

# Analysis of risk factors and epidemiology of blindness prevention campaign by glaucoma in João Pessoa, Paraíba

## *Análise dos fatores de risco e epidemiologia em campanha de prevenção da cegueira pelo glaucoma em João Pessoa, Paraíba*

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### ABSTRACT

**Objective:** This study aims evaluating the incidence of risk factors in a population sample, assessed during campaign of prevention of blindness by glaucoma, and analyzing epidemiological data incidence of glaucoma in the city of João Pessoa (PB). **Methods:** After prior disclosure, individuals aged  $\geq 40$  years, attended voluntarily at Lauro Wanderley University Hospital, Joao Pessoa (PB) for examination, anamnesis, intraocular pressure (IOP) measured by applanation tonometer of Goldmann, and direct fundoscopy. Those who were considered suspect showed IOP  $\geq 21$  mmHg or/and a cup to disc ratio (CDR)  $\geq 0,5$ . The cases suspects were separated by age, sex and abnormal signs. We referred to Group I individuals from 40 to 49 years old, Group II from 50 to 59 years old, Group III  $\geq 60$  years, "P+" for IOP  $\geq 21$  mmHg, "E/D+" for CDR  $\geq 0,5$  and "P/E/D+" for individuals with all the showing signs. **Results:** Within a total of 244 patients, 29.50% were considered suspects (48.61% male, 51.38% female, and 41.66% of group I, 23.61% of Group II and 34.72% of Group III). Regarding the type of sign: 70.83% were E/D+, 15.27% were P+ and 13.88% were P/ E/D+. There was also carried out a detailed analysis of men and women. **Conclusion:** Despite the irreversibility of the modifications caused by glaucoma, early diagnosis and proper treatment associated with raising awareness of population are preventive actions to inhibit blindness, confirming the relevance of conducting periodic preventive campaigns.

**Keywords:** Glaucoma/prevention & control; Glaucoma/epidemiology

### RESUMO

**Objetivo:** Este trabalho tem por objetivo avaliar a incidência dos fatores de risco em uma amostra da população, avaliada durante uma campanha de prevenção da cegueira pelo glaucoma, bem como analisar os dados epidemiológicos sobre a ocorrência de casos suspeitos de glaucoma na cidade de João Pessoa, Paraíba. **Métodos:** Após prévia divulgação, pessoas com idade  $\geq 40$  anos, compareceram voluntariamente ao Hospital Universitário Lauro Wanderley, João Pessoa, Paraíba. Realizou-se anamnese, medida da pressão intraocular (PIO) com tonômetro de aplanção de Goldmann e biomicroscopia de fundo. Considerados suspeitos aqueles com PIO  $\geq 21$  mmHg ou disco óptico com relação escavação sobre disco (E/D)  $\geq 0,5 \times 0,5$ . Os suspeitos foram subdivididos por idade, sexo e tipo de alteração e divididos em: Grupo I de 40 e 49 anos; Grupo II de 50 e 59 anos; Grupo III  $\geq 60$  anos; P+ se apenas PIO Analysis of risk factors and epidemiology of blindness prevention campaign by glaucoma in João Pessoa, Paraíba 21 mmHg; E/D+ se apenas E/D  $\geq 0,5 \times 0,5$ ; e P/E/D+ quando ambos alterados. **Resultado:** No total de 244 pacientes, 29,50% foram considerados suspeitos (48,61% homens (H) e 51,38% mulheres(M), sendo 41,66% pertencentes ao Grupo I; 23,61% ao Grupo II e 34,72% ao Grupo III. Com relação ao tipo de alteração: 70,83% eram E/D+; 15,27% eram P+ e 13,88% P/E/D+. Foi ainda realizada uma análise detalhada entre homens e mulheres. **Conclusão:** Apesar da irreversibilidade das alterações conseqüentes ao glaucoma, o diagnóstico precoce e o tratamento adequado, associado à conscientização da população, são capazes de prevenir cegueira, comprovando a importância da realização periódica dessas campanhas.

**Descritores:** Glaucoma/prevenção & controle; Glaucoma/epidemiologia

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## INTRODUCTION

**G**laucoma is a major public health problem and a leading cause of blindness in Brazil and worldwide<sup>(1)</sup>. It is characterised by progressive and irreversible damage to the optic disc and retinal nerve fibre layer (RNFL)<sup>(2)</sup>. Intraocular pressure (IOP) above 21 mmHg can be considered as a major risk factor for glaucoma, and its reduction is the only effective means of treatment<sup>(3)</sup>, even in patients with normal tension glaucoma<sup>(2)</sup>, although such cases are rare<sup>(4)</sup>. It is an insidious neuropathy which causes the death of retinal ganglion cells with consequent damage to optic nerve and visual field loss, mainly peripheral<sup>(4)</sup>.

The onset of glaucoma is believed to be multifactorial. Important factors are: age above 60 years; diabetes mellitus (DM); black race; socioeconomic status; family history of glaucoma; and high myopia<sup>(5)</sup>. It is the second leading cause of blindness and the most important cause of irreversible blindness worldwide. According to the World Health Organization (WHO), glaucoma accounts for 13% of global blindness, and 2.4 million new cases occur every year<sup>(6)</sup>.

The current estimate is that glaucoma affects about 70 million people worldwide, i.e. 2-3% of the world population<sup>(7)</sup>, leading to bilateral blindness in 10%<sup>(8)</sup> of cases; in 2020 this number is expected to rise to 80 million<sup>(7)</sup>. In Brazil it is still very difficult to obtain accurate data about the condition. Still, the Brazilian Council of Ophthalmology (CBO) estimates that there are 985.000 patients over 40 years of age with glaucoma, of which 70% remain undiagnosed<sup>(5)</sup>. The WHO also estimates that the condition affects about 900.000 Brazilians over the age of 40 and that about 20% of patients find out that they have the condition during glaucoma campaigns<sup>(1)</sup>. It is believed that in developing countries like Brazil 80% of cases of blindness could be prevented or cured through timely diagnosis and treatment<sup>(5)</sup>.

For the condition to affect the visual field, at least 50% of the retinal nerve fibre layer needs to be damaged<sup>(8)</sup>. Therefore, patients who seek medical care only after noticing changes in their visual field may already have serious visual impairment. The earlier the diagnosis, the greater chance of preserving the patient's vision through treatment<sup>(8)</sup>. In our daily work in a reference centre for ophthalmology, a large number of patients are diagnosed with advanced-stage glaucoma.

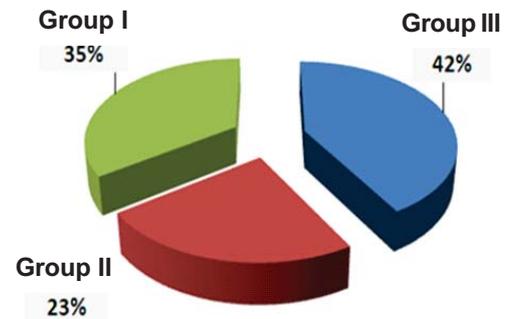
In this context, our campaign to prevent blindness aimed to alert and inform the public about the disease and its main risk factors and to diagnose suspected cases at an early stage, stressing the importance of regular exams, especially among patients with a family history of glaucoma or those aged over 40 years. This work aimed to assess the incidence of risk factors in a population sample and to analyse epidemiological data on suspected cases of glaucoma in the city of João Pessoa/PB.

## METHODS

The campaign, which had been previously announced in the media, took place at the Lauro Wanderley University Hospital, UFPB, João Pessoa/PB, on June 11, 2011. In total, 244 patients who presented voluntarily for examination met the inclusion criterion of age above 40 years. The instrument for data collection was a questionnaire that assessed the subjects' identification data, medical history, and family history for the disease. The subjects had their intraocular pressure (IOP) measured with a Goldmann Applanation Tonometer attached to a Zeiss<sup>TM</sup> slit lamp; IOP was described numerically in mmHg for the best and worst eye. Cup/

Chart 01

Percent distribution of suspected cases by age



Group I: 40 - 49 years  
Group II: 50 - 59 years  
Group III: ≥ 60 years

disc (C/D) ratio was assessed by fundus biomicroscopy using a 78 D Haag-Streit<sup>TM</sup> lens.

Suspected cases were those with IOP equal or greater than 21 mmHg or a cup/disc ratio equal or greater than 0.5 x 0.5. These cases were subdivided by age, sex, and type of change. Subjects were grouped as follows: Group I, 40-49 years; Group II, 50-59 years; Group III, 60+ years; P+ if IOP e" 21 mmHg only; C/D+ if C/D e" 0.5 x 0.5 only; and P/C/D+ when both IOP and C/D were changed. Data were analysed based on percentage distribution; tables and charts were prepared using Excel<sup>TM</sup> 2007 software. Suspected cases received information leaflets containing the addresses of public services for glaucoma and were advised to undergo tests to confirm the disease.

## RESULTS

Of a total of 244 patients, 29.50% were considered as suspected cases, of which 48.61% were male (M) and 51.38% were female (F). Subjects were divided into three age groups, with 41.66% in group I, 23.61% in group II, and 34.72% in group III (Chart 1). As for the types of changes, we found a higher incidence of C/D+ for both sexes; however, when subdivided by sex, C/D+ and P+ were more common among women, while P/E/D+ was more common among men (Table 1). Detailed analysis among men showed that younger subjects had the greatest number of changes, followed by the group over 60 years, with a higher proportion of C/D+ at all ages (Table 2). Among women, we found that the incidence of suspected cases increased with increasing age, with a significant predominance of C/D+ for all age groups (Table 3).

## DISCUSSION

Glaucoma is a leading cause of preventable blindness in the adult population. To reduce the risk of blindness due to glaucoma, the literature suggests a strategy aimed at encouraging early diagnosis in the community, including recognising the scale of the problem; facilitating access to primary care; and educating the public about the condition, its risk factors, treatment, and outcomes<sup>(9)</sup>. In this context, campaigns are critical.

Sakata et al.<sup>(10)</sup> reported that the most frequent causes of blindness include cataract, senile macular degeneration,

**Chart 01**  
**Percent distribution of suspected cases by age**

Type of suspected change	Percent of total suspected cases	Distribution per sex for each type of change	
		Men	Women
E/D+	70.83%	49.01%	50.98%
P+	15.27%	18.18%	81.81%
P/E/D+	13.88%	80%	20%

Group I: 40 - 49 years; Group II: 50 - 59 years; Group III ≥ 60 years; IOP: Intraocular pressure; C/D: cup to disc ratio	P+ if IOP $\geq$ 21 mmHg only; C/D+ if C/D $\geq$ 0.5x0.5 only; P/C/D+ if both IOP and C/D changed;
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**Table 02**

**Detailed analysis in males**

Distribution per age	Percent of total suspected cases	Distribution per change in each group		
		E/D+	P+	P/E/D+
Group I	50.28%	68.42%	0%	31.57%
Group II	14.28%	100%	0%	0%
Group III	31.42%	63.63%	18.18%	18.18%

Group I: 40 - 49 years; Group II: 50 - 59 years; Group III ≥ 60 years; IOP: Intraocular pressure; C/D: cup to disc ratio	P+ if IOP $\geq$ 21 mmHg only; C/D+ if C/D $\geq$ 0.5x0.5 only; P/C/D+ if both IOP and C/D changed;
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**Table 03**

**Detailed analysis in females**

Distribution per age	Percent of total suspected cases	Distribution per change in each group		
		E/D+	P+	P/E/D+
Group I	29.72%	90.90%	0%	9.09%
Group II	32.43%	66.66%	33.33%	0%
Group III	37.83%	57.14%	35.71%	7.14%

Group I: 40 - 49 years; Group II: 50 - 59 years; Group III ≥ 60 years; IOP: Intraocular pressure; C/D: cup to disc ratio	P+ if IOP $\geq$ 21 mmHg only; C/D+ if C/D $\geq$ 0.5x0.5 only; P/C/D+ if both IOP and C/D changed;
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glaucoma, and diabetic retinopathy. The authors also state that the costs of preventing blindness due to these conditions are significantly lower than the costs of supporting a blind adult person. The authors' conclusion is that for glaucoma prevention it is essential that patients be made aware of the disease and have access to early diagnosis, bridging the gap between the population and ophthalmologists.

Despite the development of new technologies for the diagnosis of glaucoma, the main strategy is still a routine eye examination. Data obtained by tonometry, gonioscopy, stereoscopic examination of the optic disc, and visual field testing are the basis for diagnosing the disease or detecting suspected cases<sup>(5)</sup>.

In an assessment of the socioeconomic profile of patients with glaucoma seen at the University Hospital of Minas Gerais, Ramalho et al.<sup>(6)</sup> found that non-adherence/low fidelity to treatment is one of the most important risk factors for the progression of the condition and may ultimately result in permanent and severe reduction of visual function, with serious social consequences. Knowledge about glaucoma is related to medical advice received by patients and their level of education; thus, the lack of adherence to treatment is related to various factors, with numerous social implications<sup>(6)</sup>.

In our study, 29.50% of subjects were considered as suspected cases, with females being slightly more likely to be affected (51.38%). This is in agreement with several studies<sup>(5,11,12)</sup>. In a retrospective cross-sectional study by Salai et al.<sup>(5)</sup>, who examined 100 patients to assess the epidemiology of glaucoma at the University Hospital of Santa Catarina (HU-UFSC), female subjects were also more likely to be affected (59%). Silva et al.<sup>(11)</sup> in a cross-sectional study with 146 patients seen at the Glaucoma Unit of the University Hospital of the State University of Campinas (UNICAMP), also found the same pattern, with 52.7% of females and 47.3% of males. Demarco et al.<sup>(12)</sup>, in a study on 100 patients seen at the Glaucoma Unit of Hospital de Base in São José do Rio Preto/SP, also found 58% of female patients.

The most obvious risk factor for both sexes was increased cupping of the optic nerve; however, IOP measurement is still important as screening tool. Among men, most suspected cases were in the fifth decade of life, highlighting the importance of regular preventive examination after the age of 40 years. Several studies confirm the importance of early diagnosis in preventing blindness due to glaucoma<sup>(13,14)</sup>.

Among women, incidence increased with age, stressing the importance of advanced age as a risk factor. Oliveira et al.<sup>(13)</sup>, in a study conducted at the Federal University of São Paulo (UNIFESP), found a prevalence of 63.86% in the group older than 60 years, concluding that the main risk factors related to late diagnosis of the conditions are older age and low socioeconomic status<sup>(13)</sup>.

Even though the changes induced by glaucoma are not curable, medical and/or surgical treatment, when properly prescribed, can prevent blindness as long as the condition is diagnosed early. The population should also be made aware of the importance of ophthalmic monitoring and treatment, emphasising the importance of periodic campaigns.

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