Evaluating user comfort and confidence in retinal examination instruments: direct ophthalmoscope and handheld fundus camera

Siti Husna Hussein[1], Norlelawati Zainol Abidin[2], Tengku Amatullah Madeehah Tengku Mohd[1], Maimunah Abdul Muna'aim[1], Azlina Mokhtar[1]

[1]Faculty of Medicine and Health Sciences, Universiti Sains Islam Malaysia, Nilai, Negeri Sembilan, Malaysia, [2]Aurelius Hospital Negeri Sembilan, Nilai, Negeri Sembilan, Malaysia

ABSTRACT

Introduction: Traditionally, the direct ophthalmoscope has been the standard tool for retinal examination. However, its limitations in ease of use, patient comfort, and image quality have driven the search for more advanced technologies. The handheld non-mydriatic fundus camera offers a modern alternative with enhanced usability and superior diagnostic capabilities. This study compares the user comfort and confidence between these two devices in clinical practice, responding to the increasing demand for tools that improve both the clinician's efficiency and the patient's experience. **Materials and Methods:** This quasi-experimental design study involves medical doctors and students from various fields, excluding ophthalmologists and ophthalmology residents. 70 participants were randomly assigned to either the direct ophthalmoscope (Welch Allyn) or the handheld non-mydriatic digital retinal fundus camera (New Eyes), followed by a 15-minute demonstration and practice session. Participants performed timed retinal examinations on non-dilated patients and completed questionnaires to evaluate their experiences. The procedure was repeated with the alternative device on different patients. The system usability scale (SUS) was used to objectively measure participant's experience, perceived usability and confidence between two devices. Additional data on demographic information and the ability to reliably recognise retinal structures was collected. **Results:** The handheld fundus camera had a higher mean SUS score (64.0) compared to the direct ophthalmoscope (58.6), with a significant mean difference ($p < 0.001$). Confidence in correct findings was significantly higher with the handheld fundus camera (92.9%) than with the direct ophthalmoscope (32.9%, $p < 0.001$). Confidence in image sharpness also favoured the handheld fundus camera (94.3%) over the direct ophthalmoscope (45.7%, $p < 0.001$). **Conclusion:** The handheld non-mydriatic digital retinal fundus camera demonstrated superior ease of use and effectiveness, indicating a preference for this technology in medical practice.