

Racial disparity in the prevalence of glaucoma in the United States

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Abstract

Glaucoma, a disorder of the optic nerve, occurs when the intraocular pressure, a risk factor for glaucoma, is elevated, leading to an eventual loss of sight. This study's purpose is to evaluate the racial disparity in the prevalence of glaucoma and present different ways to improve early diagnosis and treatment outcomes among glaucoma patients. A literature review is performed using the PubMed database to examine the associated risk factors and prevalence of glaucoma among racial grouping. The literature indicates that early diagnosis and treatment is the most effective approach for combating the considerable social and economic cost of blindness caused by this disease. Studies also suggest that outreach, educational, and screening programs to combat eye diseases should be geared towards high-risk populations such as African Americans and Latinos, as these groups tend to be less aware of their eye problems and have limited access to treatments. The establishment of projects to prevent blindness from glaucoma will alert medical care providers of the need for early evaluation for risk factors, which in turn will allow for the allocation of resources to reimburse for the treatment provided.

Introduction

Glaucoma is a group of ocular diseases of the optic nerve associated with the progressive loss of vision. Glaucoma is one of the leading causes of bilateral blindness especially among older populations. Approximately 8.4 million persons worldwide and 130,000 in the United States are bilaterally blind due to angle closure glaucoma (ACG) or open angle glaucoma (OAG).¹ The latter form of the disease, OAG, is the more prevalent of the two in the UNITED STATES, and according to one study is responsible for over 75% of the glaucomatous blindness.¹ In 2004 an estimated 2.2 million persons in the UNITED STATES had open angle glaucoma and by 2020, because of the aging population, some 3.36 million is expected to be afflicted (Figure 1).²

Racial Disparity in Prevalence

Among the many challenges of eye care practitioners and researchers, one of the most urgent is improving the diagnosis and treatment of glaucoma in order to minimize the number of patients who become blind from the disease. Progress has been made over the last couple of decades: the probability of blindness due to glaucoma has decreased by nearly half since 1980.³ Despite this progress, there is still significant progress that needs to be made in order to prevent the

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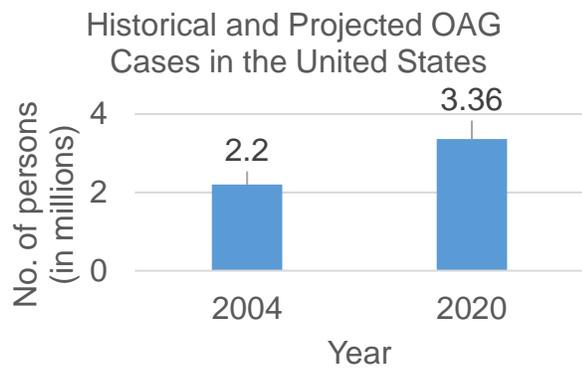


Figure 1

The projected cases of OAG in the year 2020 is expected to increase substantially compared the historical number of OAG in 2004.

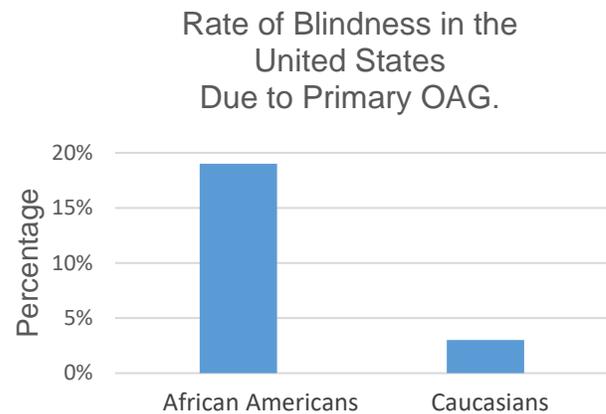


Figure 3

The rate of blindness due to POAG is substantially higher in African Americans (19%) than Caucasians (3%).⁴

estimated 15 percent of patients who in this current era will still progress to blindness.

African Americans and, to a lesser extent, Latinos have a disproportionate representation in that 15%. Both these groups have elevated risks of developing glaucoma and becoming blind from it. The Baltimore Eye Survey, for example, revealed that primary open angle glaucoma (POAG), that is, glaucoma not related to another underlying condition, is 6.6 to 6.8 times more prevalent among African Americans than Caucasians.⁴ POAG results in a 19% rate of blindness in African Americans compared to a 3% rate in Caucasians (Figure 2). In addition, the survey revealed that on average, POAG begins ten years earlier in African American than in Caucasians. The Los Angeles Latino Eye Study (LALES) found that the prevalence of glaucoma among Latinos was nearly 5%, and that older Latinos' risk profile for POAG is comparable to that of African Americans, starting at about age 61 years.⁵

African Americans' higher risk of glaucoma may be due in part to slight structural differences in their eyes. It is well documented that African Americans on average have larger discs and thinner retinal nerve fiber layer (RNFL) than Caucasians.⁶ Nevertheless, there is conflicting evidence as to whether either or both of these structural differences lead to the higher glaucoma

susceptibility in African Americans.^{7,8} Evidently, more research is warranted in this area.

Intraocular pressure (IOP) is an important risk factor for POAG, but racial differences in IOP have not been consistently found in the literature: some studies report that higher IOP levels were observed in African Americans compared to those in Caucasians, while other studies including the Baltimore Eye Survey found no differences.^{4,9-11} One racial disparity reported in the Baltimore Eye Survey though, was the finding of lower IOP levels in African Americans than Caucasians at the onset of glaucoma. This finding suggests that African Americans might develop glaucoma even when their IOP is within the statistically normal range, or that there are discrepancies in the measured IOPs of African Americans that may underestimate the true IOP. The first of these two possibilities is consistent with research findings that some individuals with IOPs in the statistically normal range (10-21mm Hg) show glaucomatous damage.¹² However, this finding occurs in all ethnicities and is not unique to African Americans. The second of the possibilities is also reported in the literature and is explained by the following argument: the current gold standard for the measurement of IOP is Goldmann applanation tonometry (GAT), and it is calibrated for corneas

520µm thick. Individuals with thinner corneas tend to show lower IOPs while those with thicker corneas record higher IOPs.¹³ African Americans tend to have thinner corneas and hence their true IOPs are most likely to be underestimated.¹⁴⁻¹⁷

Conclusion

Although there is currently no cure for glaucoma, early diagnosis and treatment is the most cost-effective approach to combating the considerable social and economic cost of blindness caused by the disease. There should be outreach and educational and screening programs implemented in the general population, but more so among high risk populations like African Americans and Latinos. The importance of such programs is further heightened by the fact that in its early stages, glaucoma is asymptomatic. Research suggests that awareness of the disease as well as accessibility to treatment appear to be reduced in high risk populations, both in the United States and in developing countries.¹³

The establishment of a project to prevent blindness from glaucoma will alert medical providers to early evaluation risk factors and allow the allocation of resources to be reimbursed for the treatment. There is one such initiative for children to prevent blindness, amblyopia and other causes of childhood visual impairment. Using this program, screenings are periodically conducted at schools and on visits to the pediatrician. For children who present with problems at the screening, a comprehensive evaluation via an optometrist or ophthalmologist is performed. A similar initiative can be established for minorities at risk for glaucoma. It would require a multi-disciplinary approach in which primary care physicians, eye care providers, and those involved in the outreach network systems coordinate their efforts at breaking down existing barriers to glaucoma evaluation and treatment for minorities, many of whom are of low socioeconomic status. The cost of this effort will undoubtedly reduce the far greater

costs resulting from managing advanced stage glaucoma and blindness at a future point in time.

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