

What have we researched about HIV infection in Colombia? A bibliometric review 1983 - 2018

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Abstract

Objective: Our objective was to quantitatively describe the research on HIV infection carried out in Colombia.

Materials and methods: A bibliometric review of all studies that included people infected or affected by HIV between January 1, 1983, and August 31, 2018, was performed.

Results: 587 studies were identified. Most were descriptive studies. There are a lower number of studies in the fields of prevention, education and public health. Most of the published studies were carried out in 3 departments. 72% were published in Q3, Q4 or unclassified journals.

Discussion: The research performed has given priority to the description of figures and is not enough to understand and know how to treat factors like late diagnosis, the stigma and the prevention of the disease.

Conclusion: There does not seem to be a national strategy to define the research needs. There is a low dissemination of the results and a low cover of the research in the country.

Keywords: HIV, research, bibliometrics, Colombia

Qué hemos investigado acerca de la infección por VIH en Colombia? Una revisión bibliométrica 1983 - 2018

Resumen

Objetivo: Describir cuantitativamente la investigación sobre infección por VIH realizada en Colombia.

Materiales y métodos: Se realizó una revisión bibliométrica de estudios que incluyeran personas infectadas o afectadas por el VIH entre el 1 de enero de 1983 y el 31 de agosto de 2018.

Resultados: Se identificaron 587 estudios. La mayoría fueron descriptivos. Hay un menor número en los campos de prevención, educación y salud pública. La mayoría se llevaron a cabo en 3 departamentos. El 72% se publicaron en Q3, Q4 o revistas no clasificadas.

Discusión: La investigación realizada ha dado prioridad a la descripción de las cifras y no es suficiente para comprender y saber cómo tratar factores como el diagnóstico tardío, el estigma y la prevención de la enfermedad.

Conclusión: No parece haber una estrategia nacional para definir las necesidades de investigación. Hay una baja difusión de los resultados y una baja cobertura de la investigación en el país.

Palabras clave: VIH, investigación, bibliometría, Colombia

Introduction

Thirty-seven years after the first report of patients with infection with the human immunodeficiency virus (HIV)¹, 36.7 million people live with the virus around the world, 1.8 million of them in Latin America². Improvements in the health care of these people, including new recommendations about the initiation of antiretroviral therapy³, the transition to less toxic antiretroviral drugs, greater adherence to medications, treatment of comorbidities and preventive measures have improved their survival⁴.

With the aim of ending the epidemic of the human immunodeficiency syndrome (AIDS) in the world, the joint program of the United Nations on HIV / AIDS (UNAIDS) has set new goals in the control of infection, including that for the year 2020 90% of all people living with HIV know their status about the infection, 90% of all people diagnosed receive antiretroviral treatment and 90% of them have reached viral suppression, which is expected to achieve the goal to eradicate the epidemic by the year 2030⁵. This strategy considers innovation and research as essential tools in the response to HIV to improve the efficiency and quality of interventions, while also improving equity in their impact⁶.

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Colombia has developed a national plan to respond to sexually transmitted infections, including HIV infection, in which it aims to strengthen comprehensive care for infected people through various strategies, including, among others, the promotion of health reproductive, intersectoral and inter-institutional coordination, the strengthening of social support networks and the strengthening of basic and applied research⁷.

Previous bibliometric reviews have reported that publications in infectious diseases in Colombia have been carried out mainly in the fields of parasitology, bacteriology, antibiotic resistance and virology⁸. In the country, research in virology has increased significantly since the beginning of the 21st century, developed more frequently in HIV / AIDS, dengue and papillomavirus infections⁹. However, studies describing in detail the areas of knowledge in the field of HIV / AIDS research, have not been published to date.

The objective of this study is to describe the quantitative characteristics of research in HIV infection that has been carried out in Colombia through a review of bibliometric indicators, to identify gaps in knowledge management around this disease in the country.

Materials and methods

A bibliometric review was carried out in which all the quantitative (observational or experimental) and qualitative studies that included people infected or affected by HIV (population at risk of becoming infected) in the Colombian population during the period January 1th 1983 to August 31th 2018, were analyzed.

Secondary studies (reviews of any type with or without meta-analysis), editorials and letters to the editor were excluded. Likewise, those in which the main outcome did not include HIV infection, those that were not performed in the Colombian population and those carried out in animals were excluded.

To classify them, the full text of each study was read and discussed among the reviewers if the method used corresponded to that reported in the article; otherwise, the methodology was evaluated according to whether the study was experimental or not, analytical or descriptive observational¹⁰.

Bibliometric indicators

The measured bibliometric indicators can be consulted in table 1.

Search methods for the identification of studies

All searches were conducted without language restriction. They were limited to studies in humans of any age, sex or gender identity, carried out between 1983 (the first case of HIV infection reported in Colombia) and August 31th 2018. Additionally, In vitro studies derived from samples taken in humans were analyzed.

An electronic search was carried out in the following databases: SCOPUS, PUBMED, EMBASE, and LILACS. In addition, a manual search was performed on the supplements of Infectio magazine, corresponding to abstracts of research presented at the congresses of the Colombian Association of Infectious Diseases, which began in 1998 and are held every two years.

To define the search strategy and the classification terms of the selected studies, an initial pilot test was conducted between two reviewers, independently, in the PUBMED database, obtaining the classification terms used in the bibliometric indicators.

The search strategy was compared (((HIV [Title / Abstract]) OR Acquired Immunodeficiency Syndrome [Title / Abstract]) OR AIDS [Title / Abstract]) AND Colombia [Title / Abstract])), with which they were obtained 278 titles and the "HIV AND Colombia" strategy with which 545 titles were obtained.

Based on the above, it was defined among all the authors, to use the search terms "HIV and Colombia", with a higher risk of false positives, but increasing the sensitivity of the search to obtain all the relevant information.

The pilot testing reported that most of the studies belonged to the quantitative method, with the classification term epidemiology and with Antioquia, Cundinamarca and Valle del Cauca being the main site where were developed the studies.

Selection of studies

The final selection of the studies was made independently by two researchers. One of the researchers was different from those who performed the pilot test, with the aim to evaluate the reproducibility of the results. Both evaluated all titles and abstracts and excluded those that were detected as duplicates or that fulfilled exclusion criteria. Then they made an evaluation of the complete text of the studies to verify the eligibility criteria and extract the variables proposed for the measurement of the bibliometric indexes. Disagreements between the reviewers were resolved by discussion between the two, without the need to go to a third reviewer.

Extraction and management of variables

We extracted all the variables considered relevant to measure the outcomes, including the type of study (quantitative or qualitative), study design, target population, region or city where the study is conducted, the language in which the study is published, year of publication, category, classification terms.

Statistic analysis

The variables were collected in a database in the Excel 2016 program and from it, they were collected in order to perform descriptive statistics.

Results

Selection of studies

The search identified 1,653 titles for its initial evaluation. 429 were excluded by duplication of the studies among the da-

Table 1. Bibliometric indicators evaluated

Bibliometric indicator	Definition
Number of publications	Absolute frequency of identified articles
Number of publications per year	Absolute frequency of included studies discriminated by year of publication
Number of publications identified by each database	Absolute frequency of included studies of each database source of information
Number of publications by type of study	Absolute frequency of studies according to the methodology used, quantitative or qualitative research
Number of publications by study design	Absolute frequency of studies performed discriminated by study design
Number of publications per target population	Absolute frequency of studies discriminated by type of population in which it is carried out
Number of publications by region or city where it develops	Absolute frequency of studies discriminated by geographic region where it is developed
Number of publications by category and by classification term	Absolute frequency and proportion of studies according to the category and scientific area in which it was developed
Number of publications by category and department where it develops	Absolute frequency of studies discriminated by scientific area and geographical region in which it was developed
Number of publications per quartile of the journal where they are published	Absolute frequency of studies according to the quartile in which the journal where it is published is classified (Scimago Journal Ranking)
Number of publications per quartil of the journal where they are published and category	Proportion of studies according to the category and quartil of the journal in which they are published

tabases analyzed. Additionally, 637 were excluded because they did not correspond to the types of studies included in the review: 331 because its main outcome was not HIV infection or did not include it within its outcomes, 162 because it corresponded to systematic reviews, narratives or editorials, 143 were not performed with the Colombian population and 1 corresponded to a study carried out on animals (figure 1). The 587 included studies were reviewed in their full text, verifying eligibility criteria and extracting from them the necessary variables to measure the bibliometric indexes.

There were 195 disagreements between the two reviewers, which were resolved by discussion between them and there was no need to go to a third investigator.

Bibliometric indexes

Number of publications per year. Publications were identified since 1990, initially with a low frequency (12 publications between 1990 and 1999 - 1.2 per year), increasing after the year 2000 (119 between 2000 and 2009 - 11.9 per year), and mainly from the year 2010, with 456 studies published after this year until August 31, 2018 - 50.7 per year (figure 2).

Number of publications identified by each database. In total, 194/587 (33%) titles of Scopus, 91/587 (16%) of Pubmed, 79/587 (13%) of Lilacs, 69/587 (12%) of Embase and 154/587 (26 %) of the abstracts of congresses of the Colombian Association of Infectology (ACIN). 334/587 (57%) studies were published in Spanish, 201/587 (34%) in English, 49/587 (8%) in Spanish and English, 3/587 (1%) in Spanish, English, and Portuguese.

Number of publications by type of study. Most of the studies, 552/587 (94%), corresponding to the quantitative method, 30/587 (5%) were developed by the qualitative method and 5/587 (1%) studies were carried out using a combination of both.

Number of publications by study design. The majority of the published works (84,2%) correspond to observational studies developed by cross-sectional design, and their objective was to describe specific populations based on some particular characteristic (in the clinical or basic sciences area) or to report cases that were considered of interest to the community scientific. With a lower frequency (5,1%), the studies proposed the search for association or causality of outcomes such as adherence or effectiveness of the treatment, changes in the clinical conditions of the patients, in relation to clinical or social exposures. A similar proportion (5,1%) of the studies, tried to describe knowledge, perceptions, beliefs about the infection in some populations. 3,7% of the studies, were developed to evaluate some intervention, as the comparison between the efficacy of antiretroviral drugs or interventions to improve adherence to treatment (table 2).

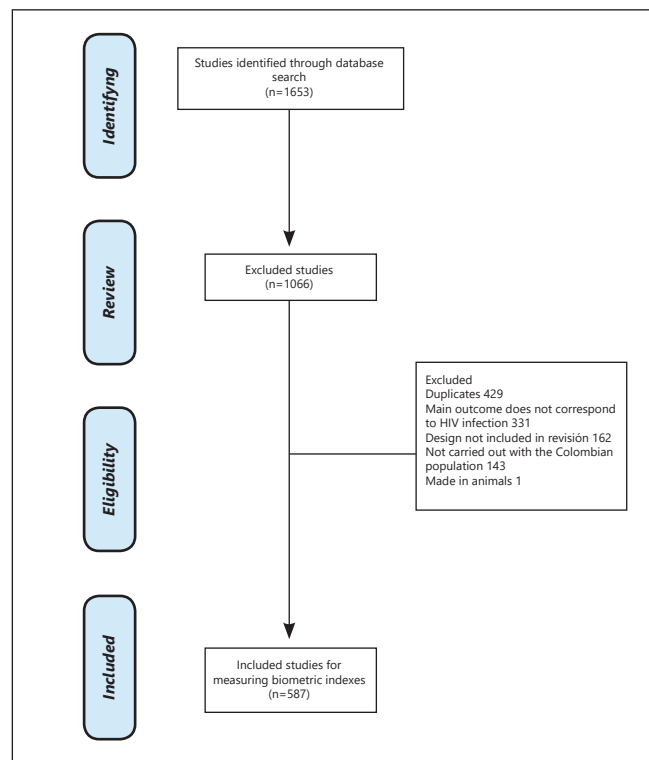


Figure 1. Flowchart with the results of the bibliographic search

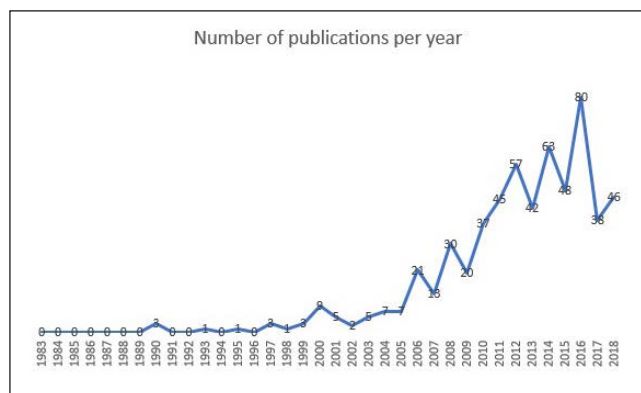


Figure 2. The number of studies published per year. 2018 measurement until August 31th

Number of publications per target population. 435/587 (74%) of the studies were carried out with people infected with HIV, 107/587 (18%) with uninfected people, exposed or not to the virus, 36/587 (6%) compared results between people infected and not infected by the virus, 6/587 (1%) with health workers involved in the care of these people and 3/587 (0.5%) with health administrative personnel involved in the care of infected persons.

Number of publications by region or city where it is developed. The three departments in which most of the studies were carried out were Antioquia with 209 studies, Cundinamarca - Bogota Capital District, 167 and Valle del Cauca, 119. In the majority of the other departments, less than 10 studies were carried out. There are large areas of the country, where no study has been reported, mainly in the regions of the Llanos orientales (eastern plains), Pacific (except Valle del Cauca) and insular (figure 3)

Number of publications by category and by classification term. The category and classification term in which the works included in this study were located can be consulted in Table 3. Most of them corresponded to the Epidemiology category (270/587, 46%), in which the authors intended to report cases or establish frequencies about the presentation of events associated or not associated with AIDS. The studies carried out in the populations of pregnant and pediatric women corresponded to 1,2% and 2,9% of the total of the included studies in this category. The next category, in a number of publications, corresponded to the basic sciences, mainly in the area of immunology (67/587, 11,4%). The studies that evaluated treatment factors, such as adherence, effectiveness or resistance, represented 14,31% and those that evaluated social factors in relation to the infection, 13,3%, including those associated mainly with vulnerability and quality of life. A few studies (8/587, 1,4%) analyzed economic factors in relation to the cost of health attention.

Number of publications according to the event reported. The publications that described prevalences, or reported cases associated and not associated with AIDS, did so mainly by studying Tuberculosis and fungal infections. Around half

of the studies (46,8%) analyzed conditions associated with AIDS, whereas comorbidities with other microorganisms as hepatitis virus, papillomavirus, represented 13,5% of the studies in this category; and conditions associated with chronic inflammation, like cardiovascular events, cancer or mental diseases, only were reported in 9,4% of these studies. Most of the conditions studied in the epidemiology category have only one published study and were depicted like other studies (figure 4).

Number of publications by region or city and classification term. The studies carried out in basic sciences were carried out mainly in the department of Antioquia (74/99). In the 300 studies published in the area of epidemiology, the majority were developed in 3 departments, Cundinamarca, Antioquia and Valle del Cauca (80, 87 and 40 respectively). In terms of public health, 65% were developed in Antioquia and Valle del Cauca, and with respect to social factors, 64% were carried out in Antioquia, Valle del Cauca, and Cundinamarca. Similarly, 55,6% of the studies that described or analyzed factors associated with the treatment, carried out in these three departments.

Number of publications per quartile of the magazine. 377/587 (64%) publications were reported in Q3 or Q4 journals, 163/587 (28%) in Q1 or Q2 journals. In 47 (8%) cases, the journal was not classified in the database of Scimago Journal Rank (figure 5)

Discussion

Our study quantitatively described the volume of research on HIV infection in Colombia, between 1983 and August 2018, reporting the areas of knowledge in which it was investigated, as well as the geographical distribution of these studies.

Table 2. Absolute frequency of studies according to design and research method

Research method	Study design	Absolute frequency
Quantitative	Descriptive - transversal	385
	Report and series of cases	67
	Prevalence	42
	Analytical - cohort	27
	Clinical trials	14
	Pseudoexperimental	8
	Diagnostic tests	5
	Analytical - cases and controls	3
	Ecological	1
Qualitative	Ethnography	12
	Theory founded	9
	Phenomenology	6
	Narrative	2
	Investigation action	1
Mixed	Cuantitativo - cualitativo	5
Total		587

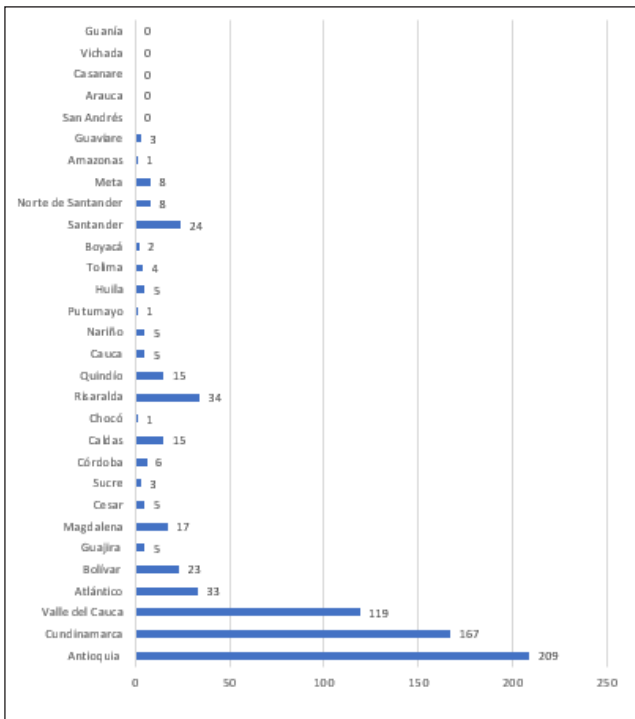


Figure 3. Distribution of studies by absolute frequency in each department.

The results obtained allowed us to identify the trends in the research carried out on HIV infection in Colombia since the first case was reported in the country. This trend may reflect changes in the social security system in health in the country, because, before 1993, 80% of the population did not have health insurance, which led to the formulation of new laws that in that year created a new system that sought to improve coverage in the country¹¹. From that moment on, a progressive increase in the number of publications is observed, which is based on cross-sectional, descriptive studies with the main theme of the epidemiology of HIV infection and its associated conditions, mainly through measures descriptive of prevalence on conditions associated with AIDS. This type of study was carried out mainly in the non-pregnant adult population, developing them in a much smaller proportion in the pediatric population and pregnant women. Likewise, there is a significant proportion of studies carried out in basic sciences, mainly in the area of immunology, with a lower number of studies in treatment areas, and in the fields of prevention, education and public health. Another important finding is that most of the studies were conducted in 3 departments, with regions of the country such as the Llanos orientales (eastern plains), Amazon and insular where there are few or no studies on aspects related to infection.

A quarter of the studies were published as abstracts in national research conferences on infectious diseases, carried out biannually since 1998. On the other hand, almost three quarters (72%) were published in journals Q3, Q4 or not classified by the quartile system.

Bibliometric reviews carried out in other developing coun-

tries have reported similar results in terms of research deficit about prevention measures or educational measures^{12,13}. The number of publications in the country is lower than others, such as those of the European Union¹⁴, where the median by country is 319 articles in a period of 10 years, while in the same period (2002 - 2011), in Colombia, the total number of articles published was 187, but we do not know a standard that indicates whether this number of publications is considered high or low.

Table 3. Frequency of studies according to category and classification term

Category	Classification term	Absolute frequency
Epidemiology	Events associated with AIDS	95
	Events not associated with AIDS	76
	Prevalence	29
	Pediatric population group	17
	Epidemic behavior	15
	Pregnant population group	7
	Incidence	7
	Morbidity	10
	Surveillance	9
	Mortality	4
	Late diagnosis	1
	Basic Sciences	Immunology
Virology		20
Genetics		2
Transmission		2
Treatment	Effectiveness	32
	Adherence	30
	Resistance	15
	Adverse effects	7
Social factors	Vulnerability	23
	Quality of life	18
	Education	14
	Culture	7
	Stigma	4
	Psychology	4
	Sindemia	4
	Inequalities	2
	Socioeconomic level	2
	Ethnicities	1
Public Health	Health campaigns	3
	Policies	3
	Prevention	36
	Promotion	2
Diagnosis	Techniques and procedures	7
	Immunological tests	2
	Diagnostic techniques in pregnant women	2
Economic factors	Costs of health care	8

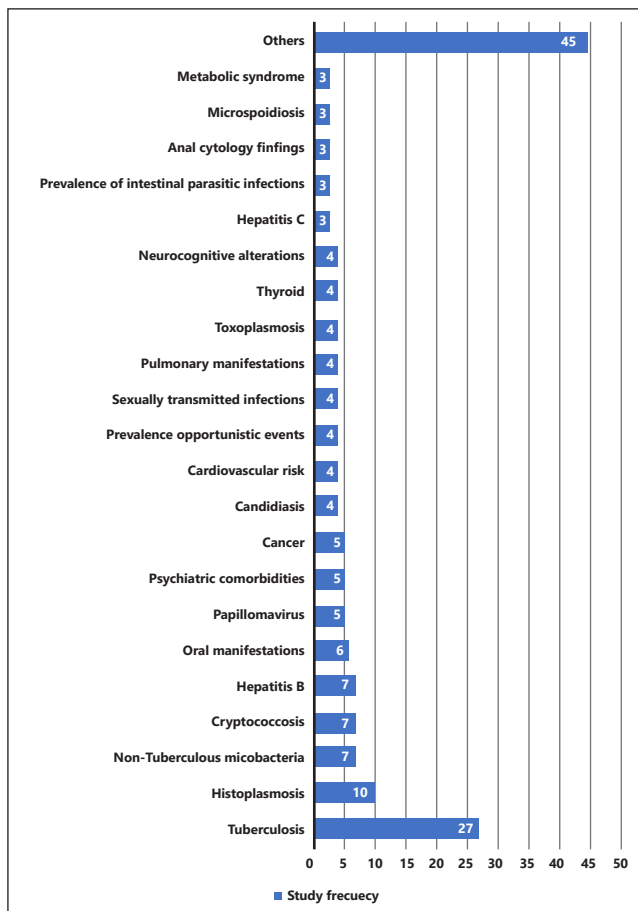


Figure 4. Number of publications according to the event reported

Colombia reported, through the high-cost account, 82856 people infected with HIV with a cutoff date of January 31th 2017, corresponding to a prevalence of 0,17% and 9399 new cases during the year prior to this date, with a 35% of these occurring late¹⁵. Reports from the Joint United Nations Program on HIV / AIDS (UNAIDS), describe a prevalence in Colombia of 150.000 people infected with HIV (120.000 - 180.000), without data on compliance with the 90 90 90 strategy for the year 2017¹⁶, which estimates values of 81 - 72 - 79 for Latin America¹⁷. Systematic reviews of studies in low- and middle-income countries have shown significant associations between stigma and late diagnosis of HIV infection¹⁸. Situations such as this have led to the proposal of a new approach, mainly in strategies to prevent infection¹⁹. On the other hand, world experts have analyzed the barriers and opportunities for the introduction of new antiretroviral drugs in countries such as Colombia, concluding that there is a need for more information about their safety and efficacy in some subpopulations of these countries²⁰.

Some of the studies carried out in Colombia have attempted to clarify the causes and factors associated with the behavior of the epidemic in the country. Among others, sociocultural factors such as social stigma, religious significance, definitions of risk groups, have become barriers to access to the diagnosis of infection²¹. On the other hand, sex, low educational level, affiliation to the health system, residence in rural areas

and age, influence to the adequate counseling for the performance of diagnostic tests²². Health personnel has been linked to social stigma towards people living with HIV infection²³.

Colombia has formulated in recent years a national policy to promote research and innovation in response to the country's obligation to construct more favorable conditions for its integral development, from a social, economic, political and cultural perspective. This policy has been based on the need to undertake actions for sustained social development through the reduction of poverty, inequality, insufficient coverage and quality of health and education services²⁴.

In Colombia, the main funding source for research projects arises from the calls regulated by Colciencias. Although in the calls of the last 4 years (2016 - 2019), HIV infection has been included within the priority themes, it has been done in a generic way as "AIDS" (2016); sexually transmitted diseases, mother and child transmission of HIV (2017); and a little more specific with topics such as qualitative analysis of condom use in key populations, analysis of factors that influence the performance or not of HIV tests, strategies to improve the effectiveness of antiretroviral prophylaxis after exposure, resistance to antiretrovirals in patients with HIV / AIDS (2018); development of innovative prevention strategies focused on high-risk population, timely diagnosis and adherence to treatment (2019).

The foregoing is not in accordance with the aforementioned research promotion policy, and we believe that it reflects the heterogeneity in the findings of our review, where the associated factors and possible interventions are not being clarified to diminish the late diagnosis, the stigma surrounding the HIV infection, improve the prevention of the disease and increase the coverage of care and adequate adherence to treatment uniformly throughout the country, giving priority until now to the description of figures and the concentration of research in a few areas of the country and that is reflected in the figures mentioned about the behavior of the epidemic in our country.

Finally, given the limitations of HIV programs for their control, researchers and world leaders have called for adopting strategies such as the science of implementation, in order to improve the efficiency and effectiveness of HIV programs²⁵.

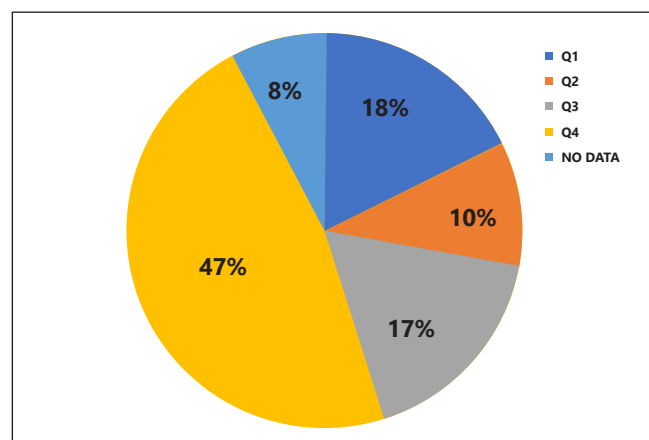


Figure 5. Number of publications per quartile of the journal

The science of implementation can be defined as the scientific study of methods to promote the systematic use of research findings and other evidence-based practices in health care programs to help improve their quality and effectiveness. These studies must be carried out by transdisciplinary research teams²⁶. This strategy has four components that include the identification of bottlenecks and gaps, the development and implementation of strategies, the measurement of their effectiveness and efficiency, and the use of their results²⁶. In general, the implementation of evidence-based interventions in low- and middle-income countries has been based on diverse strategies, some focused on health workers, others on users of health systems and few on organizations or entities responsible for health care²⁷. Strategies as the science of implementation have been developed in response to situations such as the fact that the findings of evidence-based practice take 17 years, on average, to be incorporated into health care programs, even being implemented less than half of these²⁶.

The results of the review, can be useful for clinical teams, research and decision makers, public and private funders and health and research policies in the country, to define priorities in terms of topics and funding.

Conclusions

Although the number of publications about HIV infection in Colombia is growing, mainly in the last decade, there does not seem to be a national strategy or guideline to define the research needs and a significant proportion of the studies remain in exposition of their results in national congresses, which although they are disclosed, have a limitation in this same disclosure that can lead to the effort of the researchers and the results of their work not being taken into account when planning improvements in attention to Patients based on research.

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Ethical disclosure

Protection of human and animal subjects. This research do not use animal nor human material or data.

Confidentiality of data. Not applicable

Conflicts of interest. The researchers did not receive any type of sponsorship for the development of the research, different from the salaries they receive for their daily work in the entities to which they belong.

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