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### Is there a difference in clinical skills gained between healthcare professionals of high- and low and middle-income countries with online simulation-based learning?

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#### **Abstract -**

**Background:** Healthcare professionals in low- and middle-income countries (LMICs) compared with those in high-income countries (HICs) face unequal clinical learning opportunities, caused by barriers such as cost, time, and accessibility. Simulation via Instant Messaging - Birmingham Advance (SIMBA) overcomes these barriers, acting as a free virtual simulation-based model which supports clinicians' professional development. The study compared the impact of SIMBA in LMICs and HICs.

**Method:** Sixteen SIMBA sessions were conducted between May 2020 and October 2021. Participants solved anonymised real-life clinical scenarios by interacting with moderators over WhatsApp. Participants completed pre- and post- SIMBA surveys; responses were grouped into HICs and LMICs using the 2022 World Bank Report. Participants' performance, perceptions, and improvements in core competencies were compared using the Chi-square test. Thematic analysis of open-ended questions was also performed.

**Findings:** 462 participants (29.7% from LMICs,  $n=137$ ) completed both the pre- and post-SIMBA surveys. Participants from HICs showed better knowledge on patient management ( $p=.01$ ), whereas participants from LMICs reported higher improvement in professionalism ( $p=.02$ ). Both groups reported similar gains in patient care ( $p=.28$ ), systems-based practice ( $p=.052$ ), practice-based learning ( $p=.15$ ), communication skills ( $p=.22$ ), application to practice ( $p=.266$ ), engagement ( $p=.197$ ), and overall quality of the session ( $p=.101$ ). In thematic analysis, strengths of SIMBA included providing individualised, structured, and engaging sessions.

**Conclusions:** Healthcare professionals from both LMICs and HICs improved in their competencies, illustrating that SIMBA produces equivalent teaching experiences. Furthermore, SIMBA's virtual nature enables international accessibility and potential for global scalability. This model could steer future standardised education policy development in LMICs.

**Keywords** – LMICs, HICs, Simulation-based Training, Clinical skills

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