



Educational Technologies in Ophthalmology for Riverside Communities in the Amazon: An Integrative Review of the Literature

**Camilla Castilho Maia ^{a++},
Francinéa de Nazaré Ferreira de Castilho ^{b#†},
Alexandre Antonio Marques Rosa ^{c†},
Evelly Christinne da Silva Moraes ^{c‡}
and Vitor Hugo Auzier Lima ^{d^*}**

^a Federal University of Pará, Brazil.

^b Facultad Interamericana de Ciências Sociais, Universidade Lusófona de Humanidades e Tecnologias UHLT, Lisboa, Portugal.

^c Department of Ophthalmology, Federal University of Pará, Brazil.

^d Universidade Paulista, Brazil.

Authors' contributions

This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.

Article Information

DOI: <https://doi.org/10.9734/jammr/2024/v36i75479>

Open Peer Review History:

This journal follows the Advanced Open Peer Review policy. Identity of the Reviewers, Editor(s) and additional Reviewers, peer review comments, different versions of the manuscript, comments of the editors, etc are available here: <https://www.sdiarticle5.com/review-history/117916>

Systematic Review Article

Received: 03/04/2024

Accepted: 06/06/2024

Published: 12/06/2024

⁺⁺ Specialist and Master's Student;

[#] PhD;

[†] Full Professor;

[‡] Master's Student;

[^] Consultant Professor;

*Corresponding author: E-mail: vitorauzier9@gmail.com.

Cite as: Maia, Camilla Castilho, Francinéa de Nazaré Ferreira de Castilho, Alexandre Antonio Marques Rosa, Evelly Christinne da Silva Moraes, and Vitor Hugo Auzier Lima. 2024. "Educational Technologies in Ophthalmology for Riverside Communities in the Amazon: An Integrative Review of the Literature". *Journal of Advances in Medicine and Medical Research* 36 (7):1-13. <https://doi.org/10.9734/jammr/2024/v36i75479>.

ABSTRACT

In the Amazon region, riverside communities have specific geographical, cultural and social characteristics that challenge health promotion. This is due to the diverse needs and social determinants of these communities, which generally live in rural areas, with a certain degree of isolation and unequal access to health services. It is known that this population faces difficulty or no access to ophthalmological medical care, in addition to the lack of epidemiological studies and the construction of educational technologies aimed at these peoples. This study aims to identify evidence and scientific production on the development of educational technologies aimed at ophthalmology in the context of the lives of riverine patients, by means of an integrative literature review, whose guiding question was: "What current scientific evidence deals with the production of educational technologies in ophthalmology for riverine patients?". Twelve studies were selected, categorised into: benefits of the applicability of ophthalmic technologies in rural populations; benefits of the applicability of ophthalmic technologies in urban populations; pedagogical technologies as a tool for education in ophthalmology and the eye health profile of traditional communities. This review resulted in few findings regarding the main objective of the research. The lack of a descriptor that specifically mentions the riverside population is noteworthy and, as a result, it became unfeasible for the authors to carry out a scientific survey that addressed the triad of the riverside population, educational technologies and ophthalmology. Scientific production on the health of the riverine population in Brazil has increased in recent years, but there are still gaps in relation to medical specialities such as ophthalmology and methods that assess the application of technologies that facilitate the relationship between these specialities and riverine circumstances. As a result, further studies are needed into the health of riverine peoples, especially in the area of ophthalmology. It is necessary to carry out more studies to obtain more information about the modus vivendi of the riverside population. Interpretations of this knowledge can help in the development of public policies that promote socio-environmental sustainability, respecting the right of these populations to remain in their territories with socio-cultural and political autonomy. Additionally, it can be discussed how to develop technological plans for activities that are compatible with riverside culture in order to connect this community to specialized eye health needs.

Keywords: Ophthalmology; health promotion; riverside population; educational technology.

1. INTRODUCTION

The term "riverside" refers to any community that lives on the banks of a river and is isolated from society in general, such as access to written media, television and radio, as the distances between their homes can exceed two kilometers. This group of people is culturally distinct and has its own social, cultural and financial circumstances Franco et al., [1], Oliveira et al., 2022.

In the Amazon region, especially in riverside communities, it is noted that, due to the geographic, cultural and social characteristics of this community, there are many challenges to promoting health. It is known that this population does not have access to any health care program or ophthalmological medical care. Furthermore, there are no epidemiological studies involving pathologies such as ametropia and ophthalmopathies Couto et al., 2013; Franco et al., [1], Lima, [2].

The term "health promotion" emphasizes the elements that influence the quality of life of a population, and the adequate provision of health care is one of these elements. Care-educational technology (TCE) is an innovative approach that goes beyond the simple conceptualization of technology and combines the principles of care with the educational opportunities that technological instruments offer [3,1,4].

TCEs improve health promotion and problem solving by providing essential theoretical knowledge about the health-disease process. They help patients feel safer and allow care managers to talk to each other, which makes it easier to identify needs and implement safe, effective care. This type of technological advancement can help healthcare professionals adopt evidence-based practices, which can result in greater autonomy, self-confidence and better social relationships between care teams and specific patient populations [5,6].

In this sense, manuals are known as one of the forms of light technologies applied in Continuing Health Education (EPS) and are used in the health education process as support resources for healthcare teams, functioning as effective tools to facilitate and provide knowledge. Silva; Carreiro; Mello, [7].

Due to the scarcity of studies aimed at the general health conditions of riverside communities, as well as the importance of these studies to guide and establish public health policies aimed at this population, the present study aims to identify evidence and scientific productions on the development of technologies focused on ophthalmology in the context of the lives of riverside patients.

2. MATERIALS AND METHODS

This is an integrative literature review (ILR), the aim of which is to investigate a subject that has been little or widely documented in the literature, using search methods and sample selection patterns to analyse the results, seeking to learn about and analyse previous research with the aim of correlating these studies, providing new perspectives and interpretations, so as to make a scientific contribution to identifying gaps and flaws in the studies, as well as promoting discussion on the subject studied [8].

This review is organised in six stages, according to Sousa et al. (2017): definition of the research question; creation of the data source and criteria for inclusion and exclusion; definition of the information that will be extracted from the selected studies (categorisation of the studies); evaluation and critical analysis of the results, identifying differences and conflicts; interpretation of the results and synthesis of the evidence found.

We therefore had the following guiding question: "What is the current scientific evidence on the production of ophthalmology technologies for riverside patients?". PubMed, SciELO and the Virtual Health Library (VHL) were the databases used to conduct the search. The following DeCS/MeSH validated descriptors in Portuguese and English were used: "Oftalmologia" or "Ophthalmology", "Promoção da saúde" or "Health promotion", "População rural" or "Rural population" and "Tecnologia educacional" or "Educational technology". To broaden the search further, the keyword "Ribeirinho" or "Riverside" was used, as it is not a descriptor. And to further refine data collection, the combination of Boolean

operators "AND" or "OR" was used in the aforementioned descriptors.

To be included, full articles, theses and dissertations from institutional repositories, free of charge and written in Portuguese, English and Spanish, from the last five years (2019 to 2023) were considered. Articles repeated in searches, incomplete publications or other types of documents were not included, as well as studies that did not find an answer to the research questions.

Laurence Bardin (2011) proposed "Content Analysis", a research method that classifies and groups scientific studies according to their themes and main elements. In addition, the PRISMA Flow Diagram 2020 was used to establish the guidelines for organising and selecting the texts. The content of the articles was organised into tables containing the most pertinent information on authorship, year of publication, journal, methodological characteristics of the study, objectives and main research results.

In the end, the results were collected, organised and summarised according to the categories defined in this study. In addition, the researchers developed the results and conclusions of the research in a critical-reflexive manner.

3. RESULTS AND DISCUSSION

The scientific databases were searched using search filters based on the inclusion and exclusion criteria, as well as reading the full text, abstracts and titles. Thus, the final sample consisted of twelve articles, which were distributed in the following databases: BVS: 0; SciELO: 1; PubMed: 2 and Google Scholar: 9.

Fig. 1 shows the flowchart for selecting and organising the articles based on the PRISMA Flow Diagram 2020.

Table 1 then presents selected articles to provide relevant information and characteristics for each publication, including author, year, journal, methods, objectives and main results.

Of the 12 studies selected for this review, most are in Portuguese and correspond to the year 2021. There were 5 studies from 2021, 2 studies published in 2023, 3 in 2019, 1 in 2020 and 1 in 2022. After reading and analysing the content of the above studies, macro categories were created in order to facilitate understanding of the subject.

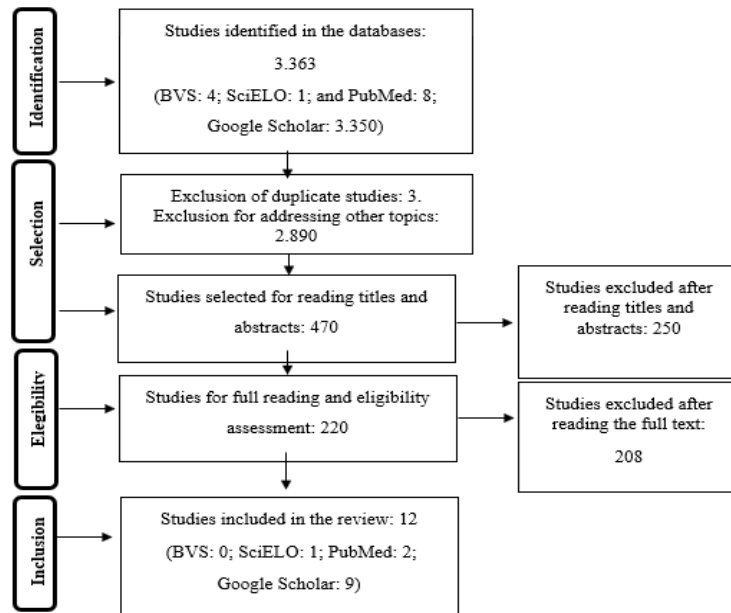


Fig. 1. Flowchart for selecting articles
Source: Own authorship (2024)

These categories were composed by collecting the evidence found in the scientific literature: 1) Benefits of the applicability of ophthalmological technologies in rural populations; 2) Benefits of the applicability of ophthalmological technologies in urban populations; 3) Pedagogical technologies as a tool for education in ophthalmology and 4) Eye health profile of traditional communities.

3.1 Category 1 - Benefits of Applying Ophthalmology Technologies to Rural Populations

This category mentions the only two articles that deal with studies using technologies that aim to bring vulnerable populations closer to the field of ophthalmology.

In the study by Moreira et al. (2022), according to the table of selected articles, most of the patients were mainly women (66.1%), and the majority were referred for teleradiology because of low visual acuity (60.5%). In all age groups, the most common diagnoses were refractive errors. The most common eye disease in adults and the elderly was presbyopia (65.4 per cent), followed by cataracts (41.3 per cent) and suspected glaucoma (10.6 per cent). Of the 30,315 patients who underwent teleradiology, 70.5 percent had their eye complaints completely resolved without having to go to a personal ophthalmologist.

The analysis of appointments shows that the use of telemedicine in this speciality is effective and can help to reduce queues for appointments. With the advance of technologies, synchronous ophthalmological telemedicine services have gained prominence in the scientific literature due to their excellent results, which increase the supply of consultations and patient satisfaction [9].

For many years, ophthalmology has used telemedicine to track and monitor eye diseases in developed countries. Although the use of synchronous telemedicine in Brazil is still in its infancy, there is evidence that it can solve the pent-up demands of ophthalmology in certain populations in the country [9].

Thus, this study has shown that telemedicine, as a form of technology, can help solve the most common eye diseases in the population, increasing the supply of diagnoses, qualifying patients and helping to reduce waiting times for ophthalmological care.

In the study by Hazel et al. [10], an experimental project was described, based on a knowledge programme design process to increase women's adherence to eye health services in rural areas of Nepal, given that in that country avoidable blindness continues to be a major public health problem, being more prevalent in women than in men.

Table 1. Characteristics of the selected studies

Author, and Journal	Year	Methods	Objectives	Main Results
Moreira et al, Cadernos de Saúde Pública, 2022.		Cross-sectional study on a teleophthalmology project.	To describe the performance of 30,315 teleradiologists in ophthalmology in primary care patients and the resolutiveness of this service.	The majority of patients were female (66.1 per cent), adults (70.3 per cent) and were referred to teleradiology mainly due to low visual acuity (60.5 per cent). Refractive errors were the most prevalent diagnosis in all age groups. Presbyopia was the most prevalent eye disease in adults (65.4%) and the elderly (64%), followed by cataracts (41.3%) and suspected glaucoma (10.6%) in the elderly. Of the 30,315 patients who underwent teleradiology, 70.5 per cent had their eye complaints completely resolved, without the need for a referral to an ophthalmologist in person.
Hazel et al, [10] International Journal of Environmental Research and Public Health, 2020.		Interventional study.	To describe a process of programme design and knowledge translation aimed at increasing women's uptake of eye health services in rural Nepal, outlining the key learnings from this process, and how it can contribute to addressing gender equality in eye health.	This ongoing process of knowledge translation has allowed an in-depth exploration of the complexity of implementing gender equity strategies in an eye health intervention in rural Nepal, and a number of important lessons have emerged from this process that will be useful in the design and implementation of future eye health programme interventions.
Barreto, [15]		A qualitative study.	Develop and validate an educational booklet to guide professionals, family members and teachers on promoting visual health in school-age children.	The booklet was the first to be produced with a specific visual health theme for schoolchildren, with teachers as the focus. In terms of the Flesch Readability Index, the booklet was classified as "very easy", with a score of 90 per cent. The teachers considered the educational booklet to be valid in terms of the other indicators assessed. It achieved a level of agreement equal to or greater than 81 per cent and an overall Cronbach's alpha of 0.79. These results show that the technology developed is reliable and valid for use with teachers.
Biase, Minatel, Junkes, Seven Academic Publications, [19]		A qualitative study.	Understand how problems related to fishermen's eye health occur, their risk factors and the preventive measures that can be taken to minimise these	Although the international literature shows that various problems can affect fishermen, including eye injuries, reports indicate that the most frequent injuries result from excessive exposure to the sun, including cataracts, senile macular degeneration, exfoliation

Author, and Journal	Year	Methods	Objectives	Main Results
			effects.	syndrome and retinopathy. But there are other types of predominant injuries, which are related to eye trauma such as puncture wounds, and exhausting working hours. The most common eye traumas are lacerations of the upper eyelids, corneal lesions, eye contact with fish fragments and secretions, blepharospasm, conjunctival abscess and corneal ulcers, which progress to opacity and limited visual acuity. Ophthalmological problems and/or eye complaints were the second biggest cause of complaints from fishermen in Brazil's coastal regions.
Damasceno et al., [11].		A cross-sectional, analytical, descriptive and quantitative study.	Developing an application for mobile devices to facilitate the teaching-learning process in funduscopy and diabetic retinopathy (DR) for medical students.	The results indicated a good level of usability for the application, which was also considered a useful tool for student learning. The portable adapter developed made it easy to obtain digital images of the retina.
Gomes, [12]		A cross-sectional, analytical, descriptive and quantitative study.	To create a database with clinical information and the appropriate management of patients with ophthalmological complaints, to help doctors diagnose and conduct emergency care in general practice.	In this context, flowcharts were created, based on the literature, of the main ophthalmological emergencies, divided into three large groups: visual loss, ocular trauma and red eye. An application was developed to guide general practitioners in differentiating between cases that should be referred to ophthalmologists as a matter of urgency and those that could be managed in their general care units. In addition, differential diagnosis options were proposed for the signs and symptoms presented by the patient, and initial measures to be instituted in patients with ophthalmological complaints, signs and symptoms in non-serious cases were suggested.
Macedo et al, Brazilian Journal of Ophthalmology, [16]		A cross-sectional, descriptive study.	To assess the population's knowledge of glaucoma.	A total of 153 questionnaires were collected, of which 130 were considered eligible, including 65 before the educational video and 65 after. Before and after the educational video, 80% and 7%, respectively, believed that glaucoma was not more common in African-Americans. The questions addressed were similar to others consolidated in the literature, in order to assess the participants' level of knowledge.
Melo, [17]		Experimental study.	Evaluating the educational video "Visual	A total of 55 teachers took part in the study. There was a

Author, and Journal	Year	Methods	Objectives	Main Results
			Health of Schoolchildren" to promote teachers' knowledge and attitudes towards visual health care for schoolchildren.	prevalence of females (94.5%), with an average age of 39.1±8.1. As for professional experience, there was a predominance of two to ten years (41.8%). In terms of qualifications, the majority had a specialisation degree (61.8%). Regarding training on the subject, the teachers declared that they had no specific training in the area of visual health (89.1%). In the knowledge questions, when comparing the number of correct answers before and after, there was a statistically significant increase. On the attitude questions, when comparing the number of correct answers before and after, there was also a statistically significant increase. It can be concluded that the educational video provided teachers with knowledge and attitudes towards visual health care for school-age children and could be widely used as an educational intervention, collaborating as a strategy to promote visual health.
Pimentel, [13]		Exploratory and descriptive research.	Carry out a workshop to teach refractometry skills using the app, using the flipped classroom teaching technique.	It involved residents and preceptors from the ophthalmology department. It took place in three phases: an inverted classroom using the HELPER KERATOCONUS application, a practical class where they were trained to use the application in their routine care, and a semi-structured questionnaire where they were asked about their teaching and learning activities. In this context, it is believed that the project contributed to the development of skills in teaching refractometry, as well as bringing technological advances and new teaching techniques closer to medical residency.
Ramesh et al, Indian Journal of Ophthalmology, 2021.		Descriptive study.	Propose the use of new green carpet technology in ophthalmology webinars with minimal cost and high productivity. 3	Technology helps eliminate the problem of a non-interactive online session. In addition, the main advantages of using green mat technology are clarity, interactivity and creativity. This innovative pedagogy with the use of green mat technology in Continuing Medical Education (CMEs) and virtual conferences can bring the charisma of the physical presentation to the podium and fill the cognitive communication gaps of interactive conferences and seminars effectively.

Author, and Journal	Year	Methods	Objectives	Main Results
Rocha, [18]		Qualitative study.	To develop theoretical content related to the basic concepts of biological sciences and ocular anatomy, and to develop a game-type tool to aid studies in biological sciences and ophthalmology, using software development methodologies.	It was possible to study related subjects and build an executable tool based on concepts from the biological sciences and methodologies used in software engineering, adopting guidelines defined in the literature for software development.
Sarquis, Nasicmento, Revista Contexto & Saúde, [14]		Quantitative, descriptive and cross-sectional research	To present the development of a mobile application to guide general practitioners and ophthalmologists in the management of ophthalmological emergencies.	The results point to favourable responses to the app, which focuses on the conduct of ophthalmological emergencies, with the presence of images and easy handling. The app can be used as a teaching tool, as well as for diagnosis, damage prevention, monitoring and control of complications in ophthalmological emergencies.

Source: Own authorship (2024)

The type of technology used in the study, as a guide for a continuous process of knowledge translation, allowed for an in-depth analysis of the challenges associated with implementing gender equity strategies in eye health interventions. In addition, it provided the opportunity to develop evidence-based interventions, while also addressing implementation problems to demonstrate the need for a greater network of services for rural women in that country [10].

3.2 Category 2 - Benefits of the Applicability of Ophthalmological Technologies in Urban Populations

In their cross-sectional research into the development of a mobile application designed to facilitate the teaching and learning of medical students about fundoscopy and diabetic retinopathy, Damasceno et al. [11] demonstrated that the technology shown is very usable and is considered a useful tool for student learning. This is due to the fact that digital images of the retina can be easily obtained using an adapter.

In his descriptive analytical work, Gomes [12] states that the study led to the creation of a database with clinical information on the appropriate management of patients with ophthalmological complaints. The study resulted in the creation of a flowchart that helps general practitioners distinguish which cases are urgent and which can be treated in general care units.

Pimentel [13], in his exploratory study, carried out a workshop to teach refractometry using an app. The study showed that the project improved refractometry teaching skills and helped medical residents get closer to the technological advances associated with new teaching approaches.

On the other hand, Ramesh et al. (2021), in proposing the use of a new green mat technology in ophthalmology webinars, demonstrated that this resource helped to eliminate the problem of a non-interactive online session, as well as promoting the advantages of using green mat technology, such as: clarity, interactivity and creativity. In this work, the aforementioned innovative pedagogy in Continuing Medical Education (CME) and virtual conferences enabled the same charisma seen in physical presentations, as well as effectively filling communication gaps in conferences and seminars.

Also in this context, Sarquis and Nascimento [14] report on the development of a mobile application to guide general practitioners and ophthalmologists on emergency ophthalmological procedures. In this study, the authors point to positive responses to the use of the app, with an emphasis on ophthalmological emergency procedures, because the technology is presented as a teaching tool and helps to diagnose, prevent damage, monitor and control complications in ophthalmology.

3.3 Category 3 - Pedagogical Technologies as a Tool for Education in Ophthalmology

In the qualitative study by Barreto [15], a booklet developed with a specific visual health theme for schoolchildren, focusing on teachers, proved to be valid and achieved almost unanimous acceptance, showing that the technology built in the aforementioned study is reliable and valid for use with teachers.

In the cross-sectional study by Macedo [16], when assessing the population's knowledge of glaucoma, it was shown that after an educational video about this eye condition, there was an improvement in the level of knowledge of the 130 participants eligible for the study.

Melo [17], also evaluating the effect of an educational video to promote the knowledge and attitude of 55 teachers, concluded that the educational video enabled an improvement in the knowledge and attitude of these teachers regarding the visual health care of schoolchildren, as well as being able to be widely used as an educational intervention, collaborating as a strategy to promote visual health.

Finally, Rocha [18] developed a tool related to the basic concepts of biological sciences and ocular anatomy to help with studies in biological sciences and ophthalmology. It was possible to study related subjects and create a usable tool based on biological science concepts and methodologies. This demonstrates that creating prototypes for educational games improves the teaching-learning process and understanding of biological sciences and ocular anatomy lessons.

3.4 Category 4 - Eye Health Profile of Traditional Communities

In the qualitative study by Biase, Minatel and Junkes [19] on the risk factors for the eye health

of artisanal fishermen, a variety of problems that can affect this population were exposed, including eye lesions. Reports show that the most common lesions caused by exposure to the sun are cataracts, senile macular degeneration, exfoliation syndrome and retinopathy. However, there are other more common types of injuries that are associated with eye trauma, such as puncture wounds and long periods of work.

The most common eye traumas include lacerations of the upper lesions, corneal lesions, eye contact with fish fragments and secretions, blepharospasm, conjunctival abscess and corneal ulcers, which result in opacity and limited visual acuity. It is known that the second biggest cause of complaints from fishermen in Brazil's coastal regions was eye problems.

So, having elucidated the four categories from the content analysed, it is necessary to highlight the imbroglios of this literature review, since the number of studies addressing the main objective of the research are rare. Firstly, the fact that there is no descriptor that specifically mentions the riverside population makes it unfeasible for the authors to carry out a scientific survey that addresses the triad of riverside population, technologies and ophthalmology.

Furthermore, it is clear from the categories discussed that there are studies involving technologies and the medical field of ophthalmology, but there are few that associate these two axes with the realities of traditional communities.

Riverside dwellers have strong cultural legacies from indigenous peoples, especially when it comes to health issues, which are easily perceived through the use of medicinal plants. More often than not, however, traditional knowledge and practices are disregarded, jeopardising the way of life and religiosity of this population, as many practices are associated with prayers, which alienates the river dwellers from health services [20,21].

As a result, riverine peoples still do not receive funding from researchers and research institutions with the aim of increasing and strengthening specific health actions for these populations. This makes it very difficult to implement the principles and guidelines of the SUS for these peoples [21].

Although there has been an increase in the number of studies published on the health of the riverside population in Brazil, articles dealing with ophthalmology in these populations are scarce or even non-existent, especially when the technological factor is added as a study method.

This is a reflection of the lack of collective investment by researchers and institutions in the production and dissemination of studies of different kinds, as in the case in question, where a certain population has studies that refer to it, but when other factors of analysis are applied, the rarity of productions on such populations can be seen.

With regard to the discussions on the subject, it is clear that the eye health profile of the riverside population is not known, which justifies the need for more studies and interventions to change the panorama of populations like this, who live in regions that are difficult to access, so that they gain more relevance and consequently have adequate ophthalmological care.

The scarcity of data and studies on eye health conditions in these populations indicates the importance of research that surveys epidemiological indicators for the implementation of public policies that seek to improve the living conditions of these groups and equate access to health services [2].

The fact is that if there were studies available on ophthalmology applied to riverine peoples, it would be possible to identify the prevalence of various ametropias and ocular conditions in the aforementioned population, as well as in other similar populations. This would demonstrate, in practice, the viability of ophthalmological care in Primary Care (ESF), as recommended by the Ministry of Health's National Ophthalmology Policy [2].

The fact that so much is said "for the Amazon" rather than "with the Amazon" contributes in part to the invisibility of these peoples, since this preservation and naturalistic perspective is often addressed when talking about the Amazon. This is important and legitimate, but it is also just as important that the populations living in the Amazon receive due visibility, especially in terms of health actions [22,2].

As a result, epidemiological and exploratory studies are needed in these more dispersed populations. In addition, responses to

improvements in access and transport need to be specific to capture the characteristics of each context and respond to local health needs. This is true in other remote rural contexts, which has led to the creation of specific care models to combat the tyranny of distance and the lack of services available to populations living in these locations. Geographical obstacles limit mobility and affect people's ability to quickly access health services [23].

Although the shortage of health professionals exists all over the world, it is more prevalent in rural areas. In the interior of Brazil, users stop buying important things to pay for their healthcare costs, especially medicines. The lack of professionals, as well as services and technological tools, reduces the resolutiveness of PHC. This hinders the constitutional objective of the Ministry of Health's National Ophthalmology Policy [23].

It is well known that the political conjuncture of capitalism leads municipalities, or more inland regions, to have no public policies. This means that, in this scenario, public policies will be less and less necessary because this economic system, together with the political agents who make decisions and use the municipality's resources, creates barriers for the most disadvantaged people. Riverine, quilombola and indigenous communities are therefore the ones who suffer most from the consequences of this lack of attention. This is due to the fact that, as the state manages public policies to assist the population, it only tries to implement palliative solutions [24,25].

On the other hand, exploitation is increasing in the Amazon, especially in the state of Pará. This results in socio-environmental conflicts and the elimination of older communities and peoples due to land disputes, which increases social inequality in these populations. As a result, it is clear that it is necessary to recognise the health needs of these peoples, whether through science or politics, so that these traditional populations can exercise their political authority and create alternatives for their social and collective reproduction as part of the Amazonian socio-territorial right [26-29].

4. CONCLUSION

Scientific production on the health of the riverside population in Brazil has increased in recent years, showing a growing trend. However, in

relation to medical specialities such as ophthalmology and methods that assess the application of technologies that facilitate the relationship between these specialities and riverine circumstances, there are still gaps.

With this in mind, bibliometric studies are important and should be carried out in relation to these groups that are considered vulnerable. This reflection is based on the fact that they can produce or obtain indicators that support the advancement of science, the development of other research and the strengthening of individual and collective actions to promote health and prevent eye diseases in riverine communities.

With regard to traditional communities living in the Amazon, more studies need to be carried out to obtain more information about their *modus vivendi*. Interpretations of this knowledge can help in the development of public policies that promote socio-environmental sustainability, respecting the right of these populations to remain in their territories with socio-cultural and political autonomy. In addition, we can discuss how to develop technological plans for activities that are compatible with the riverside culture, in order to connect this community to specialised eye health needs.

DISCLAIMER (ARTIFICIAL INTELLIGENCE)

Author(s) hereby declare that NO generative AI technologies such as Large Language Models (ChatGPT, COPILOT, etc) and text-to-image generators have been used during writing or editing of manuscripts.

CONSENT

It is not applicable.

ETHICAL APPROVAL

It is not applicable.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

REFERENCES

1. Franco EC. et al. Health promotion for the riverside population of the Amazon region:

- an experience report. *Revista CEFAC*. 2015;17(5):1521-1530, Available:<https://www.scielo.br/j/rcefac/a/fm3wGQQnWsgjr5Lpkjvp7jt/?lang=pt> Accessed on: 11 Feb. 2024.
2. Lima EFF. Rede sobre as águas: A saúde no contexto ribeirinho amazônico. Monograph (Multiprofessional Residency in Collective Health) - Institute of Collective Health Studies, Federal University of Rio de Janeiro, Rio de Janeiro; 2020. Available:<https://pantheon.ufrj.br/bitstream/11422/16080/1/EFFLima.pdf>. Accessed on: 29 Jan. 2024.
 3. Nietzsche EA. et al. Tecnologias educacionais, assistenciais e gerenciais: Uma reflexão a partir da concepção dos professores de enfermagem. *Revista Latino Americana de Enfermagem*. 2005; 13(3):344-53 Available:<https://www.scielo.br/j/rlae/a/D73Y67WhnhmbtqqX58czmzL/>. Accessed on: 29 Jan. 2024.
 4. Borges CCL. et al. Care-educational technology to support men in coping with the coronavirus pandemic. *Enfermagem em Foco. ESP*. 2020;11(2). Available:<http://revista.cofen.gov.br/index.php/enfermagem/article/view/3674>. Accessed on: 14 Feb. 2024.
 5. Salbego C. et al. Care-educational technologies: An emerging concept of the praxis of nurses in a hospital context. *Revista Brasileira de Enfermagem*. 2018;71(6):2666-74 Available: <http://dx.doi.org/10.1590/0034-7167-2017-0753> Accessed on: 29 Jan. 2024.
 6. Ferreira SL. et al. Construction and validation of educational technology for family members of people with venous ulcers. *Revista Brasileira de Enfermagem*. 2022;75. Available:<https://www.scielo.br/j/reben/a/3k4C63hDLs5mGfwnwSnLnck/?lang=en> Accessed on: 11 Feb. 2024.
 7. Silva DML, Carreiro FA, Mello R. Educational technologies in nursing care in health education: integrative review. *Revista de Enfermagem UFPE Online*. 2017;11(2):1044-51. Available:<https://doi.org/10.5205/reuol.10263-91568-1-RV.1102sup20172> Accessed on: 29 Jan. 2024.
 8. Galvão MCB, Ricarte ILM. Systematic literature review: Conceptualisation, production and publication. *Logeion: Philosophy of Information*. 2020;6(1):57-73. Disponível em: Available:<https://doi.org/10.21728/logeion.2019v6n1.p57-73> Accessed on: 29 Jan. 2024.
 9. Moreira TC. et al. Tele Oftalmologia: A strategy to expand the supply of ophthalmological telediagnosics for primary health care in southern Brazil. *Cadernos de Saúde Pública*. 2022;38(6). Available:<https://doi:10.1590/0102-311XP T281321> Accessed on: 13 Feb. 2024.
 10. Hazel YP. et al. Continuous knowledge translation in action: Designing a programmatic research trial for equitable eye health for rural nepalese women. *International Journal of Environmental Research and Public Health*. 2020;17(345). Available:<https://doi.org/10.3390/ijerph17010345> Accessed on: 29 Jan. 2024.
 11. Damasceno, Márcia Benevides et al. Mobile devices as facilitating tools in the teaching-learning process in fundoscopy. *Renote*. 2019;17(3):386-396.
 12. Gomes, Mariana Studart Mendonça. Mobile device as a tool to aid ophthalmological differential diagnosis in the emergency room. Dissertation (Professional Master's Degree in Health Technology and Simulation) - Christus University Centre, Fortaleza; 2021.
 13. Pimentel, Leonardo Nogueira. The teaching/learning process in refractometry using a digital tool (Helper Keratoconus). 2019. 61f. Dissertation (Professional Master's Degree in Health Teaching) - Health Sciences Centre, Federal University of Rio Grande do Norte, Natal; 2019.
 14. Sarquis, Ingrid Cavalcante; DO Nascimento, Karla Angélica Silva. Development of a mobile application as a facilitating tool in the teaching process in ophthalmology. *Revista Contexto & Saúde*. 2023;23(47): e14381-e14381,.
 15. Barreto ACO. Construction and validation of an educational booklet to promote visual health in schoolchildren. 101 f. Dissertation (Master's in Nursing) - Faculty of Pharmacy, Dentistry and Nursing, Federal University of Ceará, Fortaleza; 2019.
 16. Macedo, Caroline Lopes Aragão de et al. Green may campaign: Evaluation of

- population knowledge about glaucoma. Brazilian Journal of Ophthalmology. 2021; 80.
17. Melo KM. Evaluation of an educational video to promote the visual health of schoolchildren: teachers' knowledge and attitudes. 93 f. Dissertation (Master's in Nursing) - Faculty of Pharmacy, Dentistry and Nursing, Federal University of Ceará, Fortaleza; 2021. Available:<http://www.repositorio.ufc.br/handle/riufc/62638> Accessed on: 03/12/2021.
 18. Rocha, Rafael Lopes. Educational game to stimulate learning in teaching of biological sciences and ocular anatomy. Dissertation (Master's Degree) - Federal University of São Paulo. Paulista School of Medicine. Department of Ophthalmology. Professional Master's Degree in Technology, Management and Eye Health. São Paulo; 2021.
 19. De Biase, Carmem Lúcia Carneiro Leão, Minatel, Vinicius, Junkes, Janaína Accordi. Artisanal fishermen's eye health and associated risk factors. Seven Editora; 2023.
 20. Pereira FR. et al. Banheiro no território líquido da Amazônia: A micropolítica do trabalho de uma equipe de saúde ribeirinha. Atenção Básica na região Amazônica: saberes e práticas para o fortalecimento do SUS. Porto Alegre: Rede Unida. 2019;92-111.
 21. Silva RLS. et al. Scientific production on the health of the riverside population in Brazil: a bibliometric study. Revista de Enfermagem da UFSM. 2023;13(41): 1-21. Available:<https://periodicos.ufsm.br/reufsm/article/view/84359> Accessed on: 13 Feb. 2024.
 22. Almeida ER. et al. Atenção Básica à Saúde: Avanços e desafios no contexto amazônico. Atenção Básica na Região Amazônica: saberes e práticas para o fortalecimento do SUS. Porto Alegre. 2019;15-50.
 23. Lima JG. et al. Barriers to access to primary health care in remote rural municipalities in western Pará. Trabalho, Educação e Saúde, Rio de Janeiro. 2022;20. Available: <https://doi.org/10.1590/1981-7746-ojs616> Accessed on: 29 Jan. 2024.
 24. Carmo ED, Silva MES. Invisibility of the riverside population to access and implement public policies: experiences in the disputed territory of Anajás-PA. PRACS: Revista Eletrônica de Humanidades do Curso de Ciências Sociais da UNIFAP, Macapá. 2020;13(2): 189-209, jul./dez. Available:<https://periodicos.unifap.br/index.php/pracs> Accessed on: 09 Feb. 2024.
 25. Gomes MCRL. et al. Unde by sun and water: Development of a water supply system for riverine peoples in Amazonia. Revista Tecnologia e Sociedade. 2019;15: 92-112.
 26. Mathis AA. et al. Development, neo-development and impacts on labour in the Brazilian Amazon. Novos Cadernos Naea. 2016;19(1):237-252. Available:<https://periodicos.ufpa.br/index.php/ncn/article/view/2490/3184> Accessed on: 13 Feb. 2024.
 27. Bardin L. Content Analysis. 1.ed. São Paulo: Edições. 2011;70. Available:<https://madmunifacs.files.wordpress.com/2016/08/anc3a1lise-de-contec3bado-laurence-bardin.pdf> Accessed on: 11 Feb. 2024.
 28. Lima RTS. et al. Saúde em vista: Uma análise da Atenção Primária à Saúde em áreas ribeirinhas e rurais amazônicas. Ciência & Saúde Coletiva. 2021;26(6): 2053-2064.
 29. Pacífico ACN. et al. Tecnologia para acesso à água na várzea amazônica: Impactos positivos na vida de comunidades ribeirinhas do Médio Solimões, Amazonas, Brasil. Cad. Saúde Pública. 2021;37(3).

© Copyright (2024): Author(s). The licensee is the journal publisher. This is an Open Access article distributed under the terms of the Creative Commons Attribution License (<http://creativecommons.org/licenses/by/4.0>), which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.

Peer-review history:

The peer review history for this paper can be accessed here:

<https://www.sdiarticle5.com/review-history/117916>