

Evaluation of efficacy, efficiency and effectiveness of community projects of visual health in the population of the amazon riversides

Vagner Loduca¹, José Ricardo Rehder¹, Halmelio Sobral Neto¹, Guilherme Daher¹, Marina Gracia¹, Priscilla A. Jorge¹, Newton Kara-Junior¹

¹ Faculdade de Medicina do ABC, Santo André, SP, Brazil.

¹ Faculdade de Medicina da USP, São Paulo, SP, Brazil.

OBJECTIVE: To estimate the prevalence of eye diseases in the Amazon region and evaluate the efficacy, efficiency and effectiveness of community projects of visual health in underserved communities.

METHODS: Retrospective, observational and ecological study, which covers the underserved communities of the Brazilian Amazon by the Amazon Project Vision 2000. The data were retrieved from a total sample of 1,276 patients. A questionnaire was applied to patients with 22 questions divided into general and health data. All patients were submitted to a complete eye examination. All project data were stored in a database for later evaluation.

RESULTS: Of the 1,276 patients evaluated, 65% were female, 51.9% said they had never had an eye examination and 91% believed to have some visual problem. Emmetropia was detected in 3.8% and 47.2% had presbyopia. Cataract (16.2%) and pterygium (23.6%) were the prevalent diseases. During the project, cataract surgeries were performed in 27.6% and pterygium in 6.9% of patients. When asked why they had not operated before, 24.1% said they had no financial conditions and 55.2% because there was no specialized doctor nearby.

CONCLUSION: Refractive errors, pterygium and cataract were the most common ocular findings in the population evaluated. The Amazon Project Vision 2000 provided the equipment and resources for the activities proposed, reaching the pre-defined goal.

KEYWORDS: Cataract, indigenous health services, vision, low, blindness.

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E-mail: vagnerloduca@uol.com.br

INTRODUCTION

Developing countries comprise the majority of people with low income and also a large number with visual impairment.¹⁻³ The Amazon region in South America is predominantly within the limits of the Brazilian territory and has a unique geomorphological, biological and social reality which has no counterpart in the world. Figure 1 depicts the geographical extension of the region. Its great extension and low population density makes it difficult for people to have access to transport and communication. Displacement for the majority of the population is by boat, foot or bicycle, in spite of the

long distances. According to the latest Brazilian census conducted in 2010, the Brazilian Amazonic population is approximately 3.4 million, of which 20% are located in rural areas.⁴ There is considerable variation in the frequency of blindness and visual impairment within the region, as well as in the proportions of blindness and visual impairment from different diseases and conditions.⁵ Any development plans and health promotion strategies are a challenge to professionals in this region.¹⁻⁶

Devised in 1995, the Amazon Vision Project 2000 was born as a partnership between University (Department of Ophthalmology, Faculdade de Medicina of the ABC Foundation), Government (Ministries of the Navy and Health) and the Private Sector. The main goal of this project was to make an eye health and blindness

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Figure 1 - A map of the Amazonian region (courtesy of www.peru-explorer.com)

prevention program available to the riverside population of the Amazon and to groups of indigenous villages; the end-goal was to implement eye health actions at the primary care level. The Project used hospital support ships of the Ministry of Health, transforming them into floating eye hospitals, with the ability to range from consultations and preventive guidance to the most complex surgeries and eye treatments. The trips were scheduled to forecast all the necessary logistical resources, with an average duration of 20 days.

Based on epidemiological characteristics of the population and with the object of gauging the material eye and human resources employed in the Project, this study estimated the prevalence of cataract, glaucoma, refractive errors and other causes of preventable and treatable blindness. The habits, beliefs and customs of the population, coupled with the uniqueness of the Amazonic climate can lead to different rates of prevalence of eye diseases in comparison with other regions of the country. Thus, and especially in order to optimize the therapeutic capacity for future projects, the objective of this study was to estimate the prevalence of eye diseases in the region and evaluate the efficacy, efficiency and effectiveness of community projects of visual health in underserved communities, checking the solving of problems and the application of human and material resources used in the execution of projects.

■ MATERIALS AND METHODS

This is a retrospective, observational and ecological study, which covers the underserved communities of the Brazilian Amazon. The Amazon Vision Project 2000 gave assistance to the communities of the Xingu, Trombetas, Jari, Marajó and Tocantins regions, offering eye care to 18 locations. The mission took place in November 2001, with a total navigation of 2,285 nautical miles.

A questionnaire was applied to patients by a local health official previously trained by the ophthalmologist team. It contained 22 questions divided into general and health data. The questionnaire was based on that applied by Kara-José & Temporini in a study of cataract in the State of São Paulo, Brazil.⁷ Following this, a complete eye examination was performed, including the measurement of visual acuity, static refraction, slit lamp examination, tonometry, fundus direct exam and/or retinal mapping. If indicated by the ophthalmologist, specific tests were additionally conducted, such as ultrasound and ocular biometry. Patients with surgical needs were submitted to the appropriate procedures at the floating eye hospital and special cases were referred to reference centers. All project data were stored in a database for later evaluation.

The sample evaluated in this study comprises a total of 1,276 patients. The study variables including demographic and socioeconomic data and eye examination data.

■ RESULTS

Of the 1,276 patients evaluated, 65% were female. Age distribution showed a relatively young population, with a majority (51%) between 31 and 60 years and 30% were under 30 years. Regarding the number of their offspring, 12.2% had none, 55% had 1-5 children, 26.1% had 6-10 and 6.7% were over 10 children. Regarding the education level 18.4% were illiterate, 55% had incomplete 1st degree and 26.6% had 2nd degree or higher education. At the time of the examination, 52.6% patients did not work and 26.3% said they earned up to \$60.00 monthly. Concerning sanitation, 80.7% had piped water but only 24.5% had sewage. Electrical network covered almost 90% of households. Over 75% had television and fewer than 1% had computers in their homes. For 64.6% of patients transport was by foot whereas 26.1% used bikes.

With regard to ocular health 51.9% said they had never had an eye examination and 91% believed to have some visual problem. The frequency of general medical care available in the community reported by patients was 52.1% for daily service, with 5.4% receiving fortnightly attention; 12.1% had no regular service. No regular specialized eye care was available. The visual acuity exam showed 65.2% of patients with 0.5 or better levels on the Snellen chart, while 11% had a value of 0.1 or worse. Intraocular pressure was checked by bidigital exam in 43.5%: aplanation tonometry showed that 47.6% of the evaluated sample had intraocular pressure between 10 and 20 mmHg, while 8.9% had pressures above 20 mmHg.

Among the ocular abnormalities, cataracts were detected in 16.2%, pterygium was detected in 23.6%, corneal opacity in 2.3%, pingueculae and eyelid changes were found in 1.6% each. Figure 2 shows that presbyopia

was the most prevalent refractive error, with 47.2%, followed by compound hypermetropic astigmatism (33%) and hypermetropia (14.6%); 21% of patients were free from metropic problems. Regarding surgical ocular changes, 48.3% knew they had cataracts and 27.6% knew they had pterygium. Among these, 86.2% knew that these changes needed surgery. When asked why they had not operated before, 24.1% said they had no financial conditions and 55.2% because there was no specialized doctor nearby. Figure 3 shows that cataract and/or pterygium made 24% of patients stop working, while 21% depended on someone to eat and get out of the house; 18% of patients were not affected. During the execution of this project, cataract surgeries were performed in 27.6% and pterygium in 6.9% of the patients. Of these, 25% intended to return to work.

DISCUSSION

The Brazilian Council of Ophthalmology Census data shows that the northern region has the lowest number of ophthalmologists in the country, and despite the increasing

number detected in the latest census, the eye doctor/inhabitant ratio was down, because population growth occurred more rapidly. In addition, specialized care in rural areas is very poor.^{8,9} In this study, the sample consisted of a relatively young population with low education, low income and poor sanitation. These parameters reflect the reality of the region as shown by the Brazilian Institute of Geography and Statistics census, which also features the indigenous population pyramid with a wide base that will rapidly reduce with age, in a pattern that reflects their high rates of fertility and mortality; this also reflects the pattern of the rural Amazonic population.¹⁰

In Brazil, the prevalence of blindness is estimated to be 1.3% of those over the age of 50 years. The Botucatu Eye Study¹¹ showed low vision and blindness were found in 5.2% and 2.2% of the studied population, respectively. The Sao Paulo Eye Study showed a prevalence of visual impairment at about 4.74% and of bilateral blindness at 1.51%.¹² In another study made in Campinas, Sao Paulo, Brazil, blindness was found in 1.98% of inhabitants.¹³ This represents not only a significant burden to those who are affected, but it also represents a large social and economic cost to the State.^{14,15}

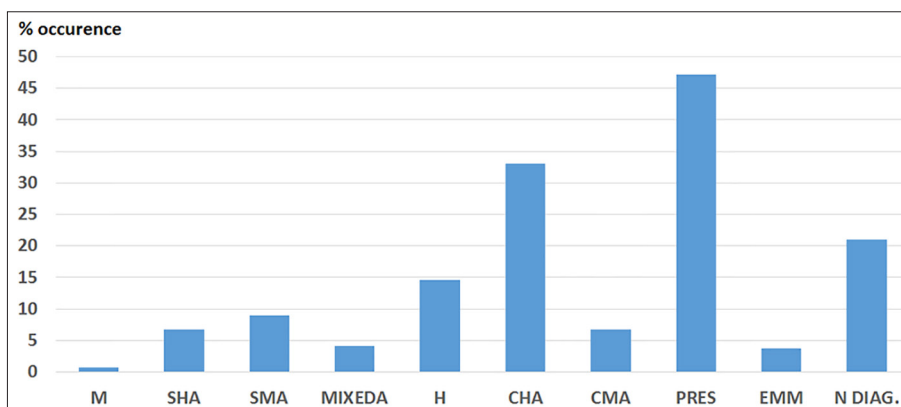


Figure 2 - Frequency of occurrence of objective static refraction alterations. M: myopia; SHA: simple hypermetropic astigmatism; SMA: simple myopic astigmatism; MIXEDA: mixed astigmatism; H: hypermetropy; CHA: compound hypermetropic astigmatism; CMA: compound myopic astigmatism; PRES: presbyopia; EMM: emmetropia; N: none diagnosed

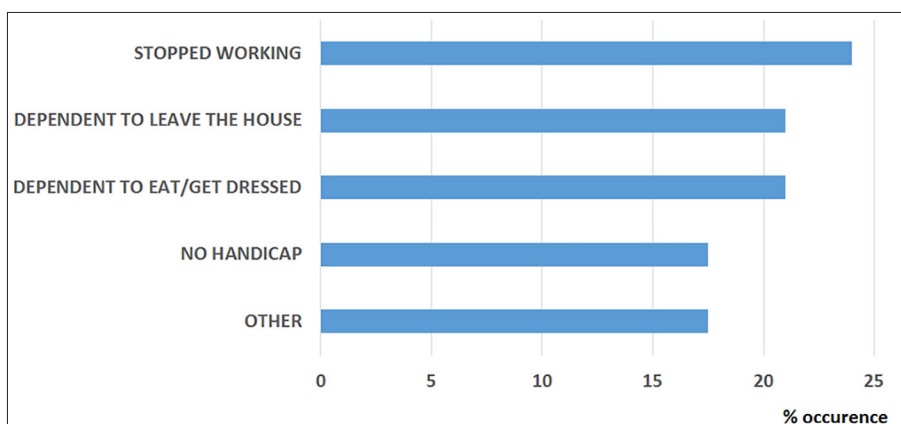


Figure 3 - Impact of cataract and/or pterygium in patients' life (% of occurrence)

The main visual impairment founded in the population studied in this project was represented by refractive errors. Uncorrected refractive errors are one of the leading causes of blindness and visual impairment in the world.^{13,16-18} A large number of patients with ametropia were treated with prescription of glasses. As the peak age of patients was between 41 and 50 years, nearly half of the refractive errors was presbyopia. The study showed low prevalence of elderly eye diseases, even though a previous report has shown an increase of visual impairment with age.¹⁹ The singularity of the Amazon region can maybe explain these results.

Cataract and pterygium were the most common surgical pathologies found, in agreement with previous reports.²⁰⁻²² Both affected significantly patients' lives, with impairments upon work and daily activities such as eating or leaving the house. In response to the questionnaire at the time of the examination, the prevailing factors for not performing cataract surgery were financial and logistical. Vision services in most of the Latin American countries cover less than 10% of the populations. These results may be compared to a recently described epidemiological study of rural population in the state of Pernambuco.²³ This, in itself shows the need to facilitate the access of this population to cataract surgery by decentralizing social services and by developing community projects to prevent blindness.^{11,13,24,25}

The main limitation of this paper is the fact that the data is old, because the Project was conducted in 2001. However, the Amazon Project Vision 2000 provided the equipment and resources for the activities proposed, detecting and solving the mainly ocular diseases, and reaching the pre-defined goal. Nevertheless, there is still an urgent need to implement programs to promote continuous eye health and blindness prevention, as well as improved access of marginalized populations to these services, in joint actions with government agencies.

■ SUMMARY

The Project on visual health covering the Amazonian riverside population found cataract, pterygium and refractive errors as the prevalent diseases. The resources for execution the Project were enough to solve the problems and are reproducible for others projects.

■ AUTHOR CONTRIBUTION

Loduca V: conception and design, acquisition of data, analysis and interpretation of data; critical revision of the manuscript for important intellectual content; final approval of the submitted manuscript. **Rehder JR:** conception and design, acquisition of data; critical revision of the manuscript for important intellectual content; final

approval of the submitted manuscript. **Sobral Neto H:** conception and design, acquisition of data; critical revision of the manuscript for important intellectual content; final approval of the submitted manuscript. **Daher G:** substantial contribution to analysis and interpretation of data; critical revision of the manuscript for important intellectual content, drafting of the manuscript and final approval of the submitted manuscript. **Gracia M:** substantial contribution to analysis and interpretation of data, critical revision of the manuscript for important intellectual content and final approval of the submitted manuscript. **Jorge PA:** substantial contribution to conception and design, analysis and interpretation of data, drafting of the manuscript, critical revision of the manuscript for important intellectual content and final approval of the submitted manuscript. **Kara-Junior N:** substantial contribution to conception and design, analysis and interpretation of data, drafting of the manuscript, critical revision of the manuscript for important intellectual content and final approval of the submitted manuscript.

■ CONFLICT OF INTEREST

Authors declare no conflict of interest regarding this project.

AVALIAÇÃO DA EFICÁCIA, EFICIÊNCIA E EFETIVIDADE DOS PROJETOS COMUNITÁRIOS DE SAÚDE VISUAL NA POPULAÇÃO RIBEIRINHA AMAZÔNICA

OBJETIVO: Estimar a prevalência de doenças oculares na região amazônica e avaliar a eficácia, eficiência e efetividade dos projetos comunitários de saúde visual em comunidades carentes.

MÉTODOS: Estudo retrospectivo observacional e ecológico, que abrange as comunidades carentes da Amazônia brasileira pelo Projeto Amazônia Visão de 2000. Os dados foram obtidos a partir de uma amostra completa de 1276 pacientes. Um questionário foi aplicado aos pacientes com 22 questões divididas em dados gerais e de saúde. Todos os pacientes foram submetidos a um exame oftalmológico completo. Todos os dados de projeto armazenados em um banco de dados foram para posterior avaliação.

RESULTADOS: Dos 1276 pacientes avaliados, 65,0% eram do sexo feminino, 51,9% disseram que nunca tinham feito exame de vista e 91,0% acreditavam ter algum problema visual. Emetropia foi detectada em 3,8%; 47,2% tinham presbiopia. A Catarata (16,2%) e o pterígio (23,6%) foram as doenças prevalentes. Durante o projeto, cirurgias de catarata e pterígio foram realizadas em 27,6% e 6,9% da população estudada, respectivamente. Quando indagados sobre o porque de não terem sido operados antes, 24,1% disseram que não tinham condições financeiras e 55,2% Porque não havia médico especializado nas proximidades.

CONCLUSÃO: Erros de refração, pterígyum e catarata foram os achados mais comuns na população avaliada. O Projeto Amazônia Visão 2000 forneceu equipamento e recursos para as atividades propostas, atingindo a meta pré-definida.

PALAVRAS-CHAVE: Catarata, serviços de saúde indígenas, visão, baixo, cegueira.

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