Response to comments on: Evaluation of Barrett’s universal II formula for intraocular lens power calculation in Asian Indian population

Dear Editor:

We thank the authors for their keen interest in our work and their perspectives on this subject.[1,2] The observations are pertinent and useful and we are pleased to have the opportunity to respond to the points raised, thus adding more depth and scope to the interpretation of the work. IOL power calculation still remains the most important exercise in cataract surgery demanding importance and accuracy of greater magnitude, especially in complex eyes.

With continually evolving IOL formulas and advancements in biostatistical methods for computing their accuracy, it is indeed imperative to relook at biostatistical analytical methods to ensure optimal conclusions in comparisons.[3,4] The research question addressed by our study methodology was finalized ahead of the publication of “Protocols for studies of intraocular lens formula accuracy” by Hoffer et al.[5] It did also hover around the aspect that the use of modified SRK II in recent times is not optimal as it is error prone. Therefore, we had endeavored to compare modified SRK II formula along with other formulas in comparison to Barrett’s universal (BU II) in Indian scenarios where it is still widely used, especially while calculating the IOL power manually from ultrasonic axial length values, in cases when optical biometry is not possible.

Inclusion of other fourth and fifth generation formulas such as Haigis, Holladay 2, and Hill-RBF would definitely expand the scope of comparative analysis. As well known, Haigis formula comes best recommended in post-refractive surgery eyes, which were not included in our study sample. Holladay 2 and Hill RBF were also not included in light of nonaccessibility at the time of commencing the work.

Evaluation of the accuracy of BU-II formula in Asian Indian population being the aim of our study, and given the limits of ethical concerns raised during the commencement of this evaluation, we had to adopt a standard accepted IOL power formula (SRK-T) for prediction of postoperative refractive errors against a new formula (BU-II) which at that point of time did not have much validated results in Asian Indian eyes. Hence, a direct prospective evaluation with use of BU II formula was not adopted and the methodology prevailed upon the use of SRK-T formula in cases where the deviation of predicted IOL power was greater than 0.5D, which was already known to be accurate over a wide range of axial lengths. Further, the demonstration of prediction error and predicted accuracy is an acceptable alternative method of evaluation and comparison.

As recommended, both the mean absolute error (MAE) and median absolute error (MedAE) of predicted postoperative refraction of the various IOL power calculation formulas have been analyzed in our study. The MedAE represents the central location of absolute errors and is less affected by outliers in a dataset, which may be extremely important in analysis. Therefore, as explained by Kane et al.,[6] it is important to provide both MAE and MedAE. For the secondary outcome of the study, i.e., the difference in mean absolute error in the prediction of postoperative refraction between the four formulas, only the MAE was used. The comparison was done using a recommended nonparametric test (Friedman test), as distribution of mean absolute errors does not follow normal distribution.

Having described a methodological classification of IOL power calculation formulas elucidating the limitations of current formulas, technologies, and measurement concerns that can result in IOL calculation errors in outcomes and reporting, Wang et al. moved on to describe the criteria for analyzing outcomes in which lens constant optimization has been elaborated in the latter half of 2017.[4,5] The issue of lens constant optimization is topical as it helps to reduce the arithmetic mean error to zero, thereby eliminating the systematic myopic or hyperopic prediction error, and the readers must be aware of the same. It was not done in the present study as it was too complex to allow for the several variables involved such as different surgeons, lenses, and calculation strategies. However, as suggested, this analytical method adoption in future studies will be of use in providing better analytical outcomes.

Lastly, as suggested, besides reporting the percentage of eyes within ± 0.50 D and ± 1.00 D, those within ± 0.25 D and ± 2.00 D of refractive prediction errors would also help to enhance outcome analysis.[9] In our study, the percentage of eyes within ± 0.25 D of prediction error was 31.47%, 35.53%, 34.52%, and 38.07% in the modified SRK II, SRK-T, Olsen, and BU II formulas, respectively. Percentage of eyes within ± 2.00 D in the modified SRK II, SRK-T, Olsen, and BU II formulas was 98.98%, 100%, 100%, and 100%, respectively [Fig. I].

We thank the authors for further enhancing our outcome analysis with these newer criteria recommendations in analytical outcomes which serve to provide maximal information from studies analyzing the accuracy of IOL power prediction using different IOL formulas.

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Nil.

Conflicts of interest

There are no conflicts of interest.
We witnessed a number of shortcomings in this recently demonstrated case report. Overall, this interesting case report has a number of shortcomings which need to be addressed before the conclusions drawn can be adopted.

Firstly, no heteroplasmy rates in any affected or non-affected family members were provided. We should know heteroplasmy rates which have been stated as follows: interpreting as subclinical involvement in the mitochondrial chorio-capillaris. Secondly, the mother of the index patient was not hypothetically supported since they can be helpful to predict the disease trajectory and tissue were provided. We should know heteroplasmy rates the study which have been stated as follows:

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