

Ocular health of brazilian indigenous populations*

Saúde ocular dos povos indígenas do Brasil

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ABSTRACT

There are relatively few published studies involving the eye health of indigenous peoples of Brazil. The purpose of this paper is to present the current situation based on a narrative review, covering the period from 1897 to today, with most publications involving the indigenous population living in the Amazon region of Brazil. Comparisons between them are difficult because of the variety of methods. Therefore, it is crucial to perform systematic and continuous evaluations so that they can re-orient public policies towards the improvement of the eye health of these populations.

Keywords: Eye Health. Brazil/ethnology. Indigenous Population. Health of Indigenous Peoples. Public Health. Eye Diseases.

RESUMO

Quanto à saúde ocular indígena, há escassez de relatos de avaliações em índios brasileiros e, por isso, o objetivo deste estudo é apresentar uma contextualização desta situação no Brasil, baseada em revisão da bibliografia. São apresentados os mais variados resultados de pesquisas, que datam desde 1897 até os dias atuais, sendo que, o maior número desses artigos publicados está relacionado com problemas apresentados pelas etnias residentes na região Amazônica. Muitas averiguações são feitas de maneira pontual, tanto em relação aos aspectos temporais quanto espaciais, o que dificulta que se tenham conclusões comparativas. Portanto, é importante que sejam realizadas avaliações sistematizadas e continuadas que possam orientar políticas públicas no que tange à saúde ocular desses povos.

Palavras-chave: Saúde Ocular. Brasil/etnologia. População Indígena. Saúde de Populações Indígenas. Saúde Pública. Oftalmopatias.

Introduction

Brazilian indigenous groups comprise approximately 500 thousand persons, representing 1% of the Brazilian population, in all states of the country except Piauí and Rio Grande do Norte.^{1,2} However, the epidemiological profiles of these

people are still insufficiently known. According to some authors, this is due to the small number of investigations, the absence of censuses and of other regular surveys, and the precarious characteristics of the systems of information reports regarding morbidity, mortality and vaccinal coverage, among other factors.^{3,4,5}

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Available information about morbidity and mortality reveals a high incidence of respiratory⁶ and acute gastrointestinal infections,^{7,8} malaria,^{4,8,9} tuberculosis,^{4,9,10,11} sexually transmitted diseases¹², malnutrition^{4,13,14} and diseases that can be prevented by vaccination.^{4,7} Arterial hypertension, diabetes, alcoholism, depression and suicide are increasingly more frequent problems in various communities.⁷

Regarding the eye health of indigenous populations, reports of evaluations of Brazilian Indians are scarce. Thus, the objective of the present study was to present a contextualization of indigenous eye health in Brazil based on a review of the literature.

Indigenous eye health

Few reports of evaluations of Brazilian Indians are available in literature and the epidemiological studies focusing on the ocular aspects of indigenous populations have been preferentially conducted in the North region.

There are citations¹⁵ referring to a study conducted on Brazilian Indians in 1897, which dealt with their visual acuity, concluding that "the visual capacity of the Indians is not superior to ours...". In 1958, Mattos studied visual acuity as well as dyschromatopsia in Brazilian Indians and did not observe uniformity of visual acuity for distance, nor did he detect any case of dyschromatopsia.¹⁶ A 1970 follow-up of that study, which also considered eventual eye diseases, revealed that, in most cases, visual acuity was 1.5 or higher. Again, no cases of dyschromatopsia were observed. Regarding the diseases, the authors detected three cases due to the loss of vision in one eye associated with traumatic corneal disease. Only one case of cured posterior uveitis was observed despite the frequency of infectious foci of tuberculosis and toxoplasmosis.¹⁷

Also in the 1970's, studies mentioning the situation of ocular onchocerciasis were published, demonstrating the absence of severe cutaneous or ocular symptoms.^{18,19} Another study conducted during the same period demonstrated a high frequency of ocular changes, mainly corneal, in addition to iridocyclitis, although without the loss of vision and with no damage to the posterior pole.²⁰ These articles suggest a probably recent introduction of the disease in the communities studied.

More recently, other studies about onchocerciasis were published,²¹⁻²⁴ involving Yanomami Indians, preferentially located in the North region. These studies pointed out the high endemicity of the disease,²⁴ as well as the large number of individuals with mild ocular involvement,^{22,24} although a few cases of blindness were detected.^{21,22} One of these studies reported a 65.37% rate of ocular involvement, with 60% of cases in the early phase and only 5.37% in the advanced phase.²⁴ Despite these results, a study conducted in the Southwest Amazon region did not detect any findings related to systemic onchocerciasis, with negative skin exams for the condition.²⁵

Also regarding the study of onchocerciasis in indigenous populations, a 1995 study with an anthropological approach reported ethnographic information about the representations and concepts of the Yanomamis with respect to the cutaneous and ophthalmological symptoms of onchocerciasis and the treatments instituted.²⁶

Based on the research line devoted to the evaluation of infectious diseases with ocular manifestations, some studies have assessed the presence of injuries caused by mansonelliasis, and the findings suggested an association between the corneal lesions detected and this infection.^{25,27}

Most of the publications surveyed deal with the detection and repercussions of trachoma in indigenous communities, mainly in ethnic groups located in the Upper Rio Negro region (Makus, Aruaks and Tukanos), some of them located along the Middle Rio Negro, and others among Indians living in the Xingu Park.²⁸⁻³⁷

These studies have reported trachoma prevalence ranging from 28.02% to 56.4%,^{29,31,33,34,37} with these findings showing different epidemiological behaviors.²⁸ The prevalence of mild cases is higher,³¹ although the inflammatory and cicatricial forms have been detected.^{34,37} No cases of trichiasis or corneal opacification were observed.^{33,34,37} Another study demonstrated the presence of corneal nummular opacifications, as well as the presence of low visual acuity due to corneal injuries secondary to trachoma in 2.8% of the subjects studied.³⁵ Cicatricial trachoma was studied in an investigation referring to a surgical technique for the correction of entropion and trichiasis.³⁶

A correlation between precarious socioeconomic and sanitary conditions and the presence of trachoma was determined in studies on the Hupdah in the Upper Rio Negro region and on the Fulni-Ô in Pernambuco.^{32,38}

Despite the prevalences of trachoma cited above, a study conducted on 524 Indians from the Southwest Amazon region did not detect any case of this disease.²⁵

Aspects related to intraocular pressure (IOP) and glaucoma have been investigated in some studies.^{21,30,39,40,41} A study on the Guarani Indians from São Paulo observed a mean IOP of 10.46 mmHg,³⁹ and a study on the Yanomami did not detect significant changes regarding this aspect of ophthalmological evaluation.²¹ In contrast, an 8.1% presence of glaucoma was detected in communities from the Upper Rio Negro (Arawak, Tukano, Maku, and Yanomami),⁴⁰ with primary angle closure glaucoma being the most frequent.^{40,41}

The presence of pterygium and cataract has been reported in some studies,^{30,35,42-45} with the highest prevalence of the former being observed in riverine populations.^{43,45} Pterygium was the most prevalent finding in two studies.^{45,46}

There are also reports of cases of "parasitic" keratitis, retinal affections, leukoma, amblyopia, bulbar atrophy, *pinguecula*, and blepharitis.^{25,30,45}

Ametropia has been described as the most frequent finding in some studies,^{25,30} in addition to being the most common cause of low visual acuity.³⁰ Cases of myopia are absent or rare,^{42,47,48,49,50} with astigmatism being the change most commonly detected in some studies^{42,46,48} or hypermetropia in another.⁵⁰

Color vision has been studied in some investigations⁵¹⁻⁵⁵ in addition to those already cited. The Ishihara pseudoisochromatic table was used in most studies,^{53,54,55} with the results indicating a very low frequency of color vision deficiency among Indian males and no case among Indian females. When the Terena ethnic group was evaluated using the Hardy, Rand and Rittler (HRR) pseudoisochromatic test in Mato Grosso do Sul, no case was detected among males.⁵¹ Females were not evaluated in that study.

The publications commented in this article are summarized in Table 1.

Comments

Most of the papers published about the ophthalmological aspects of indigenous communities are related to the problems of the ethnic groups residing in the Amazon region. Many investigations are conducted in a timely manner regarding both temporal and spatial aspects, a fact that impairs comparative conclusions. Therefore, it is crucial to perform systematic and continuous evaluations so that they can re-orient public policies towards the improvement of the eye health of these populations, especially in regions with greater scarcity of information.

Method for a literature search

These data were obtained from a review of the specialized literature published between 2005 and 2012. The scientific papers were collected from the Virtual Health Library in the data banks SciELO, LILACS and MEDLINE. The key words used were South American Indians and Health of Indigenous Populations, which were also crossed with Ocular Health, Public Health and Ophthalmopathies. Other terms used were Trachoma and Upper Rio Negro Region and, for each article read, the references related to the Indigenous Ocular Health were listed. Articles in Portuguese, Spanish and English were read and none of those detected was excluded. These were obtained from the thesis banks of the various universities and older publications that were not available in the electronic media were provided by the Brazilian Council of Ophthalmology. In addition, the textbook *Bibliografia crítica da saúde indígena no Brasil (1844-2006)* (Critical Bibliography of Indigenous Health in Brazil) was consulted. The websites of FUNAI, FUNASA, SESAI, CIMI and of the Socioenvironmental Institute were also visited.

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Table 1: Subjects and main outcomes of the studies referenced in this review.

Year	Author(s)	Study	Subject	Main outcome(s)
1958	Mattos RB	Acuidade visual para longe e frequência de discromatopsia em Índios Brasileiros. Descrição de alguns aspectos oftalmológicos em índios examinados.	Visual acuity and dichromatopsies	Absence of dichromatopsies. Various levels of visual acuity.
1964	Neel JV et al.	Studies on the Xavante Indians of the Brazilian Mato Grosso.	Visual acuity, ocular diseases and color vision	Absence of dichromatopsies. Good levels of visual acuity. Presence of pterygium, corneal opacifications and cataracts at a frequency similar to that observed in non-indigenous individuals.
1966	Vianna MC	Aspectos sócio-econômicos e sanitários dos Fulni-Ô de Águas Belas - Pernambuco.	Trachoma	Relationship between socio-economic-cultural conditions and presence of trachoma.
1967	Weinstein ED, Neel JV, Salzano FM	Further Studies on the Xavante Indians	Visual acuity and color vision	Absence of dichromatopsies. Few cases of reduced visual acuity.
1970	Mattos RB	Estudo oftalmológico dos índios do Médio Xingu.	Visual acuity, dichromatopsies, ocular diseases	High levels of visual acuity in most of the population (≥ 1.5). Absence of dichromatopsies. Few ocular diseases.
1972	Salzano FM	Visual acuity and color blindness among Brazilian Cayapo	Visual acuity and color vision	More than half the subjects studied with visual acuity higher than 1.0. One case of dichromatopsia.
1978	Moraes MAP et al	Novas observações sobre o foco de oncocercose da área do rio Toototobi, Estado do Amazonas, Brasil.	Onchocerciasis	High frequency of corneal changes attributable to the disease.
1979	Belfort Jr. R, Moraes MAP	Oncocercose ocular no Brasil	Onchocerciasis	Low prevalence of onchocerciasis and absence of severe cutaneous or ocular lesions, indicating that the disease had been only recently introduced in the community.
1979	Moraes MAP, et al	Novas observações sobre o foco de oncocercose da área do rio Auaris, Território de Roraima, Brasil.	Onchocerciasis	Presence of clinical and laboratory manifestations of onchocerciasis.
1980	Salzano FM	New studies on the color vision of Brazilian Indians	Color vision	Low prevalence of changes in color vision.
1992	Chaves CC, Cohen JM, Ribeiro E	Manifestações oculares em doenças tropicais	Onchocerciasis	High frequency of microfilariae, although the ocular alterations are discrete and do not cause blindness.
1992	Vila MF	Estudo das alterações oculares na região oncocercótica yanomami	Onchocerciasis	65.37% of the subjects with ocular involvement, although 60% of them in the initial phase.
1994	Chaves CC	Oncocercose ocular na Amazônia Brasileira	Onchocerciasis	Prevalence of 33.8%; lower frequency of ocular disease.

(continuação) **Table 1: Subjects and main outcomes of the studies referenced in this review.**

Year	Author(s)	Study	Subject	Main outcome(s)
1994	Mörschbacher R	Prevalência do tracoma no Parque Indígena do Xingu	Trachoma	No cases of trichiasis, entropion or corneal opacification were detected.
1995	Albert B	Componente antropologia e educação para a saúde	Onchocerciasis	Anthropological information is presented about the perception of the Yanomami regarding the cutaneous and ophthalmological symptoms of onchocerciasis.
1998	Abdanur LRA, et al	Análise dos valores da pressão intraocular em indígenas	Intraocular pressure	Mean IOP of 10.46 mmHg.
1998	Branco BC, et al	Achados oculares entre habitantes do Município de Pauini e possível associação entre lesões corneanas e mansonelose na Amazônia.	Onchocerciasis Mansonellosis Trachoma	Absence of the ocular manifestations of onchocerciasis. Absence of cases of trachoma. Presence of ocular lesions indicative of mansonellosis. Presence of ametropias.
1998	Carvalho RC, et al	Prevalence of glaucoma among indigenous people of the upper Amazon basin.	Glaucoma	Primary closed-angle glaucoma was the most frequent form detected.
1998	Garrido C, Carvalho RC, Thorn F, Cruz AAV	Pterygia & Cataracts in Forest dwelling and riverside indigenous people of the Upper Amazon basin	Pterygium and cataract	Riverine populations with pterygium and cataracts attributable to sun exposure.
1998	Machado AJ, et al	Axial ocular biometry in indigenous people of the Upper Amazon basin	Refractive errors	Absence of myopia and of the axial changes more commonly attributed to it.
1998	Thorn F, et al	Refractive Status of the indigenous people of the Upper Amazon basin	Refractive errors	Astigmatism is the change most frequently detected, with cases of myopia being rare.
1999	Carvalho RAC	Perfil epidemiológico do glaucoma em indígenas do Alto Rio Negro, Estado do Amazonas, Brasil.	Glaucoma	Frequency of glaucoma: 8.1%. Most frequent form: Primary closed-angle glaucoma.
1999	Espósito P, et al	Avaliação de doenças oculares na aldeia Fulni-Ô do estado de Pernambuco	Ocular Health	More frequent ocular changes: pterygium (13.05%), pinguecula (13.05%) and blepharitis (11.2%).
1999	Garrido CMB, Guidugli T, Campos M	Estudo clínico-laboratorial do tracoma em população indígena da Amazônia Brasileira	Trachoma	Although it appears with mild manifestations in infancy, the disease progresses and causes sequelae.
1999	Machado AJ	Prevalência de miopia, catarata e pterígeo em indígenas da bacia do Rio Negro.	Myopia, cataract and pterygium	Pterygium was more prevalent among riverine populations. Myopia was rare, affecting less than 5% of the individuals. The frequency of cataract did not differ between groups in different habitats.
1999	Redher JR, et al	Prevalência e causas de cegueira e baixa acuidade visual entre grupos indígenas da Amazônia Legal	Visual Acuity	Reduced visual acuity in 2% of the subjects evaluated. 2.7% of bilateral blindness.

(continuação) **Table 1: Subjects and main outcomes of the studies referenced in this review.**

Year	Author(s)	Study	Subject	Main outcome(s)
2000	Alves APX	Tracoma em quatro grupos populacionais da região do Alto e Médio Rio Negro	Trachoma	Expressive frequency of trachoma in all groups studied.
2000	Garrido CMB, Campos M	First report of presumed parasitic keratitis in Indians from the Brazilian Amazon	Mansonellosis	The findings suggest the presence of an association between the corneal lesions detected and mansonellosis.
2000	Garrido CMB	Saúde ocular em comunidades de índios e não-índios da região do Alto Rio Negro, Estado do Amazonas, Brasil.	Ocular Health	The findings for the Indians were, in decreasing order of frequency: ametropia, trachoma, pterygium, cataract, parasitic keratitis, retinal affections, glaucoma, leucoma, ambliopia, and bulbar atrophy.
2002	Alves APX, Medina NH, Cruz AAV	Trachoma and ethnic diversity in the Upper Rio Negro Basin of Amazonas State, Brazil.	Trachoma	Trachoma is endemic in the groups studied and its severity is related to the ethnic origin of the groups.
2002	Faro JCNA, Portes AJF, Portes ALF	Avaliação oftalmológica dos índios Tikunas	Ocular Diseases	Pterygium was the most prevalent finding and astigmatism was the ametropia most frequently detected.
2002	Paula JS	Trachoma em índios Yanomami do Médio Rio Negro	Trachoma	The inflammatory and cicatricial forms of trachoma were detected, but there were no cases of trichiasis or corneal opacification.
2002	Paula JS, Medina NH, Cruz AA	Trachoma among the Yanomami Indians	Trachoma	Endemicity of trachoma in all tribes visited, with the cicatricial form increasing with age.
2002	Reis ACPP, et al	Detecção de tracoma e doenças corneanas em índios da região do Alto Rio Negro	Trachoma	Nummular corneal opacifications, pterygium and trachoma in the subjects examined, 2.8% of whom had low visual acuity due to corneal lesions secondary to trachoma.
2002	Vieira JBF	Levantamento e avaliação epidemiológica como componentes sistêmicos do Programa de Eliminação da Oncocercose no Brasil.	Onchocerciasis	A high frequency of mild ocular involvement, with no cases of blindness.
2003	Scarpi MJ, Mello Filho PAA	Erros de refração em índios do Parque do Xingu	Refractive errors	Cases of myopia are absent or rare.
2004	Machado M	Perfil de morbimortalidade entre os índios Hupdah da região do Alto Rio Negro: uma proposta de pesquisa	Trachoma	There is a correlation between the precarious living conditions and the worse health indices in the region.
2004	Soares OE, Cruz AAV	Community-based transconjuntival marginal rotational cicatricial trachoma in Indian from the Upper Rio Negro basin	Trachoma	Cicatricial trachoma was considered in this study, which mentioned a surgical technique for the correction of cases of entropion and trichiasis.
2006	Paula JS, Thorn F, Cruz AAV	Prevalence of pterygium and cataract in indigenous populations of the Brazilian Amazon rain Forest	Pterygium and cataract	Four indigenous populations were grouped according to their social behavior. The prevalence of pterygium and cataract was higher in the group with a greater rate of sun exposure.

(continuação) **Table 1: Subjects and main outcomes of the studies referenced in this review.**

Year	Author(s)	Study	Subject	Main outcome(s)
2007	Buchillet D	Bibliografia crítica da saúde indígena no Brasil (1844-2006).	Visual acuity	Similar visual capacity of different indigenous populations.
2007	Piccinin MRM, et al	Baixa prevalência de discromatopsia, pela 4ª edição do teste pseudoisocromático HRR (Hardy, Rand e Rittler), da população indígena de etnia Terena da aldeia Lalimana, região de Miranda: Mato Grosso do Sul	Color Vision	Absence of color vision defects.
2008	Cruz AAV, et al	Prevalence of trachoma in a population of the Upper Rio Negro basin and risk factors for active disease	Trachoma	Total prevalence of trachoma: 8.9%. The prevalence of the active form was 11.1% in children aged 1-9 years and the prevalence of the cicatricial form was 22.4% in subjects aged 50-60 years. The risk factors associated with the active form seem to be mainly related to the indicators of low socio-economic conditions.

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