Research Article

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# Prevalence of Primary Open-Angle Glaucoma in Candidates for a Public Competition

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## ABSTRACT

*Primary open-angle glaucoma is a chronically progressive anterior optic neuropathy characterized by perimetric changes and pathological excavation of the optic disc. It is recognized as a disease that affects quality of life, social and professional life. If seen late or not treated, it can be disabling for all workers by making them medically unfit for their jobs. The prevention of occupational deintegration and job retention are important public health issues today. We report on 350 (700 eyes) glaucoma patients screened during a medical ophthalmological visit in the context of preparation for a public competition, which took place over 24 days in Yamoussoukro. The objective of this study was to determine the prevalence of primary open-angle glaucoma in candidates for a public competition.*

## Keywords

Primary open-angle glaucoma,

## Introduction

Primary open-angle glaucoma (POAG) is a chronically progressive anterior optic neuropathy characterized by perimetric changes and pathological excavation of the optic disc [1]. It is the leading cause of irreversible blindness in developing countries and the second most common worldwide [2]. Its prevalence varies between populations: 1.4% in the Caucasian population [3], 4.8% in black Africans [4] and 4% to 13% in African Americans [5]. It thus poses a public health problem. POAG has become one of the priorities of the national blindness program and is the subject of numerous information, education, and communication sessions. Initially an asymptomatic disease, it is from the very advanced stages that visual acuity decreases significantly with irreversible damage to the optic nerve. Because of the almost asymptomatic nature of the disease, screening is the first, if not the only, means available to diagnose the disease as early as possible and institute a treatment capable of slowing its progression. If detected early, glaucoma can be treated to prevent blindness in the majority of patients. Screening is secondary prevention [6]. The prevention of professional disintegration and job retention are important public health issues today [7]. In France, according to the Direction Générale du Travail, more than 160,000 employees in the private sector were declared medically unfit for their jobs in 2014 [8] Glaucoma is recognized as a disease that affects quality of life, social life, and professional life. When seen late or untreated, it can be disabling for all workers. It is therefore important to detect it early in any individual who wishes to enter the workplace. The objective of this study was to determine the prevalence of primary open angle glaucoma in candidates for a public competition.

## Material and Methods

This was a retrospective cross-sectional study with a descriptive and analytical aim on candidates who had undergone an ophthalmological medical examination as part of their preparation for a public competition. It took place from 22 March to 15 April 2021 in Yamoussoukro in two parts. The first stage took place on the site of a local university establishment. Each candidate had to fill in a form on socio-demographic characteristics (age, sex, profession) and on their medical and surgical history. Ophthalmic nurses then assessed the visual acuity of the candidates. Ophthalmologists then received them for fundus examination. The papillary excavation

of both eyes was assessed. When they were less than or equal to 3/10ths, they were considered good, and the candidates were declared fit. However, when the excavations were greater than 3/10ths, the optic discs were considered suspicious. Candidates were referred to a medical clinic for further investigations: slit lamp examination, gonioscopy, intraocular pressure measurement, fundus examination and automated visual field.) At the end of the visit, the diagnosis of glaucoma was made, and management was proposed. The information was recorded on a data collection survey form. Statistical analysis was performed using Epi info 7.2.2 software**.**

## Results

Out of 16230 candidates visited, 350 (700 eyes) had suspicious glaucomatous papillary excavation (greater than 3/10ths), a prevalence of 2.16%. The average age was 26 years with extremes of 18 and 39 years. Males were predominant with a sex ratio of 1.84. Pupils/Students came first with 50%. Most applicants had no known personal history (82%) (Table 1). Visual acuity was judged well according to WHO (greater than or equal to 3/10ths) in 42% of the candidates (Table 2). Intraocular pressure (IOP) measured with the Goldman applanation tonometer was between 10 and 21mmhg in 80% of the candidates. After an ocular challenge test, this measurement was higher than 21mmhg in 91.01% of the candidates. Papillary excavation was between 3/10 and 7/10 in 88% of candidates and greater than 7/10 in 12%. Automated visual fields were performed and 78% of the candidates had early glaucoma (-3 to -6 db) (Table 3). Regarding management, 92% of the candidates were put on antiglaucoma treatment and 8% on clinical monitoring.

**Table 1:** Distribution of applicants by personal history.

| Personal history | Number | Percentage |
|---|---|---|
| **Glaucoma** | **28** | **8.0** |
| **Wearing corrective lenses** | 84 | 24.0 |
| **Ocular trauma** | 7 | 2.0 |
| HTA | 14 | 4.0 |
| **No history** | **217** | **82.0** |
| Total | 350 | 100.0 |

**Table 2:** Distribution of candidates according to visual acuity in the right eye.

| Distance visual acuity | Right eye | Percentage | Left eye | Percentage |
|---|---|---|---|---|
| $10/10^e$ | 48 | 13.7 | 62 | 17.7 |
| [$3/10^e$ - $9/10^e$] | 99 | 28.3 | 85 | 24.3 |
| [$1/10^e$ - $3/10^e$] | 28 | 8,0 | 7 | 2.0 |
| [$1/10^e$ - CLF* 1m] | 7 | 2,0 | 7 | 2.0 |
| [CLF* 1m - LP*-] | 350 | 100,0 | 350 | 100.0 |
| Total | | | | |

***Count the fingers**

***Light perception**

**Table 3:** Distribution of candidates by Automated Visual Field score.

| Automated Visual Field | Effectif | Pourcentage |
|---|---|---|
| Severe glaucoma (sup à-20 db) | 14 | 2.0 |
| Advanced glaucoma (-12 à-20 db) | 28 | 4.0 |
| Moderate glaucoma (-6 à-12 db) | 56 | 8.0 |
| Incipient glaucoma (-3 à -6 db) | 546 | 78.0 |
| No signs of glaucoma (-1 à-3 db) | 56 | 8.0 |
| Total | 700 | 100.0 |

## Discussion

The prevalence of glaucoma in the candidates was 2.16%. All subjects were under 40 years of age. According to the terminology, this was a juvenile glaucoma because it was consistent with the age of onset. The prevalence was variable according to the series. It was 0.97% in Ivorian melanoderma [9], and 0.4% in Cameroon [10]. In France, the prevalence is estimated at 6% according to Rouland [11]. In our series, 82% of the candidates had no known history of glaucoma. Other authors found a hereditary history of glaucoma in 88.3% of these patients [10]. Since the transmission of this disease is autosomal dominant with a high penetrance [12,13], a family investigation of the candidates should be carried out. Most of them had no knowledge of the family influence of glaucoma. Clinically, intraocular pressure (IOP) measured with the Goldman applanation tonometer was between 10 and 21mmhg in 80% of the candidates. This was an apparently normal pressure measurement. However, after performing an ocular provocation test, which consisted of putting the candidates in dark conditions to stimulate mydriasis with reduction in physiological condition of the iridocorneal angle, we found the increase in high IOP, which was greater than 21mmHg in 91.01% of them. In juvenile glaucoma, hypertonia can be major with values sometimes reaching 50mmhg [14]. Classically, ocular hypertonia associated with a rapid alteration of the optic disc is characteristic of glaucoma in young subjects [11]. In our series, papillary excavation was between 3/10 and 7/10 in 88% of candidates and greater than 7/10 in 12%. Automated visual fields were performed and showed early glaucoma (-3 to -6 db) in 78% of candidates. For some authors the visual field alteration-indicating moderate to severe glaucoma was estimated at 79.16%. Juvenile glaucoma is more severe and earlier in melanoderma [4-7,9,14]. Management consisted of the prescription of a prostaglandin analogue for 92% of candidates and 8% were placed on clinical monitoring. However, for many authors, the treatment of juvenile glaucoma is surgical [12,15-17]. This study allowed the discovery of glaucoma patients by the candidates or those at risk of developing glaucoma. Glaucoma, commonly referred to as the "silent killer", has an impact on quality of life, social life and the environment. It is important to detect and manage it early. Screening actions in the workplace can help to prevent professional exclusion, by allowing earlier detection and consequently a limitation of incapacity. Having glaucoma is not a counter-indication to integration into the workplace. However, if discovered late or left untreated, it can be disabling for all workers and contribute to their being declared medically unfit for work. It is therefore important to detect it early in any individual who wishes to enter the workplace.

## Conclusion

The important role of medical examinations before any integration into a professional function has been underlined. It enables the detection of pathologies likely to cause professional exclusion, in particular glaucoma, described as a silent killer of sight. These medical examinations are therefore strongly recommended, particularly in our African context.

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