LETTER TO THE EDITOR

(reply to letter CEOptom-21-347-LE)

Re: Inter-optometrist variability of IOP measurement for modern tonometers and their agreement with Goldmann Applanation Tonometry

AUTHORS:
Peter Campbell* ORCID 0000-0002-6019-1596
David F. Edgar* ORCID 0000-0001-9004-264X
Rakhee Shah* ORCID: 0000-0002-6134-0936

Author institutions:
*Division of Optometry and Visual Sciences, School of Health Sciences, City, University of London, Northampton Square, London EC1V 0HB, United Kingdom

Contact author: Peter Campbell Email: peter.campbell@city.ac.uk

To the Editor:

We thank Drs Pearse and Maddess for their interest in Campbell et al.[1] and for drawing attention to their review on IOP variability using Goldmann Applanation Tonometry (GAT).[2] Drs Pearse and Maddess express disappointment at the choice of a selected paper,[3] from a study "carried out on glaucoma subjects (as opposed to the presumably healthy subjects in the current study, whose glaucoma status is not mentioned in the methods)". Our Methods describe participants as "volunteers … recruited from University staff and students, and patients attending the university's eye clinic." It could perhaps be deduced that this sample did not comprise glaucoma patients, but lingering doubt would be removed by this sentence in the Discussion, "It would be useful to extend the current study sample to include …people with glaucoma, and ocular hypertension patients being treated with glaucoma medication."

Drs Pearce and Maddess note that “The selected paper[3] gave results similar to that obtained in the current study,[1] with no mention of other studies[4] which may have been more relevant and provided different results to the current study.” This paper[3] was indeed selected for comparison purposes, and we welcome this opportunity to explain the rationale for this selection. Journals understandably impose strict word and reference limits on authors. For research with a broad remit (our research investigated agreement between three tonometers and GAT) meeting these limits requires selective choice of references, and we did not compare our results with the paper[4] referenced by Drs Pearce and Maddess because inter-observer data were obtained from eight eyes. No criticism of this excellent paper[4] is intended, and eight eyes were sufficient for those authors’ objectives, but not for ours.

Drs Pearce and Maddess state: “…in the Discussion where the authors suggest the removal of outliers to align their results more closely with those of Kotecha et al.[3] There was no reason given for the removal of these outliers…”. Our paper did not “suggest” removal of outliers.They were removed in response to constructive comments from one reviewer who requested discussion of this issue be extended because the differences in measurements could be biased by outliers. All other references to GAT LoAs (Abstract, Results, Tables and Discussion) are based on the full data set. We echo Bland & Altman’s[5] statement regarding agreement studies, “We do not recommend excluding outliers from analyses, but it may be useful to assess their influence on the results in this way.”

Drs Pearce and Maddess note, “The selective choice of comparison references was repeated for the intra-observer intra-visit GAT comparisons, where the authors selectively compare their results to those of Wang et al.,[6] a paper which had the highest level of intra-visit intra-observer GAT test-retest variability out of the six papers which have investigated this clinical scenario previously (see Pearce and Maddess[2] for a full list of these other papers) and ignore the rest.” These other papers are among the seven in the “Healthy Subjects” section of Table 1 of Drs Pearce and Maddess’s review, and none were “ignored”. We selected studies that closely matched our criteria for selecting comparison GAT test-retest agreement papers. These were: - Essential criteria: appropriate masking of GAT measurements to remove bias, GAT measurements taken within the same session

(preferably within two hours), adequate sample size, and similar range of IOPs measured. Desirable criteria: two GAT measurements from each participant taken by each clinician (less desirable but acceptable was three measurements with the first ignored), and GAT measurements taken by ophthalmologists (the standard against which other clinical professions will be assessed). All relevant papers, including all seven papers in the “Healthy Subjects” Table 1 of Drs Pearce and Maddess’s review, were considered from the perspective of whether our criteria were met. Importantly, for test-retest agreement studies we have no reservations about comparing data from our sample with those from a sample of glaucoma patients, provided our criteria are met. The “selected paper[3]”, reporting research on glaucoma patients, met every criterion, indeed our study adopted their masking and GAT measurement methods. Unfortunately, this study[3] did not measure intra-observer agreement, therefore the Wang et al., paper[6] was selected as comparator as it met our essential criteria.

REFERENCES

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