

## **Implementation of Newly Adopted Technology in Neurocritical Care: A Usability Study of an Automated Pupillometer**

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### **Introduction**

Biomedical technology in critical care is advancing at a rapid rate, offering the potential to substantially improve performance through improved efficiency and productivity. Recent evidence suggests that visual assessment of pupillary size and reactivity has limited interrater reliability and accuracy, hence, we examined the introduction and implementation of an automated pupillometer in an academic neurological ICU. We evaluated clinicians' perceptions about the added utility of the pupillometer to the standard visual pupillary exam.

### **Methods**

Following a five-minute bedside education and demonstration of the pupillometer by a 'superuser', we conducted usability testing at the bedside. Participants completed the end-user testing methodology, where they completed specified tasks designed to test the pupillometer's features and later completed a questionnaire regarding their ease of use and interpretation of results, comfort and confidence using the pupillometer, and their behavioral intention to use the pupillometer if adopted into the clinical environment.

### **Results**

To date, 46 participants have completed 50 questionnaires. Participants were allowed repeat enrollment in the study. The participant's professional designations include 41 registered nurses, 3 residents and 2 fellows and the majority have practised in the ICU for 1 to 5 years. Most of the participants are somewhat comfortable (24/46) performing the traditional visual pupillary exam and somewhat confident (29/46) with the results obtained from this exam. Most participants report uncertainty in their visual exam and routinely ask a colleague to confirm their findings. All but 2 participants found the education session necessary to understand the operation of the pupillometer.

The majority (31/46) found the pupillometer results very easy to interpret. Repeated use showed an increase in comfort scores.

Twenty-one, out of 50 responses, were very comfortable in using the pupillometer, 22/50 were somewhat comfortable, and 7/50 were neutral. If this technology is introduced into ICU, the majority (31/46) will use this device to conduct pupillary exams, and 30/46 would consider changing management based on the pupillometer results.

### **Conclusions**

**First-time users of the pupillometer were able to perform basic tasks in an effective and efficient manner.** This study outlines a strategy to evaluate the implementation and usability of a newly adopted technology into the critical care environment. Improved implementation methods and evaluation of these processes are necessary for successful adoption of new technology into acute care settings.