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Barriers to access to ophthalmology services in Latin America: A scoping review

Erwin Hernández Rincón

erwin.hernandez1@unisabana.edu.co

Universidad de la Sabana

Juan Tobo Hernandez

Universidad de la Sabana https://orcid.org/0000-0002-2767-6954

Juan Alvarez Tovar

Maria Ramirez Cruz

Maria Olivares Manrique

Article

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Abstract

Introduction: Visual impairment is a global public health priority because of its high prevalence and impact on quality of life. In Latin America, access to ophthalmologic care is limited by multiple barriers that especially affect vulnerable populations and hinder the timely detection and management of preventable visual diseases.

Objective: To describe the available evidence on the barriers affecting access to ophthalmology services in Latin America.

Materials and Methods: In accordance with the JBI and PRISMA-ScR guidelines, a search was conducted in four scientific databases (PubMed, Scielo, Scopus and Web of Science), including studies published between 2010 and 2025, highlighting the barriers to accessing ophthalmology services in Latin America and excluding those focused on other regions of the world.

Results: Sixty-eight studies were included, with the main barriers identified for access to ophthalmology services being structural, geographic, economic, sociocultural, technological, and health system barriers. Among the strategies implemented to improve access, teleophthalmology, mobile brigades, educational campaigns, and strengthening of primary care stand out, although significant inequalities persist between regions and population groups.

Conclusions: Access to ophthalmologic care in Latin America continues to be affected by multiple barriers, especially affecting the most vulnerable populations. Although progress has been made through various strategies, it is necessary to strengthen the integration of services, invest in human and technological resources, and prioritize equity to advance toward universal and effective eye care coverage in the region.

INTRODUCTION

Visual impairment constitutes a global public health priority because of its high prevalence and profound impact on quality of life, biopsychosocial well-being, and health systems [(1)]. The main causes of this condition are uncorrected refractive defects, cataracts, glaucoma, diabetic retinopathy, and corneal opacities, most of which are preventable or treatable pathologies if detected early [(2)]. Therefore, it is essential to guarantee timely, continuous, and equitable access to ophthalmological services to make the right to visual health effective [(3)].

Latin America was ranked in 2019 as the region with the greatest inequality, facing social, economic, and environmental gaps that limit access to health care. In ophthalmology, multiple structural, economic, geographic, cultural, and health system barriers especially affect vulnerable populations, perpetuating inequities and hindering the timely detection and management of preventable visual diseases [(3, 4)].

Among preventable visual diseases, diabetic retinopathy (DR) stands out as one of the main causes of visual impairment, especially in contexts with limited medical coverage. Early detection of this pathology is particularly complex in regions where the previously mentioned structural, economic, and technological barriers persist, hindering access to specialized services [6]. One example of a possible strategy that has emerged to address these challenges has been telemedicine as a promising alternative for screening, diagnosis, and follow-up of eye diseases, as it facilitates the expansion of access to eye care through remote platforms and integrated care models [5].

While teleophthalmology programs have been shown to reduce inequalities, they face organizational, technological, and human challenges that compromise their sustainability. These include a lack of investment, poor staff training, a lack of clinical standards, and gaps in digital infrastructure [5]. In addition, the subjective perceptions of users, their confidence in remote care, and the quality of the patient–physician link are also important.

However, beyond technological and organizational limitations, profound structural inequities persist. Historically marginalized communities such as indigenous peoples, Afro-descendant populations, and low-income people face a disproportionate burden of visual disease, compounded by their underrepresentation in research and inclusive health policies [7].

Furthermore, access to vision rehabilitation services represents a critical need that continues to be neglected. Globally, less than 10% of people with low vision have access to functional interventions, and in Latin America, the situation is even more limited [8].

Therefore, overcoming barriers to access to eye care in Latin America requires global awareness of the magnitude of the problem and the implementation of innovative strategies supported by technology and equitable patient-centered policies. Only through coordinated and sustained actions will it be possible to move toward more accessible and equitable eye care for the entire population of the region.

MATERIALS AND METHODS

A scoping review was conducted in June 2025 following the methodology of the Joanna Briggs Institute (JBI) [9] and the PRISMA-ScR [10] guidelines. This approach allowed a rigorous mapping of the scientific literature on the subject. The review was guided by the following research question: What are the barriers affecting access to ophthalmology services in the Latin American population?

Search strategy:

The search was conducted in four scientific databases, PubMed, Scopus, SciELO, and Web of Science, following the previously established inclusion and exclusion criteria. In addition, gray literature, including international technical reports, institutional bulletins, documents from academic repositories, and

nonindexed institutional journals, was considered. The search terms were designed using MeSH-DeCS descriptors and related keywords.

The specific search strategies for each database, as well as the inclusion and exclusion criteria applied, are detailed in Table 1. These strategies were adapted to the particularities of each database to ensure broad and accurate coverage of the relevant literature.

Table 1
Search strategies and article selection criteria

CRITERIA USED IN THE SEARCH STRATEGIES	
Inclusion	**Exclusion**
Articles in English, Spanish, or Portuguese	Editorials, letters to the editor, opinions without empirical support, and case reports.
Publications between January 2010 and June 2025.	Studies published outside the established time range
Studies conducted in Latin American countries or directly comparing Latin American contexts.	Studies conducted outside Latin America
Scientific articles, systematic or scoping reviews, qualitative, quantitative or mixed studies, and technical reports, narrative reviews.	Exclusively clinical or technological studies that do not address barriers to access to ophthalmologic care.
Studies that analyze geographic, economic, sociocultural, organizational, structural, technological, or health system barriers to accessing ophthalmology services.	Publications focusing only on clinical or surgical interventions, unrelated to access to care
DATABASES AND SEARCH STRATEGIES	
Database	**Search** strategy
PubMed	1. (("Eye Care Services"[MeSH] OR "Ophthalmology"[MeSH] OR ophthalmology[tiab] OR "eye health"[tiab]) AND ("Health Services Accessibility"[MeSH] OR access[tiab] OR barriers[tiab] OR inequity[tiab] OR inequality[tiab] OR obstacles[tiab]) AND ("Latin America"[MeSH] OR "South America"[MeSH] OR "Central America"[MeSH] OR "Caribbean Region"[MeSH] OR "Mexico"[MeSH] OR "Brazil"[MeSH] OR "Argentina"[MeSH] OR "Colombia"[MeSH] OR "Peru"[MeSH] OR "Chile"[MeSH] OR "Venezuela"[MeSH] OR "Latin America"[tiab] OR "South America"[tiab] OR "Central America"[tiab] OR "Caribbean"[tiab])) AND ("2010/01/01"[Date - Publication] : "2025/12/31"[Date - Publication]) 2. ((((ophthalmology) OR (ophthalmology services)) OR (visual care)) AND (barriers to care)) AND (health disparities)

Summary of inclusion and exclusion criteria and database-specific search strategies used to identify relevant literature on barriers to accessing eye care in Latin America.

CRITERIA USED IN THE SEARCH STRATEGIES	
	3. (ophthalmology [MeSH Terms] OR "eye care" [tiab] OR "vision care" [tiab]) AND ("barriers to care" [tiab] OR "access to care" [tiab] OR "Health Services Accessibility" [MeSH Terms]) AND ("health disparities"[tiab] OR "Healthcare Disparities"[MeSH Terms])
Scopus	1. Ophthalmology AND Access AND Disparities AND "Latin America" AND Determinants 2. (TITLE-ABS-KEY (ophthalmology) OR TITLE-ABS-KEY ("eye care") OR TITLE-ABS-KEY ("vision care") OR TITLE-ABS-KEY (cataract) OR TITLE-ABS-KEY (glaucoma) OR TITLE-ABS-KEY ("diabetic retinopathy") OR TITLE-ABS-KEY ("age-related macular degeneration") OR TITLE-ABS-KEY ("age-related macular degeneration") OR TITLE-ABS-KEY ("refractive errors") OR TITLE-ABS-KEY ("retinal diseases") OR TITLE-ABS-KEY (uveitis)) AND (TITLE-ABS-KEY ("barriers to care") OR TITLE-ABS-KEY ("health services accessibility") OR TITLE-ABS-KEY ("access to health services") OR TITLE-ABS-KEY ("health disparities")) AND (TITLE-ABS-KEY ("Latin America") OR TITLE-ABS-KEY ("South America") OR TITLE-ABS-KEY ("Central America") OR TITLE-ABS-KEY (Caribbean) OR TITLE-ABS-KEY (Argentina) OR TITLE-ABS-KEY (Bolivia) OR TITLE-ABS-KEY (Brazil) OR TITLE-ABS-KEY (Chile) OR TITLE-ABS-KEY (Colombia) OR TITLE-ABS-KEY (Ecuador) OR TITLE-ABS-KEY (Mexico)))
SCIELO	(telemedicine OR "eye health" OR ophthalmology OR cataracts OR glaucoma OR retina OR vision) AND ("access to health" OR barriers OR inequalities OR inequities OR inequities) AND ("Latin America" OR "South America" OR "South America" OR "Central America" OR Argentina OR Brazil OR Colombia OR Peru OR Mexico OR Chile)
Web of Science	Guatemala OR Honduras OR Nicaragua OR Panama OR Cuba OR Cuba OR Haiti OR Dominican Republic")

Summary of inclusion and exclusion criteria and database-specific search strategies used to identify relevant literature on barriers to accessing eye care in Latin America.

The choice of databases used in this review was based on their relevance to answer the research question of barriers to accessing ophthalmology services in Latin America. PubMed was included for its focus on biomedical research and coverage of peer-reviewed scientific literature in health sciences; Scopus, for its interdisciplinary nature and broad scope in terms of citations and abstracts; SciELO, for its access to scientific literature published in Latin America and its usefulness in identifying regional evidence; and Web of Science, for its rigor in indexing high-impact journals and its ability to retrieve relevant studies published in international scientific journals with coverage of public health, inequalities and ophthalmology services. The selection and flow of the articles included are presented in **Fig. 1.**

Study selection

All the citations were managed on the Rayyan platform. The identified articles were consolidated in a database, eliminating duplicates manually. Subsequently, four reviewers independently reviewed titles

and abstracts according to the inclusion and exclusion criteria, resolving discrepancies by consensus. Finally, four reviewers reviewed the full texts to confirm the final eligibility of the studies.

Data extraction

Data extraction was carried out via a table previously designed by the research team. This table included the following elements: country or place, dates of development, type of study, objective, number of population included or number of articles (in the case of reviews), type and characteristics of the population studied, and the method employed. The level of care or type of service addressed in each study was also recorded, specifying which of these were addressed and how. In addition, the barriers to access to ophthalmologic services identified in each study were documented, and their approach and content were described.

Strategies, models, or interventions aimed at improving access were also compiled. Accordingly, key results and findings, such as coverage achieved, improvements in care or referral times, changes in the perception or use of services, persistent barriers, and, where applicable, clinical outcomes, were recorded. Limitations noted by the authors or identified by the evaluation team were also documented. The collection was performed independently by four reviewers, and any discrepancies were resolved by consensus.

Data analysis and synthesis:

The extracted data were analyzed via narrative and descriptive synthesis, organizing the information according to the frequency and distribution of barriers to access identified in different countries or regions, the population groups affected, and the levels of care involved. The barriers were classified into structural, geographic, economic, sociocultural, technological, health system, and other categories, presenting concrete examples reported in the articles reviewed. In addition, the main strategies and intervention models proposed to improve access were compiled, as were evidence gaps and priority areas for future research, integrating both qualitative and quantitative studies to provide a broad view of the regional landscape.

RESULTS

A total of 898 records were identified in the initial search. Among these, 191 (21.3%) were eliminated as duplicates. A total of 707 records (78.7%) were reviewed, of which 587 (83%) were excluded after review of titles and abstracts because they did not meet the inclusion criteria. A total of 120 reports (17%) were selected for retrieval, of which 7 (5.8%) could not be obtained. Then, 113 full-text reports were evaluated for eligibility, with 45 (39.8%) excluded: 4 (3.5%) for not being related to ophthalmology, 29 (25.7%) for being conducted in non-Latin countries, 3 (2.6%) for not addressing access barriers and 9 (8%) for publication date. In total, 68 studies (7.6% of the initial total) were included in the review.

Characteristics of the articles reviewed:

Sixty-eight articles were included, covering a population ranging from preterm infants to older adults, as well as special populations such as people with visual impairment and indigenous communities. Among these studies, 34 cross-sectional studies, 3 descriptive studies, 6 prospective studies, 6 systematic reviews, 7 retrospective studies, 3 qualitative case studies, 3 cohort studies, 2 meta-analyses, and 4 policy or historical analysis studies were identified. Community intervention studies, population-based survey analyses, and documentary analysis studies, which cover a wide range of methodologies and approaches to accessing ophthalmology services, were also included.

In terms of geographic distribution, the review exclusively covers Latin America. Brazil is the country with the greatest number of mentions in the included studies (n = 35), followed by Argentina (n = 21), Colombia (n = 17), Peru (n = 15), Mexico (n = 15), Chile (n = 14), Venezuela (n = 14), Ecuador (n = 14), Cuba (n = 13), Paraguay (n = 13), Uruguay (n = 13), Guatemala (n = 12), the Dominican Republic (n = 12), Costa Rica (n = 11), El Salvador (n = 11), Honduras (n = 11), Panama (n = 11), Bolivia (n = 10), and Nicaragua (n = 9). In addition, regional and multinational studies covering multiple countries in Latin America were identified. The geographic distribution of the included studies is shown in **Fig. 2.**

Regarding years of publication, the studies are distributed as follows: 2014 (n = 9), 2015 (n = 8), 2021 (n = 8), 2023 (n = 7), 2024 (n = 6), 2019 (n = 5), 2016 (n = 4), 2017 (n = 4), 2018 (n = 4), 2022 (n = 4), 2010 (n = 3), 2013 (n = 3), 2020 (n = 2), and 2011 (n = 1). This diversity of studies highlights the variety of methodological approaches and the representation of different contexts and periods in Latin America concerning barriers to accessing ophthalmology services.

Barriers to access to ophthalmology services

From the analysis of the articles included, it was possible to group the barriers identified into seven major categories: structural, geographic, economic, sociocultural, technological, health system, and other barriers. This classification makes it possible to understand the complexity and multidimensionality of access, as well as the particularities that affect different population groups and regional contexts. The main barriers identified in different Latin American countries are summarized **in** Table 2.

Table 2
Main barriers to and strategies for improving access to eye care in Latin America.

Barrier category	Countries involved	Strategies used
Structural	Argentina, Bolivia, Brazil, Colombia, Costa Rica, Chile, Dominican Republic, Ecuador, Guatemala, Honduras, Mexico, Paraguay, Peru, Uruguay, and Venezuela.	Training and redeployment of specialists, investment in infrastructure, integration of services, implementation of telemedicine, provision of modern equipment, and strengthening of primary care centers [6, 27, 38, 44, 67].
Geographic	Brazil, Colombia, Peru, Paraguay, Honduras, Ecuador, Mexico, and Venezuela.	Mobile ophthalmology units, tele-ophthalmology for remote diagnosis and follow-up, periodic rural campaigns, subsidized transport for patients, decentralization of services, and training of community agents [14, 27, 32, 33, 44, 67].
Economic	Brazil, Bolivia, Chile, Peru, Colombia, Cuba, Costa Rica, Ecuador, Paraguay, El Salvador, Mexico, Guatemala, Nicaragua, Dominican Republic, Argentina, Honduras, Panama, Uruguay, and Venezuela.	Mobile brigades and free or subsidized cataract surgery campaigns, free eyeglasses, expansion of public insurance coverage, reduction of direct payments, alliances with NGOs to cover costs of supplies and transportation, subsidies for eyeglasses and surgeries [14, 31, 37, 41, 46, 50, 51, 56].
Sociocultural	Brazil, Colombia, Chile, Cuba, Dominican Republic, Ecuador, Guatemala, Peru, Argentina, Mexico, Paraguay, and Venezuela.	Eye health education through mass campaigns and workshops in indigenous languages, involvement of community leaders and teachers, school awareness programs, training of health promoters, campaigns to reduce fear of surgery and myths about eye diseases [15, 18, 22, 31, 54].
Technological	Brazil, Paraguay, Mexico, Colombia, Venezuela, Ecuador, Peru, and Ecuador.	Implementation of telemedicine and mobile applications for screening and follow-up, provision of portable diagnostic equipment in rural centers, public–private partnerships for technology acquisition, training in the use of digital tools, development of information systems for monitoring results [32, 36, 68, 71].
Health system	Brazil, Mexico, Chile, and Peru	Intermunicipal consortia to share resources, improve referral and counter referral systems, simplify administrative procedures, integrate levels of care, standardize protocols for referral and follow-up, strengthen local management, and use performance indicators [23, 35, 31, 38, 63].
Other barriers	Several countries	Improving data collection, inclusive policies, equity training, addressing discrimination and administrative barriers, developing specific

Summary of the main barriers identified and the strategies implemented or proposed to enhance eye care access across Latin American countries.

Barrier category	Countries involved	Strategies used
		campaigns for vulnerable groups, and strengthening local research [2, 27, 32, 38].

Summary of the main barriers identified and the strategies implemented or proposed to enhance eye care access across Latin American countries.

Structural barriers include the insufficiency and fragmentation of vision rehabilitation services, the shortage of trained professionals, the concentration of services in large cities, the lack of adequate infrastructure, the absence of eye health promotion and prevention initiatives and low integration with primary care [1, 2, 6, 16, 27, 32, 40, 44, 61, 62]. Geographic barriers are manifested mainly in the distance to specialized centers, lack of adequate transportation, and territorial inequality in the distribution of human resources and ophthalmologic services, especially affecting rural and remote populations, where the concentration of ophthalmologists and equipment in urban areas limits access in underdeveloped regions [6, 17, 18, 20, 21, 22, 27, 29, 32, 33, 34, 36, 37, 41, 42, 44, 50, 63, 65, 66, 67, 69, 73, 74, 75].

With respect to economic barriers, the cost of consultations, surgeries, medications, optical aids and transportation is one of the main limitations for the population, especially for those who lack insurance or state coverage, in addition to indirect economic barriers such as loss of wages due to absenteeism from work and the costs associated with the continuity of treatment [1, 2, 12, 14, 15, 16, 18, 21, 24, 25, 26, 29, 31, 33, 35, 37, 39, 41, 42, 45, 46, 47, 48, 49, 50, 51, 52, 53, 56, 57, 63, 67, 68, 69, 73, 74]. Sociocultural barriers include a lack of perceived need, a lack of knowledge of diseases or treatments, a fear of surgery or poor outcomes, social stigma, cultural and religious beliefs, and low eye health literacy, making it difficult to demand and adhere to treatments. In addition, women, face additional obstacles related to gender roles, language and autonomy in decision making [11, 12, 14, 15, 16, 18, 19, 22, 23, 24, 25, 27, 28, 32, 34, 38, 42,, 52, 54, 60, 66, 67, 69, 73].

Technological barriers are related to the limited availability of advanced diagnostic and therapeutic equipment, unequal access to telemedicine technologies, incomplete digitization of records, and the need for technical training in their use, especially in rural areas and public hospitals [1, 2, 16, 27, 32, 33, 34, 38, 39, 42, 57, 60, 61, 65, 66, 68, 71, 72, 75]. Health system barriers include fragmentation and segmentation of systems, poor coordination between levels of care, administrative delays, a lack of effective universal coverage, long waiting lists, and low integration of ophthalmologic services in primary care, as well as the absence of public policies and systematic detection and prevention programs [1, 2, 18, 22, 25, 26, 27, 28, 29, 30, 32, 35, 38, 39, 40, 41, 42, 49, 50, 51, 57, 58, 60, 61, 66, 72].

Other barriers were found to be related to advanced age, comorbidities, lack of companions, mobility problems, denial of treatment by the provider and the perception of visual loss as an inevitable part of aging, in addition to the negative impact of the COVID-19 pandemic, which aggravated many of these difficulties by generating postponements of surgeries and reducing consultations and prevention campaigns [11, 12, 14, 18, 19, 21, 23, 24, 25, 28, 29, 31, 32, 42, 47, 53, 54, 56, 69, 73, 74]. These barriers, identified

throughout the included studies, demonstrate the complexity and multidimensionality of access to ophthalmology services in Latin America, differentially affecting the most vulnerable groups in the region.

Levels of ophthalmologic care involved in access barriers

Access to ophthalmology services in Latin America involves a wide variety of levels of care, from primary and community care to specialized and highly complex services. Numerous articles emphasize the fundamental role of primary care as the gateway to the eye health system, including screening services, initial diagnosis, basic optical correction, and referral to higher levels when necessary [11, 12, 18, 27, 32, 33, 34, 38, 55, 58, 59, 63, 67, 71, 73, 74]. Models such as the Ophthalmology Primary Care Units (UAPO) in Chile and other countries have demonstrated significant resolution capacity, allowing the majority of general consultations to be resolved and referring only complex cases to secondary or tertiary care [13, 14, 38].

Secondary and specialized care is addressed in studies that analyze outpatient consultations; the management of specific pathologies such as cataracts, diabetic retinopathy and retinopathy of prematurity; and the provision of optical and surgical aids [15, 16, 23, 24, 29, 30, 31, 35, 36, 40, 41, 42, 44, 45, 46, 47, 48, 50, 51, 52, 53, 54, 56, 57, 60, 61, 62, 64, 65, 66, 68, 69, 72, 75]. At this level, integration with primary care and timely referral are key to continuity of care and improved visual outcomes.

Tertiary care and high-complexity hospital services focus on the diagnosis and treatment of complex diseases, specialized surgeries, the management of complications, and visual rehabilitation [6, 20, 21, 22, 24, 25, 16, 28, 35, 36, 43, 45, 47, 60, 61, 69, 72, 75]. These services tend to be concentrated in urban areas and large hospitals, which may limit access for rural or marginalized populations.

In addition, community and mobile interventions, such as eye health campaigns, rural brigades, school programs, and mobile care units, which bring services closer to vulnerable and hard-to-reach populations, have been identified [13, 15, 19, 25, 27, 32, 33, 34, 48, 49, 52, 54, 55, 63, 64, 67, 73, 74].

On the other hand, some studies address the integration of telemedicine and artificial intelligence in primary and secondary care, facilitating screening, diagnosis, and referral in contexts with a shortage of specialists [27, 36, 68, 75]. Overall, the evidence shows that an articulated network between the different levels of care, together with mobile and community initiatives, is essential to reduce access gaps and improve eye health in the region.

Strategies and interventions to improve access to ophthalmic care

Among the main strategies identified are the implementation of specific public policies on visual health, the strengthening of visual rehabilitation services, the timely provision of optical and nonoptical aids, the

continuous training of health personnel, and the application of validated instruments to measure vision-related quality of life [1, 2, 11, 12, 27, 29, 39, 46, 57, 67]. The promotion and prevention of visual health, the improvement of infrastructure and resources in rehabilitation services, the registration and certification of visual impairment to facilitate access to social and health benefits, and the integration of services to reduce fragmentation are highlighted [1, 2, 27, 32, 38, 40, 46, 57, 63].

Multidisciplinary and multicomponent rehabilitation, including the use of electronic and manual optical aids, occupational therapy and psychology interventions, and group device training programs, is an effective intervention, especially when it is locally adapted and validated [2, 13, 27, 32, 38, 45]. The integration of services and the reduction of fragmentation are recommended, as are the adaptation of international models and the promotion of public policies and social awareness [2, 11, 27, 32, 38, 40, 46, 57, 63].

Other strategies include expanding the supply of and access to health services, investing in continuity of care, training professionals in communication skills, providing access to medication care, and implementing eye and foot exams as routine care for populations with diabetes [12, 35, 32, 39, 47, 69]. For the child and school population, visual screening campaigns, school health programs, free eyeglasses, and follow-up by teachers, as well as teacher training for early detection of visual problems, have been implemented [13, 14, 15, 32, 48, 49, 54, 55, 64, 73]. In these programs, school screening coverage has exceeded 90% in some contexts, and adherence to follow-up has reached values above 80% [13,14,15,32,48,49,54,55,64,73].

Teleophthalmology and the use of digital technologies have been recurrent strategies to expand coverage in rural and remote areas, allowing training of local technicians, transmission of images, remote analysis by specialists, and reduction of unnecessary referrals [27, 33, 36, 38, 43, 59, 60, 63, 68, 71, 75]. In successful telemedicine models, the first contact case resolution rate has reached 85%, and the reduction in unnecessary referrals has reached 50% [27,33,36,38,43,59,60,63,68,71,75]. The average turnaround time between detection and surgical treatment in screening and rapid referral programs has been reduced to less than 21 days, and the postoperative follow-up rate exceeds 75% in organized campaigns [24, 25, 37, 42, 51, 57, 63, 67, 69].

In the surgical field, campaigns have been developed for cataract surgery, subsidies or free of charge in countries with universal coverage, improvements in surgical quality and monitoring of results, as well as training in low-cost techniques such as MSICS [16, 24, 25, 29, 37, 42, 44, 47, 49, 52, 53, 56, 61, 62, 65, 66]. The cataract surgery rate has reached values of up to 77% in Uruguay and 76.8% per eye in Brazilian studies, whereas in El Salvador, it has barely reached 15%, reflecting regional disparities [13, 25, 37, 52]. The proportion of optimal visual outcomes after cataract surgery varies: in Uruguay, 70% of patients achieve a visual acuity of at least 20/60, whereas in El Salvador, only 56% reach this threshold, and up to 23% show poor results [13, 25, 37, 52].

Eye health education and public awareness, especially among vulnerable groups, have been cross-cutting components in many programs, achieving increases in consultation and surgery attendance of up to 40% after educational interventions [18, 19, 21, 22, 23, 25, 30, 31, 34, 35, 41, 45, 46, 49, 51, 52, 53, 60, 63, 66, 70, 73].

Models of decentralized care, the creation of intermunicipal consortia, the integration of eye care into primary care, and the development of performance indicators for local monitoring and management have also been identified [27, 38, 40, 42, 46, 50, 57, 63, 67]. In summary, the performance indicators reported in these studies include case resolution rates between 75% and 85% in primary care and mobile campaigns; postoperative follow-up rates above 75%; and average response times of 14–21 days for surgical interventions and school and community screening coverage exceeding 80% in the most consolidated programs [13, 14, 15, 24, 25, 32, 37, 42, 48, 49, 51, 54, 48, 55, 63, 67, 69, 73]. These strategies, adapted to local contexts and with multisectoral participation, have proven to be fundamental in reducing access gaps and improving visual health in the region. The main strategies implemented to overcome the barriers raised in different Latin American countries are summarized **in** Table 2.

DISCUSSION

Health system inequities and limitations in access to ophthalmologic care

Inequities in access to eye care in Latin America are related mainly to the fragmentation of health systems, the concentration of resources in urban areas, and the lack of integration and sustained public policies, aggravated by insufficient financing and segmentation between subsystems, which increases inequality for vulnerable populations [1, 12, 15, 24, 26, 29, 32,, 37, 40, 41, 44, 46, 47, 48, 50, 51, 53, 61, 67, 73, 76].

A comparison of these findings with the international literature reveals that structural inequities in Latin America replicate patterns identified in other contexts, such as the United States, where the social determinants of health (SDOH) and structural racism have a significant impact on eye health and access to eye care, affecting mainly ethnic minorities, low-income people and rural residents [() (77) ()]. In both settings, the unequal distribution of ophthalmologists and resources, gaps in insurance coverage, and lack of integration of eye health services into primary care perpetuate inequities in eye health outcomes [76, 77].

In Latin America, the segmentation and fragmentation of health systems result in difficulties in referral and counterreferral, administrative delays, long waiting lists, and low continuity of care, which limits the effectiveness of interventions and exacerbates the burden of preventable visual impairment [1, 2, 18, 22, 25, 26, 27, 28, 29, 30, 32, 35, 38, 39, 40, 41, 42, 49, 50, 51, 57, 58, 60, 61, 66, 72, 76]. Unequal access to diagnostic technologies, advanced treatments, and rehabilitation programs reinforces the gap between urban and rural populations, as well as between those with and without sufficient financial coverage [1, 2, 16, 27, 32, 33, 34, 31, 38, 42, 57, 60, 61, 65, 66, 68, 71, 72, 75].

At the regional level, countries such as Brazil and Mexico show better indicators of coverage and case resolution in urban contexts and the presence of specific national programs, whereas in countries with less public investment and greater fragmentation, such as Honduras, Paraguay or El Salvador, access rates and optimal visual outcomes are considerably lower [13, 25, 37, 52, 53, 56, 57, 63, 67, 69, 73, 74]. ()). The diversity of strategies documented in Table 2 reflects the heterogeneity of barriers and responses in Latin America, which underscores the need for integrated, flexible, and evidence-based public policies.

In summary, structural inequities and limitations of the health system in Latin America constitute a fundamental obstacle to equitable access to eye care, and addressing them requires profound reforms in governance, financing, integration of services, and prioritization of eye health in the public agenda, in line with international recommendations and comparative evidence [76, 77].

Benefits and limitations of strategies to improve access to eye care

The strategies implemented in Latin America to improve access to ophthalmologic care have shown significant progress, especially in the expansion of surgery campaigns, the strengthening of primary care, and the adoption of models such as teleophthalmology and mobile units [14, 20, 27, 33, 38, 48, 60]. These actions have made it possible to bring services closer to rural populations, improve coverage, and promote eye health education, in line with the recommendations of the WHO World Vision Report, which emphasizes the need to integrate eye care into health systems and strengthen primary care to achieve effective universal coverage [3].

However, structural limitations persist that hinder the sustainability and long-term impact of these strategies. The fragmentation of health systems, lack of data integration, unequal distribution of human and technological resources, and scarce systematic evaluation of results continue to be common challenges in the region [2, 6, 16, 32, 40, 61, 62]. In addition, the international literature indicates that although intervention models in Latin America have made progress, the lack of stable funding, dependence on ad hoc campaigns and the absence of robust monitoring and evaluation mechanisms limit their ability to sustainably transform eye care systems, a problem that is also observed in other regions and that requires structural solutions and long-term policies [3].

Clinical and social consequences of unequal access to eye care

Unequal access to ophthalmologic care in Latin America has a direct and differentiated impact on the prognosis and clinical consequences of various ocular pathologies, modulating both the prevalence of avoidable blindness and the quality of life of those affected. In the case of refractive errors, economic and cultural barriers, together with a lack of access to affordable optical services and school screening campaigns, perpetuate high levels of avoidable visual impairment, affecting academic performance and work productivity [3, 14, 15, 32, 48, 49, 54, 55, 64, 73]. For cataracts, the main cause of reversible blindness,

economic limitations, low surgical coverage in rural areas, and lack of integration of surgery in primary care results in late diagnosis and progression to blindness, despite the existence of cost-effective interventions [3, 16, 24, 15, 29, 37, 42, 44, 47, 51, 52, 53, 56, 61, 62, 65, 66].

In pathologies such as glaucoma and diabetic retinopathy, the lack of follow-up, low adherence to treatment, and scarcity of specialists in rural and peripheral areas lead to diagnoses in advanced stages, when therapeutic options are limited and visual damage is irreversible [2, 3, 13, 27, 32, 38, 45, 60, 63, 68, 71, 72, 75]. These conditions, considered causes of "irreversible blindness" if not detected and treated promptly, show how inequity in access defines the difference between preventable disability and permanent visual loss. Strategies implemented, such as teleophthalmology, mobile campaigns, and the integration of eye care into primary care, have been shown to improve early detection and access to interventions, but their impact remains uneven and depends on overcoming structural barriers and strengthening referral and follow-up systems [3, 20, 27, 33, 36, 38, 43, 59, 60, 63, 68, 71, 75]. The specific relationships among the main clinical conditions, the predominant barriers, and the consequences of limited access are summarized **in** Table 3.

Table 3
Relationships between ocular clinical conditions, predominant barriers, and consequences of limited access in the region

Clinical condition	Predominant barriers	Consequences of limited access
Refractive errors	**Economic, cultural, and a lack of access to opticians and school campaigns.**	**Avoidable visual impairment affects school and work performance, reduces quality of life, causes social isolation, increases risk of accidents, and perpetuation the cycle of poverty due to the impossibility of accessing adequate optical correction [3, 14, 15, 32, 48, 49, 54, 55, 64, 73].**
Cataracts	**Economic, geographic, lack of surgical coverage, integration**	**Untreated reversible blindness leading to loss of autonomy, dependence on third parties, increased risk of falls and fractures, deterioration of mental health, social exclusion, and significant reduction in life expectancy and quality of life. In addition, it increases the burden on the family and the health system due to prolonged care [3, 16, 24, 25, 29, 37, 42, 44, 47, 51, 52, 53, 56, 61, 62, 65, 66].**
Glaucoma	Lack of follow-up, shortage of specialists, poor adherence	Late diagnosis resulting in irreversible optic nerve damage, progressive visual field loss, permanent blindness, and functional disability. This limits personal independence and can generate severe emotional impact, in addition to increasing social and healthcare costs due to disability [2, 3, 13, 27, 32, 38, 45, 60, 63, 68, 71, 72, 75].
Diabetic retinopathy	Lack of follow-up, access to screening, and technological resources	Avoidable visual loss due to lack of detection and timely treatment, progression to blindness, difficulties in diabetes self-care, increased risk of systemic complications, reduced productivity, and economic burden for the patient and family [2, 3, 13, 27, 32, 38, 45, 60, 63, 68, 71, 72, 75].
Infectious pathologies and trachoma	Social, environmental, lack of sanitation, and education	Avoidable blindness with chronic sequelae, stigmatization, reduced productive capacity, intergenerational transmission of the disease, and perpetuation of conditions of poverty and marginalization in rural and indigenous communities [3].

Table 3. Overview of major eye conditions, their main access barriers, and health outcomes in Latin America.

Gaps in the evidence on access to ophthalmologic services in Latin America

Despite the growing interest in investigating barriers to access to ophthalmology services in Latin America, important gaps in the evidence persist that limit the generalizability and applicability of the findings. Many studies present methodological limitations, such as the predominance of cross-sectional designs that prevent establishing causality and the lack of long-term follow-up to evaluate the real impact of interventions [11, 12, 24, 25, 26, 27, 64, 70]. In addition, there is a notorious scarcity of high-quality

research in certain areas, especially in visual rehabilitation and telerehabilitation, as well as considerable variability in the instruments and outcomes used, which makes comparisons between contexts and countries difficult [1, 2, 16, 32, 38, 39, 57, 68, 75].

The lack of systematic data and updated national databases, together with the underreporting of procedures and the limited representation of rural, indigenous, and low-income areas, restricts a comprehensive understanding of inequities in access [27, 28, 29, 33, 38, 40, 61, 62]. Similarly, the absence of robust monitoring and quality indicators, the limited evaluation of long-term impact, and the lack of qualitative studies on user experience demonstrate the need to strengthen local and regional research [2, 27, 32, 38, 40, 50, 54, 55, 57, 63, 68].

In this context, it is essential to invest in longitudinal studies, impact evaluations, and mixed approaches to better understand the dynamics of access and design more effective and equitable interventions for the region [11, 12, 16, 27, 32, 38, 57, 68, 75].

Public health implications

Access barriers identified in the region, such as the fragmentation of health systems, the concentration of services in urban areas, economic limitations, and the lack of integration of ophthalmologic care in primary care, represent priority challenges for the public health agenda in Latin America [1, 2, 6, 16, 27, 32, 40, 44, 61, 62]. These barriers especially affect rural and indigenous populations and people in vulnerable situations, perpetuating inequity and making it difficult to achieve effective and universal coverage [14,24,33,48,57,78].

The strategies and intervention models implemented, such as teleophthalmology, mobile brigades, school programs, subsidies, and municipal consortia, have shown progress in expanding coverage and reducing immediate barriers [14, 20, 27, 33, 38, 48, 60]. However, their long-term sustainability, integration, and responsiveness remain limited, especially in contexts of low public investment and fragmented systems [2, 6, 16, 32, 40, 61, 62]. The results and key findings of these studies show that although improvements have been achieved in the detection and timely treatment of pathologies such as cataracts and refractive errors, the lack of follow-up, the variability in the quality of services, and the scarce impact evaluations limit the scope of these interventions [24, 25, 37, 42, 51, 57, 63, 67, 69].

At the public health level, these limitations translate into the persistence of a high burden of avoidable blindness and visual impairment, which affects the social and economic development of the region. The global goals for 2030, which propose increasing the effective coverage of refractive error correction by 40% and cataract surgery by 30%, underscore the need for integrated, sustainable, and equity-focused public policies [78,79]. To achieve these objectives, strengthening the integration of eye health into national health systems, investing in human and technological resources, and adopting monitoring and evaluation mechanisms that allow strategies to be adjusted according to the real needs of the population are essential [2,6,14,20,24,15,27,32,33,37,38,40,42,48,50,51,54,55,57,60,61,62,63,67,68,69,78,79].

This is why the limitations reported by the authors, such as the lack of systematic data, the scarce representation of vulnerable populations and the absence of longitudinal studies, highlight the need for greater investment in research and in the generation of local evidence to guide decision making and ensure the sustainability of eye health policies in the region [2, 27, 31, 38, 40, 50, 54, 55, 57, 63, 68].

CONCLUSION

Access to ophthalmology services in Latin America continues to be affected by a multiplicity of structural, geographic, economic, sociocultural, technological, and health system barriers that differentially affect the most vulnerable populations in the region. Although various strategies and intervention models have been implemented, such as teleophthalmology, mobile brigades, educational campaigns, and subsidies, significant challenges persist in terms of sustainability, integration, and equity.

The heterogeneity of national and local responses highlights the need for flexible, integrated, and evidence-based public policies aligned with global goals for 2030. Overcoming inequities in visual health requires strengthening primary care, investing in human and technological resources, improving monitoring and evaluation systems, and prioritizing the inclusion of historically marginalized groups. Only in this way will it be possible to advance toward universal and effective coverage in ophthalmologic care in Latin America.

Declarations

AUTHORS' CONTRIBUTIONS:

AMR, JCT, JNA, AOM: Conceptualization, methodology, formal analysis, research, data curation, writing the original draft, reviewing and editing, visualization. EHHR: Methodology, visualization, oversight, project management, and securing funding.

Ethical Approval:

This study was approved by the Ethics and Research Committee of the Faculty of Medicine, Universidad de La Sabana.

Availability of data and materials:

Not applicable.

Conflicts of interest:

The authors declare that they have no conflicts of interest.

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Figures

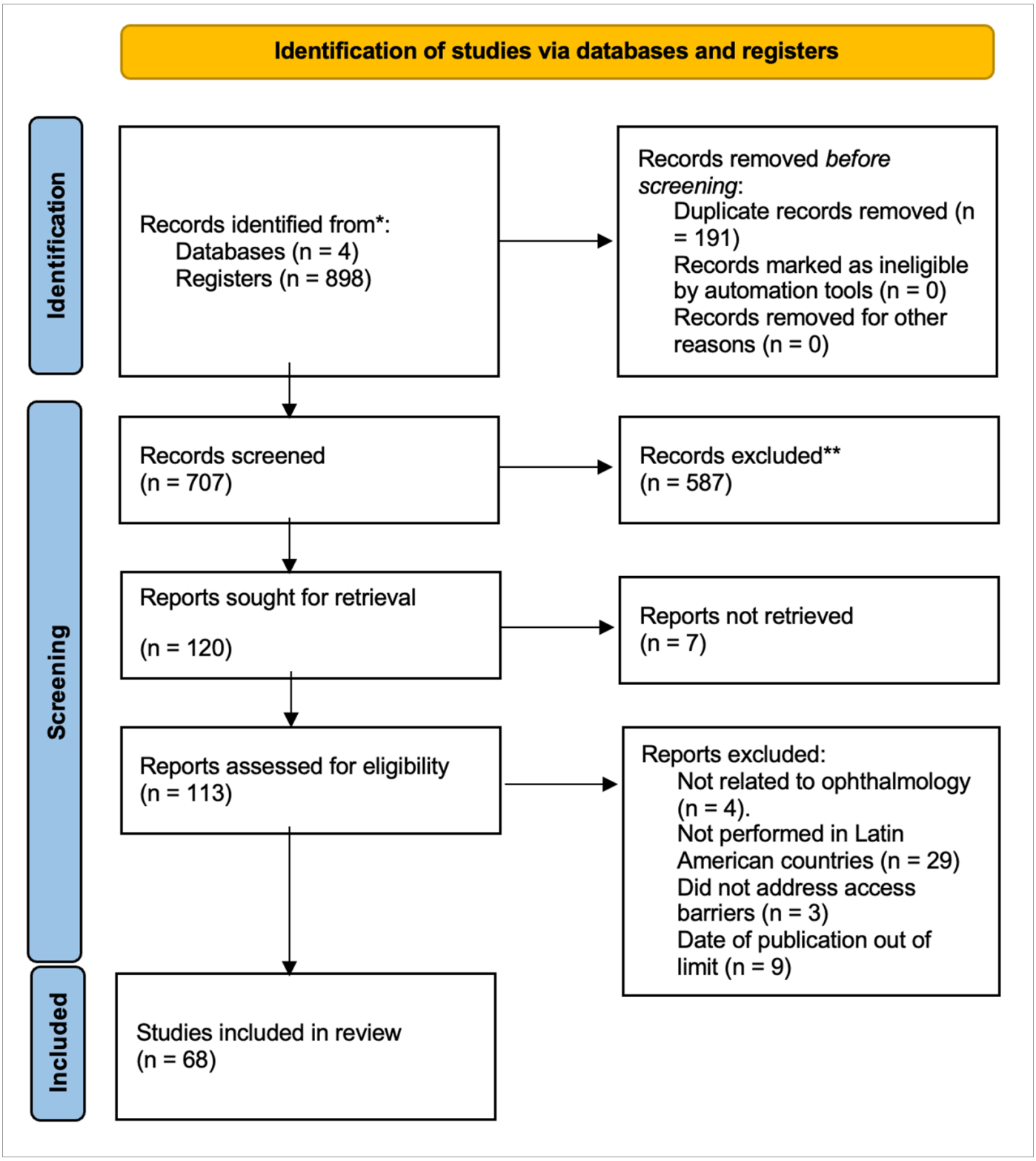


Figure 1

Prism flow chart

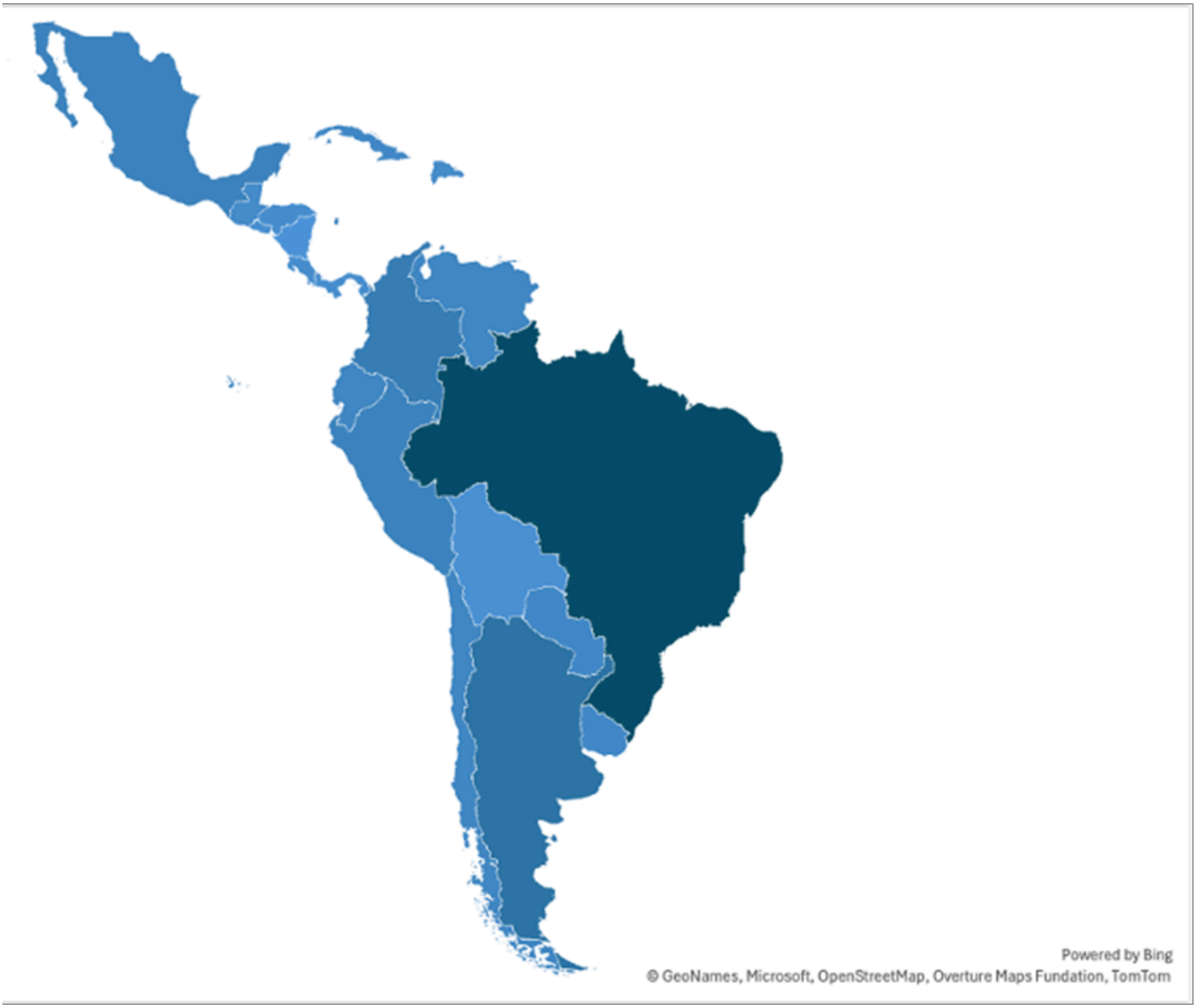


Figure 2

Geographical distribution of the studies

Brazil is the country with the greatest number of included studies (n= 35), followed by Argentina (n= 21), Colombia (n= 17), Peru (n= 15), Mexico (n= 15), Chile (n= 14), Venezuela (n= 14), Ecuador (n= 14), Cuba (n= 13), Paraguay (n= 13), Uruguay (n= 13), Guatemala (n= 12), the Dominican Republic (n= 12), Costa Rica (n= 11), El Salvador (= 11), Honduras (= 11), Panama (n= 11), Bolivia (n= 10), and Nicaragua (n= 9).