ASPiH India 2025: Conference Proceedings

ORIGINAL RESEARCH

| 1 | ROLE OF MEDICAL SIMULATION IN STROKE CARE - AT EMERGENCY DEPARTMENT OF TERTIARY LEVEL HOSPITAL OF NEPAL |

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Introduction: Stroke remains a serious global health challenge. The catchphrase "time is brain" emphasises the criticality of swift action. Thrombolytic therapy with intravenous tissue-type plasminogen activator administered within the first 270 minutes after symptom onset significantly reduces poststroke disability for patients with acute ischemic stroke [1]. In the emergency department, there is constant change of staffs which creates a gap in team dynamics and timely interventions. There is no formal team training [2,3]. Medical simulation on stroke care is one of the best solutions [4].

Methods: Gap Analysis: Baseline data regarding patients presenting with stroke-like symptoms collected [2]. Emergency in situ stroke scenarios were run with simulated patients with consent, using checklists. A 3D debriefing model was applied. Over a 4-week period, actual patient cases were observed to capture changes in clinical practice. Key metrics included time to initial assessment, vital signs, neurological exam (BEFAST), and time from arrival to provisional diagnosis. Research Design was prospective, applying translational simulation principles. IRC Approval taken from Norvic International Hospital, Nepal.

Results: Simulation interventions showed a marked improvement in initial assessment and care and decrease in door-to-provisional diagnosis time, from an average of 5.45 minutes in simulations to 1.8 minutes in real cases. This contributed to a reduction in door-to-needle time for thrombolysis, averaging 75 minutes compared to the hospital baseline of 103 minutes.

Discussion: Translational simulation provides a framework where simulation aligns with real-world clinical outcomes and system improvement [4]. This study found significant improvement in primary assessment of stroke patients presenting to the Emergency Department. Essential assessments were more consistently performed and also reduced delays in provisional diagnosis, activated stroke alert systems more efficiently, and improved door-to-needle times. Integrating such programs into routine hospital workflows and expanding to multicenter studies may strengthen national stroke response pathways and ultimately improve survival and functional outcomes.

Ethics Statement: Authors confirm that all relevant ethical standards for research conduct and dissemination have been met. The submitting author confirms that relevant ethical approval was granted.

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ORIGINAL RESEARCH

| 2 | EFFECTIVENESS OF A SIMULATION-BASED FLIPPED CLASSROOM IN TEACHING TRAUMA RESUSCITATION SKILLS AMONG PARAMEDIC STUDENTS: A EXPERIMENTAL STUDY |

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Introduction: The escalating complexity inherent within the field of emergency medicine necessitates that paramedic students not only acquire but also meticulously maintain an exceptional level of proficiency in the time-sensitive and critical domain of trauma resuscitation; this imperative demands a continuous, rigorous evaluation and subsequent enhancement of existing pedagogical methodologies employed in paramedic education [1,2]. Trauma resuscitation requires rapid clinical decision-making and procedural competence, yet traditional lecture-based methods often fail to prepare paramedic students for real-time application. The flipped classroom model, combined with simulation, may enhance both cognitive and practical outcomes in trauma training [3]. Objective was to evaluate the effectiveness of a flipped classroom integrated with simulation compared to traditional lecture-based instruction in teaching trauma resuscitation skills to final-year paramedic students.

Methods: An experimental study was conducted with 28 final-year paramedic students, equally divided into flipped classroom (n=14) and traditional lecture (n=14) groups. Pre- and post-tests assessed knowledge, ensuring that students are randomly assigned to either the flipped classroom group or the traditional teaching group. However, to account for differences in academic performance, stratified randomization is incorporated. The students are first categorized into three performance levels based on their previous academic cores: Above 80% (High performers); 50–80% (Average performers); Below 50% (Low performers). To measure the effectiveness of both approaches, data collection is carried out using a combination of assessment tools. Simulation Exam, which provides a structured way to evaluate students' trauma resuscitation skills under standardized conditions. Pre-test and post-test evaluations are also conducted to compare knowledge retention between the two groups.

Results: There was no significant difference in pre-test scores flipped group (M=55.71, SD=9.47) and the traditional group (M=54.57, SD=11.4), confirming baseline equivalence. Post-test scores were significantly higher in the flipped group (M=74.71, SD=9.91) compared to the traditional group (M=66.00, SD=8.84), with a large effect size (Cohen's d=0.93). Simulation performance was also better in the flipped group (M=39.14, SD=4.47), who completed tasks faster (M=7.25 mins) than the traditional group (M=8.13 mins), p<0.001. Cognitive load ratings showed no significant group differences. the students who scored below 50% in the pretest, after the training, scored more than 70% in the post test, showing the significance of the flipped education method. Regression analysis revealed that cognitive load factors did not significantly predict performance outcomes.

Discussion: The flipped classroom approach, when combined with simulation, significantly improves both knowledge and trauma resuscitation skills without increasing cognitive burden. These findings support the integration of active, learner-centered models in emergency and trauma education for paramedic students.

Ethics Statement: Authors confirm that all relevant ethical standards for research conduct and dissemination have been met. The submitting author confirms that relevant ethical approval was granted.

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ORIGINAL RESEARCH

3 | **SIMULATION TRAINING FOR FATHERS: SUPPORTING BREASTFEEDING IN PRETERM INFANTS**

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Introduction: Fathers of preterm infants play a crucial role in sustaining breastfeeding, yet their involvement in lactation support is often overlooked [1]. Simulation-based training may equip fathers with practical skills and confidence to support their partners [2]. This study evaluated the effect of simulation-based lactation support training on paternal breastfeeding self-efficacy (PBSE) among fathers of preterm infants [3].

Methods: A randomized controlled trial was conducted among 220 fathers of preterm infants in a tertiary neonatal unit. Using stratified block randomization, participants were assigned to intervention (n=110) and control (n=110) groups. The intervention comprised simulation-based training with task trainers for breastfeeding techniques, cup feeding, and scenario-based sessions addressing the transition from hospital to home. The control group received routine counseling. PBSE was measured at discharge using a validated scale. Regression analysis assessed the intervention effect, adjusting for demographic and clinical covariates.

Results: Fathers in the intervention group reported significantly higher PBSE scores compared to controls (unadjusted β=3.84, 95% CI: 2.08–5.59, p<0.001). This effect remained significant after adjustment (β=3.81, 95% CI: 1.99–5.63, p<0.001). The model explained 9.7% of PBSE variance (R^2=0.0965). Effect size was moderate (Cohen's d=0.58), reflecting practical significance.

Discussion: Simulation-based lactation support training effectively enhanced paternal breastfeeding self-efficacy among fathers of preterm infants, independent of demographic and clinical factors. Integrating father-focused simulation into neonatal care could strengthen family-centered support and improve breastfeeding outcomes [4].

Ethics Statement: Authors confirm that all relevant ethical standards for research conduct and dissemination have been met. The submitting author confirms that relevant ethical approval was granted.

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ORIGINAL RESEARCH

4 | **EFFECT OF SIMULATION-ENHANCED IPE EXPERIENCE ON INTERPROFESSIONAL COLLABORATIVE COMPETENCY (IPC)**

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Introduction: Interprofessional Education (IPE) occurs when "students from two or more professions learn about, from, and with each other to enable effective collaboration and improve health outcomes" – WHO [1]. This study aims to evaluate the effect of sim-IPE experience on IPC which is values and ethics, teamwork, roles, and responsibilities, interprofessional communication among UG nursing and medical students and their attitude towards inter-professional education.

Methods: A quasi-experimental study involves the health professionals' students from medicine and nursing. The study group (N=140) will be provided with Sim-IPE sessions [2]

as part of intervention and Control group (N=140) with traditional classes. The pre and post assessment includes the interprofessional collaborative competency using TOSCE and Quiz, attitude towards interprofessional education by KidSim ATTITUDE Questionnaire and perceptions using Interprofessional Collaborative Competency Attainment Scale (ICCAS). Analysis of the data collected will be done by the standard statistical tool such as SPSS version 16.0. The reflection on interprofessional training or experience will be assessed and analyzed using descriptive analysis.

Results: Evidence of increased knowledge and skills on interprofessional collaborative practice, increased perception level in attainment of IPC, positive attitude toward IPE. Results will provide new knowledge and help identifying effective training strategies that enables implementation of knowledge and skills on Interprofessional collaboration to health professional (undergraduate medical and Nursing) student.

Discussion: Sim-IPE fosters collaborative competency by bringing interprofessional teams together to actively participate and reflect. This approach breaks down educational silos, promotes effective collaboration and teamwork in clinical settings among health care professionals.

Ethics Statement: Authors confirm that all relevant ethical standards for research conduct and dissemination have been met. The submitting author confirms that relevant ethical approval was granted.

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ORIGINAL RESEARCH

5 — COMPETENCE IN PROVIDING MENTAL HEALTH NURSING CARE AMONG NURSING STUDENTS

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Introduction: Confidence and competence are essential in preparing nursing students to deliver safe and effective mental health care. Traditional teaching methods may not provide adequate opportunities for practice, especially in complex psychiatric scenarios [1]. Simulated patients (SPs) who can standardize their portrayal offers an interactive and realistic platform for developing clinical readiness. Previous research has shown that SP-based simulation enhances communication, clinical judgment, and self-efficacy in nursing education [2]. This study aimed to evaluate the effectiveness of simulation exercises with SPs on confidence and competence in providing mental health nursing care among undergraduate nursing students.

Methods: A quasi-experimental, post-test-only design was adopted. A total of 200 undergraduate nursing students with prior clinical exposure in mental health nursing were selected using purposive sampling. Of these, 100 students in the intervention group underwent simulation-based training with simulated patients, while 100 students in the control group did not receive the intervention. Confidence was assessed using a structured rating scale, and competence was measured using a validated checklist. Data were analyzed using descriptive statistics and inferential statistics, including the Mann–Whitney U test, chi-square test, and Pearson's correlation, with significance set at p<0.05.

Results: The majority of students were aged 20–21 years, predominantly female, and from nuclear families. In the intervention group, 61% demonstrated moderate confidence and 31% demonstrated high confidence, whereas in the control group, low confidence was predominant (35%). The difference between groups was statistically significant (p<0.001). With regard to competence, 97% of the intervention group demonstrated excellent competence compared to 69% of the control group, who showed good competence, also statistically significant (p<0.001). A weak positive correlation between confidence and competence was noted in the intervention group (r=0.1215, p=0.004), while the control group showed a negligible negative correlation. Demographic variables showed no significant associations, except for age, which was associated with competence in the control group (p=0.0435).

Discussion: The findings provide strong evidence that simulation with simulated patients who can standardize their portrayal enhances confidence and competence in mental health nursing. These results align with earlier studies highlighting the benefits of experiential learning strategies in psychiatric nursing [3]. The weak but positive correlation suggests that while related, confidence and competence may develop independently and require structured approaches. The absence of demographic influences indicates that simulation benefits students across varied backgrounds.

Ethics Statement: The study protocol was reviewed and approved by the Institutional Ethics Committee of ACS Medical College and Hospital. Ethical clearance was granted (No. 1278/2024/IEC/ACSMCH, dated 05.07.2024) after addressing all queries raised during the review process. Written informed consent was obtained from all participants prior to data collection, and confidentiality of the information provided was strictly maintained.

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ORIGINAL RESEARCH

6 — SIMULATION-BASED TRAINING FOR ACUTE NEURO-EMERGENCIES: LESSONS FROM THE NEMS (NEURO EMERGENCY MANAGEMENT SIMULATION) INITIATIVE IN INDIA

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Introduction: Simulation-based training has emerged as a cornerstone in enhancing team performance and patient safety in acute care medicine [1]. Within anesthesia and critical care, high-fidelity simulations have been shown to improve both technical and non-technical skills such as communication, leadership, and crisis management [2,3]. Despite its widespread adoption in many specialties, structured simulation programs focusing specifically on neuro-emergencies remain sparse in low- and middle-income countries [4]. India, with its growing burden of neurosurgical and neurological emergencies, faces unique challenges including variable resource availability, limited interdisciplinary training platforms, and inconsistent protocol adherence. Addressing these gaps requires innovative and context-specific approaches. To bridge this need, the Neuro Emergency Management Simulation (NEMS) program was conceptualized as a multidisciplinary training initiative, targeting high-stakes scenarios in neurocritical care such as traumatic brain injury, status epilepticus, and acute ischemic stroke

Methods: The NEMS was conducted in July 2024 as a structured one-day program. Participants represented multiple specialties, including neurosurgery, neuromedicine, neurocritical care, anesthesiology, critical care, and emergency medicine. Simulation scenarios were designed to replicate common yet high-stakes neuro- emergencies such as traumatic brain injury, status epilepticus, and acute ischemic stroke. To optimize learning, a brief didactic lecture was delivered prior to each simulation to strengthen technical knowledge and reinforce evidence- based protocols. In addition, a dedicated WhatsApp communication group was created one week before the event. This platform was used to circulate preparatory reading materials and foster pre-course engagement among participants. High-fidelity manikins, standardized protocols, and audiovisual debriefing tools were used. Training objectives were Crisis resource management, interdisciplinary communication, rapid decision-making, and protocol adherence. Evaluation and Debriefing of Pre- and post-simulation were conducted to measure knowledge, confidence, and team performance.

Results: A total of 30 participants underwent NEMS training, representing six specialties: neurosurgery (n=4), neuromedicine (n=2), neurocritical care (n=5), critical care (n=2), anesthesia (n=9), and emergency medicine (n=8). Confidence scores improved significantly: mean pre-test confidence was 3.6/5, rising to 4.3/5 post-simulation. Participants reported improved role clarity, interdisciplinary communication, and adherence to neuro-emergency protocols. Structured debriefing was consistently highlighted as the most valuable component for reflection and performance improvement.

Discussion: NEMS represents the first structured multidisciplinary neuro-emergency simulation initiative in India. By integrating clinical realism with team-based training, it addresses key challenges in neurocritical care—limited preparedness, fragmented team coordination, and variable adherence to guidelines. The program demonstrates feasibility, scalability, and strong participant acceptance. Long-term integration into residency training and continuous professional development could standardize acute neuro-emergency responses nationally.

Ethics Statement: This educational project did not involve patient data or interventions. All participants provided informed consent for involvement in training and feedback. Institutional permission was obtained for program implementation.

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ORIGINAL RESEARCH

| 7 |

PERCEPTIONS OF NURSING STUDENTS AND FACULTY ON VIRTUAL REALITY SIMULATION IN NURSING EDUCATION: A DESCRIPTIVE EXPLORATORY STUDY IN SOUTH INDIA

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Introduction: In recent years, the integration of advanced technology in nursing education has grown significantly, with Virtual Reality (VR) simulation emerging as a transformative tool [1]. VR offers immersive, interactive, and risk-free learning environments where nursing students can practice complex clinical skills without posing any risk to real patients. This aligns with the growing emphasis on experiential learning and the development of clinical competence, both of which are essential in preparing students for the demands of modern healthcare [2]. As the primary beneficiaries of this technology, nursing students play a pivotal role in determining its effectiveness, sustainability, and long-term integration into educational frameworks. Understanding their perspectives can yield valuable insights into the strengths, usability, and limitations of VR-based simulation, ultimately guiding strategies for improvement and broader adoption. VR simulation is gaining momentum in nursing education as an innovative, immersive, and risk-free approach to learning clinical skills. However, its successful integration depends on user acceptance and perception [1]. Aimed to explore the perceptions of nursing students and faculty regarding VR simulation in nursing education, including perceived benefits, challenges, and suggestions for improvement.

Methods: A descriptive exploratory qualitative study was conducted in a nursing college in South India. Purposive sampling recruited 100 final-year and third-year B.Sc. Nursing students and 50 faculty members from both academic and clinical settings. Data were collected through semi-structured interviews and analyzed using content analysis. Institutional permission granted and approved for this study.

Results: A faculty survey on VR simulation in nursing education revealed that 83% were already aware of VR, with 65% having prior exposure. Most (92%) believed it enhances clinical learning, and 90% agreed it improves clinical decision-making, though they saw it mainly as a supplement rather than a replacement for real practice. VR was considered broadly applicable across specialties

such as Medical-Surgical, Obstetrics, Pediatrics, and Critical Care. While 60% preferred integration into the curriculum each semester, others suggested supplementary or weekly use. Faculty confidence in using VR was high (75%), with 95% recommending it to others, though moderate to high technical support was considered necessary. Preferences leaned toward fully immersive (40%) and semi-immersive (35%) experiences, with strong agreement (92%) on its role in improving patient safety. Overall perceptions were very positive (70%), highlighting enthusiasm but also the need for continued training, evidence, and institutional support. A survey of students on VR simulation in nursing education showed that 75% were aware of VR, with 60% having prior exposure. Nearly all (95%) believed it enhances clinical learning, and 65% rated it very effective in improving decision-making. Most (90%) felt prior VR exposure reduces anxiety and builds confidence in clinical practice. However, 75% stated it cannot replace real patient care, though 25% saw it as partially useful. Overall, students strongly view VR as a valuable supplement to traditional learning rather than a substitute. VR was perceived as a safe and interactive environment, with the potential to reduce fear and anxiety in real clinical practice. Challenges included lack of resources, technical support, faculty training, and cost concerns. The majority expressed a need for structured workshops and immersive training.

Discussion: VR simulation holds strong potential to enhance nursing education by improving clinical preparedness, engagement, and patient safety. VR simulation should not be viewed as a replacement for real clinical practice but as a powerful supplementary tool. Strategic planning, institutional support, and continuous faculty development are essential to unlock its full potential in producing competent, confident, and patient-centered nursing professionals.

Ethics Statement: Authors confirm that all relevant ethical standards for research conduct and dissemination have been met.

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ORIGINAL RESEARCH

| 8 |

A COMPARATIVE STUDY TO ASSESS THE EFFECTIVENESS OF VIRTUAL REALITY VERSUS DIGITAL TRUE-LIFE EXPERIENCES ON ANXIETY AND CLINICAL PARAMETERS AMONG PATIENTS UNDERGOING MASTECTOMY IN A SELECTED HOSPITAL AT COIMBATORE

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Introduction: Preoperative anxiety is common in breast cancer patients and is associated with negative physiological outcomes, emphasizing the importance of supportive interventions [1,2]. Recent evidence supports the use of virtual reality and digital-based methods in reducing perioperative anxiety and improving preparedness [3,4].

Methods: A total of 60 patients participated in the study, with 20 in Experimental Group I, 20 in Experimental Group II, and 20 in the Control Group. Participants were selected through a non-probability purposive sampling technique. After getting formal permission from the concerned hospital authority, the data was collected from the samples. Virtual reality intervention was given to the experimental group I for 15 minutes, 2 hours prior to the surgery, and experimental group II received digital storytelling for 15 minutes, 16 hours prior to the surgery. Data collection involved gathering demographic information using a structured interview schedule, measuring anxiety levels with a visual analog scale for anxiety, and assessing clinical parameters by bio-physiological measurements. The blood pressure was measured using a sphygmomanometer, heart rate with a stethoscope, respiratory rate by observing chest movements, and oxygen saturation using a pulse oximeter. The measurements were assessed and recorded, both before and after the intervention. The collected data were analyzed using descriptive and inferential statistics with SPSS software.

Results: The results of the study revealed that in experimental group I, anxiety levels decreased significantly, with 19 patients (95%) initially experiencing severe anxiety and 1 (5%) with moderate anxiety before the intervention. After the intervention, 15 patients (75%) had moderate anxiety, while 5 (25%) remained at a severe level. In experimental group II, all patients 20 (100%) had severe anxiety before the intervention. After the intervention, 19 patients (95%) shifted to moderate anxiety, and only 1 (5%) remained with severe anxiety. Whereas, the control group observed no change, with all patients 20 (100%) continuing to experience severe anxiety in the baseline and subsequent observation period. There was a significant difference (decreased) in the mean score of clinical parameters (blood pressure, heart rate, respiratory rate with significant value at (p=0.000), and SpO_2 (p=0.002)) before and after intervention in the experimental groups I and II. There was a significant difference (increased) in the mean score of clinical parameters (blood pressure, heart rate (p=0.000), and respiratory rate (p=0.001)) before and after intervention in the control group.

Discussion: Both virtual reality and digital true-life experiences were effective in reducing preoperative anxiety and improving clinical parameters among mastectomy patients. VR provided rapid short-term relief, while digital storytelling produced more sustained effects. These interventions demonstrated positive physiological and psychological outcomes, underscoring their value in perioperative care. Technology-assisted approaches thus represent practical, non-invasive strategies to enhance recovery and patient well-being during breast cancer surgery.

Ethics Statement: The study was approved by the Institutional Ethical Committee, with written permission from authorities. Participants gave verbal consent, ensured confidentiality, and were provided privacy and comfort throughout the study.

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ORIGINAL RESEARCH

9 SIMULATION TRAINING ON PREECLAMPSIA AND ECLAMPSIA MANAGEMENT FOR NURSES – AN EXPERIMENTAL STUDY

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Introduction: Hypertensive disorders of pregnancy add up to an extensive burden of illness in developing countries [1,2]. Simulation training is a good learning strategy to foster nursing practice in obstetric settings [3]. Objectives: To evaluate the improvement in knowledge of nurses after simulation training on management of preeclampsia and eclampsia.

Methods: A pre-experimental one group pretest and posttest design was used. Sixty nurses working in maternity units of a tertiary care, teaching hospital participated in a training program that included blended approach of lecture, visualization of patient assessment videos and two low fidelity simulation training sessions on nursing management of preeclampsia and eclampsia. Nurses' knowledge on management of hypertensive disorders was compared before and after the training program. Data were analyzed with descriptive statistics and inferential statistics.

Results: Pretest mean knowledge score of 13.52 ± 4.04 on management of hypertensive disorders improved to 17.97 ± 5.4 in the posttest ($p<0.001$). Nurses' satisfaction and self-confidence in managing the simulated patient was 57.23 ± 9.36. About 88.3% participants perceived simulation learning to be rational, reasonable and important. A positive correlation existed between satisfaction and self-confidence ($r=0.70$) at $p<0.05$.

Discussion: Simulation-based training significantly improved nurses' knowledge, satisfaction, and self-confidence in managing preeclampsia/eclampsia. The study emphasizes the importance of simulation as an innovative strategy to bridge the theory–practice gap and strengthen clinical decision-making. High nursing turnover necessitates frequent reinforcement of emergency obstetric skills through such training. Establishing simulation units in hospitals and educational institutions enhance preparedness and quality of maternal care [4,5].

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ORIGINAL RESEARCH

10 EFFECTIVENESS OF A VIDEO-BASED SIMULATION ON ATTITUDE TOWARDS END-OF-LIFE CARE AMONG NURSING STUDENTS

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Introduction: End-of-life care (EOLC) is a critical nursing competency that requires not only clinical skills but also compassionate attitudes [1]. This study examined the effectiveness of a video-based simulation in modifying undergraduate nursing students' attitudes toward EOLC.

Methods: An experimental design was adopted with final-year B.Sc. Nursing students selected purposively and randomly assigned to the study group (n=45; 15 males, 30 females) or control group (n=44; 14 males, 30 females) by a non-research personnel. Sample size was calculated using a previous study [2], considering a 5% margin of error, 95% CI, and 15% attrition. The study group received a 20-minute lecture on EOLC followed by a video-based simulation (pre-briefing, scenario, debriefing). The control group received only the lecture. The intervention was conducted from April 1–30, 2021, during the COVID-19 second wave. Attitudes were measured using the Frommelt Attitude Toward the Care of the Dying Scale Form B (FATCOD-B), a 30-item self-report questionnaire (score range 30–150; ≥50% indicates a positive attitude; Cronbach's $\alpha=0.977$). Post-test data were collected seven days after the intervention.

Results: Most participants were 21 years old (study group: 86.7%, control: 90.9%) and female (68.9% and 65.9%,

respectively). Over half in both groups were unaware of EOLC as part of formal education (study: 53.3%, control: 45.4%), and the majority had no prior exposure to EOLC (82.2% vs. 70.5%). Many felt their curriculum had not prepared them to provide EOLC (64.7% vs. 47.7%). Mean pre-test scores were 109.16±12.69 (study) and 107.84±18.58 (control), while post-test scores were 108.24±21.14 and 106.70±23.08, respectively. Differences between groups were not statistically significant.

Discussion: Both groups demonstrated positive attitudes towards EOLC with scores above the positive threshold despite no statistically significant change post-intervention. This suggests that while nursing students generally hold favourable views on caring for the dying, a single exposure to a video-based simulation may be insufficient to shift attitudes. Attitude change may require sustained and repeated educational strategies, coupled with direct clinical exposure to EOLC situations [3,4]. Video-based simulation did not significantly alter attitudes towards EOLC among undergraduate nursing students, highlighting the need for longitudinal, experiential approaches to foster deeper attitudinal change.

Ethics Statement: Ethical permission was obtained from ethics committee IEC permission(CSP/21/JAN/89/71). Written informed consent was obtained after explaining about the study from each participant and confidentiality was maintained throughout the study

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ORIGINAL RESEARCH

11   INNOVATIVE DIGITAL HEALTHCARE SIMULATION EDUCATION ON HAND HYGIENE FOR HEALTHCARE WORKERS AT AL AHLI HOSPITAL, QATAR

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Introduction: Globally, 7% of patients in developed and 15% in developing countries will acquire at least one HAI and 1.27 million deaths were directly caused by MDRO. Hand Hygiene (HH) is the first and foremost, preventive measure to reduce the spread of infection [1]. WHO initiated multimodal improvement strategy to practice HH at the right moment in the right way [2]. MOPH, Qatar (2024) standardised the HH benchmark (89.9%) in alignment with international guidelines. However, research studies analysed that Healthcare workers (HCWs) perception, ingrained behaviours and overconfidence affects the HH behaviour regardless of various advanced HH pedagogy [3]. It is challenging to change the HH behavioural culture. Thus, it demands for innovative pedagogy to bridge the gap between behavioural change and real practice. Objectives were to develop an innovative digital healthcare simulation learning with gamified concept that changes the behaviour and real HH practice. Assess the HH practice and HCWs behaviour before and after SiM Game learning.

Methods: Implementation science approach applied. Pre-implementation phase- Innovative digital simulated gamified learning app prototype named 'INNO IPAC' featured with comprehensive HH concepts including real-time reminder and feedback. Intra-implementation phase- app was tested technically and validated by 25 experts from various field experts globally by using standardised Mobile App Rating Scale MARS with mean average score 4.35 and IMS Healthcare Informatics Functionality mean average score was 9.47. Post-implementation phase, healthcare workers in medical surgical units were observed for their HH practice through direct observation method by using WHO Hand Hygiene observation tool before and after the innovative gamified simulation learning on hand hygiene. Behaviour change and digital simulation learning usability were assessed by Digital Behaviour Change Intervention and System Usability Scale at a smaller scale.

Results: Developed app recommended for launch with overall score ranges between good and excellent and successfully launched for use. Significant increase in HH HCWs' practice from 80% to 88.5% at p<0.001 after playing the digital simulated gamified learning app. Relationship between the HH practice, behavioural engagement and usability were strongly positive with correlation coefficient 0.95 and 0.76. Further, this research implemented at a larger scale with mixed methodology including the grounded theory approach.

Discussion: Innovative digital healthcare simulated gamified learning proved the behavioural change and real practice. These findings are in alignment with similar research in which the hand hygiene compliance improved significantly [4]. It encourages the healthcare workers active participation and engagement. Recommended to conduct further research at different setting. Recommended this gamified learning for the patients and public use to change the real-world practice.

Ethics Statement: Authors confirm that all relevant ethical standards for research conduct and dissemination have been met. The submitting author confirms that relevant ethical approval was granted.

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ORIGINAL RESEARCH

12   BUILDING EXCELLENCE THROUGH
SIMULATION TRAINING (BEST): CREATING
POSITIVE OUTCOMES IN SKILL RETENTION
AND PATIENT SATISFACTION

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Introduction: In alignment with our commitment to patient safety and supported by organizational leadership, simulation-based training [1] was introduced as a structured skilling approach for nurses. Training was designed at three levels: Level 1 and 2 for all participants, and Level 3 for specialty training. Level 1 focused on 13 essential skills, identified as critical for patient safety and routinely performed by nurses in daily practice.

Methods: From January to May 2025, nurses from Apollo Hospitals participated in Level 1 training. Sessions were delivered in batches of 20 nurses, three times weekly. Each participant received pre-read material and completed a pre-test MCQ. The one-day contact program emphasized hands-on skill practice, followed by an Objective Structured Clinical Examination (OSCE), with ≥70% considered satisfactory. Outcomes assessed included skill retention which was a follow up OSCE in clinical area after 2–3 month of training, patient satisfaction and supervisor feedback.

Results: A total of 801 Nurses were trained in 42 batches from January to May 2025 with 13 Skills. 99.62% (n=798) of participants scored ≥70% in OSCE, meeting program benchmarks.

Follow-up with the same OSCE participants in clinical area after 2–3 months of training demonstrated sustained competency, with high performance across oral/IV medication administration (n=212), infusion pump use (n=95), and Ryle's tube procedures (n=14).

Marked improvements were noted in clinical confidence, teamwork, willingness to report, and patient-oriented care. Supervisors also reported reduced medication errors, fewer patient complaints, and greater confidence in assigning trained nurses to independent duties.

Preliminary satisfaction scores suggested a positive trend post-training. Data collection continues to assess sustainability of outcomes.

Discussion: The BEST Level-1 simulation-based training program significantly enhanced immediate skill acquisition [3], sustained retention, and improved behavioural competencies among nurses. These improvements positively impacted patient care and safety. Expansion into Level-2 [2], focusing on in-situ team-based training and advanced clinical skills, is underway to reinforce and build upon these outcomes [4].

Ethics Statement: Authors confirm that all relevant ethical standards for research conduct and dissemination have been met. The submitting author confirms that relevant institutional approval was granted for the educational initiative.

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REVIEW ARTICLE

13   SIMULATION-BASED GAMIFICATION IN
NURSING EDUCATION: A SYSTEMATIC REVIEW

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Introduction: As portrayed in the literature, game design techniques within game-less domains is what is referred to as gamification and is highly regarded within the field of health professional education [1]. In nursing, simulation-based gamification merges experiential learning and gamification as a way to foster integration and enthusiasm [2]. This technique is known to enhance the retention of knowledge and the development of critical thinking, collaborative, and decision-making skills [3]. There are unmet requests pertaining to the use innovative techniques in education, and gamification offers a way to create risk-free, immersive environments for practice [4]. Although it does provide numerous opportunities, the evidence in regards to the long-term impact is still lacking, thus a more comprehensive analysis is warranted.

Methods: This was evaluated using the PICO framework. The population consisted of nursing students in an academic or clinical setting. The intervention was simulation-based gamification, while the comparisons consisted of non-gamified simulation or conventional teaching. The outcomes evaluated included knowledge, clinical competencies, engagement, motivation, satisfaction, and self-confidence. Eligible studies consisting of randomized controlled trials, quasi-experimental designs, and controlled before and after studies were found in the electronic databases. The evidence was graded based on the methodological quality.

Results: Research indicates that simulation-based gamification techniques increase student engagement and motivation. Compared to traditional teaching, there were significant improvements in knowledge retention, clinical skills, and critical thinking. Increased satisfaction, improved learning experience, and enhanced self-confidence also positively impacted these areas. However, inconsistencies in findings arose due to differences in methodology and outcome measures. While short-term benefits were well-documented, claims surrounding long-term retention and transferability were largely unsupported. All in all, the review indicates considerable potential, though it emphasizes the need for more substantial investigations.

Discussion: Gamification is useful to complement traditional pedagogy especially in active learning motivation [1,3]. Even with the positive results, variances in study designs diminish the comparability and generalizability. The evidence is still limited longitudinally to sustain. There are also ethical and pedagogical issues to be considered when integrating curriculum components with game-like features [5]. Still, simulation-based gamification meets educational requirements and is likely to enhance clinical competence [3,4]. Further studies are encouraged to conduct large-scale, multi-center studies with uniform criteria.

Ethics Statement: This review followed the ethical guidelines for research and publications. As this study is a systematic review of the literature, there was no direct involvement of human participants or patients. Accordingly, ethical approval and informed consent were unnecessary. All materials used in the review were properly cited and the authors acknowledgement of no. All authors have declared their potential conflicts of interests as required by the journal.

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ORIGINAL RESEARCH

14 EDUCATE TO RESUSCITATE: EVALUATING A SIMULATION -BASED CPR TRAINING PROGRAM FOR NON-HEALTHCARE ADULT WORKERS

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Introduction: Cardiac arrest is a major public health concern, responsible for hundreds of thousands of deaths globally each year. According to the American Heart Association (2020), immediate initiation of cardiopulmonary resuscitation (CPR) can double or even triple a victim's chance of survival [2]. While CPR training is traditionally targeted at healthcare professionals, many cardiac arrests occur in community or institutional settings where trained medical staff may not be immediately available. Despite growing awareness, CPR knowledge and skills among non-healthcare workers remain critically low [3]. A 2023 Indian observational study found that prior to training, only 5–20% of non-medical staff demonstrated basic CPR knowledge;

Recent advances in CPR education including blended learning, guided simulation, and feedback-based practice have proven effective not only in knowledge gain but also in long-term retention of skills [1]. This study, *"Educate to Resuscitate,"* aims to evaluate the effectiveness of a simulation based training in improving CPR knowledge and practical skills among non-healthcare adult workers. The findings are expected to contribute to institutional training models, ensuring that every individual not just medical personnel can play a critical role in saving lives. Objectives were to assess effectiveness of a simulation based training program on knowledge and skill regarding CPR among non-healthcare adult workers.

Methods: A quantitative pre-experimental one-group pre-test/post-test design was used to evaluate the effectiveness of a simulation based CPR training on knowledge and skill among adult non-healthcare workers. Thirty participants were selected through convenience sampling. Data were collected using a demographic form, CPR knowledge questionnaire, and skill checklist. The intervention comprised a structured teaching session with demonstration based on current CPR guidelines. Pre- and post-tests were administered, and data were analysed using descriptive and inferential statistics.

Results: Pre-test findings showed 97% of participants had inadequate CPR knowledge, which improved post-intervention to 30% adequate, 67% moderate, and 3.3% inadequate. The mean knowledge score increased significantly (t=10.81, p=0.0334). Skill performance improved from 53.3% inadequate to 87% adequate, with the mean score rising from 4.0 to 8.06 (t=7.25), though not statistically significant (p=0.8603).

Discussion: The structured simulation based CPR training program significantly enhanced knowledge and improved skill performance among non-healthcare adult workers. The absence of statistical significance in skill gains may reflect limited hands-on practice or short training duration, consistent with prior studies [4]. International evidence supports the value of structured, accessible CPR training, particularly when complemented by repeated practice and refresher sessions to sustain psychomotor competence [5].

Ethics Statement: Authors confirm that all relevant ethical standards for research conduct and dissemination have been met.

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REVIEW ARTICLE

| 15 | **ARTIFICIAL INTELLIGENCE–DRIVEN INNOVATIONS IN CARDIAC REHABILITATION: DIGITAL TWINS, CHATBOTS, EXTENDED REALITY, AND WEARABLES – A SCOPING REVIEW** |

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Introduction: Cardiac rehabilitation improves outcomes in coronary artery disease, yet global participation remains below 30% due to access barriers, workforce shortages, and limited engagement [1]. AI innovations—such as digital twin simulation (DTS), chatbots, extended reality (XR), and wearable biosensors—offer scalable, personalized, and interactive solutions [3]. Objective was to systematically map and synthesize existing evidence on artificial intelligence (AI)–driven innovations in cardiac rehabilitation, including the types and functional roles of AI technologies, their modes of delivery and integration into care pathways, and reported outcomes across clinical, behavioural, usability, and patient-reported domains, following JBI scoping review methodology.

Methods: Guided by the PRISMA-ScR and JBI methods, six databases (PubMed, Scopus, EMBASE, IEEE Xplore, Web of Science, and ACM Digital Library) were searched for studies (January 2020–May 2025) involving adults in CR or secondary prevention that utilized AI-enabled technologies. All designs were eligible. Technology type, intervention characteristics, and outcome domains were charted.

Results: Forty-six studies met the criteria. DTs supported individualized care planning, risk stratification, and therapy optimization, particularly when integrated with wearables and electronic health records. Wearables enable continuous monitoring, improve adherence, and provide real-time alerts [6]. Extended reality provided immersive, gamified rehabilitation, enhancing motivation and functional capacity [8]. Chatbots in Cardiac rehabilitation delivered behavioural support, reminders, and counselling with high satisfaction [2]. Multi-modal platforms in cardiac rehabilitation showed synergistic benefits. Outcomes included improved VO_2 max, 6MWT performance, adherence, reduced readmissions, and increased engagement. These findings underscore the potential of AI to enhance the comprehensiveness and accessibility of cardiac rehabilitation, addressing critical gaps in traditional care delivery [10].

Discussion: AI-driven technologies—especially DTs, wearables, XR, and chatbots—are transforming CR by enabling personalized, data-driven, patient-centered care. Evidence suggests benefits for clinical and behavioral outcomes, but studies are mostly short-term, small-scale, and lack cost-effectiveness analysis. Future priorities include large, diverse, longitudinal trials; economic evaluations; and ethically grounded, co-designed frameworks. Integration of genetic and molecular data into real-time DTs represents a promising frontier.

Ethical Statement: Authors confirm that all relevant ethical standards for research conduct and dissemination have been met. The submitting author confirms that relevant ethical approval was granted.

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