RESEARCH NOTE

Research on *Babesia*: A bibliometric assessment of a neglected tick-borne parasite [version 1; peer review: 1 approved, 1 approved with reservations, 1 not approved]

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Abstract

Given the emergence and reemergence of tick-borne diseases, here we assessed the publishing patterns of research focused on *Babesia*. We also discuss the implications for the articles published in the last decade, and how more clinical and epidemiological information concerning *Babesia* is still required. The findings of this article would be useful to define research priorities about *Babesia* and diagnose the important of scientific production on this pathogen.

Keywords

Babesia, tick-borne disease, epidemiology, public health, bibliometric

This article is included in the **Emerging Diseases and Outbreaks** gateway.

Open Peer Review

Approval Status ✓ ✗ ✓

	1	2	3
version 2 (revision) 18 Jul 2019	✓ view		
	↑		
version 1 30 Dec 2018	? view	✗ view	✓ view

1. **Stalin Vilcarrromero** , Stony Brook University, New York, USA
Universidad Nacional de la Amazonía
Peruana, Iquitos, Peru
2. **Jeremy S. Gray**, University College Dublin, Dublin, Ireland
3. **Cristina Casalone**, Liguria and Valle D'Aosta, Turin, Italy

Any reports and responses or comments on the article can be found at the end of the article.

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Author roles: **Rodriguez-Morales AJ:** Conceptualization, Data Curation, Formal Analysis, Methodology, Writing – Original Draft Preparation, Writing – Review & Editing; **Bonilla-Aldana DK:** Conceptualization, Data Curation, Formal Analysis, Writing – Original Draft Preparation, Writing – Review & Editing; **Escalera-Antezana JP:** Formal Analysis, Writing – Original Draft Preparation, Writing – Review & Editing; **Alvarado-Arnez LE:** Formal Analysis, Writing – Original Draft Preparation, Writing – Review & Editing

Competing interests: No competing interests were disclosed.

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Introduction

Babesiosis is a zoonotic disease with a global distribution; it is mainly transmitted by ticks of different genera (e.g. *Rhipicephalus* spp. and *Dermacentor* spp.) and diverse species¹. It is caused by infection of the erythrocytes of mammals by *Babesia* species, which are Apicomplexa protozoa of the suborder Piroplasmidea and the family Babesiidae². The vector role of ticks for these parasites was discovered by Smith and Kilbourne in 1893, who were the first to demonstrate its transmission³. The first case was described by Skaraballo and occurred in 1957 in Zagreb, Croatia⁴.

Human babesiosis is not under surveillance and notification in most countries, including those with autochthonous incidence vector-borne diseases. However, studies show that their vectors are widely distributed in tropical and subtropical areas⁵. Research is fundamental to better comprehending this disease. The relevance of bibliometric evaluations on emerging and reemerging disease has been previously described^{6–7} as they can contribute in the understanding on how the global scientific and health communities respond to outbreaks⁸. Herein, our objective was to use bibliometric approaches to analyze *Babesia* research.

Methods

A bibliometric evaluation was performed focusing on *Babesia* scientific bibliography. Six main databases were used for retrieving information: Science Citation Index Expanded (SCI-E), Scopus, Medline, LILACS, SciELO and Google Scholar.

For the search pipeline we used the following combination of key words (MeSH, Medical Subject Headings): “*Babesia*” AND “Latin America”, “*Babesia*” AND “Argentina”, “*Babesia*” AND “Colombia”, and this strategy was maintained including the name of each country as a keyword. Also, “Babesiosis” was used as a substitute of *Babesia* to increase the number of results. Regarding the type of publications, we decided to include original papers, review articles, case reports and editorials, which were further stratified according to publication year and the name and institution to which the main author was affiliated at the time of publishing. This analysis included results obtained up to December 1, 2018.

Data summaries for quantitative variables (number of articles, articles per country, articles per year or periods, citations and H index) were expressed as means and interquartile ranges (IQRs), and for qualitative variables proportions are reported.

Results

Overall, 78,137 *Babesia*-associated items resulted from the initial screening of publications. From Google Scholar 62,100 articles (25% USA, 24.9% South Africa, 18.5% Japan) were recovered, followed by Scopus, with 6,272 articles (25.4% from USA, 8.5% Japan, 7.2% UK), and Medline with 5,045 articles (13.7% USA, 10.1% Japan and 5.2% China) (Table 1). From Web of Science, 4,330 publications were retrieved (28.06% from USA, 11.4% Japan and 7.37% Brazil), followed by LILACS with 202 articles (29.2% Brazil, 2.4% Mexico, 1.9% USA) and

Table 1. The 20 countries with the highest number of scientific articles on *Babesia* research that is available in Web of Science, Scopus and Medline.

Rank	Country	Number of articles	Database with highest number of articles
1	United States of America	1594	Scopus
2	Japan	536	Scopus
3	United Kingdom	456	Scopus
4	Australia	424	Scopus
5	Germany	324	Scopus
6	Brazil	319	Web of Sciences
7	China	284	Web of Sciences
8	France	256	Scopus
9	South Africa	254	Web of Sciences
10	India	195	Scopus
11	Poland	189	Web of Sciences
11	Spain	178	Scopus
12	Argentina	178	Medline
13	Italy	172	Scopus
14	Netherlands	136	Scopus
15	Turkey	119	Web of Sciences
16	Mexico	116	Medline
17	Switzerland	101	Scopus
18	Kenya	98	Scopus
19	Israel	93	Scopus
20	Egypt	82	Web of Sciences

SciELO with 188 articles (26.6% Brazil, 3.1% Mexico) (Table 1). Considering the Medline database, the number of research articles on *Babesia* increased above 100 publications per year only after 2004 (Figure 1).

In the case of Scopus, the median number of articles published each year as of 1970 was only one (IQR: 0-3), from 1970 until 1995 this number increased to 64 (IQR: 56-73) and from 1996 till 2018 was 188 (IQR: 115-271) (Figure 2). At Scopus 134 countries contributed a minimum of one paper over the study period. For SCI-E, the annual median number of articles reported from 1996 until 2018 was of 99 (IQR: 96-103) (Figure 3), with at least one article published from 129 countries during the study period.

“Obihiro University” in Hokkaido, Japan, was the institution with the most productive research in Scopus, and “Igarashi, I” was the author with the largest record in *Babesia* research, with 210 articles (Figure 4 and Figure 5). At Web of Sciences, the H index for the topic is 88, with 70,950 citations, reaching 7,734 citations in 2017 (Figure 6).

The raw data generated in this study are available on [OSF](#)⁹.

Discussion

The results presented here show that the USA and Japan have primary roles in *Babesia* research, with USA leading the scientific production with nearly quarter of the published articles, followed by Japan and the UK (Table 1). Certainly, in USA,

tickborne disease occurrence is frequent especially in certain areas and months over the year. Tickborne diseases such as babesiosis are commonly reported in Northeastern states as well in the upper Midwest, often with higher incidence in summer. In addition, blood transfusions is still a matter of concern, even in the USA¹⁰⁻¹³. In countries in Asia, such as Japan, human babesiosis was not reported until fairly recently (1999), when a symptomatic case was describe in Kobe City, Hyogo Prefecture, Japan^{14,15}; however, since then research has significantly increased in this country. Authors from UK have collaborated with research with others from endemic countries. However, in 2006 and 2016, two cases of autochthonous canine babesiosis were reported in the UK. Since November 2015, there have been at least three more cases of canine babesiosis in untraveled dogs from Essex, all were confirmed *B. canis* infections by PCR. *Dermacentor reticulatus* ticks were found on the dogs¹⁶.

One of the relevant aspects surrounding babesiosis is that there are not yet licensed human prophylactic vaccines, and treatment alternative remain limited. Two commonly used antimicrobial regimes are highly effective: the combination of atovaquone and azithromycin and the combination of clindamycin and quinine¹⁷. Thus, most preventive measures are needed to reduce the risk of infection from ticks and wild and domestic reservoirs (e.g. rats).

Bibliometric analyses contribute an objective vision of the scientific activity of a country or a region, in an investigative area. In the particular case of infectious diseases, there are different reports about its utility⁵⁻⁸, especially in emerging infectious

Figure 1. Research trends on *Babesia* from 1931 to 2018, Medline.

Figure 2. Research trends on *Babesia* from 1931 to 2018, Scopus.

Figure 3. Research trends on *Babesia* from 1996 to 2018, Web of Science.

Figure 4. Top research institutions that published scientific literature on *Babesia*, Scopus.

Figure 5. Top research authors that published scientific literature on *Babesia*, Scopus.

Sum of Times Cited per Year

Figure 6. Citation trends on *Babesia* from 1931 to 2018, Web of Scopus.

diseases^{18–20}, being possible to establish and to compare the amount of scientific production in journals, institutions, and authors publishing about a certain issue; this would allow establishment of a plan in terms of scientific policy as well in other matters²¹. No previous bibliometric studies about babesiosis or *Babesia* have been found in the consulted bibliographical scientific databases.

In conclusion, it is time to translate research findings into effective control of babesiosis. As occurs with other emerging diseases, research leading to vaccinal or effective therapeutic options are of utmost importance. Tick-borne pathogens such

as *Babesia* and others with even clearer epidemic potential need to be researched more and to be prioritized with effective interventions to reduce their negative impact.

Data availability

Raw bibliometric data generated in this study are available on OSF. DOI: <https://doi.org/10.17605/OSF.IO/ER9UP>.

Grant information

The author(s) declared that not grants were involved in supporting this work.

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Open Peer Review

Current Peer Review Status: ? ✗ ✓

Version 1

Reviewer Report 28 February 2019

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Cristina Casalone

Experimental Institute for Zooprophyllaxis in Piedmont, Liguria and Valle D'Aosta, Turin, Italy

The manuscript submitted by Rodríguez Morales et al. represents a bibliometric evaluation on Babesia, in order to contribute to understanding this neglected zoonosis and addressing future research and control strategies. Bibliometric evaluation is an excellent tool to obtain objective information about specific areas of research and support the adoption of strategic decisions. In detail, this study provides and summaries data on the research activity on Babesia worldwide. It shows that the main country involved in the research on Babesia is USA, where babesiosis is a notifiable disease since 2011 (CDC) and most human cases have been reported. Of interest the strong research activity of institutions and countries as Japan and UK, in which Babesia represents a new emerging problem both in animals and humans. This study highlights the increased research activity on this neglected zoonosis, considered of growing importance in several countries and the need of further studies addressed to preventive and therapeutic aspects. The manuscript, proposed as a research note, is well structured, the statistical analysis and its interpretation is sufficient, results and discussion appropriate. To fulfil F1000Research criteria ("Research note ... can be reported with one or two illustrations (figures/tables)"), authors could reduce the number of figures/graphs.

I suggest the following minor revisions in the text:

In the Introduction:

- I suggest to add *Ixodes* spp as tick genera involved in the transmission of Babesia to humans. Indeed in USA most reported human cases are attributed to *B. microti* transmitted to people by *Ixodes scapularis*. Moreover, most European human cases are caused by *B. divergens* and *B. venatorum*, primarily transmitted by *Ixodes ricinus*¹.
- The authors should specify that the first case described in Croatia in 1957 by Skaraballo, refers to a "human" case.
- Moreover I suggest adding a sentence regarding the role of animal reservoirs and their distribution that contributes (as the presence of vectors) in the maintenance of the transmission cycle.

In the Methods:

You could clarify which and/or how many countries have been used as keyword for the search pipeline

Figure 6: In the caption: the citation trends is from Web of Science (as reported in the results), not Scopus.

References

1. Gray J, Zintl A, Hildebrandt A, Hunfeld KP, et al.: Zoonotic babesiosis: overview of the disease and novel aspects of pathogen identity. *Ticks Tick Borne Dis.* 2010; **1** (1): 3-10 [PubMed Abstract](#) | [Publisher Full Text](#)

Is the work clearly and accurately presented and does it cite the current literature?

Yes

Is the study design appropriate and is the work technically sound?

Yes

Are sufficient details of methods and analysis provided to allow replication by others?

Yes

If applicable, is the statistical analysis and its interpretation appropriate?

Yes

Are all the source data underlying the results available to ensure full reproducibility?

Yes

Are the conclusions drawn adequately supported by the results?

Yes

Competing Interests: No competing interests were disclosed.

Reviewer Expertise: Diagnostics on vector borne disease, neuropathology, surveillance program

I confirm that I have read this submission and believe that I have an appropriate level of expertise to confirm that it is of an acceptable scientific standard.

Author Response 07 Jul 2019

Alfonso Rodriguez-Morales, Fundación Universitaria Autónoma de las Américas, Colombia

Dear Dr. Casalone

Thanks for your valuable comments. Regards them, we would like to comment and discuss, in the context of the submission a new revised version (version 2).

The manuscript submitted by Rodríguez Morales et al. represents a bibliometric

evaluation on Babesia, in order to contribute to understanding this neglected zoonosis and addressing future research and control strategies. Bibliometric evaluation is an excellent tool to obtain objective information about specific areas of research and support the adoption of strategic decisions. In detail, this study provides and summaries data on the research activity on Babesia worldwide. It shows that the main country involved in the research on Babesia is USA, where babesiosis is a notifiable disease since 2011 (CDC) and most human cases have been reported. Of interest the strong research activity of institutions and countries as Japan and UK, in which Babesia represents a new emerging problem both in animals and humans. This study highlights the increased research activity on this neglected zoonosis, considered of growing importance in several countries and the need of further studies addressed to preventive and therapeutic aspects.

We are thankful for your comments. In this revised version, we have included more information such as, an adjustment per capita of the number of publications per million population of the countries (Table 1). In the case of USA, where data from 2011 to 2015 was available, we analyzed and compared the number of reported cases in that period with the number of publications at Scopus, WoS and PubMed during the same time.

The manuscript, proposed as a research note, is well structured, the statistical analysis and its interpretation is sufficient, results and discussion appropriate. To fulfil F1000Research criteria ("Research note ... can be reported with one or two illustrations (figures/tables)"), authors could reduce the number of figures/graphs.

Thank you for the comments. Per request from the other reviewers, we actually have extended on analyses, data and figures in order to respond to their inquiries.

I suggest the following minor revisions in the text:

In the Introduction:

I suggest to add *Ixodes spp* as tick genera involved in the transmission of Babesia to humans.

Done. Included (Second line in Introduction section).

Indeed, in USA most reported human cases are attributed to *B. microti* transmitted to people by *Ixodes scapularis*. Moreover, most European human cases are caused by *B. divergens* and *B. venatorum*, primarily transmitted by *Ixodes ricinus*¹.

Done. Included.

The authors should specify that the first case described in Croatia in 1957 by Skaraballo, refers to a "human" case.

Done. Included (Fifth line in Introduction section).

Moreover, I suggest adding a sentence regarding the role of animal reservoirs and their distribution that contributes (as the presence of vectors) in the maintenance of the transmission cycle.

Done, now included (Final sentence in Introduction section).

In the Methods:

You could clarify which and/or how many countries have been used as keyword for the search pipeline

Now included (In Methods section after keyword specification).

Figure 6: In the caption: the citation trends is from Web of Science (as reported in the results), not Scopus.

Corrected.

Competing Interests: None.

Reviewer Report 26 February 2019

<https://doi.org/10.5256/f1000research.19225.r44953>

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Jeremy S. Gray

UCD School of Biology & Environmental Science, University College Dublin, Dublin, Ireland

This article attempts to assess the bibliographic status of *Babesia* parasites with the declared objective of identifying research priorities in order to achieve effective prevention and control of babesiosis. The authors have produced publication data from various sources showing trends over the years and also by citation, author, institute and country.

Unfortunately the article has major deficiencies. The most obvious of these is that the human and animal versions of the disease have been conflated so that the data are more or less meaningless. The economic impact, research priorities and research constraints are very different in veterinary compared with medical babesiosis. In fact it is possible to argue that even the parasites are different, since the vast majority of human cases are caused by a parasite (*Babesia microti*) that is only distantly related to those prevalent in veterinary babesiosis (*Babesia sensu stricto*), and there are differences in their biology such as presence or absence of transovarial transmission, sensitivity to antibabesials, availability of in vitro cultures etc.

Additionally, it is difficult to see the point of counting numbers of articles published by different countries, authors, institutions etc. Cross comparison of these data is invidious since different interests and time scales are involved. Such data may tell the reader something about where there has been sufficient interest for research funding but nothing about the nature of the research, which is necessary to identify areas of neglect. It would have been much more useful to break the

data down by topic. For example, how many articles are in the area of pure immunological research, usually involving rodents, how many address therapeutic issues, how many vaccination, how many epidemiology etc. Only then would it be possible to see where the gaps are, particularly in relation to practical measures, particularly if accompanied by analytical comments. The superficial approach of this article certainly does not, especially when there has been no attempt to explain the trends presented in the figures.

The authors have identified some research areas that require more attention, for example blood transfusion infection in the USA, development of vaccines (presumably molecular), development of new antibabesials, but have not provided the necessary context or evidence for these conclusions.

Some important issues that the authors seem to have ignored completely, include the development and successful use of live vaccines for cattle babesiosis over a long period of time, the prodigious, but failed efforts, to produce molecular vaccines against cattle babesiosis (which indicates the very great difficulty involved in the development of vaccines for human use), the change in direction and emphasis of babesiosis research in general with the discovery of *B. microti* in the US, and epidemiological issues such as the extension of the geographical range of infections, although briefly touched on in relation to the UK, for reasons that are not clear.

The references make little mention of established authorities in the topic and there are at least five instances of self-citation. Finally there are many examples of poor sentence construction (e.g. the last part of the last sentence in the abstract, inaccurate statements (e.g. the first sentence in the Introduction and the first sentence in the second paragraph), unnecessary sentences (e.g. the third sentence in the second paragraph) etc. There are more of all these in the Discussion.

Overall, the impression gained is that the authors have made use of readily available metrics on the internet, to present data that appear to have no useful meaning and have not attempted to analyze the data to achieve their stated objectives.

Is the work clearly and accurately presented and does it cite the current literature?

No

Is the study design appropriate and is the work technically sound?

No

Are sufficient details of methods and analysis provided to allow replication by others?

Yes

If applicable, is the statistical analysis and its interpretation appropriate?

Not applicable

Are all the source data underlying the results available to ensure full reproducibility?

Yes

Are the conclusions drawn adequately supported by the results?

No

Competing Interests: No competing interests were disclosed.

Reviewer Expertise: Parasitologist, with special interest in babesiosis and tick-borne diseases

I confirm that I have read this submission and believe that I have an appropriate level of expertise to state that I do not consider it to be of an acceptable scientific standard, for reasons outlined above.

Author Response 07 Jul 2019

Alfonso Rodriguez-Morales, Fundación Universitaria Autónoma de las Américas, Colombia

Dear Dr. Gray

Thanks for your comments. We have revised and improved the manuscript. In regard to your observations, we would like to comment and discuss, in the context of the submission a new revised version (version 2).

This article attempts to assess the bibliographic status of Babesia parasites with the declared objective of identifying research priorities in order to achieve effective prevention and control of babesiosis. The authors have produced publication data from various sources showing trends over the years and also by citation, author, institute and country.

The objective of this bibliometric study was not to “identifying research priorities in order to achieve effective prevention and control of babesiosis”, which would be impossible from this type of study. What we really declared is “The findings of this article would be useful to define research priorities about Babesia and diagnose the important of scientific production on this pathogen” (final line of the abstract)

Unfortunately the article has major deficiencies. The most obvious of these is that the human and animal versions of the disease have been conflated so that the data are more or less meaningless. The economic impact, research priorities and research constraints are very different in veterinary compared with medical babesiosis. In fact it is possible to argue that even the parasites are different, since the vast majority of human cases are caused by a parasite (*Babesia microti*) that is only distantly related to those prevalent in veterinary babesiosis (*Babesia sensu stricto*), and there are differences in their biology such as presence or absence of transovarial transmission, sensitivity to antibabesials, availability of in vitro cultures etc.

We thank the reviewer for the observation, although we consider that today, the vision of zoonoses should be an integrated one. Then, having separated human and animal babesiosis, to us, is not rationale. Babesiosis is one zoonotic disease, no matter the host. The work on babesiosis should be together between veterinarians and human physicians, working in the interphase that zoonoses, such as babesiosis, provide. One World, One Health.

Additionally, it is difficult to see the point of counting numbers of articles published by

different countries, authors, institutions etc. Cross comparison of these data is invidious since different interests and time scales are involved. Such data may tell the reader something about where there has been sufficient interest for research funding but nothing about the nature of the research, which is necessary to identify areas of neglect. It would have been much more useful to break the data down by topic. For example, how many articles are in the area of pure immunological research, usually involving rodents, how many address therapeutic issues, how many vaccination, how many epidemiology etc. Only then would it be possible to see where the gaps are, particularly in relation to practical measures, particularly if accompanied by analytical comments. The superficial approach of this article certainly does not, especially when there has been no attempt to explain the trends presented in the figures.

Bibliometric studies quantify and compare the scientific output on specific and general topics. That is the idea and the design, that has been a base consensus in this type of studies. Nevertheless, we have included additional information in regards the areas of research related to Babesia as well as the funding sponsors, from both Scopus and Web of Sciences.

The authors have identified some research areas that require more attention, for example blood transfusion infection in the USA, development of vaccines (presumably molecular), development of new antibabesials, but have not provided the necessary context or evidence for these conclusions.

That would be more related to other kind of studies. If required, a specific study (e.g. review) about that should be designed, to address those specific topics.

Some important issues that the authors seem to have ignored completely, include the development and successful use of live vaccines for cattle babesiosis over a long period of time, the prodigious, but failed efforts, to produce molecular vaccines against cattle babesiosis (which indicates the very great difficulty involved in the development of vaccines for human use), the change in direction and emphasis of babesiosis research in general with the discovery of *B. microti* in the US, and epidemiological issues such as the extension of the geographical range of infections, although briefly touched on in relation to the UK, for reasons that are not clear.

We agree with the reviewer that such points would be of interest. But our study characterizes as a bibliometric research note, and not a systematic review, or a bibliometric study about vaccines. Therefore, that was not an objective of our study.

The references make little mention of established authorities in the topic and there are at least five instances of self-citation. Finally there are many examples of poor sentence construction (e.g. the last part of the last sentence in the abstract, inaccurate statements (e.g. the first sentence in the Introduction and the first sentence in the second paragraph), unnecessary sentences (e.g. the third sentence in the second paragraph) etc. There are more of all these in the Discussion.

Thank you very much for the observation. In this revised version, we attended several of

such issues in order to improve the manuscript.

Overall, the impression gained is that the authors have made use of readily available metrics on the internet, to present data that appear to have no useful meaning and have not attempted to analyze the data to achieve their stated objectives.

As previously indicated, in this revised version the manuscript has been improved. Although we would like to clarify that: i) the metrics presented in this research note were not available on the internet and ii) the databases that were evaluated are significant sources for bibliometric studies, to whom (Scopus and SCI-E Web of Knowledge) the Universidad Tecnológica de Pereira, in Colombia has valid subscriptions.

Competing Interests: None.

Reviewer Report 08 February 2019

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In the manuscript entitled "Research on Babesia: A bibliometric assessment of a neglected tick-borne parasite" the authors try to evaluate the previous bibliometric research regarding babesiosis in the world. It has recognized the value of this type of study because it helps to identify the importance of a country, institution or researcher in solving problems based on scientific evidence. Most of them describe bibliometrics in their papers considering bibliometric variables such as number of citations, author participation in research production, author and co-authorship analysis with VOSviewer¹, the H-index, geographical distribution of that disease by countries, the amount and intensity of their international collaboration, analysis of that research based on the frequency of the words used in the title of the articles², number of publications with intra-country collaboration, number of publications with inter-country collaboration^{3,4} etc, and usually, the literature was retrieved using only one database (Scopus, Medline, etc) which may give the advantage to let them analyze this in depth.

However, when the number of publications is normalized by population¹, by gross domestic product, and by gross national income per capita⁵, health expenditure⁶, scientific collaboration⁷ or other important variable (epidemiology variables such as prevalence, incidence⁸, endemic versus non-endemic, etc) it makes more relevant the study. On the other hand, it is known the

capacity of databases such Scopus, Medline, Web of Science and Scielo, and the authors may decide to use only one giving more details to the analysis.

In this case, considering that Babesiosis is a neglected disease, of importance in several countries as it has been described in the manuscript, so this topic deserve still more research, so I consider that this bibliometric analysis would be important for the scientific community. However, it would also be important to normalize the number of publications (including some of those variables mentioned above), include other bibliometric variables such as H-index.

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Is the work clearly and accurately presented and does it cite the current literature?

Yes

Is the study design appropriate and is the work technically sound?

Yes

Are sufficient details of methods and analysis provided to allow replication by others?

Partly

If applicable, is the statistical analysis and its interpretation appropriate?

Yes

Are all the source data underlying the results available to ensure full reproducibility?

Yes

Are the conclusions drawn adequately supported by the results?

Yes

Competing Interests: No competing interests were disclosed.

Reviewer Expertise: Clinical and epidemiological research in Vector Borne Disease

I confirm that I have read this submission and believe that I have an appropriate level of expertise to confirm that it is of an acceptable scientific standard, however I have significant reservations, as outlined above.

Author Response 07 Jul 2019

Alfonso Rodriguez-Morales, Fundación Universitaria Autónoma de las Américas, Colombia

Dear Dr. Vilcarromero

Thanks for your valuable comments. Regarding them, we would like to comment and discuss, in the context of the submission a new revised version (version 2).

In the manuscript entitled “Research on Babesia: A bibliometric assessment of a neglected tick-borne parasite” the authors try to evaluate the previous bibliometric research regarding babesiosis in the world. It has recognized the value of this type of study because it helps to identify the importance of a country, institution or researcher in solving problems based on scientific evidence. Most of them describe bibliometrics in their papers considering bibliometric variables such as number of citations, author participation in research production, author and co-authorship analysis with VOSviewer1, the H-index, geographical distribution of that disease by countries, the amount and intensity of their international collaboration, analysis of that research based on the frequency of the words used in the title of the articles2, number of publications with intra-country collaboration, number of publications with inter-country collaboration3,4 etc, and usually, the literature was retrieved using only one database (Scopus, Medline, etc) which may give the advantage to let them analyze this in depth.

We performed a bibliometric study; we did not evaluate previous bibliometric research. As until the present date, there are no records of previous published bibliometric study in this subject. Regarding the “method”, there is still no consensus on reporting or performing bibliometric studies. Some studies analyze only one database, but this would lead to certain bias, as e.g. WoS have a limited geographical coverage, compared to Scopus. Or Medline is limited in number of journals of certain biomedical areas. The advantage of having different databases is to have a wider coverage and avoid geographical bias, as we intended to do. Secondly, we have published a Research Note (a brief article), not an Original Article. Then extension is quite different. In reference to variables, we used the most common ones utilized in bibliometric studies.

However, when the number of publications is normalized by population¹, by gross domestic product, and by gross national income per capita⁵, health expenditure⁶, scientific collaboration⁷ or other important variable (epidemiology variables such as prevalence, incidence⁸, endemic versus non-endemic, etc) it makes more relevant the study. On the other hand, it is known the capacity of databases such Scopus, Medline, Web of Science and Scielo, and the authors may decide to use only one giving more details to the analysis.

Although the proposed relationships would be very relevant, this is a research note for a descriptive bibliometric study. Such analysis would result in an extended analytical bibliometric study for a Full-Length Original Article. Even more, some of the suggested variables are not standardized for many countries nor available for the whole period of years and even more publicly available. For example, as we clearly stated, babesiosis is not under surveillance in most countries. Then, this makes highly unlikely to have epidemiological indicators to make such correlations. However, we included in the Table 1 an adjustment per capita of the number of publications per million population of the countries. In the case of USA, where data from 2011 to 2015 was available, we analyzed and compared the number of reported cases in that period with the number of publications at Scopus, WoS and PubMed during the same time. That data from USA, was published this year (May 2019), and was now cited by us, but not previously available, when we performed the bibliometric study. For more years, and other countries, this is not possible. In addition, we have access to data from Wisconsin, USA, which was included and analyzed (Figure 12).

In this case, considering that Babesiosis is a neglected disease, of importance in several countries as it has been described in the manuscript, so this topic deserve still more research, so I consider that this bibliometric analysis would be important for the scientific community. However, it would also be important to normalize the number of publications (including some of those variables mentioned above), include other bibliometric variables such as H-index.

We are grateful to the reviewer in the appreciation that the bibliometric analysis is of relevance for the scientific community. In reference of the mentioned variables, the H index is already included in the manuscript (third paragraph of the results description).

Competing Interests: None.

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