

# Association between Age-Related Macular Degeneration and Lens Opacity in Senior Population in Hainan Province

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To the Editor: Cataract and age-related macular degeneration (AMD), often develop concurrently, which are two of the leading causes of visual damages associated with aging. Sunlight is reported to contribute to the pathogenesis of both cataract and AMD.<sup>[1]</sup> In cases of cataract, less sunlight could possibly access to the ocular fundus. On this basis, lens opacity maybe a protective factor for AMD. Nevertheless, there are still disputes up to now.

Hainan Province, in southern China, is localized in the tropical area with an average of sunshine of more than 2000 h/year. The aim of this study was to analyze the correlation between cataract and AMD in population aged  $\geq 50$  years in Hainan Province from January 2014 to June 2016. To exclude the inferences of each pathological factor on the individuals, binocular disparity was applied to the analysis of results. To be specific, the difference between the left and right eyes for each subject in the score for each condition was calculated by subtraction. On this basis, we can investigate whether the inter-eye differences in lens opacity patients are related to inter-eye differences in AMD patients. Each individual signed the informed consent. The study protocols were approved by the Ethical Committee of Hainan General Hospital.

The sample size was based on the estimation of an anticipated prevalence of AMD (15.5%) based on Jing'an District in Shanghai city and an anticipated prevalence rate of 15.6% in cataract according to Peking Shunyi District within an error bound of 2%. Four cities in the east, west, south, and north Hainan province were selected for the sampling. Individuals aged  $\geq 50$  years and long-term residence or individuals for at least 12 months in these communities and/or villages were included in this study. For the sampling, a computer-based random number generator was used in each site. A door-to-door visit was given to the subjects underwent no examinations. The lens opacity was evaluated according to the lens opacity classification system III. The nuclear opacification was divided into six grades according to the severity, and a score of 1–6 was bequeathed to each grade. The opacification of the cortical or posterior capsular was divided into five grades according to the area of the lesions and severity, and a five score range was established according to the grading. The severity of the lens opacity was evaluated according to the

sum total scores of the nuclear and cortical and posterior capsular opacification. AMD was diagnosed according to the Beckman Initiative for Macular Research Classification Committee. The AMD score was divided into 0 (without AMD), 1 (early AMD), 2 (intermediate AMD), and 3 (late AMD). Findings for fundus examination were evaluated by two experienced ophthalmologists. In cases of any disputes, a comprehensive discussion was given until a consensus.

In total, 2288 individuals (4576 eyes) participated in this study, among which 129 subjects (258 eyes) were excluded from the study due to pseudophakia (172), keratopathy (23), atrophy of eyeball (7), or severe lens opacity (56). Thereafter, 2159 individuals (4318 eyes) involved in this study, including 689 of aged 50–59 years, 657 of aged 60–69 years, 565 of aged 70–79 years, and 248 of aged  $\geq 80$  years. Spearman rank correlation analysis indicated that there was no correlation between lens opacity and AMD in these patients ( $r = -0.028$ ,  $P = 0.193$ ). Nowadays, study confirmed that cataract surgery contributed to the progression of AMD.<sup>[2]</sup> This may be related to the fact that removal of cataract may result in access of sunlight into the fundus and elimination of antiglare barrier after lens removal. However, it seemed that there was no correlation between cataract and AMD in a previous study.<sup>[3]</sup>

In this study, no correlation was noticed between AMD and lens opacity in the aged population in Hainan Province. This indicates that the development of lens opacity causes no effects on the development of AMD, which might not decrease the prevalence of AMD. This indicated that the development of lens opacity might not decrease the prevalence of AMD as we anticipated: First, there might be more complex factors besides the sunshine exposure which influence the relationship between the lens opacity

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and AMD. Second, different light waves show different effects on cataract and AMD. Cortical or nuclear cataract was not associated with ocular exposure to blue or all visible radiation, rather than infrared or ultraviolet light,<sup>[4]</sup> while blue or visible light contributes to advanced AMD other than ultraviolet light.<sup>[5]</sup> Third, it is not sure whether there might be simultaneous onset of AMD and lens opacity or in an order when only take the light exposure into consideration. Our data implies the retina injury response faster than the formation of lens opacity under light exposure, which deserves further studies in the near future.

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### Conflicts of interest

There are no conflicts of interest.

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