Causes of low vision in patients referred to the Low Vision Service in a Reference Center of Ophthalmology

Causas de baixa visão em pacientes encaminhados ao Serviço de Visão Subnormal em um Centro de Referência em Oftalmologia

José Maurício Garcia[1], Luciana Castro Lavigne[2], Éricka Campos Freitas[3], Lívia Maria Oliveira Salviano[4], João Jorge Nassaralla Neto[4], David Leonardo Cruvinel Isaac[5], Marcos Pereira de Ávila[5]

Abstract

Purpose: *To identify the prevalence of the most common diseases diagnosed in the Low Vision Service (LVS)* ***Methods:*** *Seven hundred and thirteen patient's clinical records were evaluated. The best corrected visual acuity (BCVA) in the better eye was collected. All of the diagnosed diseases related to visual impairment were identified and classified. A total of 220 patients (36.6%) fulfilled the concept of low vision (group 1), and 381 patients (63.39%) presented legal blindness (groups 2, 3, 4 and 5), according to the WHO Study Group on the Prevention of Blindness (Geneva, l972).* ***Results:*** *The most prevalent disorder was the group of Retinal Inherited Distrophies (n=124; 20.63%). Following the first group were Ocular toxoplasmosis with chorioretinal scars (118 cases, representing a prevalence of 19.63%), Myopic Maculopathy (38-6.32%), Age related Macular Degeneration (AMD) (36 cases, representing a prevalence of 6%).* ***Conclusion:*** *Planning and implementing preventive actions in ophthalmology requires appropriate comprehension about regional clinical problems. Social support, and a proper partnership between educational and health systems, are important to improve visual outcomes in patients diagnosed with low vision and legal blindness.*

Keywords: *Low vision; Public health; Blindness; Vision, low/epidemiology; Blindness/prevention & control*

Resumo

Objetivo: identificar a prevalência dos distúrbios mais comuns em pacientes do Serviço de Visão Subnormal do Centro de Referência de Oftalmologia (CEROF - UFG). **Método:** Foram avaliados 713 registros de pacientes, todos apresentavam erros refrativos corrigidos. Coletaram-se dois elementos: melhor acuidade visual corrigida (MAVC) no melhor olho e o diagnóstico da doença oftalmológica responsável pela deficiência visual. Todos os grupos etários foram incluídos, sem distinção entre sexo ou raça. **Resultados:** As doenças mais prevalentes foram distrofias retinianas hereditárias (124 pacientes; 20,63%), cicatrizes coriorretinianas por toxoplasmose (118-19,63%), maculopatia miópica (38-6,32%), Degeneração macular relacionada à idade (DMRI) (36-6%). 220 pacientes (36,6%) preencheram critério de baixa visão (grupo 1), e 381 (63,39%) apresentaram definição de cegueira legal (grupos 2, 3, 4 e 5) recomendada pelo Grupo de Estudos para a Prevenção da Cegueira WHO (Genebra, l972). **Conclusão:** Estudos nacionais mostram resultados semelhantes sobre cicatrizes coriorretinianas. Estudos epidemiológicos mostram maior prevalência de DMRI, provavelmente porque as clínicas oftalmológicas primárias falham no encaminhamento destes pacientes. A proporção de cegueira relacionada à ROP nos países desenvolvidos é maior, possivelmente porque não há plano de ação público oferecendo acompanhamento oftalmológico adequado para essas crianças. Não havia número significativo de pacientes com glaucoma congênito no departamento, o que pode se relacionar com as condições socioeconômicas e saúde no Brasil. Ações preventivas em oftalmologia necessitam de conhecimento científico de problemas oftalmológicos regionais aplicados à realidade, que será foco de tal ação. Um suporte social, incluindo parceria entre escola, família e sistema público de saúde, seria importante para gerar benefícios para a população.

Descritores: Baixa visão; Saúde Pública; Cegueira; Visão/epidemiologia; Cegueira/prevenção & controle

[1] Fellowship in Retina and Vítreo, Universidade Federal de Goiás, Goiânia, GO, Brazil.
[2] Fellowship in Vision, Universidade Federal de Goiás, Goiânia, GO, Brazil.
[3] Departament of Subnormal Vision, Universidade Federal de Goiás, Goiânia, GO, Brazil.
[4] Physician Graduation Course, Universidade Federal de Goiás, Goiânia, GO, Brazil.
[5] Departament of Ophthalmology, Universidade Federal de Goiás, Goiânia, GO, Brazil.

Local of study: Centro de Referência em Oftalmologia da Universidade Federal de Goiás (CEROF-UFG)

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Introduction

The current concept of "low vision" (LV), according to the 10th Revision of the International Classification of Diseases and Related Health Problems (ICD 10) by World Health Organization (WHO), includes patients with visual impairment, with a habitual correction, and a visual acuity (VA) worst than 20/70, but equal or better than 20/400, or less than 20° in radius around central fixation in the better eye with the best corrected visual acuity.[1, 2] The WHO refers 45 million patients diagnosed with legal blindness worldwide, and an additional of 135 million individuals visually impaired.[1-4] Taking into account the population growth and increased life expectancy, 76 million people might become blind by 2020, in case of no changes in our current health system.[5] Globally, uncorrected refractive errors and cataract remain as the most common diseases related to visual impairment, and cataract remains as the leading cause of treatable blindness in developing world.[6] Although highly prevalent, both are amenable to treatment. The WHO launched the "VISION 2020: right to sight" in 1999. The goal of this project is the elimination of avoidable blindness related to cataract, trachoma, onchocerciasis, vitamin A deficiency, and refractive errors.

Its most frequent cause in United States is Age related Macular Degeneration (AMD), accounting for almost half of visually impaired patients. International Among other important causes of blindness and visual impairment are glaucoma, corneal scarring, diabetic retinopathy, childhood blindness, trachoma and onchocercosis.[4,7-9] Approximately 2.9 million patients over the age of 40 are diagnosed with low vision (LV).[4] Kirchner and Petterson estimated that 71% of patients with LV are over 65 years old. [10,11] Symptoms attributed to clinical are also related closely with the ability to perform daily tasks, and a psychological support might provide low vision assistance (LVA). [3, 7, 12-15]

In Brazil, although the scarcity of previous studies, the WHO estimates that blindness prevalence affecting individuals over 50 years old is 1.3%, similar to Barbados and Paraguay.[4] In a study performed with patients attended in a tertiary service, retinal disorders accounted as the most common cause of LV, with uveitis coming as the second most common cause, and toxoplasmosis being the most frequent in uveitic group.[5] The frequency of toxoplasmosis and its ocular features is highly relevant in our population, possibly related to our public health conditions.[5, 6, 16, 17] All these data brings new elements and perspectives, different than was found in developed countries.

The purpose of this study is identifying the frequency and most common disorders diagnosed in patients attended in the low vision service (LVS) of Centro de Referência em Oftalmologia – Federal University of Goias, aiming to compare with previous data in Brazil.

Methods

A cross sectional study was conducted after analysis of 713 clinical charts, referred to the LVS at the Centro de Referência em Oftalmologia – Federal University of Goias Patients were referred from other outpatient subspecialties after complete ophthalmologic examination, including correction of refractive errors Patients were classified in legal blindness and visual impairment, according to the WHO score of distance visual acuity. The best corrected visual acuity (BCVA) in the better eye was collected, and the disease directly responsible for visual impairment was identified. All age groups were included in the study, and there was no distinction among sex or race. In the present study, all the patients on their first visit were evaluated by a specific questionnaire (in attachment), including a detailed anamnesis, BCVA, and, then, VA with optical aids tested according to each case. Patients' clinical data were assessed in a proper illuminated room, with interactive playground area for children, blackboard for training telescope and texts with various types for speed reading training. The BCVA was evaluated using the ETDRS (Early Treatment Diabetic Retinopathy Study) charts for literate patients (Lighthouse Illuminated Box; Lighthouse International, New York, NY) at different distances (50 cm; 1.0 m; 2.0 m and 4.0 m), and Lea Symbols (GoodLite, New York, NY) for illiterate children and adults, at different distances (75 cm; 1.5 m; 3.0m) individually. Patients with cognitive disorders and children with no ability to inform vision through any of these described methods were subjected to VA examination with the Teller cards. The patients were then classified into categories according to the WHO score of distance VA, separating VA into four strata [6] (Table 1).

Table 1
The classification of severity of visual impairment recommended by a WHO Study Group on the Prevention of Blindness (Geneva, l972).[6]

Visual Acuity with Best Possible Correction		
Category of Visual Impaiment	**Maximum less than**	**Minimum equal to or better than**
1	6/18 3/10 (0.30) 20/70	6/60 1/10 (0.10) 20/200
2	6/60 1/10 (0.10) 20/200	3/60 1/20 (0.50) 20/400
3	3/60 1/20 (0.05) 20/400	1/60 (CF at 1 meter) 1/50 (0.02) 5/300 (20/1200)
4	1/60 (CF at 1 meter) 1/50 (0.02) 50/300	Light perception
5	No light perception	
9	Undetermined/unspecified	

CF= central fixation
The term low vision in category H54 comprises categories 1 and 2 of the table, the term blindness categories 3, 4 and 5, and the term unqualified visual loss category 9.
In the extent of visual field is taken into account, patients with a field no greater than 10 degrees but greater than 5 around central fixation should be placed in category 3, patients with a field greater than 5 around central fixation should be placed in category 4, even if the central accuiy is not impaired.

Patients referred without registered VA, or not included in the definition of LV, incomplete clinical data or lack of confirmed diagnoses were excluded from the study. The Microsoft Excel for Mac 2011 (14.4.3; 140616) was the software package used for statistical analyses.

Results

The mean age of the subjects was 18.7 years, ranging from 2 months to 89 years old. Females responded for 62.5% of our population. The most prevalent diseases related to LV and visual impairment were Retinal inherited distrophies (n=124; 20.63%), followed by chorioretinal scars presumably caused by toxoplasmosis (19.63%; n = 118), myopic maculopathy (6.32%; n = 38) and AMD (6%; n = 36). When analyzed by the severity of the subnormal vision, 220 patients (36.6%) fulfilled the concept of low vision (Group 1), and 381 patients (63.39%) had the definition of legal blindness (Groups 2, 3, 4 and 5) (Table 1). Other causes of low vision were: Cerebral Palsy, corresponding to 35 patients (5.82%); Optic Neuropathy (n=34; 5.65%); Congenital Cataract (n=27; 4.5%); Diabetic Retinopathy (n=19; 3.16%); Glaucoma (n=17; 2.82%); Optic Nerve Hypoplasia (n=14; 2.33%), Congenital Glaucoma (n=14; 2.33%), Amblyopia (n=14; 2.33%), Retinal Detachment (n=14; 2.33%), Retinopathy of Prematurity (n=13; 2.16%), others (n=67; 11.14%) (Table 2).

Table 2
Frequency and causes of low vision in the Low Vision Service

Causes o low vision	Number	%
Retinal inherited distrophies	124	20.63
Ocular toxoplasmosis	118	19.63
Myopic maculopathy	38	6.32
Age related macular degeneration	36	6.00
Cerebal palsy	35	5.82
Optic neuropathy	34	5.65
Congenital cataract	27	4.50
Diabetic retinopathy	19	3.16
Glaucoma	17	2.82
Optic nerve hypoplasia	14	2.33
Congenital glaucoma	14	2.33
Amblyopia	14	2.33
Retinal detachment	14	2.33
Retinopathy of prematurity	13	2.16
Others	67	11.14
Total	601	100

Discussion

To our knowledge, this is the first population-based survey in our region that considered the prevalence of LV and its related disorders. Only the patients with corrected refractions errors were included, despite the fact of other studies still incorporate uncorrected refraction errors as causes of low vision and visual impairment.[15] It is known that patients with legal blindness usually are not referred to rehabilitation clinics.[18] According to Sampaio et al there is a direct relationship between VA and the application of LV aids to the patients. The use of optical and nonoptical aids aims to provide magnification of retinal image in patients with BCVA worse than 20/80, but better than 20/400. In patients with BCVA worse than 20/500, but better than 20/1000, the most indicated nonoptical aids are audio alternatives and tactile or "braile" labeling. [19]

In our study, adults with operable cataract and uncorrected refractive errors were excluded. Cataract remains one of the most prevalent disorder related to blindness.[4] In a study performed in an adult population in Bangladesh, the majority of legally blind people was diagnosed with operable cataract.[11] Carlos et al estimate the frequency of cataract in 4.94% of general population, and blindness related to cataract was found in 0.52% of this group of patients. These findings are similar to rates found in the developed world.[20] Uncorrected refractive errors were detected in 13.8% of patients in a study in Sao Paulo.[21] Both cataract and uncorrected refractive errors occur worldwide, but have sight-restoring interventions.[22-26]

However, patients referred to a LVS are already diagnosed with untreatable disorders. In the present study, chorioretinal scars presumably related to ocular toxoplasmosis was the major cause of LV, including its congenital and acquired forms. National studies has shown similar results, with different frequency observed according to geographic distribution, such as found in Bahia (10.4%) and in São Paulo (16.7%).(16,17) The macular retinochoroiditis, related to ocular toxoplasmosis, is the most frequent posterior uveitis in Brazil, affecting 60 - 85% of patients in a uveitic studied group.[6] It is an important disease associated to visual impairment in the world, with a relative higher incidence in our country, considering daily practices, and general public health conditions.[6, 16, 17] In Norway, it was found a 0.17% frequency of primary infection during pregnancy, among previously noninfected women.[26]

In United States, both dry and wet forms of AMD correspond to the most common primary diagnosis (55%) in patients under visual rehabilitation[7, 8] affecting approximately 2 million adults.[7] In Bangladesh, macular degeneration responds for 1.86% of subjects with LV.[1] In our study, 6% of the patients have been diagnosed with AMD, but Silva et al found it in 20.8% in a tertiary service.[5] It is important to highlight how primary ophthalmic clinics are referring patients diagnosed with AMD, since it is known that initial diagnosis and early treatment may avoid visual loss, when referred appropriately.

Retinopathy of prematurity (ROP) corresponded to 2.16% of our group studied. The prevalence of blindness related to ROP in the developed world ranges from 6 to 18%.[25-29] In Latin America, ROP accounts for a third to a half of infants with severe visual impairment, and its appearance may be an indicator of perinatal quality, associated with higher survival in low birth weight infants.[23, 24] Although the social advances, there is no action plan to provide an appropriate ophthalmologic follow up for these infants.

The congenital cataract, or patients operated after prior diagnosis, was found in 4.5% of our patients. Cataract accounts for 5% to 20% of childhood blindness, and patients with untreated cataract, or treated in a late moment, represent 10% of children attending schools for the blind in developing countries.[16, 24-26,29] Rodrigues et al presented 13 infants diagnosed with congenital cataract in a group of 29 children.[28]

In the present study, among 601 patients, 14 had congenital glaucoma. International data indicate that congenital glaucoma accounts for 6% of blind children worldwide [16,30] It is important to point out that, in developing world, corneal scarring is still a frequent cause of LV, mainly resulting of vitamin A deficiency. Haddad et al. demonstrated that corneal scarring accounts for 20% to 50% of the blind children.[16] In the present study, it was not found a significant number of patients affected, which might

be related to improvement in social, economical and health care conditions in Brazil.

Conclusion

It has been stated that planning, and implementing preventive actions in ophthalmology, require scientific knowledge of regional ophthalmologic problems, applied to the reality that will be the object of such actions.Furthermore, early diagnosis and aggressive treatment also may have prevented a significant amount of LV caused by AMD and diabetic retinopathy in our population. This indicates that a social support, including a partnership between school, family and general health public system, would be important to generate good visual outcomes.

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Corresponding author:
José Maurício Garcia
Av. Primeira Avenida, S/N - Setor Leste Universitário,
Zip code: 74605-020, Goiânia GO, Brazil.
Phone: + 55 (62) 3269-8200
E-mail: zemauricio@hotmail.com