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THE EFFECTS OF VIRTUAL REALITY PROGRAMS AND SIMULATION TRAINING ON NURSING STUDENTS' MEASUREMENT OF CHILDREN'S VITAL SIGNS — A REVIEW

Nursing

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ABSTRACT

synthesizes five recent studies (2021–2025) that evaluate virtual reality (VR), game-based, and simulation approaches for teaching nursing students pediatric vital-sign measurement and related pediatric clinical skills; includes at least one India-context study.

KEYWORDS

BACKGROUND:
Measuring vital signs in children presents unique challenges (cooperation, technique, age-specific norms). Simulation and VR promise safe, repeatable practice that can raise competence and confidence without risk to patients. Recent primary studies and reviews have tested immersive VR, game-based simulators, and mixed simulation curricula to determine impact on skill acquisition, satisfaction, and transfer to clinical settings.

Selected Studies:
1. Park SN et al., 2025 (South Korea) —
2. Yoon H., 2024 (MDPI) —.
3. Sung H. et al., 2024 (systematic review & meta-analysis) —
4. Tanrıkulu F., 2025 (BMC Medical Education) —
5. Mondal R. et al., 2024 (Indian perspective review) —

Synthesis-Common Findings And Contrasts
1. Effectiveness for skill acquisition: Across randomized and quasi-experimental studies, technology-enhanced modalities (VR, 3-D game-based simulation) produced statistically meaningful improvements in immediate performance, accuracy of vital-sign technique, and learner confidence-often comparable to, or better than, high-fidelity mannequin simulation. Park (2025) specifically found VR matched high-fidelity simulation for pediatric vital-sign measurement.
2. Learner engagement and repeatability: VR and game-based tools encourage repeated deliberate practice, objective automated feedback, and higher engagement-advantages when clinical placements or child patient exposure are limited. Multiple studies highlight higher satisfaction/engagement in VR groups.
3. Evidence quality and outcome types: Systematic review evidence shows positive trends but heterogeneity in methods, outcomes, and follow-up; robust data on long-term retention and real-world clinical transfer remain limited. Meta-analytic work (Sung et al.) stresses standardized assessments and larger multicentre trials.
4. Context and scalability (India): The Indian review identifies real constraints-bandwidth, hardware cost, faculty readiness, and need for localization-but also notes successful small pilots and advocates blended models (low-cost VR + simulation labs) for resource-limited settings. Implementation science is essential to move from pilots to curricula.
5. Mixed-methods insights on affect and realism: Qualitative components (e.g., Park's study) report that realism and immediate feedback reduce anxiety and increase perceived preparedness; however, some students still value tactile feedback from mannequins for certain psychomotor tasks, implying a hybrid approach may be optimal.

Practical Implications For Nursing Educators
- Adopt blended curricula: combine VR (for repetition, scenario variety, remote access) with periodic high-fidelity simulation (for tactile practice and team dynamics). Evidence supports comparable or better immediate performance using VR while preserving hands-on skills.
- Standardize assessment: use validated checklists and objective metrics (time, accuracy, checklist scores) and measure retention at ≥3 months to assess transfer. Sung et al. recommend consistent outcome sets for comparability.
- Scale thoughtfully in India and similar settings: prioritize low-cost VR options, faculty training, language adaptation, and blended models to overcome infrastructure limits. Pilot → evaluate → scale pathway is advised.

CONCLUSION:
Recent evidence (2021–2025) converges on a favorable view of VR and game-based simulation as effective, engaging tools for teaching pediatric vital-sign measurement to nursing students. VR can match high-fidelity simulation for skill acquisition and offers clear advantages in scalability and repeat practice. To translate gains into safer clinical care, educators should implement blended approaches, standardize outcomes, and pursue multicentre, long-term studies-while tailoring solutions for Indian and other resource-constrained settings.