Relationship between sociodemographic and clinical factors with visual impairment in patients attended at two ophthalmological institutions of the city of Medellín during 2015

Relación entre factores sociodemográficos y clínicos con la discapacidad visual en pacientes atendidos en dos instituciones oftalmológicas de la ciudad de Medellín durante el 2015

Aníbal J. Cabrales-López^{1,2,3}, John A. Isaza-Arias^{1,2,3}, Laura Quintero-Gutiérrez^{1,2,3}, Christian Ramírez-Rodríguez^{1,2,3}, Valentina Serna-Loaiza^{1,2,3}, Yudy Aguilar¹ and Juan C. Suárez-Escudero^{1,2*}

¹School of Medicine; ²Line of Research on Disability, Public Health Research Group; ³Seedbed of the Faculty of Medicine. School of Health Sciences (ECS), Universidad Pontificia Bolivariana (UPB), Medellín, Colombia

Abstract

Visual impairment represents a significant challenge on quality of life, generating an increase in the years of life adjusted for disability. Awareness on the associated risk factors allows taking actions to benefit this population, since most causes are preventable, and limitations and restrictions on functioning can be improved with an early diagnosis and functional-comprehensive rehabilitation; it is important to know the social and clinical risks to which this population is exposed. **Objective:** To determine the relationship between sociodemographic and clinical factors with visual impairment in patients treated at two ophthalmological institutions in Medellín during 2015. **Methodology:** Cross-sectional, analytical study in a population of 180 patients with some degree of permanent visual impairment, attended at two specialized institutions. **Results:** In the group of patients with visual impairment, the average age was close to 50 years and the following characteristics predominated: female sex (55.6%), low level of education (50.9%), unemployment (67.9%), alcohol (23.6%), tobacco (15%) and psychoactive substance (4.71%) use; 67.9% had at least one ocular and non-ocular comorbidity, especially diabetes mellitus (75%) and arterial hypertension (33.9%). **Conclusion:** In patients with visual impairment, higher percentages of the mentioned variables were observed compared to patients with visual deficiency but without criteria for visual impairment, suggesting a relationship between these with disability, either as a risk factor or as an outcome. Thus, more studies with a larger population are needed to evaluate statistical significance.

Key words: Persons with disabilities. Visually impaired persons. Low vision. Blindness. Disability assessment.

Resumen

La discapacidad visual representa un reto significativo en la calidad de vida, generando aumento en los años de vida ajustados por discapacidad. Conocer los factores de riesgo asociados permite construir acciones hacia esta población, ya que

Correspondence:

*Juan Camilo Suárez-Escudero

UPB, campus de Robledo, calle 78b No. 72a-109,
Medellín, Colombia

E-mail: juanca.suarez@upb.edu.co

Date of reception: 29-11-2018

Date of acceptance: 24-04-2019

DOI: 10.24875/RMOE.M19000072

Available online: XX-XX-2019

Rev Mex Oftalmol (Eng). 2019;93(4):150-158

www.rmo.com.mx

2604-1731/© 2019 Sociedad Mexicana de Oftalmología. Published by Permayer México SA de CV. This is an Open Access article under the CC BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/4.0/>).

gran parte de su etiología es prevenible, y las limitaciones y restricciones en el funcionamiento se pueden mejorar con un diagnóstico precoz y rehabilitación funcional-integral. Es importante conocer los riesgos tanto sociales como clínicos a los que se ve expuesta esta población. **Objetivo:** Determinar la relación entre factores sociodemográficos y clínicos con la discapacidad visual en pacientes atendidos en dos instituciones oftalmológicas de Medellín durante el año 2015. **Metodología:** Estudio transversal, analítico en una población de 180 pacientes con alguna deficiencia visual permanente, atendidos en dos instituciones especializadas. **Resultados:** En el grupo de pacientes con discapacidad visual, el promedio de edad fue cercano a los 50 años, predominó el sexo femenino (55.6%), bajo nivel de escolaridad (50.9%), la no actividad laboral (67.9%), consumo de alcohol (23.6%), tabaco (15%) y sustancias psicoactivas (4.71%); el 67.9% tuvo al menos una comorbilidad oftalmológica y no oftalmológica, destacándose la diabetes mellitus (7.5%) y la hipertensión arterial (33.9%). **Conclusion:** En los pacientes con discapacidad visual se encontraron mayores porcentajes de las variables mencionadas respecto a pacientes con deficiencia visual, pero sin criterio de discapacidad visual, lo que sugiere relación de estas con la discapacidad, ya sea como factor de riesgo o como desenlace, por lo que sería preciso realizar estudios con mayor población para poder encontrar significancia estadística.

Palabras clave: Personas con discapacidad. Personas con daño visual. Baja visión. Ceguera. Evaluación de la discapacidad.

Introduction

Currently, disability is addressed as a cross-sectoral issue centered on human functioning that encompasses bodily functions and structures, performing activities and participation. In other words, disability is a universal phenomenon that brings the body, the individual and the social into dialogue. In the context of sensory organs, visual impairment is defined as those functional or structural alterations that affect the perception of images in a partial or total way, either due to low visual acuity, reduced visual field or an inability to distinguish light intensity. In this way, the term visual disability includes low vision and blindness².

The worldwide prevalence of disability is of 15% (close to one billion people)³, and one of the most prevalent disabilities is visual impairment⁴. A systematic review and meta-analysis of visual impairment estimated that there are around 36 million blind people in the world and 217 million with low vision⁵. Given that about 80% of all visual deficiencies can be prevented, it is important to investigate the clinical and sociodemographic characteristics in this population^{6,7}. Once the visual disability is certified, it is important to know the social and clinical risks to which this population is exposed in order to achieve a better prognosis through a comprehensive approach, since the limitations and restrictions on functioning can be improved or reduced by means of functional rehabilitation and accessibility actions.

At present, the etiology of permanent visual impairment is related to an age over 50 years and the presence of chronic eye diseases such as age-related macular degeneration (AMD), glaucoma and diabetic retinopathy. Even uncorrected refractive errors and cataracts continue to be the most important potentially

avoidable causes of low vision and blindness from a public health perspective⁶.

In Colombia, although there are some descriptive studies that characterize the population with visual impairment, such as one conducted in two institutions in Medellín between 2014 and 2015⁸ and another from the Saldarriaga Concha Foundation in 2010⁹, there are no analytical studies that study and establish associations between the main sociodemographic and clinical factors with visual impairment, such as age over 50, female sex, low educational level, smoking, alcohol and psychoactive substance use, and ocular and non-ocular comorbidities.

In other parts of the world, there are analytical studies on factors associated with visual disability. A Korean study reported that visual impairment was significantly associated with age, and that prevalence increased rapidly after age 70 (odds ratio [OR]: 1.92; 95% confidence interval [95% CI]: 1.45-2.53); female sex showed a 55% greater risk of visual disability (OR: 1.55; 95% CI: 1.28-1.89), and people with a lower educational level had a higher risk of visual disability than those with higher education (OR: 1.51; 95% CI: 1.15-1.99)¹⁰.

A study in 2011 found a significant causal relationship between smoking and nuclear cataracts, Graves' ophthalmopathy, irritation and ocular ischemia, and a potential correlation between smoking and AMD¹¹. Along with tobacco, alcohol use is another factor that can cause eye damage, as it can cause an injury to the photoreceptors of the retina, and prevent them from regenerating, causing irreversible damage¹². Additionally, it has been described a poor relationship between psychoactive substances use, mainly inhalants, and the development of ophthalmological diseases, mostly retinopathies¹³.

Regarding educational level, it has been observed that the population with visual disability is less likely to enroll school, stay in it and obtain a degree³. Regarding ocular comorbidities, when visual disability is accompanied by another disorder, refractive or of a different kind, the prognosis is poorer. With regard to non-ocular comorbidities, arterial hypertension (AHT) and diabetes mellitus (DM) are the diseases with the highest impact at the ocular level, related to chronic eye diseases¹¹.

Therefore, although there are previous studies conducted in other countries that correlate some sociodemographic factors with chronic eye diseases or visual impairment, this study is the first analytical work that studied Colombian patients with visual impairment. This is important because Colombia is a developing country, with shortcomings in health promotion and prevention, and with a higher prevalence of many of the clinical and sociodemographic factors exposed and several barriers in health care and inclusion of people with disabilities: one of every three persons with disabilities is excluded from health services, 34.18% are excluded from their right to education, the illiteracy rate is of 35.9%, and from these 92.4% are at working age, but only 14.9% are employed⁹.

Objective

To determine the relationship between sociodemographic and clinical factors with visual disability in patients that attended two ophthalmology institutions in Medellín during 2015.

Methods

Type of study and patients

Cross-sectional, analytical study in a population of 180 patients that met the eligibility criteria with any permanent visual impairment, attended in two specialized institutions of the city of Medellín during the second semester of 2015.

Eligibility criteria

The inclusion criteria were patients previously enrolled in the project "Certification of visual sensory disability: Application of the International Classification of Functioning, Health and Disability (ICF-2001) in a population of 180 people with visual impairment" (study carried out by the disability research line of the public health research group of the science school of health

of the Universidad Pontificia Bolivariana, Medellín/Colombia headquarters), of any age, of both sexes, with the presence of some degree of verified visual impairment or visual sensory loss secondary to chronic disease or ocular trauma. The patients were recruited from referral ophthalmological centers in the city of Medellín that attend population from the contributory and subsidized regime.

The criteria to identify and validate the presence or absence of visual disability were based on best-corrected visual acuity, in the only or better eye, after receiving the best available treatment. The classification categories of severity of visual impairment of the World Health Organization (WHO) "Consultation on development of standards for characterization of visual loss and visual functioning" from 2003 were used, where blindness is defined as a visual acuity worse than 3/60 (<20/400) and low vision is grouped into two categories, namely moderate and severe visual impairment (visual acuity worse than 6/18 or 20/60 to 3/60 or 20/400, respectively)^{14,15}

Exclusion criteria

Patients without ocular and non-ocular comorbidities or with inconsistencies between visual acuity and visual disability verification.

Information processing

The sociodemographic variables were age, sex, educational level and occupation; and the clinical variables of interest were category of visual impairment according to visual acuity, main ophthalmological diagnosis, ocular and non-ocular comorbidities, number of ocular comorbidities, smoking, alcoholism and psychoactive substance use. The variable "category of visual impairment" allows grouping the study population into patients without visual impairment (visual impairment without visual disability criteria), patients with low vision and patients with blindness. Blindness is a visual acuity worse than 3/60 (<20/400) and low vision is a visual acuity worse than 6/18 (20/60) to 3/60 (20/400).

The cause of visual impairment in each patient was identified and grouped in an anatomic-clinical fashion in pathologies of the anterior and posterior segments, mixed pathologies (including both segments), neuroophthalmological and extraocular pathologies. The non-ocular comorbidities identified in the patients were grouped into several categories: cardiovascular, endocrine, psychological, rheumatological, neurological, infectious, oncological, and traumatic.

A Microsoft Excel® database was designed using fields for data validation to reduce typing errors. Afterwards, the quality of the database was verified through the detection of outliers and exploration of variables, before performing the analysis.

Statistical analysis

To describe the qualitative variables, absolute and relative frequencies were calculated. For the quantitative variables, median with interquartile ranges in the group without visual impairment and means with standard deviation in the group of patients with disability were estimated. The analysis was performed in the IBM Corp. statistical package Released 2013 IBM SPSS Statistics for Windows, Version 22.0. Armonk, NY: IBM Corp.

The prevalence ratio (PR) with its respective 95% CI was calculated for some sociodemographic and clinical variables of interest, in order to assess whether the prevalence differed between exposed and unexposed groups.

To determine if there was a relationship, the PR was calculated between visual impairment with the following exposure variables: female sex, age over 50 years, smoking, alcohol use, psychoactive substance use, number of ocular comorbidities, cardiovascular comorbidities, endocrine comorbidities, hypertension and DM. In turn, smoking was associated with glaucoma, cataracts and AMD. Additionally, the presence or absence of visual impairment was considered as exposure for the development of the following variables: unemployment (for this variable, patients older than 18 years who reported being housewives, unemployed, students or pensioned in the survey), low level of education (defined as patients over 18 years of age who did not have a primary school degree), endocrine and cardiovascular comorbidities.

Ethics

This project was approved by the research and ethics committee of the Universidad Pontificia Bolivariana.

Results

The study population was of 180 patients who were part of the project “Certification of visual sensory disability: Application of the International Classification of Functioning, Health and Disability (ICF-2001) in a population of 180 people with visual disability” and who

also met the eligibility criteria of this study. None of the patients was excluded.

The majority were female, 56.1% (101/180), with a median age of 48 years (Q1: 26.2, Q3: 59.7); 47.8% (86/180) of the population was older than 50 years. The most frequent occupation was “housewife”, with 30.6% (55/180), and 79.4% (123/180) of the patients were unemployed. Among active adults, we observed a higher proportion of active men compared to women (26/67, 36.8% versus 6/88, 6.8%, $p < 0.001$). This is because most women are housewives (54%, 54/100). We found a low educational level in 56.1% (87/180) of the patients, and 37.8% (68/180) had a primary school degree. From the total, 58.8% (106/180) of the patients had visual disability. Of these, 50% (53/106) corresponded to moderately low vision, 8.4% (9/106) to severely low vision, and 41.5% (44/106) to blindness.

Table 1 describes the sociodemographic characteristics of the 180 patients divided into three groups according to the degree of visual impairment.

Most patients without disability and with low vision were female, while the patients with blindness were mostly male. Regarding occupation, the most frequent in all three groups was that of housewife. Patients without disabilities had a higher frequency of unemployment, 17 patients (23.3%), followed by the blindness group, 5 patients (11.4%), and those with low vision, 6 patients (9.7%). The patients who did not apply for occupation were: six children under five who were not yet in daycare and one patient who was in a nursing home.

For the variables corresponding to employed and low educational level, patients older than 18 years (155 patients) were considered. More than 70% of the patients were unemployed, regardless of visual capacity: 83% with visual impairment and without criteria for visual disability, 80% low vision and 73% with blindness. However, a similar frequency was found in the active patients in the three groups, which was of 27% in the group with blindness (10/37), compared to 20% in the non-disabled group (13/64) and 19.5% in the low vision group (9/54). Most patients in the three groups had a low educational level, the group in which there were more patients with this characteristic was the blindness group, with 70.3% (26/37), followed by the group of low vision and without disability.

Regarding the main diagnosis responsible for visual impairment, the most affected segment in the three groups was the posterior segment, with 46.7% (84/180), where the most frequent pathologies were glaucoma, AMD and retinitis pigmentosa. The second most affected was the anterior segment, with 22.8% (41/180), where the

Table 1. Sociodemographic characteristics of the 180 patients attended in two ophthalmological institutions in Medellín, 2015

Sociodemographic characteristic	Without visual disability n: 74 (%)	Low vision n: 62 (%)	Blindness n: 44 (%)
Sex			
Male	32 (43.2)	24 (38.7)	23 (52.3)
Female	42 (56.8)	38 (61.3)	21 (47.7)
Occupation			
Housewife	19 (26)	22 (35.5)	14 (31.8)
Unemployed	17 (23.3)	6 (9.7)	5 (11.4)
Active	13 (17.8)	9 (14.5)	10 (22.7)
Student	13 (17.8)	18 (29)	7 (15.9)
Retired	9 (12.3)	7 (11.3)	3 (6.8)
N/A	2 (2.7)	0 (0)	5 (11.4)
Education level			
None	22 (29.7)	11 (17.7)	15 (34.1)
Primary	19 (25.7)	25 (40.3)	16 (36.4)
Secondary	15 (20.3)	13 (21)	6 (13.6)
Technician/technologist	6 (8.1)	6 (9.7)	2 (4.5)
University	7 (9.5)	5 (8.1)	3 (6.8)
Postgraduate	3 (4.1)	2 (3.2)	0 (0)
N/A	2 (2.7)	0 (0)	2 (4.5)
Age (years)	48.5 (30.75-58)*	46.24 (±22.14) [†]	43.23 (±24.03) [†]

*Median (Q1-Q3).

[†]Mean (standard deviation).

most frequent pathologies were myopia and cataract, followed by neuroophthalmological pathologies, with 15.6% (28/180), of which the most frequent were compressive, ischemic and traumatic optic neuropathy.

From all patients, 66.1% (119/180) had at least one ocular comorbidity. Of these, 41.7% (75/180) had only one, 20% (36/180) had two and 4.4% (8/180) had three or more comorbidities. Ocular comorbidities were more frequent in the anterior segment, with 64.7% (77/119), and the most frequent was cataract. When discriminated by groups, the anterior segment represented 50% (32/64) of the group without disability, 47.7% (21/44) of the blindness group and 45.2% (28/62) of the group with low vision.

The most frequent non-ocular comorbidity was cardiovascular, which occurred in 37.7% (68/180), followed by the endocrine disorders, observed in 21.1% (38/180). Smoking was reported in 14.4% (26/180), 3.8% (7/180) were users of psychotropic drugs and 24.4% (44/180) were alcohol consumers. Table 2 shows the detailed clinical characteristics observed in the three groups of study patients.

No statistically significant associations were found between the disability and the variables analyzed (Table 3 and 4). Likewise, when comparing low vision with blindness, no statistically significant correlations were found with the following variables: female sex

(PR: 0.7; 95% CI: 0.4-1.1), employment (PR: 1.6; 95% CI: 0.7-3.6), educational level (PR: 1.3; 95% CI: 0.9-1.8), smoking (PR: 0.8; 95% CI: 0.4-1.7), alcohol use (PR: 1; 95% CI: 0.6-1.7), smoking (PR: 0.9; 95% CI: 0.9-1.8) and DM (PR: 0.2; 95% CI: 0.04-1.8).

To establish the correlation between smoking and cataracts, glaucoma and AMD, only patients older than 18 years (155 patients) were included, of which 26 patients were current smokers. It was observed that from the patients with cataract, eight were smokers (PR: 0.9; 95% CI: 0.5-1.8), from those with glaucoma six were smokers (PR: 1.8; 95% CI: 0.84-3) and from those with AMD, only one was a smoker (PR: 0.4; 95% CI: 0.05-3).

Discussion

We found relevant frequencies of certain variables in the different study groups. In the group of patients with visual impairment, the average age was close to 50 years, with more females, a low level of education, unemployment, and alcohol, tobacco and psychoactive substance use. Regarding the clinical characteristics, it was observed that patients with visual impairment had more ocular and non-ocular comorbidities, mainly DM and AHT.

In our study, 47.2% of patients with visual impairment were older than 50 years, which is similar to the results of a study conducted in Nigeria¹⁶ that characterized the

Table 2. Clinical characteristics of the 180 patients attended in two ophthalmological institutions in Medellín, 2015

Variable	Without disability n: 74 (%)	Low vision n: 62 (%)	Blindness n: 44 (%)
Smoking	10 (13.5)	10 (16.1)	6 (13.6)
Alcohol use	16 (21.6)	16 (25.8)	12 (27.3)
Psychotropics	2 (2.7)	5 (8)	0 (0)
Main diagnosis			
Fundus	33 (44.6)	30 (48.4)	21 (47.7)
Anterior segment	12 (16.2)	19 (30.6)	10 (22.7)
Neuro-ophthalmological	15 (20.3)	8 (12.9)	5 (11.4)
Mixed	10 (13.5)	4 (6.5)	7 (15.9)
Without diagnosis	2 (2.7)	1 (1.6)	1 (2.3)
Extraocular	2 (2.7)	0 (0)	0 (0)
Number of ocular diagnosis related			
0	27 (36.5)	18 (29)	16 (36.4)
1	34 (45.9)	25 (40.3)	16 (36.4)
2	11 (14.9)	17 (27.4)	8 (18.2)
3	2 (2.7)	2 (3.2)	4 (9.1)
Non-ocular comorbidities			
Cardiovascular	26 (35.1)	28 (45.2)	14 (31.8)
Endocrine	10 (13.5)	18 (29.1)	10 (22.7)
Another disability	11 (14.9)	10 (16.1)	6 (13.6)
Psychological	8 (10.8)	8 (12.9)	4 (9.1)
Rheumatological	2 (2.7)	1 (1.6)	1 (2.2)
Neurological	5 (6.8)	3 (4.8)	5 (11.4)
Infectious	5 (6.8)	1 (1.6)	1 (2.2)
Oncological	1 (1.4)	3 (4.8)	3 (6.8)
Traumatic	10 (13.5)	5 (8.1)	2 (4.5)
Others*	2 (2.7)		

*Others: Marfan syndrome and prematurity.

clinical and demographic profile in patients with visual impairment, and found in a sample of 193 patients between 6 and 90 years of age (mean age 41.4 years) that the percentage of patients over 50 years of age was of 42%. These figures are also similar to the ones reported by some studies conducted in Malaysia¹⁷, Korea¹⁸, Nepal¹⁹ and India²⁰, where the proportion of patients over 50 years of age was of 26%, 31%, 42% and 32%, respectively. In contrast, the WHO reported that 65% of patients with visual impairment were older than 50 years,¹ similar to the results of a study conducted in South Korea in which visual impairment was associated with an age over 70 years¹⁰. The results of this study could be explained by the fact of being conducted in a developing country, in which life expectancy is lower compared to developed countries²¹.

Regarding sex, it was observed that 55.6% of the visually impaired population were females; this result is consistent with other studies that report that 60% of the blind population are women²¹. Visual disorders affect women with more frequency than men. This phenomenon is more evident for blindness in high-income

countries²². Additionally, it was found that in patients with visual disability, the most frequent occupation was housewife, distributed in 35.5% for low vision and 31.8% for blindness. These results may be due to the fact that this occupation is generally assumed by women. The WHO World Report on Disability³ indicates a slight trend of visual disability in female and, in addition, it is reported that women have less access to health services, a fact that can be explained by their low income, greater economic burden in health care and due to their role in family care and the domestic environment that limits the time they can have access to medical care²³.

We observed that patients with visual impairment had a lower educational level, because although there are not many studies that support this, it is known that 87% of people with visual disabilities live in developing countries, which results in a low level of education and reduced access to health services, which in turn has a negative impact on health care with a potential increase in visual disability due to infectious causes or a lower motivation to seek early medical care²¹.

Table 3. Relationship between clinical and sociodemographic factors with visual impairment of the 180 patients attended in two ophthalmological institutions of Medellín, 2015

Exposition	Visual disability n: 106 (%)	Without visual disability n: 74 (%)	PR (95% CI)
Female	59 (55.6)	42 (56.7)	0.9 (0.7-1.2)
Older than 50 years	50 (47.2)	36 (48.6)	0.9 (0.7-1.2)
Low educational level	54 (50.9)	33 (44.6)	1.1 (0.8-1.5)
No work activity	72 (67.9)	51 (68.9)	0.9 (0.8-1.2)
At least one ophthalmologic comorbidity	72 (67.9)	47 (63.51)	1.0 (0.8-1.4)
Cardiovascular comorbidities	42 (39.6)	26 (35.1)	1.1 (0.7-1.6)
Hypertension	36 (33.9)	16 (21.6)	1.2 (0.9-1.6)
Endocrine comorbidities	21 (19.8)	10 (13.5)	1.4 (0.7-2.9)
Diabetes <i>mellitus</i>	8 (7.5)	3 (4)	1.2 (0.8-1.8)
Smoking	16 (15)	10 (13.5)	1.0 (0.7-1.4)
Alcohol	28 (23.6)	16 (21.6)	1.1 (0.8-1.4)
Psychoactive substances	5 (4.71)	2 (2.7)	1.2 (0.7-1.9)

Table 4. Relationship between non-ocular comorbidities and visual impairment

Comorbidity	With disability n: 106 (%)	Without disability n: 74 (%)	PR (95% CI)
Infectious	7	5	0.9 (0.6-1.6)
Rheumatological	2	2	0.8 (0.3-2.2)
Neurological	8	5	1.0 (0.6-1.6)
Oncological	2	1	1.1 (0.5-2.5)
Psychological	11	8	0.9 (0.4-2.2)
Traumatic	6	10	0.6 (0.3-1.1)
Another disability	15	11	0.9 (0.6-1.3)
Other comorbidity	7	2	1.3 (0.9-1.9)

Regarding the main diagnosis that caused the permanent visual loss, the posterior segment was the main location of the disorder that caused the visual disability. From the total population, 46.7% had glaucoma with a glaucomatous optic neuropathy seriously impairing vision. The second most frequent location causing visual loss was the anterior segment, where the most frequent disorder was myopia, with 22.8%, and finally, the neuro-ophthalmological axis, with 15.6%. However, according to the 2018 WHO reports, the global causes of visual disability are anterior segment disorders, such as uncorrected refractive errors (53%) and cataracts (25%), while glaucoma is responsible only for 8%⁶. Although in Colombia, Mexico and Brazil the most frequent refractive error associated

with low vision and blindness is hyperopia²⁴ in this study it was myopia.

Of the non-ocular comorbidities, it is known that diabetic retinopathy is responsible of around 5% of the blindness in the world as one of the main microvascular complications, as well as hypertension, which has been considered as an important factor for the development of retinopathy. It has also been described that when these two pathologies are associated, the risk increases considerably²⁵. In this study, cardiovascular and endocrine diseases were the most frequent non-ocular comorbidities; however, both associations with visual disability did not show statistically significant values.

Regarding substance use, it was found that alcohol use was more frequent in the population with visual

impairment than in the population without this condition (23.6 vs. 21.6%), as well as smoking (15 vs. 13.5%). Although it has been shown that the use of these substances affects ocular structures, in the case of tobacco due to components such as cyanide, and for alcoholism due to B12 vitamin and folate deficiencies that increase the risk of optic neuropathy⁸, the relationship of substance use with visual impairment was not statistically significant, probably because the number of people who used these substances was very low in both populations.

This study is a first analytical approach to identify and postulate relationships between some sociodemographic and clinical factors with the category of sensory visual disability. This is scientifically relevant because it is a pioneering study in Colombia that uses an observational, cross-sectional and analytical methodology in a population that meets clinical criteria of low vision and blindness. However, it has several limitations that must be considered: a) a small population size, which is why the relationships were not statistically significant; and b) a selection bias, because people with visual impairment were conveniently enrolled from two referral visual disability centers of the city of Medellín, and not from the general population, a factor that limits the external validity of the results.

Our results show an overview of the local reality in the city of Medellín and help to better identify some clinical and sociodemographic characteristics (seldom reported in the literature) about a visual health challenge such as visual disability (low vision and blindness) and provide information applicable to health personnel who care for people with disabilities. This is an important step towards improving their quality of life and health care, and a first step to propose other observational and interventional studies on this subject. This study had a next phase called "Etiology of low vision and blindness in different institutions specialized in ophthalmology or with referral ophthalmology services in Colombia", a multicenter cross-sectional study conducted in six cities (study completed in January 2018).

Conclusion

We found relevant frequencies of certain variables in the different study groups that suggest that there is some kind of relationship with disability, either as a risk factor or as an outcome. It is necessary to continue performing studies that combine sociodemographic

aspects with clinical variables in order to redirect actions of promotion, prevention and rehabilitation.

Ethical disclosures

Protection of human and animal subjects. The authors declare that the procedures followed were in accordance with the regulations of the relevant clinical research ethics committee and with those of the Code of Ethics of the World Medical Association (Declaration of Helsinki).

Confidentiality of data. The authors declare that they have followed the protocols of their work center on the publication of patient data.

Right to privacy and informed consent. The authors have obtained the written informed consent of the patients or subjects mentioned in the article. The corresponding author is in possession of this document.

Conflicts of interest

The authors declare no conflicts of interest.

References

1. Who.int [Internet]. Ginebra: OMS; 2014 [actualizado 16 de enero de 2018; citado 22 de junio de 2018]. Disponible en: <http://www.who.int/es/news-room/fact-sheets/detail/disability-and-health>.
2. García Ramos CE. Guía de atención educativa para estudiantes con discapacidad visual. [Internet]. Aguascalientes: Instituto de Educación de Aguascalientes; 2012 [Citado 22 de junio de 2018]. Disponible en: <http://www.sld.cu/galerias/pdf/sitios/histologia/normas-vancouver-bu-ma-2013-guia-breve.pdf>.
3. OMS, Banco Mundial. Informe Mundial sobre la Discapacidad [Internet]. Malta: OMS, BM; 2011. Disponible en: http://www.who.int/disabilities/world_report/2011/summary_es.pdf.
4. Stevens GA, White RA, Flaxman SR, Price H, Jonas JB, Keeffe J, et al. Global prevalence of vision impairment and blindness: Magnitude and temporal trends, 1990-2010. *Ophthalmology*. 2013;120(12):2377-84.
5. Bourne RRA, Flaxman SR, Braithwaite T, Cicinelli MV, Das A, Jonas JB, et al. Vision Loss Expert Group. Magnitude, temporal trends, and projections of the global prevalence of blindness and distance and near vision impairment: a systematic review and meta-analysis. *Lancet Glob Health*. 2017; 5 (9): e888-e897.
6. Who.int [Internet]. Ginebra: OMS; agosto de 2014 [actualizado 11 octubre de 2018; citado junio 26 de 2018]. Disponible en: <http://www.who.int/es/news-room/fact-sheets/detail/blindness-and-visual-impairment>.
7. Who.int [Internet]. Ginebra: OMS; agosto de 2014 [citado junio 26 de 2018]. Disponible en: <https://www.who.int/features/factfiles/blindness/es/>.
8. Rojas S, Ruiz S, Carvajal J, Álvarez MJ, Duque D, Correa SA, et al. Caracterización de una población con discapacidad visual (baja visión y ceguera) atendida en dos Instituciones Prestadoras de Salud de Medellín. *Med U.P.B.* 2015;34(1):30-9.
9. Beltran JC, González C; Fundación Saldarriaga Concha, Colombia Líder. Discapacidad en Colombia: Reto para la Inclusión en Capital Humano. [Internet]. Tomo I. Bogotá: Fundación Saldarriaga Concha; abril 2010 [citado julio 1 de 2018]. Disponible en: https://www.saldarriagaconcha.org/desarrollo_fsc/images/fsc/pdf/biblioteca_virtual/discapacidad/estadisticas_e_investigaciones/05_tomo_1_exclusion_DEPTAL_CH.pdf.
10. Park SH, Lee JS, Heo H, Suh YW, Kim SH, Lim KH, et al. Epidemiologic Survey Committee in the Korean Ophthalmological Society. A nationwide population-based study of low vision and blindness in South Korea. *Invest Ophthalmol Vis Sci*. 2014 Dec;56(1):484-93.
11. Zhang X, Kahende J, Fan AZ, Barker L, Thompson TJ, Mokdad AH, Li Y, Saaddine JB. Smoking and visual impairment among older adults with age-related eye diseases. *Prev Chronic Dis*. 2011;8(4):A84.
12. Velazco V. Discapacidad y Salud. El consumo de drogas y sus secuelas [Internet]. Argentina, enero 2011 [citado julio 3 2018]. Disponible en:

- <http://discapacidadrosario.blogspot.com/2011/01/el-consumo-de-drogas-y-sus-secuelas.html>.
13. Organización Mundial de la Salud. Neurociencia del consumo y dependencia de sustancias psicoactivas. Ginebra. p. 23. [citado julio 3 de 2018]. Disponible en: http://www.who.int/substance_abuse/publications/en/Neuroscience_S.pdf.
 14. Bourne R, Price H, Taylor H, Leasher J, Keeffe J, Glanville J, et al. New systematic review methodology for visual impairment and blindness for the 2010 Global Burden of Disease study. *Ophthalmic Epidemiol*. 2013;20(1):33-9.
 15. Bourne RRA, Flaxman SR, Braithwaite T, Cicinelli MV, Das A, Jonas JB, et al. Magnitude, temporal trends, and projections of the global prevalence of blindness and distance and near vision impairment: a systematic review and meta-analysis. *Lancet Glob Health*. 2017;5(9):e888-97.
 16. Olusanya B, Onoja G, Ibraheem W, Bekibele C. Profile of patients presenting at a low vision clinic in a developing country. *BMC Ophthalmol*. 2012;30:12:31.
 17. Mohidin N, Yusoff S. Profile of a low vision clinic population. *Clin Exp Optom*. 1998;81(5):198-202.
 18. Kim JH, Joo KS, Moon NJ. Characteristics of 681 low vision patients in Korea. *J Korean Med Sci*. 2010;25(8):1217-21.
 19. Paudel P, Khadka J, Sharma AK. Profile of a low vision population. *Int Congr Ser*. 2005;1282:252-6.
 20. Khan SA. A retrospective study of low-vision cases in an Indian tertiary eye-care hospital. *Indian J Ophthalmol*. 2000;48(3):201-7.
 21. Discapacidad visual y ceguera en el adulto: Revisión de tema. Juan Camilo Suárez Escudero. *MEDICINA U.P.B*. 2011;30(2):170-80.
 22. Bourne RRA, Flaxman SR, Braithwaite T, Cicinelli MV, Das A, Jonas JB, et al. Magnitude, temporal trends, and projections of the global prevalence of blindness and distance and near vision impairment: a systematic review and meta-analysis. *Lancet Glob Health*. 2017;5(9):e888-97.
 23. UNESCO. Informe de la salud visual en Suramérica 2008: cátedra Unesco Salud Visual y Desarrollo. Madrid: Unesco; 2008.
 24. Roselló Leyva A, Rodríguez Masó S, Rojas Rondón I, Linares Guerra M, Ramos Gómez EA, Vázquez Adan Yanis. Defectos refractivos más frecuentes que causan baja visión. *Rev Cubana Oftalmol*. 2011;24(2):271-8.
 25. Gallego PH, Craig ME, Hing S, Donaghue KC. Role of blood pressure in development of early retinopathy in adolescents with type 1 diabetes: prospective cohort study. *BMJ*. 2008;26:337:a918.