

educational needs, limitations including logistic expertise required in deploying VR sessions at scale require further work to demonstrate pragmatic utility of this technology in educating medical students. The work presented here therefore highlights a potential role for use of VR in medical education.

Methods: We integrated VR simulation into the undergraduate MBChB curriculum. Over 250 medical students in years 3&4 completed a VR scenario focused on acute bacterial meningitis management using Oculus Quest 2 headsets and Oxford Medical Simulation (OMS) software. Sessions included a structured debrief using the PEARLS framework. Faculty and facilitator reflections were also gathered.

Results: High student engagement and positive feedback supported VR's feasibility at scale. Year 3 students (n=48) reported strong satisfaction (83%) and alignment with learning outcomes (93%). They noted confidence gains in A-E assessment, escalation, and prescribing. Year 4 students (n=28) reported similar gains, though slightly lower satisfaction (75%). Both groups praised the immersive, user-friendly nature of the technology. Students valued improvements in prioritisation and structured clinical thinking. Suggested improvements included greater realism and more detailed pre-briefing and careful analysis re: authenticity when considering the role of VR compared to clinical placements.

Facilitators described the debrief as a vital opportunity for guided reflection, uncovering cohort-wide gaps in reasoning and task prioritisation. Notably, consistent deficits in neurologically-focused knowledge - notably in neuroanatomy, interpreting papilloedema and recognising raised intracranial pressure signs as well as understanding CSF flow pathways - emerged across all groups but particularly notable in year 3.

Without cohort-wide exposure to such an immersive case, followed by focused debrief, such discipline-specific gaps would have been harder to detect at scale using traditional small-group simulation methods.

Discussion: This project demonstrates that VR simulation can simultaneously strengthen clinical reasoning in neurology and serve as an effective diagnostic tool for educational gaps [3]. Operational strategies (including careful hardware planning, scheduling, and facilitator preparation) were crucial for success. These findings support wider adoption of immersive VR approaches to improve experiential learning and curriculum design in medical education, notably when covering complex topics like Neurology.

Ethics Statement: As the submitting author, I can confirm that all relevant ethical standards of research and dissemination have been met. Additionally, I can confirm that the necessary ethical approval has been obtained, where applicable.

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ORIGINAL RESEARCH

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USING LARGE-SCALE VR SIMULATION TO ENHANCE NEUROLOGY EDUCATION AND IDENTIFY LEARNING GAPS: AN OPERATIONAL AND EDUCATIONAL ANALYSIS

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10.54531/FGLE6556

Introduction: Virtual reality (VR) simulation is emerging as a transformative tool in medical education, offering immersive, clinical experiences on demand. In neurology, VR and augmented reality have been shown to enhance learning of complex concepts such as neuroanatomy [1]. Additionally, immersive simulation paired with structured debriefing can uncover discipline-specific knowledge gaps otherwise difficult to identify [2]. However along with addressing