



Race in the phenotype of glaucoma: genotypic or environmental variance?

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Dear Editor

I read with great interest the article by Dr. Mashael Al-Namaeh, entitled “Pharmaceutical treatment of primary open-angle glaucoma.” In this article, the author concentrated on an interesting and remarkable area in POAG treatment [1]; however, a few issues may be worth considering regarding race and its role in glaucoma treatment.

Substantial disparities exist in the quality and quantity of medical care received by those of different races, and the race-based special needs and unique responses to pharmaceutical treatment have been underestimated. Race differences must be considered in the design of cost-effective management policies [2] and clinical guidelines.

In a systematic review and meta-analysis, Asefa et al. [3] revealed that the total variance in the glaucomatous phenotype (V_p) has two main components: genotypic variance (V_G) and environmental variance (V_E). In addition to the other factors underlying these two components, racial background was considered in the final analysis of the included studies. Race, by nature a complex factor, is associated with variations in important anatomical features that could affect glaucoma progression, such as retinal nerve fiber layer thickness [4]. The disparity in the prevalence of glaucoma among different ethnicities has been well illustrated [5]. However, when considering race as an independent factor in a comprehensive systematic review and meta-analysis, as in the study by Asefa et al. [3], race could be regarded as a cyclic interaction between environmental and genotypic variance. Race cannot be precisely identified as an environmental factor, as members of a race usually live in a common geographic region and experience the same environmental conditions. On the contrary, race could be considered a genetic factor because of the genetic similarities between individuals of the same race. One may recognize the interconnected nature of race in the study of primary congenital glaucoma and genetic ancestry by Rolim et al. [6] In this study including children of the Brazilian Southeast, a poorer surgical prognosis was associated with a high proportion of African indels ($P = 0.036$). However, an insignificant difference between the case and control groups was found when comparing genetic ancestry proportions [6, 7].

Glaucoma, the leading irreversible cause of blindness worldwide [8], is diagnosed based on a set of risk factors and changes in the ocular anatomical structure [9]. Race affects some of these risk factors and anatomical structures that change during glaucoma development. As the influence of race/ethnicity is important in clinical diagnosis and decision-making [10], the implications of racial disparities may be important in the diagnosis and management of ocular diseases, especially glaucoma.

Non-clinical factors such as race/ethnicity may influence the etiology, frequency, manifestations, and treatment of uveitic glaucoma [11]; however, the exact mechanisms are unclear, and there are no uniform clinical guidelines to individualize treatment based on racial background.

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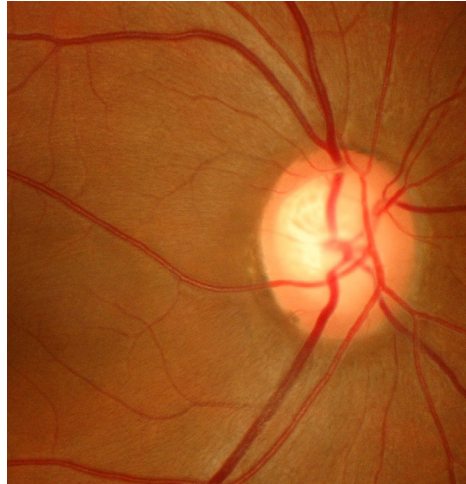


Figure 1. Color fundus photographs of the right eye of an Asian patient with glaucoma. Note the glaucomatous changes such as the large vertical cup-to-disc ratio, bayoneting sign, regional pallor, vessel barring, and subtle retinal nerve fiber layer defect. This figure has been reused with the permission of Med Hypothesis Discov Innov Ophthalmol [12].

Therefore, a clear answer to the question raised in this letter can be crucial in determining the role of race in this important ocular disease (Figure 1). Future studies could open new horizons for research in managing this common cause of blindness.

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