Reviewer’s report

Title: Paediatric vision screening by non-healthcare volunteers: Evidence based practices

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Reviewer: J. Margaret Woodhouse

Reviewer's report:

The Introduction opens with 'the first years of a child's life are integral to the development of good vision.' Then 'prevalence of common causes of visual impairment among children in developed countries such as Britain and Australia to be as high as 22.6% for myopia, 11% for astigmatism, and 10.6% for hyperopia'. Do these figures for prevalence relate to the first years of children's lives? I suspect not, so the information is misleading for the reader. Screening by distance visual acuity alone, which is, in effect what the researchers are concentrating on in most of the analysis, is unlikely to pick up hyperopia, so the introduction is not appropriate for the study.

Page 4, line 39-44. 'Following parental consent each child received both a full eye examination by the study optometrist and vision screening by one of the eight volunteer examiners'. The paper goes on to describe screening by the optometrist, not full eye examinations. Which is correct?

Page 4, lines 56-59. 'In order to ensure internal measurement consistency, an acceptable level of agreement between the study paediatric ophthalmologist and the study optometrist was established'. The paediatric ophthalmologist does not appear to play any part in the study whatsoever, so why was this included? I comment further on this later.

Page 5, lines 26-31 'training to correctly perform the following tests: distance and near visual acuity (VA), Ishihara color vision, and Randot stereoacuity' The tests for colour vision and stereopsis are precisely listed, so the reader either needs to know here, what visual acuity tests the volunteers were trained for, or restrict the list to distance and near acuity, colour vision and stereopsis.
In the Introduction, the authors use only one reference for vision screening recommendations, which is AAPOS. Colour vision and stereopsis are NOT part of those recommendations, so the authors need to justify why they have chosen those particular tests to be part of this study.

Page 6, line 6. Not all readers will know what the M&S Smart System is, so we need an explanation here. Was it a projection system, computer screen, series of test cards? How was acuity recorded; it would appear to be whole line acuity; was this in LogMAR or Snellen? What is the recommended way of recording acuity; by letter or line?

Page 6, lines 15-18. We are told that children read letters or Lea symbols. It is widely recorded that different tests tend to give different results, but nowhere in the results section do the authors consider whether the optometrist and volunteers used the same test for individual children.
Page 6, lines 20-23. What quantitative score was used for analysis of the Ishihara colour vision test?

Page 6, line 35. The list of data is in different order to the description of the tests in sections above. To avoid irritating the reader, best to stick to the same order.

Page 7, line 21. Ensuring agreement. The paediatric ophthalmologist did not take part in the study. Optometrists receive more training and gain far more experience in measuring visual acuity, stereopsis and colour vision than do ophthalmologists, so why anyone thought it appropriate to 'test' the skills in these measures of an optometrist against an ophthalmologist is mind-boggling. This is delivering a blatant insult to the profession of optometry. This section adds nothing to the study and must be deleted.

Page 7, lines 35-38. This is a very low consent rate and needs attention in the discussion.

Page 7, lines 48-33. 767 minus 29 does not give 690. Explain the missing participants

Page 7, line 45. I don't think the word 'please' is needed here

Page 8,9. Colour vision is not normally tested in each eye separately, unless there is suspicion of pathology, so I think we need some justification for its being conducted in this way. We are not told how colour vision results are quantified, but surely we expect the same score in each eye? I am, therefore somewhat surprised to see a difference in agreement between the two eyes in Table 2. I wonder if the authors could comment on this?

Page 9, Economic costing. The authors think that the sensitivity and specificity of the volunteers was high. In my understanding there is no agreed criterion for acceptance of sensitivity/specificity scores, but we do need some justification (or at the very least comparison) for the authors' conclusion. To my mind, 40 hours of training is a very great investment to end up with 75% accuracy.

The authors state that there is no cost for the volunteers. In real life there would be of course; what about insurance? And if volunteers were to take on vision screening, who would take clinical responsibility for the exercise and how would safeguarding be ensured? These are not cost-free issues.

What about the costs of an extra 151 children in every batch of 690 (that is, 22% or 1 in 5 false positives) entering the health care system unnecessarily?

We come back to the question: why did this study measure colour vision and stereopsis when these tests are not relevant to this analysis?

How do the different scoring systems used for the tests, particularly colour vision reflect the outcomes of the comparison? Could this contribute to the differences between optometrist and trainees on the different tests?

Are the methods appropriate and well described?
If not, please specify what is required in your comments to the authors.

No

**Does the work include the necessary controls?**
If not, please specify which controls are required in your comments to the authors.

Yes

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