Prevalence of visual impairment, blindness, ocular disorders and cataract surgery outcomes in low-income elderly from a metropolitan region of São Paulo - Brazil

Prevalência de cegueira, deficiência visual e alterações oculares numa população idosa e de baixa renda na cidade de São Paulo

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ABSTRACT

Purpose: To determine prevalence and causes of visual impairment, blindness, ocular disorders and cataract surgery outcomes in a low-income elderly population from a metropolitan area in the city of São Paulo, Brazil. **Methods:** Observational study where 801 individuals of 60 years and older underwent presented and best corrected visual acuity measurements as well as ophthalmologic examination. Definition of blindness and visual impairment followed studies conducted in Nepal, China and India. **Results:** The prevalence of presented and best-corrected visual acuity worse than 20/400 in both eyes was 1.38% (95% CI: 0.69% - 2.45%) and 1.25% (95% CI: 0.60% - 2.29%). Prevalence of visual impairment considering presented and best-corrected visual acuity was, respectively, 24.16% (95% CI: 21.22% - 27.28%) and 12.77% (95% CI: 10.53% - 15.28%). Cataract was the main cause of blindness (30.00%) and visual impairment (54.90%). A total of 54 participants (6.74%) had previous cataract surgery and, with best-corrected visual acuity, 35.12% showed visual acuity better than 20/60 in both eyes. Rates of visual impairment and blindness in this low-income elderly population were high. There was a considerable decrease in prevalence after optical correction emphasizing the importance of uncorrected refractive errors. **Conclusion:** Cataract was the main cause of blindness; poor visual outcomes in eyes previously operated for cataract reinforce the need to seek good quality cataract services and to provide careful postoperative follow-up.

Keywords: Blindness/epidemiology; Visual disorders/epidemiology; Refractive errors/epidemiology; Cataract/epidemiology; Aged; Brazil

Trabalho realizado no Instituto da Visão da Universidade Federal de São Paulo - UNIFESP - São Paulo (SP) - Brasil.

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Support
Department of Science, Technology, Tourism and Economical Development of the State of São Paulo - SCTTDE (Secretaria da Ciência, Tecnologia, Turismo e Desenvolvimento Econômico do Estado de São Paulo) agreement #244/01.

Recebido para publicação em 06.03.2007
Última versão recebida em 19.11.2007
Aprovação em 10.12.2007

INTRODUCTION

The latest estimates of the World Health Organization (WHO) indicate that there are 161 million visually impaired people worldwide, 37 million of which are blind, with a yearly increase of 1 to 2 million - this means approximately 0.85% of the world population. Another 135 million show visual impairment[1]. Prevalence of blindness increases with age, mainly after 50, being higher in rural areas and among women, probably because of their socioeconomical vulnerability, as well as the obstacles they face to access health services[2].

The number of individuals aged 60 years and over is rapidly increasing, coinciding with a massive urbanization and quick decline of mortality and fertility rates. According to recent estimates, by the year 2025, Brazil will show the sixth largest concentration of elderly in the world, over 32 million, representing almost 13% of the Brazilian population[3].

The impact of visual loss on the personal, economic and social life is profound. Population-based research has shown that at a best-corrected visual acuity (BCVA) 20/60 or less, 85% of people aged 65 and over cannot read standard newspaper effectively (they read less than 80 words per minute). Among people with a BCVA less than 20/100, 87% have significant difficulty recognizing faces. At 20/200, over 50% of people have difficulty with mobility, and over 66% have difficulty with simple tasks such as dialing a phone number, or using a key or plug correctly[4].

In a recent estimate of the World Health Organization (WHO), Brazil was included in a subregion along with Barbados and Paraguay, where the estimate of blindness prevalence in individuals over 50 years old was 1.3%, representing almost a million people[1]. Table 1 shows several recent studies around the world on the prevalence of visual impairment and blindness, as well as the major causes and the parameters used to define them in populations with 40 years and older.

Cataract is the main cause for 47.8% of blindness in the world. Cataract surgery is considered one of the most cost-effective intervention to restore sight[5]. Glaucoma (12.3%), age-related macular degeneration (AMD) (8.7%), corneal opacities (5.1%) and diabetic retinopathy (4.8%) are also important causes of blindness, besides childhood blindness (3.9%), trachoma (3.6%) and onchocercosis (0.8%)[1-2,4].

Refractive errors were not considered an important blindness cause since most studies used best-corrected visual acuity (VA) for distance as their main outcome measure. However, in 1999, WHO has recommended the elimination of this condition of reversible blindness and has included it as a priority in the "Vision 2020 Project - Right to Sight"[6-7].

In Brazil, there is a large variation in the rates of blindness and visual impairment. The rates range from 0.1% to 6.8%, and there is no standardization of the criteria used for blindness and visual impairment definition. The major causes of blindness and visual impairment were cataract and uncorrected refractive errors[8-9].

Scarcity of ocular epidemiological data in Brazilian metropolitan areas[1,10-12], associated with the interest of the Department of Science, Technology, Tourism and Economical Development of the State of São Paulo [DSTTED] in obtaining health data about the elderly, encouraged the development of an epidemiological study by the Reference Center for the Elderly - RCE (Centro de Referência do Idoso-CRI), an entity of the Health Department of the State of São Paulo. RCE action area comprehends approximately 24 km^2 of the metropolitan region of São Paulo East Zone 2, called São Miguel Paulista, consisting of 5 districts: Ermelino Matarazzo, Itaim Paulista, São Miguel, Vila Curuçá, and Vila Jacuí.

According to the Brazilian Census of the year 2000, the total number of elderly in that area was 43,721 individuals, 58% female and 42% male[13]. It is a high demographic density zone, with a total of 705,385 inhabitants. In that area, 11.6% of the heads of households have no income at all, 10.2% have income between > 0 and 1 current minimum wage (MW); 32.4% between > 1 e 3 MW; 21.0% between > 3 and 5 MW; 18.5 between > 5 and 10 MW; 5.1% between > 10 and 20 MW and only 1.2% with income above 20 MW per household[14].

The purpose of the present study was to determine the prevalence of blindness, visual impairment and their respective causes, and the frequency of ocular disorders, as well as cataract surgery outcomes in a sample of the low-income elderly population living in São Miguel Paulista region, in the city of São Paulo, Brazil.

METHODS

Participants

This cross-sectional study was conducted from April to July 2002 in the facilities of the RCE, and was approved by UNIFESP's Ethics in Research Committee.

Participants were 801 individuals with 60 to 90 years of age (mean: 69.0 ± 6.1 yrs; 206 men and 595 women) and the study sample was obtained in two stages: 34.5% of the individuals were drawn from lists supplied by senior groups in the area, and 65.5% through active search in RCE's appointment schedule. The criteria for inclusion were the signature on the informed consent form and the age ≥60 at the date of the ophthalmologic examination.

Table 2 shows age and gender distribution of the 801 participants. Most of them were females (74.28%) and 60.42% were less than 70 years old.

Procedures

Examinations were taken at RCE's facilities where eight workstations were installed. The field team consisted of the following members: 6 experienced ophthalmologists (MD), 4 ophthalmic technologists, 7 ophthalmic technology undergraduate students, 1 psychologist, 1 nurse, 3 nurse's aides, 2 research assistants, 2 logistics assistants, 5 administrative assistants, 2 volunteers (from senior groups), 10 volunteers (Lions Club), 2 medical coordinators, 1 research coordinator and 1 general coordinator.

The following procedures were applied to all participants: *Presented visual acuity (VA) measurement*: monocular with or without glasses, according to what the patient was wearing at the time of the examination. For distance VA, a printed tumbling "E" optotype chart was used at five meters, and for near VA, Jaeger's tumbling "E" optotype chart was used at 40 cm, both with adequate light conditions. *Computerized refractometry*: refractive errors were evaluated by an automated system. *Refractometry*: Best-corrected

Table 1. Studies on prevalence of visual impairment and blindness in the world in the last 10 years

Country	Studies	N	Age (yrs)	VA criteria	Type	Vis imp prev
Austrália	Blue mountains (1996)[25]	3647	≥ 49	≤ 20/40 - > 20/160	BCVA	4.00%
	Visual Impairment Project (1996)[35]	4744	≥ 40	< 20/60	BCVA	1.34%
Brazil	Esteves et al. (1996)[8]	1369	0 a 94	-	-	-
	Arieta et al. (2003)[8]	60404	≥ 50	≤ 20/100	PA	18.97%
Caribbean	Barbados Eye Study (1997)[34]	4631	40-84	20/60 - 20/400	BCVA	5.70%
China	Zhao et al. (1998)[17]	5052	≥ 50	< 20/60 - 20/400	PA	25.75%
	Michon et al. (2002)[18]	3441	≥ 60	< 20/60 - 20/400	PA	31.60%
Denmark	Copenhagen Eye Study (2001)[27]	946	60-80	< 20/60 - 20/400	BCVA	1.58%
EUA	SEE project (Salisbury) (2000)[24]	2520	65-84	< 20/40 - > 20/200	BCVA	3.37%
	Proyecto Ver (2002)[36]	4774	≥ 40	< 20/40 - > 20/200	BCVA	1.92%
	LALES (2004)[26]	6357	≥ 40	≤ 20/40 - 20/160	BCVA	3.00%
The Netherland	Rotterdam Study (1998)[33]	6775	≥ 50	< 20/60 - 20/400	BCVA	1.44%
India	Murthy et al. (2001)[23]	4284	≥ 50	< 20/60 - 20/400	BCVA	10.20%
	Nirmalan et al. (2002)[21]	5411	≥ 50	< 20/60 - 20/400	BCVA	10.10%
	Aravind Eye Study (2003)[37]	5150	≥ 40	< 20/60 - 20/400	MC	13.40%
Nepal	Phokarel et al. (1998)[20]	4602	≥ 45	< 20/60 - 20/400	BCVA	6.10%
Paraguay	Duerksen et al. (2004)[19]	2136	≥ 50	< 20/200	PA	10.74%
Taiwan	Shihpai Eye Study (2004)[38]	1361	≥ 65	< 20/60 - 20/400	BCVA	2.94%

Table 1 (Cont.). Studies on prevalence of visual impairment and blindness in the world in the last 10 years

Country	Main causes of visual impairment	Type	VA criteria	Blindness prevalence	Main causes of blindness
Austrália	Cataract, AMD and glaucoma	BCVA	≤ 20/200	0.70%	AMD, cataract
	Refractive error, AMD	BCVA	≤ 20/200	0.34%	AMD, glaucoma
Brazil	-	BCVA	< 20/200	3.00%	Cataract, scar of corioretinitis, DR
	Refractive error, cataract, AMD, glaucoma	-	-	-	-
Caribbean	-	BCVA	< 20/400	1.70%	Cataract and glaucoma, retinal diseases
China	Cataract, refractive error	E	< 20/400	1.70%	Cataract, retina diseases, corneal opacities
	Refractive error, cataract	E	< 20/400	0.70%	Cataract, AMD, glaucoma
Denmark	AMD, cataract, glaucoma	BCVA	< 20/400	0.53%	AMD, glaucoma, retinitis pigmentosa
EUA	Cataract, AMD, DR	BCVA	≤ 20/200	0.83%	AMD, optic atrophy and glaucoma/DR
	Cataract, AMD, DR, glaucoma	BCVA	≤ 20/200	0.29%	Glaucoma, cataract, AMD/DR
	Cataract, DR, Glaucoma, AMD	BCVA	≤ 20/200	0.40%	DR, glaucoma, cataract, AMD
The Netherland	Cataract, AMD, miopic degeneration	BCVA	< 20/400	0.47%	AMD, glaucoma, miopic degeneration
India	Cataract, refractive error	BCVA	< 20/400	5.10%	Cataract, refractive error, corneal infeccion
	Cataract, refractive error	BCVA	< 20/400	3.00%	Cataract, refractive error, AMD
	Refractive error, cataract	BCVA	< 20/400	1.00%	Cataract, glaucoma, optic atrophy
Nepal	Refractive error, cataract	BCVA	< 20/400	3.00%	Cataract, refractive error, trachoma
Paraguay	Cataract	E	< 20/400	3.14%	Cataract
Taiwan	Cataract, miopic degeneration, AMD	BCVA	< 20/400	0.59%	Cataract, AMD, high miopia

VA= visual acuity; BCVA= best corrected visual acuity; E= VA with pinhole; PA= presenting VA; AMD= age-related macular degeneration; DR= diabetic retinopathy

VA was recorded after refraction using streak retinoscopy. *Biomicroscopy with slit lamp*: Detailed external eye examination, anterior segment and intraocular pressure (IOP) measurement were performed. *Indirect ophthalmoscopy*: Retinal status, including vessels, macula and optic disc features were evaluated, and whenever necessary, fundus biomicroscopy was also performed. *Management and referral*: Free eyeglasses were provided by the joint program with the Brazilian Health Ministry/UNIFESP for those in need of prescription. For tertiary care a referral slip to UNIFESP was provided.

Classification of vision categories

Bilateral vision condition was reported using the following five vision categories for both presented and best-corrected VA used in previous reports[16-17]. *Severe bilateral blindness*: VA < 20/400 in both eyes. *Moderate bilateral blindness*: VA < 20/200 in the worse eye and VA < 20/200 to ≥ 20/400 in the better eye. *Unilateral blindness*: VA < 20/200 in the worse eye and VA ≥ 20/200 in the better eye. *Bilateral or unilateral impaired vision*: VA < 20/60 to ≥ 20/200 in the worse eye and VA ≥ 20/200 in the better eye. *Normal or near normal vision*: VA ≥ 20/60 in both eyes.

RESULTS

Prevalence of visual impairment and blindness

Table 3 shows visual impairment and blindness prevalence based on presenting and BCVA. Of the 801 examined elderly, 2 (0.25%) did not inform the VA due to cognitive impairment. Normal or near normal vision was found in 516 (64.58%) of the elderly. After optical correction, this number increased to 632 (79.10%).

Eleven (1.38%) elderly exhibited severe bilateral blindness, 8 (1.00%) moderate bilateral blindness, 71 (8.89%) unilateral blindness, 193 (24.16%) unilateral or bilateral visual impairment. After best optical correction, these figures decreased respectively to: 10 (1.25%), 2 (0.25%), 53 (6.63%) and 102 (12.77%).

Main causes of visual impairment and blindness

Main causes of visual impairment and blindness (presenting VA and BCVA) are shown in table 4. Individuals with visual impairment or blindness may have different causes for it in each eye. These cases are represented twice - once for each cause. Taking the presented VA into consideration, the most common cause for visual impairment and unilateral blindness was uncorrected refractive error. Cataract was the main cause of visual impairment and blindness, following adequate optical correction.

Among those 11 elderly with severe bilateral blindness (presenting VA), the main causes were cataract (27.27%) and diabetic retinopathy (18.18%). With the best correction, among the 10 elderly who presented severe bilateral blindness, the main cause was cataract in 3 (30.00%), followed by 2 (20.00%) with diabetic retinopathy and 2 (20.00%) with absence/disorganization of the ocular bulb. Of the 10 elderly with severe bilateral blindness, 7 (70.00%) were females and 3 (30.00%) were included in those aged 80 or above. For both unilateral and bilateral visual impairment (presenting VA), uncorrected refractive error (53.37%) and cataract (45.08%) were the main causes among 193 (24.16%) elderly.

After the best optical correction among 102 (12.77%) elderly, the main causes were: cataract (54.90%), refractive error (38.24%) and retinal disorders (25.55%). Age-related macular degeneration and diabetic retinopathy were the most common conditions in the retinal disorders category.

Prevalence of ocular disorders

Table 5 shows the frequency of ocular disorders in 1,602 eyes of the 801 participants. Uncorrected refractive error was the most prevalent, affecting 1,138 eyes (71.04%), followed by cataract in 253 (15.79%), retinal disorders (5.99%) and glaucoma in 20 (1.25%).

Tertiary care at UNIFESP´s Vision Institute

The main reasons for tertiary referral of the 223 (27.84%) elderly to the Institute of Vision are shown in table 6. Elderly who needed referrals could have different causes of visual impairment in each eye. These cases were represented twice - once for each cause. Considering BCVA, cataract surgery was the main reason of referral in 77 (9.61%) cases. Other important reasons for referrals consisted of retinal disorders in 64 (7.99%), for diagnostic confirmation, follow-up and/or glaucoma treatment in 54 (6.74%) and for corneal disorders in 10 (1.25%).

Cataract surgery outcomes

Fifty-four (6.74%) of the 801 elderly examined had been previously submitted to cataract surgery; 27 in one eye only and 27 in both eyes. The distribution of the 54 patients previously submitted to cataract surgery, according to the classification of vision with the presented and best-corrected VA is shown in table 7.

Of the 54 patients previously submitted to cataract surgery, 2 had severe bilateral blindness even with the best optical correction, and 3 who formerly had moderate bilateral blindness moved to less severe visual categories, after the best optical correction. The main causes of blindness in these cata-

Table 2. Distribution by gender and age of the 801 participants

Age	Sex				Total	
	Female		Male			
	N	%	N	%	N	%
60-69	366	61.51	118	57.28	484	60.42
70-79	197	33.11	68	33.01	265	33.08
≥80	32	5.38	20	9.71	52	6.49
Total	595	74.28	206	25.72	801	100.00

Table 3. Prevalence of vision categories of the studied 799 elderly

Vision categories	Normal or near normal	Uni or bilateral visual impairment	Unilateral blindness	Moderate bilateral blindness	Severe bilateral blindness	Total (Pres. VA)
NN	516 (64.6% [61.2; 68.0])	-	-	-	-	516 (64.6% [61.1; 67.9])
V Imp	111 (13.9% [11.6; 16.5])	82 (10.3% [8.3; 12.6])	-	-	-	193 (24.2% [21.2; 27.3])
U Blind	4 (0.50% [0.1; 1.3])	20 (2.5% [1.5; 3.8])	47 (13.9% [11.6; 16.5])	-	-	71 (8.9% [7.0; 11.0])
M Blind	1 (0.1% [0.0; 0.7])	-	5 (0.6% [0.2; 1.5])	2 (0.3% [0.0; 0.9])	-	8 (1.0% [0.4; 1.9])
S Blind	-	-	1 (0.1% [0.0; 0.7])	-	10 (1.3% [0.6; 2.3])	11 (11.4% [0.7; 2.5])
Total (BCVA)	632 (79.1% [76.1; 81.9])	102 (12.8% [10.5; 15.3)	53 (6.6% [5.0; 8.9])	2 (0.3% [0.0; 0.9])	10 (1.3% [0.6; 2.3])	799

Pres.VA= presenting visual acuity; BCVA= best corrected vision acuity; Notice= number (prevalence [reliability interval 95%]); NN= normal or near normal; V Imp= uni or bilateral visual impairment; U Blind= unilateral blindness; M blind= moderate bilateral blindness; S blind= severe bilateral blindness

Table 4. Prevalence of the main causes of visual impairment/blindness according to presented and best-corrected visual acuity

Main causes*	Visual impairment Uni or bilateral		Unilateral blindness		Moderate blindness		Severe blindness	
	Pres.VA	BCVA	Pres.VA	BCVA	Pres.VA	BCVA	Pres.VA	BCVA
Refractive error	53.37	38.24	57.75	50.94	12.50	-	-	-
Cataract	45.08	54.90	38.03	35.85	25.00	-	27.27	30.00
Retinal disorders (all)	15.03	22.55	32.39	37.74	37.50	-	36.36	40.00
AMD	3.11	6.86	7.04	7.55	-	-	-	-
Diabetic retinopathy	3.11	1.96	1.41	3.77	12.50	-	18.18	20.00
Other retinal disorders	8.81	13.73	23.94	26.42	25.00	-	18.18	20.00
Amblyopia	4.66	2.94	5.63	7.55	-	-	-	-
Glaucoma	3.11	2.94	5.63	9.43	25.00	50.00	9.09	10.00
Optical atrophy	2.07	3.92	2.82	5.66	25.00	50.00	-	-
Posterior capsule opacity	2.07	0.98	2.82	3.77	-	-	-	-
Absence/disorganization of bulb	-	-	5.63	7.55	-	-	18.18	20.00
Corneal disorders (in the visual axis)	2.59	4.90	12.68	16.98	-	-	9.09	10.00
Undetermined	5.18	5.88	5.63	-	-	-	-	-

* Cause in one or both eyes, thus total percentage exceeds 100%

Other retinal disorders= scarred focal macular chorioretinitis/maculopathy/macular edema/subretinal membrane/retinal vascular oclusion/retinal detachment/myopic degeneration/macular hole; Corneal disorders in the visual axis= pterigyum/degeneration/opacity/edema

Table 5. Prevalence of ocular disorders in the 1,602 eyes of 801 participants

	N	%
Refractive error	1,138	71.04
Cataract	253	15.79
Retinal disorders	96	5.99
Glaucoma	20	1.25
Corneal disorders (in the visual axis)	18	1.12
Optic atrophy	16	1.00
Amblyopia	14	0.87
Posterior capsule opacity	9	0.56
Absence/disorganization of bulb	8	0.50
Undetermined	14	0.87
No visual impairment	16	1.00
Total	1,602	100.00

AMD= 25 (1.56%); DR= 20 (1.25%); Other retinal disorders= 51 (3.18%)

ract-operated eyes (with the best optical correction) are shown in table 8. It was observed that corneal edema was the most prevalent cause, occurring in 4 (30.77%) of the operated eyes classified as blind.

DISCUSSION

Although the conducted epidemiologic study has not utilized an ideal resident-based sampling, some variables may be used to compare the elderly population resident in the area to the one selected for the study. As the response rate was low among those randomly drawn from senior groups list, and in order to avoid any systematic bias in the selection of the remaining 2/3 of the sample, we chose to select the participants from all the RCE's lists of appointments scheduled for five different days and hours of the week, including those listed in non-medical activities - recreational activities such as arts and crafts, dance, music etc.

The age distribution found in the total sample is comparable to the elderly population in the studied administrative districts, i.e., 61.3% under 70 years of age[13] versus the 60.42% found in the present study, for this same age range. As to gender distribution, there was a higher representation of women (74.28% vs. 57.8%). This is a common phenomenon in field surveys, as they depend on the attendance at institutions and on the compliance with proposals for interviews and clinical examinations. Some possible factors for this unbalanced gender distribution could be a greater participation of women in community groups and their higher life expectancy[14-15].

The lack of standardization for the VA classification criteria and the difference in the studied sample composition contribute to the prevalence disparities in different studies, which follow the current criteria of presented VA and BCVA, unlike others which have used only presented VA[9] or pinhole acuity[16-18]. A major aspect is the classification of vision in more representative categories, so as not to underestimate the results[16,19-22]. It is important to point out that the classification used in this study considered bilateral visual condition, therefore classifying the vision condition per individual and not only per each eye. Eleven (1.38%) with presented VA were included in severe bilateral blindness criteria; after optical correction, however, the number decreased to 10 (1.25%).

Cataract was the main cause of severe bilateral blindness in 30.00% of the cases, a much lower rate than the almost 60% estimated for South America[11]. Retinal disorders were important as well and were found in 5.99% of the cases, representing the third major cause of unilateral blindness among visually impaired individuals. It has also been the second major cause for referral to the tertiary service in 64 cases. Furthermore, there were 2 cases of severe bilateral blindness due to diabetic

retinopathy in our study, as well as 2 others due to other retinal causes. Unlike international reports of industrialized countries with a predominantly Caucasian and Latino populations[23-26] in the present study AMD was not considered as one of the main causes of blindness and these findings are in line with other Brazilian studies[8-9].

We found one case of severe bilateral blindness due to glaucoma. In spite of the difficulty to diagnose this disease, it also proved to be responsible for 11 of the 130 blind eyes. However, this figure might have been underestimated, as there were 54 referrals for the tertiary medical service for glaucoma suspicion. There is much controversy about diagnostic parameters for glaucoma, mainly how to detect its initial stages, since intraocular pressure (IOP) measurement by itself is not sufficient[27]. Criteria used in the present study went beyond the IOP, taking into consideration also cup/disc ratio (CDR) ≥ 0.7 and interocular asymmetry ≥ 0.2 in CDR, neuroretinal rim width reduced to ≤ 0.1 CDR and/or peripapillary hemorrhage[28-29].

Prevalence of unilateral or bilateral impairment found in the present study was 24.16%, with significant reduction to 12.77%, after the best optical correction. Data collected from 74 "Cataract-Free Zone" projects in the Campinas area and neighboring towns in the state of São Paulo, in individuals aged 50 and over showed uncorrected refractive errors (47.5%), followed by cataract (23.6%) as the main causes of visual impairment[9].

Surgical cataract technique used may impact on visual results[19,21-22]. In the present study, 54 participants were previously submitted to extracapsular extraction or to crystalline lens phacoemulsification. Nevertheless, only 27.78% of those had normal or near normal presented VA. In addition, 13 (16.05%) of the 81 operated eyes (BCVA) remained blind due to surgical complications. In more than half of these surgical complication cases, the main cause found (30.77%) was bullous keratopathy. A possible cornea transplant might contribute to the reversion of this blinding condition. Other 2 (15.38%) exhibited vision improvement after capsulotomy.

Besides investing in the reduction and prevention of the main causes of blindness and visual impairment, it is always necessary to strive for better quality of surgical techniques as well as extended postsurgical monitoring in order to achieve good visual results, thus eliminating the recurrence of visual impairment condition or of blindness among individuals submitted to cataract surgery[9,22,30].

Even with the best optical correction, only about 35.19% of those subjects presented normal or near normal VA. This fact suggests the undertaking of larger studies, with greater sampling, in order to determine the actual influence of the technical quality of cataract surgery for this population.

Table 6. Distribution of the causes of tertiary assistance at UNIFESP to the 801 participants

Causes of referral	N	%
Cataract surgery	77	9.61
Retinal diseases	64	7.99
Glaucoma or suspicion of this disease	54	6.74
Corneal disorders (in the visual axis)	10	1.25
Disorders of optic disc	7	0.87
Posterior capsule opacity	7	0.87
Eyelid disorders	3	0.37
Contact lens (unilateral aphakia)	1	0.12
Subtotal	223	27.84
Total	801	100.00

Table 7. Distribution of the 54 patients previously operated for cataract, according to vision categories, considering the presented and best-corrected visual acuity

Classification of vision	Presented VA		Best correction	
	N	%	N	%
Normal or near normal	15	27.78	19	35.19
Unilateral or bilateral visual impairment	20	37.04	19	35.19
Unilateral blindness	14	25.93	14	25.93
Moderate blindness	3	5.56	-	0.00
Severe blindness	2	3.70	2	3.70
Total	54	100.00	54	100.00

CONCLUSION

Initiatives such as provision of eyeglasses free of charge or carrying out permanent actions for assisting cataract and

Table 8. Main causes of blindness considering visual acuity with best optical correction in 13 eyes after cataract surgery

Main cause	Bilateral blindness		Unilateral blindness		All blind eyes	
	N	%	N	%	N	%
Corneal edema after cataract surgery		-	4	44.44	4	30.77
Diabetic retinopathy	2	50.00	-	-	2	15.38
Absence/disorganization of bulb	2	50.00	-	-	2	15.38
Posterior capsule opacity			2	22.22	2	15.38
Optic atrophy		-	1	11.11	1	7.69
Corneal opacity			1	11.11	1	7.69
Macular hole		-	1	11.11	1	7.69
Total	4	100.00	9	100.00	13	100.00

diabetic retinopathy patients are fundamental to fight reversible causes of blindness in the elderly. The results obtained in this research project led to the necessary guidelines in ophthalmology for that specific region. Data were presented in a technical report to the DSTTED and served as basis for the implementation of the Ophthalmology Service at the Prof. Alípio Correa Neto Town Hospital (Ermelino Matarazzo Hospital) forming a partnership between the Institute of Vision - UNIFESP, Health Administration of the City of São Paulo and Lions Club International. This service started in the year 2003, and provides greater complexity ophthalmic procedures in that hospital.

RESUMO

Objetivo: Determinar a prevalência e causas de deficiência visual, cegueira além dos resultados de cirurgia de catarata numa população idosa de baixa renda de São Miguel Paulista, distrito da cidade de São Paulo. **Métodos:** Estudo observacional no qual a acuidade visual apresentada e com a melhor correção óptica foi medida em 801 indivíduos com 60 anos ou mais anos, bem como realizado exame oftalmológico. Definição de cegueira e deficiência visual seguiu estudos prévios realizados no Nepal, China e Índia. **Resultados:** As prevalências de acuidade visual apresentada e com a melhor correção óptica pior do que 20/400 em ambos os olhos foram 1,38% (intervalo de confiança de 95%: 0,69% - 2,45%) e 1,25% (intervalo de confiança de 95%: 0,60% - 2,29%). As de deficiência visual considerando a acuidade visual apresentada e com a melhor correção óptica foram, respectivamente, 24,16% (intervalo de confiança de 95%: 21,22% - 27,28%) e 12,77% (intervalo de confiança de 95%: 10,53% - 15,28%). Catarata foi a principal causa de cegueira (30,00%) e deficiência visual (54,90%). Cirurgia prévia de catarata foi realizada em 54 participantes (6,74%) e 35,12% mostraram acuidade visual com a melhor correção óptica melhor do que 20/60 em ambos os olhos. Houve considerável diminuição nas prevalências de deficiência visual e cegueira após a correção óptica. **Conclusão:** Catarata foi a principal causa de cegueira. Os resultados visuais ruins nos olhos operados reforçam a necessidade de serviços de boa qualidade e de seguimento pós-operatório cuidadoso.

Descritores: Cegueira/epidemiologia; Transtornos da visão/epidemiologia; Erros de refração/epidemiologia; Catarata/epidemiologia; Idosos; Brasil

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