ş. |
|-----|------|----------|--------|--------|
| C | 34 | 33 | 17 | 16 |
| D | 34 | 33 | 17 | 16 |
| S | 34 | 33 | 17 | 16 |
| DCP | 34 | 33 | 33 | |
| DAI | 34 | 33 | 33 | |
| L | 34 | 33 | 33 | |
| W | 34 | 33 | 17 | 16 |
| CR | 34 | 33 | 33 | |
| SR | 50 | | 50 | |
| PM | | | | |
| FA | | | | |

C=Concept, D= design, S= supervision, DCP= data collection and/or processing, DAI= data analysis and/or interpretation, L= literature search, W= writing, CR= critical review, SR= submission and revision, PM= project management, FA= funding acquisition.

Conflict of Interest

The authors declared that there is no conflict of interest.

Ethical Approval/Informed Consent

The study complied with the revised Helsinki Declaration. Ethics committee approval was not required for this study because of there is no animal or human research.

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