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VISUAL IMPAIRMENT AND RISK OF COGNITIVE IMPAIRMENT: THE SINGAPORE EPIDEMIOLOGY OF EYE DISEASES (SEED) STUDY

(1) Singapore Eye Research Institute, Singapore National Eye Centre
(2) Medicine, University of New South Wales, Sydney, Australia

Aims: To examine the longitudinal association between visual impairment (VI) and incident cognitive impairment in a multi-ethnic Asian population in Singapore.

Methods: The Singapore Epidemiology of Eye Diseases Study comprised of 3 major Asian ethnic groups: Malays, Indians, and Chinese. Of the 4,407 eligible participants aged ≥60 years from baseline examination, 3,436 (response rate 77.9%) were re-examined during the 6-year follow up (year 2011-2017.) All participants underwent standardized examinations questionnaire assessment which included measurements of presenting and best-corrected (i.e. corrected with glasses) visual acuity (VA). Any VI was defined as VA <20/40, and blindness was defined as VA <20/200 in the worse-seeing eye, respectively. Cognitive impairment was defined based on a locally validated Abbreviated Mental Test using education-based cutoff scores. Incident cognitive impairment was evaluated among those without cognitive impairment at baseline. Poisson binomial regression model was used to determine the association between VI and incident cognitive impairment.

Results: After excluding those with cognitive impairment at baseline, 2,195 individuals with available follow-up data (512 Malays; 684 Indians; 999 Chinese) were included in the final analysis. Of which, 94 (4.3%) had incident cognitive impairment. Following adjustments for baseline age, gender, ethnicity, diabetes, hypertension, cardiovascular disease, smoking status and alcohol intake, any presenting VI at baseline was associated with incident cognitive impairment (relative risk [RR]= 1.65; 95% CI, 1.04-2.62; P=0.035). Similarly, any best-corrected VI at baseline was also associated with higher risk of incident cognitive impairment, albeit borderline significance (RR=1.48; 95% CI, 0.97-2.25; P=0.070). Individuals with either presenting or best-corrected blindness at baseline, were both 2.23 times likely to develop CI (95% CI 1.18-4.23; P=0.014, and 95% CI 1.18-4.21; P=0.013, respectively). Among individuals with any VI at baseline and developed cognitive impairment, the main causes of VI were under-corrected refractive error (55.9%) and cataract (62.9%) for presenting and best-corrected VI, respectively.

Conclusion: In this prospective multi-ethnic Asian cohort in Singapore, poor vision was independently associated with higher risk of developing cognitive impairment, causes of visual loss in these cases were mostly preventable by nature. This suggests that maintaining good vision may be an important interventional strategy for mitigating age-related cognitive declines.