Evaluation of a Low-Cost Binocular Indirect Ophthalmoscope

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BACKGROUND

- Access to binocular indirect ophthalmoscopes (BIOs) are limited in Low-and Middle-Income Countries (LMICs)
- We evaluated the diagnostic performance and design characteristics of a new simplified low-cost BIO (Arclight) to a traditional device (Keeler Spectra Iris)

METHODS

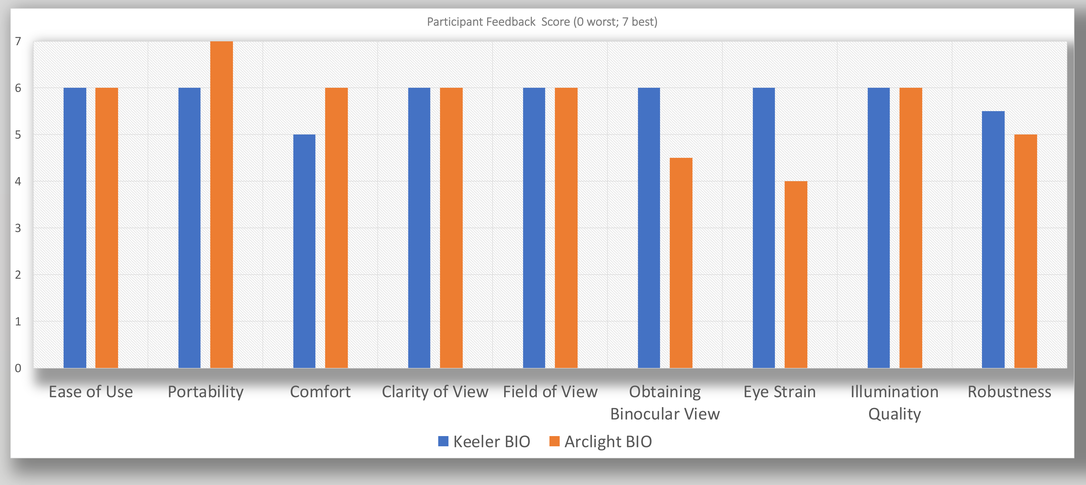
- **Design:** Randomized, crossover pilot study
- **Participants:** 12 participants (7 ophthalmologists, 3 trainee ophthalmologists and 2 optometrists)
- **Pathology Simulation:** Simulated eye modules with Lea symbols of varying sizes as a surrogate for retinal pathology were examined
- **Quantitative Outcomes Assessed:** Mean score for the total number of Lea symbols correctly identified and time taken
- **Qualitative Outcome Assessed:** Participant feedback regarding design characteristics of each device using a questionnaire





Figure 1: Arclight Simulated Eye Models with Retinal Templates (left). ***Figure 2:*** *Arclight BIO (right)*

RESULTS



- Mean score for the number of Lea symbols correctly identified (14.58/20 vs 14.17/20; p-value = 0.726)
- Time taken to identify each correct symbol using the Arclight BIO and Keeler BIO (p-value = 0.923)
- Arclight BIO scored significantly higher for **comfort of wear** and **portability**
- Keeler BIO scored significantly higher for **ease of finding binocular view**
- Main drawback identified for the Arclight BIO was **difficulty of maintaining binocularity** and **concerns with a fixed interpupillary distance**

CONCLUSION

The Arclight BIO has **comparable diagnostic utility** to a more costly traditional device; thus, it is more practical for clinicians, especially in LMICs

The Arclight BIO is **inexpensive**, **highly portable** and **comfortable**