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COMMENTARY

Using touchscreen technology for screening basic cognitive, sensory, and motor abilities in pediatric patients

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Assessment of basic cognitive, sensory, and motor functions is fundamental for neuropsychological profiling of pediatric patients. Neuropsychological profiling is used to determine the extent of functional capacity, pre- and post-treatment, and in monitoring progression against typical development over time and in response to intervention. It is thus a critical component of pediatric medical care for children with neurological problems as they advance through their treatment regime. Assessments are usually conducted on an individual basis with a trained clinical neuropsychologist, using standardized paper and pencil tests which can take up to an hour or more to complete, depending on the nature of the test. If more than one assessment is required, this can result in multiple or lengthy assessment schedules. This makes traditional standardized assessments of neurocognitive functioning costly, both in terms of clinicians' time and in purchasing assessments from test houses. Standardized assessments are usually normed on typically developing populations from one country, thus limiting their translational utility. Assessments from one publishing house are rarely co-normed with those from another, rendering exploration of associations between assessments/functions unfeasible, without the presence of a typically developing control group, which is often not tenable in clinical work. This limits the efficiency and effectiveness of clinical neuropsychology services that are often underresourced.

There is emerging evidence that touchscreen technology can provide reliable and valid measures of psychometric performance in children of different ages and cultures, including those in low- and middle-income countries.[1–5] Casey et al. have demonstrated the validation of touchscreen technology for screening cognitive delay in infants aged 24 months.[1] They outline many affordances of this technology for screening early cognitive functioning and consider the potential this technology offers to cross-cultural pediatric research and clinical care. Touchscreen technology affords the opportunity of screening neurocognitive functioning in pediatric patients, without the need for highly trained clinicians, in any setting (ward, home, school, etc.), and with precision recording of responses to tasks delivered through an app. When coupled with a database recording user performance on each interaction with the app, data can be dynamically updated, allowing for precision tracking of performance across time, within and between individuals, and comparisons to be made to different normative samples as required, because normative data can be easily acquired from different settings around the world. Thus, touchscreen technology has potential to screen for basic cognitive, sensory, and motor abilities of paediatric patients on admission to hospital and to track functional decline or improvements over time, on a self-referenced and/or norm-referenced basis. This could improve the precision of clinical care given to paediatric patients, by identifying patients most in need of formal clinical neuropsychological assessment and follow-up, and directing intervention to targeted domains.

However, this technology also brings about challenges regarding compatibility of app-based screening tools over different operating systems and updates, language of instruction used in the apps, cultural sensitivity of the test items, useability, training of practitioners implementing the technology within their clinical practice, security of the devices, and cost and supply of the hardware and software. Additional challenges arise concerning patient confidentiality when a database is used to record and monitor performance over time. Whilst the opportunities for touchscreen technology in screening basic cognitive, sensory, and motor abilities in pediatric patients are high, so are the challenges. Clinicians need to partner with technology developers to co-create feasible solutions to these challenges to ensure touchscreen technology becomes a valuable, reliable, and valid resource that will enhance the efficiency and effectiveness of service provision within clinical neuropsychology units worldwide.

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DATA AVAILABILITY STATEMENT

Not required.

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