

# Study on Screening Methods for Glaucoma in Physical Examination Population

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**ABSTRACT.** *Objective: to analyze the incidence of glaucoma in the physical population and the necessity of glaucoma screening. Methods: the subjects were selected from 300 subjects who underwent physical examination in ophthalmology department of our hospital from January 2018 to December 2018, and the subjects underwent eye examination, including medical history inquiry, visual examination, general eye examination, intraocular pressure examination, eye eye examination, etc. If the physical examination is suspected of glaucoma or fundus lesions, 24h of intraocular pressure monitoring and anterior chamber Angle microscopy should be performed. Results: the study results showed that there were 6 patients with glaucoma, and the overall prevalence rate was 5.0%, and the age group with the highest proportion of patients was over 70 years old. With the increase of age, the prevalence rate increased gradually, which was also consistent with the epidemiological survey results of previous studies on large-scale sample size. Conclusion: glaucoma screening can understand the condition of eye health in modern population, so as to reduce the possibility of visual impairment and irreversible blindness.*

**KEYWORDS:** *Physical examination population; Glaucoma; Screening method*

## 1. Introduction

Primary glaucoma is a serious and irreversible eye disease, which causes blindness. At present, the aging of the social population is becoming more and more serious, so the number of primary glaucoma patients has a significant increase trend. Because the patient's symptoms are not prominent and lack of typical features, patients often lose the best treatment opportunity due to lack of cognition, leading to moderate visual impairment or visual field defect before seeking medical treatment. Current eye treatments cannot fully restore vision in patients with advanced glaucoma, so early diagnosis is needed to delay nerve damage, and physical examination is an important means.

## 2. Data and Methods

### **2.1 General Information**

The subjects of the study were selected from 300 subjects who underwent physical examination in ophthalmology department of our hospital between January 2018 and December 2018. All of the patients were over 40 years old, and all of them were employed or retired. There were 166 males and 134 females, aged 45-71 years, with an average age of  $53.8 \pm 1.8$  years. All participants were excluded from other confirmed eye diseases.

### **2.2 Method**

After detailed inquiry of the patient's medical history, binocular vision, fundus and intraocular pressure examination were conducted to inquire the near and far vision of the patient. The international standard visual acuity chart was selected for the visual acuity examination and measured and recorded by the same ophthalmologist. The physical examinee should sit about 5m away from the visual acuity chart, cover one eye first, identify the direction of the eye mark gap with the other eye, and find out the best line for the physical examinee. According to the visual acuity calculation formula  $V = d / d$  ( $V$  is visual acuity,  $d$  is the actual visual acuity distance,  $d$  is the normal visual acuity distance) to calculate the naked eye vision of two eyes and the corrected vision, but the appearance of false blindness should be avoided.

The Angle width of the lower chamber was measured by slit lamp. In the darkroom, the slit light was adjusted to the narrowest and perpendicular to the peripheral cornea, and the line of sight and light were set at  $60^\circ$ , and the depth of the peripheral chamber Angle of the examinees was recorded respectively. In the process of screening, pre-experiments should be conducted to ensure the accuracy of the results. In the process of investigation, consistency testing of inspectors should also be carried out.

After the depth of the anterior chamber was measured, the intraocular pressure was measured with a non-contact tonometer.

Direct ophthalmoscope examination of the fundus, when the C/D value is above 0.6, or the difference in the C/D value of both eyes is above 0.2 should pay attention to observation.

If the patient has suspected eye disease or suspected glaucoma blue light, use the anterior chamber corner microscopy to check the corner area of the room, and do a good job of intraocular pressure monitoring for 24 hours.

### **2.3 Observed Index**

Follow-up examinations for suspected glaucoma are required when the following conditions occur.

- (1) Family history of glaucoma;
- (2) Patients who underwent physical examination had a history of glaucoma attack, such as iridescent vision, transient blurred vision, etc.
- (3) The intraocular pressure is above 21mmHg or the intraocular pressure difference between the eyes is above 5mmHg;
- (4) The depth of the peripheral anterior chamber was below 1/4 corneal thickness. The intraocular pressure was reviewed and the stimulation test and visual field examination were performed.

The diagnostic criteria for primary glaucoma are:

- (1) The atrial Angle is open, with glaucoma optic disc damage and field defect, and the intraocular pressure tends to increase;
- (2) There was a history of primary angle-closure glaucoma with intraocular pressure above 21mmHg and a binocular pressure difference above 5mmHg. There are corresponding glaucoma visual field defect. In addition, glaucomatous optic nerve damage can also be determined when the physical examination produces optic disc bleeding, disc stenosis or loss of retinal nerve fiber layer.

#### 2.4 Statistical Methods

All data were compared and analyzed using Excel software.

### 3. Results

The results showed that there were 6 patients with glaucoma, and the overall prevalence rate was 5.0%, and the age group with the highest proportion of patients was over 70 years old. With the increase of age, the prevalence rate increased gradually, which was also consistent with the epidemiological survey results of previous studies on large-scale sample size. The data are shown in table 1 below.

*Table 1 the Relationship Between Age and Prevalence (n,%)*

Age	Number of cases	Number of glaucoma patients	Prevalence(%)
Term	111	29(26.1)	61(55.0)
34-37	24	8(47.1)	16(66.7)
30-34	12	3(25.0)	8(66.7)
30 below	3	0(0.0)	3(100.0)
Total	150	40(26.7)	88(58.7)

#### 4. Discussion

Glaucoma, characterized by characteristic optic atrophy and visual field defect, is the second leading cause of blindness worldwide and is irreversible blindness. Since glaucoma is a very serious burden for both the patient and the family, early detection and rapid intervention measures are needed to stabilize the condition of most glaucoma patients. In fact, the number of potential glaucoma population is large, early publicity of glaucoma related disease prevention knowledge is also very necessary. After the actual screening, it can be known that the prevalence rate of glaucoma patients increases gradually with the increase of age. However, glaucoma itself is a public health problem, which can be effectively identified in the early stage, and the non-invasive identification method can make patients easy to accept, and effective treatment can be achieved after early control.

Among the screening standards for glaucoma, the intraocular pressure screening standard is a fast and convenient method with a long history, but it has some shortcomings in sensitivity and specificity. Sensitivity can be increased when the critical value of intraocular pressure is reduced, but specificity is decreased, which requires the combination of initial examination, reexamination or other examination results. Fundus examination of the optic nerve can also be a reference content. In general, the optic nerve damage caused by glaucoma will be earlier than the general changes in visual function, which belongs to the scope of objective examination and is highly reliable. Therefore, optic nerve examination is also the focus of glaucoma screening and research. However, the accuracy of the test depends largely on the personal experience of the examiner. [1]. In recent years, the results of epidemiological investigations have repeatedly confirmed that there is a close relationship between glaucoma and the age of patients. The older the patients are, the shallower the anterior chamber becomes, the narrower the Angle of the chamber becomes, and the crystal shifts forward, the greater the risk of glaucoma. A number of investigations and studies in China have shown that the age of glaucoma patients is over 40 years old, and the onset peak is between 55 and 70 years old. Therefore, this reminds us that if we want to increase the effectiveness of glaucoma screening, we should focus on the screening of middle-aged and elderly people, and patients with diabetes, family history of glaucoma, long-term myopia should also be counted as the high incidence of glaucoma population. So the association between glaucoma prevalence and age was also mentioned in this study.

From the perspective of age, the research on glaucoma at home and abroad mentioned that the female population is the high-risk group of glaucoma, the prevalence rate has a significant gender difference. However, this data still needs to be further studied to obtain more accurate results in the future [2]. Of course, from the selection of subjects in this study, the subjects selected were all those over 40 years old for physical examination, so they were related to the investigation of congenital glaucoma. Whether the composition of congenital glaucoma is characteristic of regional environment and population difference should be studied with more epidemiological data. In general, the causes of secondary glaucoma can include complications caused by diseases such as diabetes, and similar eye diseases

caused by factors such as traumatic glaucoma [3].

Based on social requirements, glaucoma has a great impact on individual life and social economy, so early treatment can reduce the possibility of blindness and control direct and indirect costs [4]. Cataracts can be surgically treated to restore visual function, but glaucoma is an irreversible blinding eye disease, and the goal of early control is to prevent loss of vision. In the analysis of clinical practice data, we can know that with early detection and reasonable treatment, the vast majority of glaucoma patients can maintain a useful level of use, especially primary angle-closure glaucoma patients. Up to now, the epidemiology of glaucoma in China has been relatively comprehensive, but the prevalence of glaucoma has not decreased with the improvement of diagnosis and treatment technology. The auxiliary use of the new equipment failed to reduce the incidence of the disease, but instead showed an increasing trend. The reason was that a large proportion of glaucoma patients did not have typical clinical symptoms, so they failed to visit the local ophthalmic clinic in time, delaying the optimal treatment period. If glaucoma patients are screened out from the normal physical examination population, it is necessary to know the type composition, age level, distribution characteristics of family history, etc., so as to provide corresponding data for future epidemiological investigation [5].

## 5. Conclusion

In conclusion, glaucoma screening can help to understand eye health in modern populations, thereby reducing the possibility of visual impairment, irreversible blindness, and other conditions.

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