# Mapping the literature on the qualitative approach to childhood asthma from 1996 to 2018: a bibliometric analysis

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## Resumo

*Objectives: to describe the scientific production of qualitative studies in childhood asthma.*

*Methods: bibliometric analysis. Articles were from Web of Science, Scopus, Cochrane, and PubMed (1996-2018), using the search terms asthma, children, qualitative research, qualitative study, qualitative analysis, ethnographic, phenomenology and narrative.*

*Results: 258 articles were retrieved from 143 journals, representing 1.2% of scientific articles on childhood asthma. The growth rate was high. Authorship included 969 authors (85.3% occasional) from 279 institutions. 94.2% were co-authored and 3.5% were international collaborations. The greatest number of articles were from the United States (45.3%), United Kingdom (17.4%) and Canada (7.4%). The categories with the highest number of articles were Nursing & Public, Environmental & Occupational Health (18.2%), Respiratory System (10.1%) and Allergy (7.7%). 99.7% of the articles were in English.*

*Conclusion: these results show a lack of consolidation of the literature based on qualitative studies on childhood asthma with a high percentage of occasional authors and limited international collaboration, indicating a need to strengthen this approach.*

**Palavras-chave** *Asthma, Children, Qualitative research, Bibliometrics, Scientific publication indicators*

## Introduction

Asthma is a chronic, episodic, and potentially severe inflammatory disease that can profoundly impact the patient's health and quality of life.[1] Asthma affects more than 300 million people, and it is estimated that by 2025 the number of patients will increase 100 million with most living in high-income countries.[2,3] Asthma is the most common chronic disease in children, imposing an increasingly consistent burden on healthcare system,[3] and its prevalence is rising in low-and middle-income countries (LMICs).[4,5] Childhood asthma represents a significant challenge for the capacity of health systems to ensure equity in access to services, and efficiency and quality of health care.[1,6] Several studies indicate that the perceptions of asthma symptoms by patients, their families and physicians can directly influence treatment efficacy.[7,8]

Precisely, the most profound meanings of human experiences and behaviours around health and disease, and the ways of relating to health systems, are part of the key elements when designing qualitative research studies.[9] Qualitative data contributes to understanding certain actions and attitudes of the participants related to the general objective of a study. The qualitative approach also allows the identification and analysis of the meanings that the actors build on a phenomenon of interest; in the case of asthma, it applies to children, their caregivers, health teams, and managers. The qualitative methodology also permits the exploration of how such actors understand and act in response to asthma symptoms or crises, and the identification and analysis of which categories, processes, and structures may be key to asthma control.[10]

To provide an overall view of studies that have used a qualitative approach to childhood asthma, as well as identifying those responsible for these studies the institutional relationships that mark this methodological approach and to the methodological designs and tools used, we propose a bibliometric analysis.[11,12] Bibliometric analysis uses quantitative methods to evaluate research performance. It is helpful also to consider potential objectives that would be useful for future research.[13]

Previous bibliometric studies on childhood asthma have analysed the global panorama of its scientific production.[11] Other bibliometric analyses reviewed the 100 most cited articles on asthma,[14] and the role of animal models in asthma research,[15] while another was restricted to the literature from specific countries such as India.[16]

Apart from that, in 2019, we presented a narrative analysis protocol on the perception of care coordination in asthma from the perspective of healthcare professionals in Ecuador and Brazil,[17] so we previously set out to analyse the available scientific literature related to qualitative studies in childhood asthma. We selected bibliometric analysis to examine large numbers of publications and their production patterns at different levels.[12] To our knowledge, a bibliometric analysis of qualitative research on childhood asthma has not been reported previously. Here, we describe qualitative studies of childhood asthma published over the period 1996-2018 and establish the trend map of scientific literature.[18] Given the high burden of childhood asthma cases on the health system, there is a need to analyse the characteristics of the relationships between patients, family, caregivers, and the health system from the qualitative paradigm, as well as the opportunity to map trends in scientific production on the topic. Therefore, we propose to carry out a bibliometric approach to analyse the main characteristics of the trend in the production of qualitative scientific articles on childhood asthma.

## Methods

To analyse the scientific production on qualitative studies in asthma children, a retrospective descriptive study with a bibliometric approach was designed. Relevant online articles were retrieved using Web of Science (WOS), Scopus, Cochrane, and PubMed, for being the most used databases to conduct comprehensive bibliometric analysis due to their international scope.[19] The studied period was from 1996 to 2018 to include as much bibliometric data as possible. Data retrieval was done on October 10, 2019. The search terms located in the title, abstract, or keyword were asthma, children, qualitative research, qualitative study, qualitative analysis, qualitative approach, ethnographic, phenomenology, and narrative, which were combined with the Boolean and truncation operators corresponding to each database. In addition, qualitative and mixed studies were included in any language with available keywords, abstract and main text. Initially, 521 records were retrieved. After filtering the data obtained by two independent and previously standardized reviewers, incomplete records or those that were not the object of the study were eliminated, obtaining 258 valid articles. Subsequently, the country, author, and affiliation institution fields were normalized, for example, Brasil for Brazil. This study followed Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) guideline for cross-sectional studies.

The analysis was based on five parameters:

1. Growth of the literature. The evolution of the articles' growth and volume was calculated by the number and percentage of indexed works and growth rate for the period 1996-2018, T= $((Nf-Ni/Ni)100)$, where *Nf* is the number of final jobs and *Ni* the number of initial jobs. The relationship between the annual cumulative number of publications and temporal coverage was analysed using

linear logistic, and exponential equations. Finally, the study topics were analysed through keywords.

2. Documentary typology and thematic areas. Qualitative approach, research paradigm and research field were described by percentage. The description of thematic areas was based on keywords. To visualize the map of concurrent keywords we used VOSviewer, for the visualisation of bibliometric networks or scientific mapping (Visualization of Similarities viewer).[20]

3. Authorship analysis. The total number of authors and affiliated institutions was quantified. Their geographical coverage and the prominent persons responsible for the investigations were identified based on their volume of work and H index. The productivity of the authors was categorized into three groups: a) Those with ≥10 items were considered large producers, b) Between 2 and 9 publications, medium producers; and c) With a single item, small producers. The transitory index was obtained from the percentage of authors with a single publication (members of a research group who have made only one publication). The impact of the most productive authors was analysed from Index H, data obtained from Scopus, while citations by country were consulted in the WOS.

4. Analysis of collaboration. Collaboration guidelines were established at the collaborative level (ratio between the total number of authors, institutions, or countries and the total number of publications on a topic). The international publication rate showed the breadth of collaboration (percentage of publications from two or more countries out of the total number of publications in a particular field of research).[15] In addition, the social network of co-authors with more than four papers and cooperation between countries is shown.

Two indicators were also calculated. a) The OutDegree centrality defined as the number of links of a node in the network and the normalized OutDegree (nOutDegree) expressed in percentages. The greater the connection with other nodes, the more essential and prestige the node has within the network.[16] b) The Betweenness centrality shows the number of shortest paths that pass through a node, and its percentage is calculated using the normalized Betweenness indicator (Betweenness).[18] The higher the betweenness centrality, the greater the ability to control the information transmitted between the other nodes. It facilitates relationships between various actors in a network, controlling the flow of information between communities.[21]

5. Analysis of the dispersion, visibility, and coverage language of scientific journals. The identification of the most specific journals in the field was analysed with the Bradford spread calculated from Egghe's formulation $k = (e^{\gamma} \times Y_m)^{1/P}$ $r_0 = T(k-1)/(KP-1)$ where $e^{\gamma} = 1.781$. $Y_m$ is the number of articles in the most productive journal, P

corresponds to the number of zones, T is the total number of journals, r0 is the number of journals in the core, and k is the Bradford multiplier.[22,23] The impact factor of the journals is shown in quartiles and identifies the WOS categories for 2018. In case the journal was listed in more than one category, the quartile of the highest impact factor was considered.

For data collection, the database records were exported to Refwoks® and then to Microsoft Excel®. Authors and countries network analysis was performed with the UCINET 6.0[21] program, and relationship maps were visualized with VOSviewer. The relationship map is shown by cluster or set of closely related nodes depending on the type of link being studied. The size of each node represents the number of items, and the link thickness symbolizes the strength of the connecting relationship. The data were presented with absolute frequencies, means and standard deviation.

## Results

### Growth of literature

The production analysed comprised 258 documents, representing 1.20% of all documents on childhood asthma. The growth of the analysed literature fitted the exponential model ($R_2 = 0.75$; $p<0.01$), with a growth rate between 1996 and 2018 of 419% (Figure 1). 50% of the documents have been published over the last five years. The relationship between the annual cumulative number of publications and the time coverage showed that the linear equations obtained a high coefficient of determination (0.92), while the exponential and logistic equations were 0.89 and 0.65.

### Documentary typology and thematic areas

79.04% of the works were qualitative and 20.96% mixed. According to the qualitative approach and theoretical framework were grounded theory studies (to develop a conceptual framework grounded in the data collected during the research process) (14.51%), narrative approach (focuses on collecting, analysing, and interpreting stories and narratives to gain insights into people's experiences, identities, and meanings) (6.85%), thematic analyses (an approach to uncovering the key ideas, concepts, and patterns in textual, visual, or other forms of data) (5.64%), ethnographic (anthropological approach used to study and understand people and their cultures) (5.63%), phenomenological (to investigate the essence and structure of human experiences, emotions, and consciousness) (5.24%), qualitative descriptive (to gain a detailed and straightforward understanding of a phenomenon or the experiences of participants) (5.03

**Figure 1**

The growth of the analysed literature.
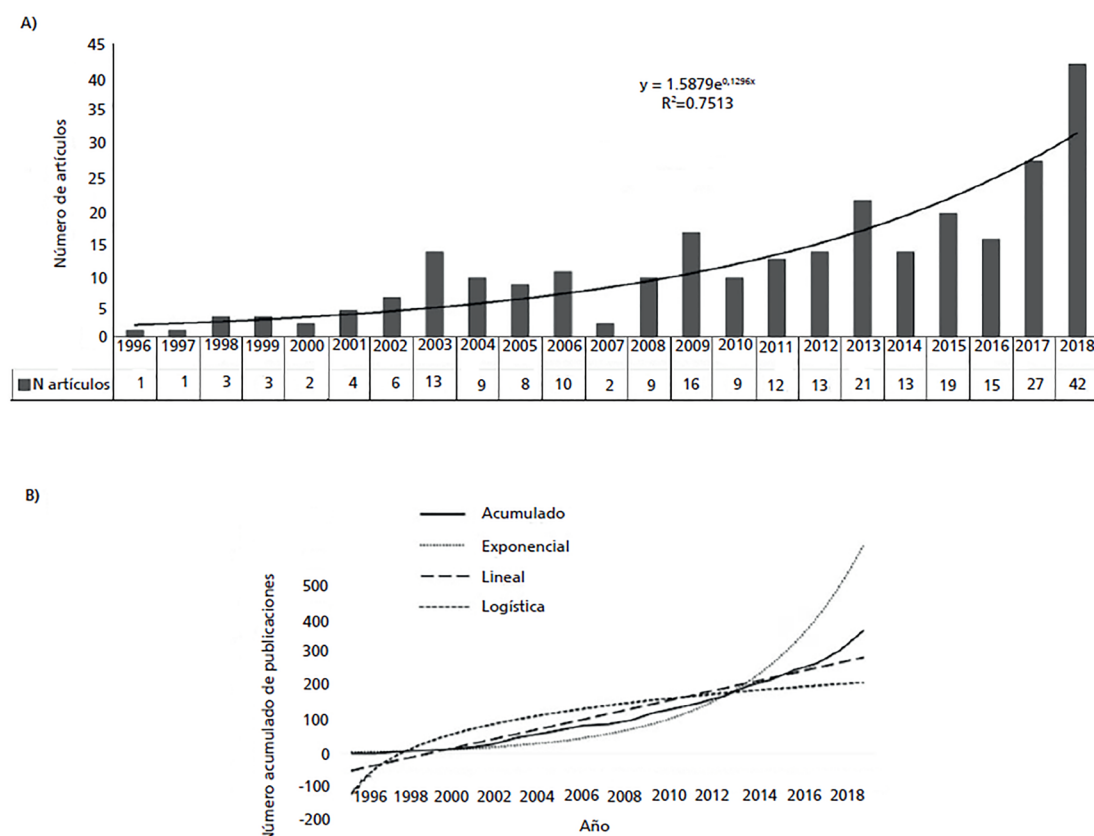


A) Evolution of the number of documents; B) Relationship between cumulative number of publications and year.

%), inductive method (a type of reasoning or research approach that begins with specific observations or data and moves toward general principles or theories) (4.83%). Instruments and data collection methods were interviews (14.91%), focus group (11.02%), and others (26.34%). According to the research field: 85.08% were clinical research, 9.27% were general education research, 4.43% were health services research, and 1.21% were medical education.

In Figure 2, through the visualization of the most used keywords, most of the research focuses on males. From an analysis of keywords: almost 27% of the terms referred to qualitative assessment tools on asthma (interviews, scales, questionnaires, evaluation); 20% of studies corresponded to the attitude toward health; 13.56% to the knowledge of pathology; 12.40% to the knowledge of health; 11.62% to psychological adaptation; 10.46% to group activities; 8.25% to quality of life; 5.42% to mothers; 5.03% to patient and family education; 4.65% to health education, self-efficiency and self-management, adherence to medication and need for assessment; 4.26% to the relationship between professionals and family and risk factors and their evaluation; 3.80% to poverty and patient compliance; 3.10% to social support and health at school; 2.71% doctor-patient relationship; and 2.32% to motivation and lifestyle.

## Authorship analysis

The production corresponded to 969 authors affiliated with 279 institutions. There were no large producers. Instead, 14.65% of the authors were medium producers (2-9 works), and the remaining 85.34% were small producers. Of the ten authors with the highest number of publications, B. Saini, M. Reznik, and I. Rydstrom were first or last authors with an H-Index of 23, 11, and 9, respectively.

## Analysis of collaboration

Co-authorship was present in 94.18% of the articles with a collaboration average of 4.75 (SD 2.61). The authors with the highest OutDegree were V.G. Press (35), M. Stewart (17), and B. Saini (13), the latter two with the highest Betweenness 6.11 and 6.56, respectively.

The six institutions with the highest number of papers were University of Michigan in the USA (n=8), Children's Hospital of Philadelphia in the USA, University of Manchester, and University of Rochester in the United Kingdom (UK) (n=6), and University of Alberta in

**Figure 2**

Visualization map of concurrent keywords in qualitative research on childhood asthma with VOSviewer.
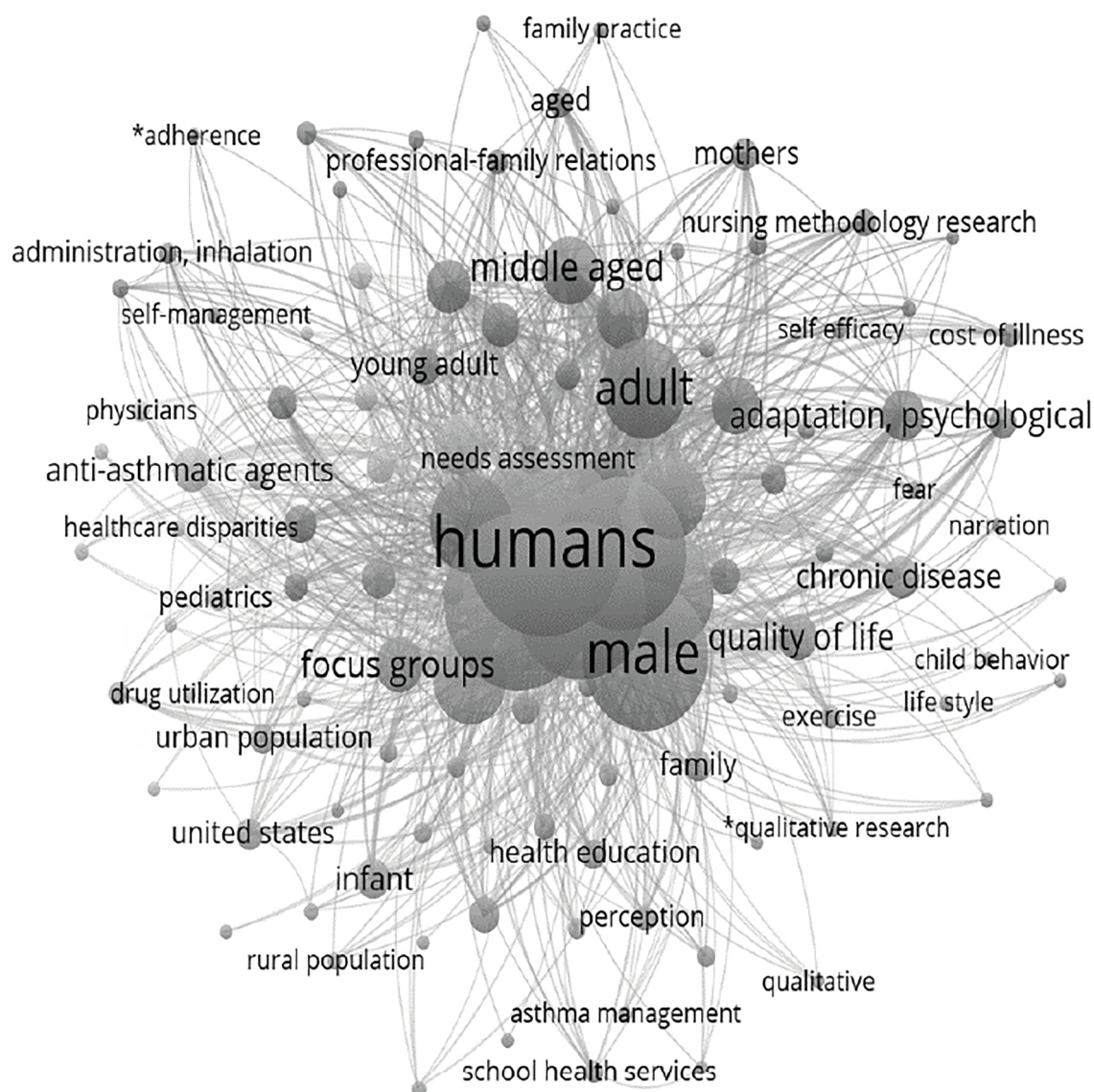


Canada and University of Bristol in UK (n=5). 26.74% of the articles had authors from more than one institution, 3.08 (SD 1.93).

The analysed production came from 27 countries (Table 1). Almost half corresponded to United States of America (USA), followed by United Kingdom (UK) (17.44%), Canada (7.36%), Australia (6.97%), and China (3.86%). The international collaboration rate represented 3.48% of the publications studied, with an average collaboration level of 2.33 (SD 0.50). International collaborations represented 17.35% of link possibilities. The countries with the highest collaboration links were UK and USA (6) and Australia (4). The three countries with the highest Betweenness were UK, USA (20), and Australia (8). Despite being among the top five most productive countries, Canada and China's roles in the collaboration were negligible. The countries with the highest number of citations were USA (554), UK (270), Netherlands (70), and Australia (34). The collaborative relationships between the authors and the countries with the most articles are shown in Figure 3.

**Analysis of the dispersion, visibility, and coverage language of scientific journals**

The 258 documents were published in 143 international journals. The dispersion of the journals, according to Bradford plus Egghe's formulation, showed a nucleus with ten journals and 76 articles, a zone 1 (31; 80), and a zone 2 (102; 102). Of journals in the field of asthma, located in the core, only three had a Q1.

Figure 4 shows the network of categories and quartiles of the journals indexed in WOS. 80% of the journals

**Table 1**

Characterization of geographic coverage.

| Country | Articles | | OutDegree (NrmOutDeg) | Betweenness (nBetweenness) | N citations |
|---|---|---|---|---|---|
| | n | % | | | |
| USA | 117 | 45.34 | 6 (27.27) | 20 (36.36) | 554 |
| UK | 45 | 17.44 | 6 (27.27) | 20 (36.36) | 270 |
| Canada | 19 | 7.36 | 1 (4.54) | 0 | 27 |
| Australia | 18 | 6.97 | 4 (18.18) | 8 (14.54) | 34 |
| China | 10 | 3.86 | 1 (4.54) | 0 | 29 |
| The Netherlands | 8 | 3.10 | 0 | 0 | 70 |
| Brazil | 6 | 2.32 | 2 (9.09) | 0 | 33 |
| Denmark | 5 | 1.93 | 0 | 0 | 0 |
| Norway | 5 | 1.93 | 0 | 0 | 16 |
| Sweden | 5 | 1.93 | 0 | 0 | 2 |
| New Zealand | 4 | 1.55 | 0 | 0 | 8 |
| Germany | 3 | 1.16 | 2 (9.09) | 0 | 15 |
| Iran | 3 | 1.16 | 0 | 0 | 9 |
| Ireland | 3 | 1.16 | 2 (9.09) | 0 | 0 |
| Switzerland | 3 | 1.16 | 2 (9.09) | 0 | 6 |
| France | 2 | 0.77 | 0 | 0 | 0 |
| Spain | 2 | 0.77 | 0 | 0 | 0 |
| Argentina | 1 | 0.38 | 0 | 0 | 0 |
| Chile | 1 | 0.38 | 0 | 0 | 0 |
| Ecuador | 1 | 0.38 | 2 (9.09) | 0 | 33 |
| India | 1 | 0.38 | 0 | 0 | 0 |
| Israel | 1 | 0.38 | 0 | 0 | 0 |
| Italy | 1 | 0.38 | 0 | 0 | 0 |
| Japan | 1 | 0.38 | 0 | 0 | 0 |
| Mexico | 1 | 0.38 | 1 (4.54) | 0 | 0 |
| Saudi Arabia | 1 | 0.38 | 1 (4.54) | 0 | 1 |
| Singapore | 1 | 0.38 | 0 | 0 | 8 |

had an impact factor: 23.25% were in the first quartile (Q1), 31.39% in Q2, 34.49% in Q3, and 12.40% in Q4. Impact factor journals are listed in 37 WOS categories. The categories with the highest number of articles are Nursing and Public, Environmental & Occupational Health (18.21%), Respiratory System (10.07%), and Allergy (7.75%). 97.67% of articles are published in English, 1.16% in Portuguese, and 0.77% in Chinese or Spanish.

## Discussion

The number of qualitative studies published on childhood asthma was small compared to quantitative studies for which production exceeded 1,600 studies.[13] Although the growth rate was high, the increase in publications did not follow an exponential trend as might be expected for the long time analysed. Half of the qualitative studies were published from 2013. The cumulative growth of articles followed most closely a linear model indicating that publications are likely to continue to grow at a constant rate. An interesting finding is that many qualitative studies on childhood asthma focus on males, possibly due to the higher prevalence in boys versus girls,[24] used grounded theory as the research design and used interviews or focus groups as study instruments.

The high index of transience or authors with a single publication shows a lack of consolidation of the scientific literature.[25] The density of the geographical set shows that a relatively small number of countries was responsible for most publications. This block consists largely of Anglo-Saxon countries (USA, UK, Canada, and Australia). Thus, might reflect the high burden of disease from asthma

in these countries.[1] The USA and UK also maintain a leadership position in research productivity due to their collaborative networks or working group activity.[4,26] China was in fifth place, and although it has a lower prevalence of asthma compared to many other LMICs, it has registered an increase in childhood and adolescent asthma over recent decades.[27]

Currently, research tends to be carried out in collaboration, both nationally and internationally. This allows the sharing of resources and knowledge, increased research productivity, and favours the development of health policies.[28] Although almost all the publications represented co-authorship, which improved research productivity,[29] international collaboration was still weak.

Journals that published qualitative studies on childhood asthma had good visibility; however, the publications with the highest volume of articles are not the lead journals with greatest impact in their research areas. The authors tended to select journals from the field of nursing and public health to disseminate the results of qualitative research. However, in other bibliometric studies on asthma with a greater presence of quantitative studies, such as that by Sweileh in 2014, the categories with the most indexed publications were medicine, immunology, and microbiology. The social sensitivity associated with nursing could be reflected in editorials in this area, so they would have a greater predisposition to publish qualitative studies.[30]

Practically all the literature has been published in English since most of the production comes from Anglo-Saxon countries. Therefore, publications in English achieve better visibility. This observation was reported on

**Figure 3**

Representation of the international collaboration network of authors (A) and countries (B) based on VOSviewer.
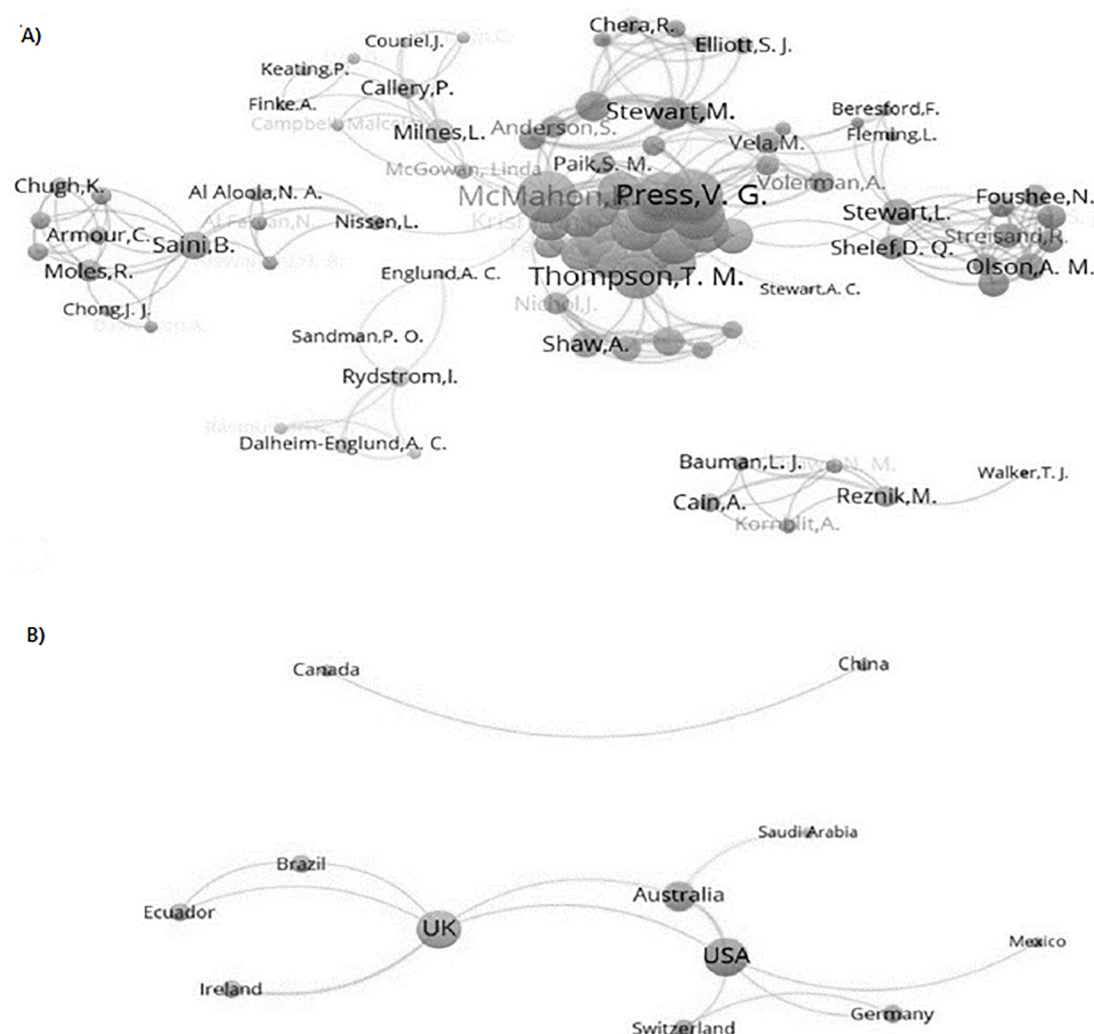


previously by Qu Y *et al.*[14] in their bibliometric analysis of childhood asthma.

Qualitative studies are necessary, and our bibliometric analysis has highlighted areas that might be the focus of future studies designed to improve our understanding of childhood asthma and its control and their relations with hospital services. For example, research on health services and childhood asthma, access to medication, and medical education on asthma, as well as increasing of collaboration between researchers from high-income countries with low-middle income countries as a positive and mutually beneficial trend in the field of research.[12,22,30]

The results are subject to the limitations of the databases used for coverage of research publications. Additional consultation of other sources of information, free or through subscription schemes, as well as scientific journal portals with regional focus or temporal coverage, may modify our results.

## Conclusions

Information on trends in scientific production relating to qualitative studies on childhood asthma has shown an exponential increase from 1996 to 2018, although the high frequency of occasional authors shows a lack of consolidation of the scientific literature. The areas addressed by qualitative studies in childhood asthma were phenomenological studies and grounded theory related to clinical research (qualitative validation about evaluation scales or questionnaires). The largest production of qualitative studies on childhood asthma is concentrated around the Anglo-Saxon countries as well maintain the leadership on collaboration. These results show the need for further qualitative research on childhood asthma to strengthen the understanding of this disease from different approaches.

**Figure 4**

Network of categories and quartiles of the journals indexed in WOS based on VOSview.
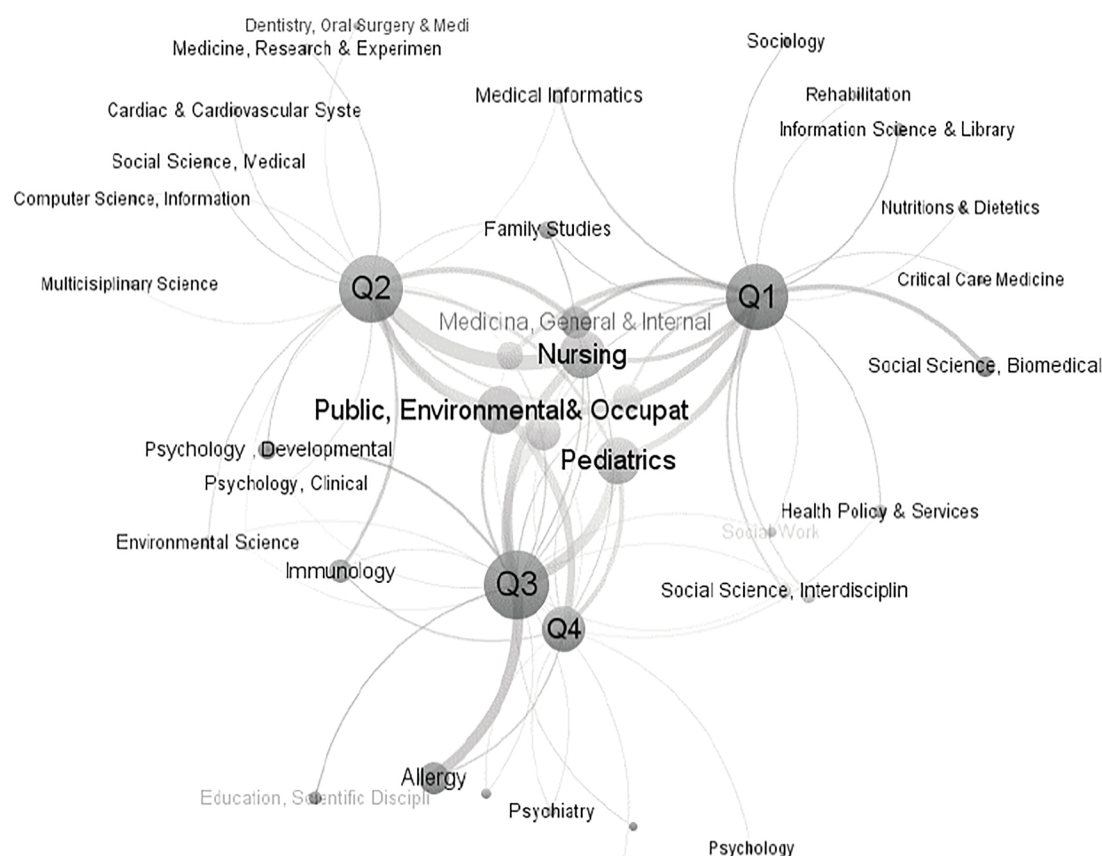


## Author's contribution

Torres-Pascual C, Romero-Sandoval N: Conceptualization, Methodology, Investigation, Writing - original draft. Torres C: Formal analysis. Granadillo E, Romero-Sandoval A, Rodríguez A: Investigation, Writing - review & editing. Cooper P: Conceptualization, Resources, Supervision, Writing - review & editing. All authors approved the final version of the article and declare no conflicts of the interest.

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