



Re: Commentary on ten-year incidence of cataract surgery in urban south China: the Liwan Eye Study

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We would like to thank Koo *et al.* for their comments regarding our study on the 10-year incidence of cataract surgery and its associations in an urban adult Chinese population aged 50 years and older (1). Our study indicated that although the annual incidence of cataract surgery in our study (0.9%) was higher than that previously reported by the Beijing Eye Study, it was notably lower than those in other high-income countries, especially for those aged 75 years and older. Participants with higher income, higher education levels, and diabetes at baseline were more likely to have cataract surgery during the 10-year follow-up period.

Our study reported an overall cataract surgery incidence of 9.4% over a 10-year period, which is significantly lower than that of the Beaver Dam Eye Study (13%), the Blue Mountains Eye Study (17.8%), and the Age-Related Eye Disease Study (29.1%) which are considered representative of the economically developed countries. In China, the cataract surgical rate seems to vary greatly across the different regions of the country; the annual incidence of cataract surgery in our study was higher than that in the Beijing Eye Study, which recruited younger participants (≥ 40 years) from four rural districts and three urban districts, while it was similar to that in the Shihpai Eye Study. In contrast, about 16% of our study participants developed visual impairment over the 10-year period, most of whom needed cataract surgery. Thus, the low cataract surgery rate in the Liwan Eye Study suggests a great potential for further improvement on the number of cataract surgeries performed in urban and rural China.

We sincerely appreciate Koo *et al.*'s commentary in regards to their agreeing with our statement that “education and income were two important factors for the accessibility of cataract surgery”. Cost has proven to be a major barrier to cataract surgery uptake in many countries. Results of one cross-sectional study with 833 participants who underwent free cataract surgery showed that financial concern was the primary barrier for their participation in the free surgery program in urban south China (2). It was also confirmed that reducing the surgery cost can significantly increase the surgery uptake in rural south China (3). Lack of awareness of cataracts may be another common factor both in China and in other developing countries. We previously conducted a cross-sectional study to investigate the barriers to cataract surgery by trained interviewers. The results indicated that lack of knowledge about cataracts and concerns about the quality of local services were the principal barriers to cataract surgery in rural south China (4). Another part of our study showed that the most common reason mentioned by the 62 participants [among the 339 participants with visually significant cataract (presenting visual acuity $< 6/60$) in rural southern China] unwilling to pay anything for surgery was that they were unaware of their cataract and felt that their vision was still good (5). Data from a free cataract surgery program conducted in urban south China found that most of the participants had poor health awareness and a low level of education (2).

Gender inequality has been previously demonstrated to be an important factor of surgery uptake with women being less likely to have cataract surgery. However, our previous

cross-sectional survey on willingness to pay indicated an increase in the proportion of willing to pay for surgery among the female subjects after the implementation of free cataract screening and community-based low-cost surgery programs in rural south China (6). The China Nine-Province Survey showed that the prevalence of cataract surgery was somewhat higher in females than males (7). Additionally, both the Liwan Eye Study and the Beijing Eye Study indicated no gender difference in incident rate of cataract surgery.

We agreed with the commenters that the study conclusions cannot be applied to the general population of China or to other areas of the world due to differences in the socioeconomic characteristics and health delivery models, and we have already acknowledged this limitation in the manuscript. In China, although the rate of general central serous retinopathy (CSR) has increased annually with socioeconomic development, the regional rate of CSR seems to vary greatly (7,8). Additionally, socioeconomic development is not the only determinant of the CSR rate; for example, the differences in cultural tendency and attention to eye care health in China versus India may be a direct reason for the discrepancy in CSR rate between these two countries (8). Thus, more data from different areas within China are needed to inform effective health resource planning.

The disparity in the accessibility and delivery of cataract surgery services in low income areas may be the major reason for the low CSR rate. Despite the rapid economic growth and improvement in healthcare coverage (with over 95% of the population insured) over the last decades (9) that have greatly improved the ability to pay for cataract surgery, the CSR rate in China remains lower than that in other resource-rich developed countries (8). This highlights the potential for further improvement in the number of surgeries and the need to address other barriers such as health education and better access to primary eye care so that those people in need of cataract surgery can be identified. We sincerely thank Koo *et al.* for their comments, interpretation of our research findings, and their contribution to a better understanding of the challenges and opportunities to deliver eye care service and cataract surgery in China.

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