



MedEd CONCLAVE

*Redefining Medical Education
for Tomorrow's Healthcare*

*Organized by
Centre of Excellence for the Education
of Health Professionals*

ABSTRACT BOOK

September 8-12 | 2026

**Skills, e-Learning & Telemedicine
(SET) Facility, AIIMS, New Delhi**

MedEd Conclave 2026

SEPTEMBER 8-12

ABSTRACT BOOK

Organized by
Centre of Excellence for the Education of Health Professionals
Skills, e-Learning, Telemedicine (S.E.T) Facility

All India Institute of Medical Sciences
New Delhi



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CONFERENCE MESSAGES



जगत प्रकाश नड्डा
JAGAT PRAKASH NADDA



मंत्री
स्वास्थ्य एवं परिवार कल्याण
व रसायन एवं उर्वरक
भारत सरकार

Minister
Health & Family Welfare
and Chemicals & Fertilizers
Government of India

MESSAGE

I am pleased to learn that the "MedEd Conclave 2026" is being organised by the Centre of Excellence for the Education of Health Professionals at AIIMS, New Delhi.

Quality medical education lies at the heart of our nation's healthcare and gatherings such as this, bringing together educators, researchers and institutions, offer an excellent opportunity to modernize and adapt medical education to current demands. The theme of this Conclave, "Redefining Medical Education for Tomorrow's Healthcare," reflects the contemporary relevance of continually aligning medical education with the evolving needs of healthcare.

I congratulate the organisers for bringing together faculty members and medical educators from leading Institutes of National Importance and other medical colleges across India, along with distinguished national and international experts in medical education.

I am confident that the deliberations at the Conclave will help strengthen pedagogy in medical education institutions nationwide. This aligns with our efforts over the past decade to expand medical institutes, ensuring not only a greater number of medical students but also better-trained professionals.

I wish the conclave a grand success.

(Jagat Prakash Nadda)
President, AIIMS New Delhi

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MESSAGE

MedEd Conclave is a timely conference focusing on new and evolving methods of pedagogy. As India's premier medical institution, AIIMS New Delhi has always understood that the quality of healthcare a nation delivers is inseparable from the quality of education that shapes its health professionals. That responsibility has only grown more in an era of rapid clinical, technological, and social change, and it is one that AIIMS, New Delhi continues to cope with.

Being at the forefront of Indian healthcare carries an obligation to also lead in how we teach. This means constantly re-examining our curricula, embracing evidence-based pedagogy, and ensuring that every health professional we train, whether doctor, nurse, or allied health worker, leaves better equipped than the generation before to meet tomorrow's clinical realities. It also means recognising that this cannot be the work of any one institution alone, but must be pursued in partnership with educators and institutions across the country.

This Conclave brings together educators from leading medical institutions across the country and reaffirms AIIMS's abiding commitment to shaping the education of health professionals of tomorrow. I extend my best wishes to all participants, and trust that the deliberations here will carry this endeavour forward across institutions nationwide.

With warm regards,


(Prof. Nikhil Tandon)
Director



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Message

It is a privilege to welcome you to the MedEd Conclave 2026, hosted by the S.E.T. Facility at AIIMS New Delhi on 11–12 September 2026. As an institution, AIIMS has consistently led the advancement of medical education in our country, and this conclave marks another vital step in our commitment to academic excellence. The efforts led through the Centre of Excellence for the Education of Health Professionals reflect our ongoing mission to prepare competent, future-ready health professionals through rigorous innovation, research, and faculty development.

The landscape of modern healthcare is evolving rapidly, demanding that we continuously adapt our pedagogical approaches. To achieve this, it is imperative that we coordinate closely with institutes across the country. Together, we must champion evidence-based teaching and learning methods that align seamlessly with both dynamic learner needs and broader societal health challenges.

Every improvement we make in how a health professional is trained ultimately reaches a patient. That is the thread connecting the keynotes, workshops, and scientific presentations over these two days, making this gathering of educators matter well beyond our own classrooms. It is this conviction that shapes the Conclave and drives our shared ambition for sustained, nationwide collaboration. I am confident this event will serve as a powerful catalyst for transformative research and strategic partnership.

I extend my very best wishes for a highly productive and inspiring event.

With warm regards,

Dr. Radhika Tandon

Dean (Research)

Prof & Chief, Dr. R.P. Centre for Ophthalmic Sciences
AIIMS, New Delhi



**All India Institute of Medical Sciences, New Delhi
Skills, e-Learning & Telemedicine (S.E.T) Facility**



Message

It gives me immense pleasure to welcome you, on behalf of the Centre of Excellence for Education of Health Professionals at the SET Facility, AIIMS New Delhi, to MedEd Conclave 2026.

This inaugural chapter of the MedEd Conclave marks the start of what we hope will grow into a national platform for health professions education. Its theme, "Redefining Medical Education for Tomorrow's Healthcare," speaks to a moment when the tools available to educate a health professional have never been more powerful or varied. Simulation-based training, blended and technology-enabled learning, artificial intelligence, and digital learning ecosystems are fast becoming the backbone of how we teach clinical reasoning, procedural skill, and patient-centred care. Our experience at the SET Facility, including building platforms such as SARAL 2.0, convinces me these newer methods are a necessity, not a convenience, in preparing health professionals for the systems they will serve.

Yet no method teaches itself. The faculty member remains the single most important determinant of whether innovation translates into competence. Our students learn differently and carry different expectations than before, and we as educators must evolve with equal urgency, investing in faculty development, mentorship, and new pedagogical and assessment skills to remain equipped to meet them where they are.

This is the conversation MedEd Conclave 2026 is designed to hold. I congratulate all presenters and contributors, thank the organising team for their tireless efforts, and look forward to the discussions and collaborations these days will inspire.

With warm regards,

Dr. Ambuj Roy
Professor, Cardiology
Head, SET Facility
PI, PEP Program (AIIMS, Delhi)
AIIMS, New Delhi



All India Institute of Medical Sciences, New Delhi Skills, e-Learning & Telemedicine (S.E.T) Facility



Message

I'm delighted to welcome you to this first edition of the MedEd Conclave. I have long believed that the greatest leverage for better healthcare is not a single new tool or technology, but the medical educators and trainers who decide every day how the next generation learns. Each new technology and each new educational tool is an instrument in the educators' armamentarium. Our efforts at the Centre of Excellence have focused on building capacity to adopt teaching methods that are not just newer, but genuinely appropriate, keeping in mind the resources and realities each institution actually works within.

That is what makes this Conclave invigorating. It brings educators from across the country together under one roof to learn from experts, share what has worked and what has not, and build lasting bonds with fellow faculty already leading real change in how our students learn and how we prepare them to be competent, future-ready professionals.

I am also deeply heartened by the scientific work shared here as abstracts and publications. Platforms like this one exist to magnify precisely such work, and I hope every contributor finds here not just an audience, but the encouragement to see their ideas taken up more widely.

I warmly welcome you all, and look forward to the friendships and collaborations these days will kindle.

With warm regards,

Prof. Rashmi Ramachandran

Professor, Anaesthesiology, Pain Medicine and Critical Care
Professor In-Charge, Skills and Simulation, SET Facility
Co-PI, PEP Program (AIIMS Delhi)
AIIMS, New Delhi

CENTRE OF EXCELLENCE



Centre of Excellence
for the Education of Health Professionals

CENTRE OF EXCELLENCE

FOR THE EDUCATION OF HEALTH PROFESSIONALS

Skills, e-Learning, Telemedicine (S.E.T) Facility

Established with support from the Novo Nordisk Foundation under the Partnership for Education of Health Professionals (PEP) programme, the Centre of Excellence is a national platform that advances health professions education through innovation, scholarship, collaboration, and lifelong learning.

By strengthening educators, equipping healthcare professionals, and building institutional capacity, the Centre aims to create more responsive and resilient health systems, ultimately contributing to better health outcomes across India and beyond.

Reimagining Health Professions Education

The Centre supports educators and institutions in adopting contemporary approaches to teaching, learning, curriculum design, simulation, digital education, and competency-based assessment.

Through faculty development programmes, workshops, mentorship, certificate and fellowship courses, and communities of practice, educators are supported to become confident teachers, skilled assessors, educational researchers, and future academic leaders.

Digital Learning at Scale

A key enabler of this vision is the SARAL 2.0 - a Learning Management System developed by the SET Facility, AIIMS New Delhi. The platform brings together structured courses, expert learning resources, and collaborative tools within a unified digital ecosystem for blended learning.

Currently hosting programmes from the SET Facility and other departments of AIIMS New Delhi, SARAL 2.0 is expanding across PAN-AIIMS and is envisioned as a national learning platform for medical faculty and health professionals.

Advancing Research and Scholarship

The Centre fosters a culture of health professions education research by mentoring emerging researchers, supporting multidisciplinary studies, and building national and international collaborations. The evidence generated helps inform curriculum reform, assessment, educational policy, and continuous quality improvement.



Centre of Excellence
for the Education of Health Professionals

CENTRE OF EXCELLENCE FOR THE EDUCATION OF HEALTH PROFESSIONALS

Skills, e-Learning, Telemedicine (S.E.T) Facility

Strengthening Cardiometabolic Education

A major focus is improving education for the prevention, management, and control of cardiometabolic diseases through standardized curricula, blended learning modules, and continuing professional development.

The Centre places special emphasis on gender equity and access for underserved communities. In collaboration with PEP partners, the Centre pilots and scales innovative approaches to strengthen high-quality, evidence-based cardiometabolic education, particularly for female healthcare professionals.

From Excellence to Impact

Using a hub-and-spoke model, the Centre extends successful educational innovations, faculty development programmes, and digital resources beyond its own institution. Partnerships with academic institutions, healthcare organisations, professional bodies, policymakers, and international collaborators help build sustainable capacity at regional, national, and global levels.

The Centre of Excellence is not only building better educational programmes. It is building a community of educators and healthcare professionals equipped to lead change, strengthen institutions, and shape the future of healthcare.



Centre of Excellence
for the Education of Health Professionals

CENTRE OF EXCELLENCE FOR THE EDUCATION OF HEALTH PROFESSIONALS

Skills, e-Learning, Telemedicine (S.E.T) Facility

PRINCIPAL INVESTIGATORS



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Principal Investigator



Dr. Nikhil Tandon
Director & Dean (Academics)
Co-Principal Investigator



Dr. Rashmi Ramachandran
Professor, Anaesthesiology
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OBJECTIVE SPECIFIC INVESTIGATORS



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Dr. Ravneet Kaur
Professor, Community Medicine
Principal Investigator



Dr. Yashdeep Gupta
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Co-Principal Investigator



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Principal Investigator



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PROGRAMME AGENDA & ORGANIZERS

PROGRAMME AGENDA

PRE-CONFERENCE WORKSHOPS

SEPTEMBER 8-10 | 2026

DATE	WORKSHOP	RESOURCE FACULTY
September 8-10, 2026	Integration of Hi Fidelity Simulation into Curricular Teaching: From Concept to Classroom	Dr. Rashmi Ramachandran, AIIMS, New Delhi Dr. Akhil Kant Singh, AIIMS, New Delhi Dr. Abhishek Nagarajappa, AIIMS, New Delhi
September 8-10, 2026	Qualitative Research in Medical Education (Basic level): Design, Conduct & Analysis	Dr. Ravneet Kaur, AIIMS, New Delhi Dr. Sumit Malhotra, AIIMS, New Delhi Dr. Mahalakshmy T, JIPMER Puducherry Dr. Mohan Bairwa, AIIMS, New Delhi Dr. Karthikeyan Pethusamy, AIIMS, New Delhi
September 9-10, 2026	Strengthening Community-based Medical Education	Dr. Pradeep Deshmukh, AIIMS Nagpur Dr. Anita S Acharya, LHMC, New Delhi Dr. Anu Oommen, CMC Vellore Dr. Pankaj Shah, SRIHER, Chennai Dr. Abhishek Raut, MGMIS, Wardha Dr. Rakesh Kumar, AIIMS, New Delhi Dr. Sumit Malhotra, AIIMS, New Delhi Dr. Mohan Bairwa, AIIMS, New Delhi Dr. Anand Krishnan, AIIMS, New Delhi Dr. Rajesh Tandon, PRIA, New Delhi
September 9-10, 2026	Reproducible and AI Augmented Medical Education Research	Dr. Biju Soman, AMCHSS SCTIMST Dr. Gurpreet Singh, AFMC, Pune Dr. Arun Mitra Peddireddy, AIIMS, Bibinagar Dr. Dalim Kumar Baidya, AIIMS, New Delhi
September 10, 2026	Implementing Blended Learning in Medical Education: From Didactic to Dynamic	Dr. Simran Kaur, AIIMS, New Delhi Dr. Tony Jacob, AIIMS, New Delhi

PROGRAMME AGENDA

CONFERENCE SESSIONS

SEPTEMBER 11 | 2026

SESSIONS	THEME	TOPICS
I	Changing Landscape of Health Professions Education: From Chalkboard to Advanced Teaching and Learning Methods	• Blended Learning in Health Professions Education: What Works Today and What Lies Ahead? • Integrating Simulation into Curricular Teaching: Challenges, Opportunities, and Best Practices • Balancing Artificial Intelligence Progress and Ethics in Medical Education
II	Converging on Essentials	• Rethinking Medical Education: Bridging Student and Faculty Perspectives • Medical Education Ecosystems in India: How Will They Benefit from Advanced Teaching-Learning Methods?
III	Implementing Evidence-Based Health Professions Education	• Advancing Medical Education through Research – Why and How? • Faculty Development Initiatives – What works, What doesn't, and Why does it matter? • Evolving Landscape of HPE Research – Trends, Paradigms and Future Priorities
IV	Changing Paradigms in Medical Education	• Bridging the Old and the New: Integrating Technology Without Losing the Human Touch in Medical Education • Digital Learning in Medicine: Are Academic Institutions and Public Health Systems Ready? • Balancing the Tilted Scales: Addressing Gender Equity in Medical Education

SEPTEMBER 12 | 2026

V	Innovation, Research and the Future of Medical Education	• Poster Presentations • How AI Will Impact Medical Education: Rethinking Learning, Assessment and Competence • Oral Presentations
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ORGANIZING COMMITTEE

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- Dr. Ambuj Roy, AIIMS, New Delhi
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- Dr. Simran Kaur, AIIMS, New Delhi
- Dr. Ravneet Kaur, AIIMS, New Delhi
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- Dr. Amrita Mehndiratta, AIIMS, New Delhi
- Mr. Amal Santhosh, AIIMS, New Delhi

ABSTRACTS

THEMES

- 1** **AI in Medical Education**
- 2** **Advanced Teaching Learning Methods (ATLM)**
- 3** **Digital Technology and Learning**
- 4** **Health Professions Education (HPE) Research**
- 5** **Simulation Based Teaching**
- 6** **Translational**
- 7** **Others**

AI in Medical Education

1

Ambient Artificial Intelligence Scribes in Health Professions Education: A Scoping Review of Emerging Educational Applications and Future Directions

Dr Karthik Sennimalai, Associate Professor, Department of Orthodontics, All India Institute of Medical Sciences, Vijaypur, Jammu, Jammu and Kashmir, India; Dr Madhanraj Selvaraj, Assistant Professor, Division of Orthodontics and Dentofacial Deformities, Centre for Dental Education and Research, All India Institute of Medical Sciences, New Delhi, India

Background

Ambient artificial intelligence (AI) scribes generate draft clinical documentation from recorded clinical encounters and are increasingly adopted to reduce documentation burden. Their role in health professions education, however, remains unclear. This scoping review mapped educational applications, opportunities, challenges, and future directions.

Methods

An a priori protocol was registered on the Open Science Framework. PubMed/MEDLINE, Scopus, and Web of Science were searched from inception to July 2026. Two reviewers independently screened studies using predefined eligibility criteria. Evidence was charted and synthesized descriptively and thematically following Joanna Briggs Institute methodology and reported according to PRISMA-ScR.

Results

Thirteen evidence sources published during 2025–2026 were included: educational trials, simulation studies, implementation reports, educational frameworks, and conceptual, ethical, and policy papers. Five educational domains emerged: documentation and clinical reasoning, AI-assisted feedback, workplace learning, simulation, and curriculum integration with supervision and governance. Reported benefits included improved formative feedback, reduced documentation burden, reflection, communication training, workplace learning, and AI literacy. Key concerns were automation bias, cognitive off-loading, inaccurate or omitted information, overreliance on AI-generated documentation, erosion of documentation competency and clinical reasoning, and the need for structured supervision.

Conclusion

Ambient AI scribes show promise for supporting feedback, reflection, simulation, documentation training, and workplace learning. However, evidence remains recent and largely exploratory. Future studies should evaluate educational outcomes, learner readiness, faculty development, competency-based implementation, and governance across diverse health professions and settings.

Advancing AI-Enabled Learning in Radiology: An Interactive Platform for Pulmonary Nodule Assessment

Himanshu Rikhari, Esha Baidya Kayal - Indian Institute of Technology Delhi, India, Centre for Biomedical Engineering, New Delhi, India; Shuvadeep Ganguly, Archana Sasi, Swetambri Sharma, Sameer Bakhshi - All India Institute of Medical Sciences New Delhi, Medical Oncology, Dr. B.R.A. IRCH, New Delhi, India; Ajith Antony, Krithika Rangarajan - All India Institute of Medical Sciences New Delhi, Radiodiagnosis, Dr. B.R.A. IRCH, New Delhi, India; Devasenathipathy Kandasamy, All India Institute of Medical Sciences New Delhi, Radiodiagnosis, New Delhi, India; Amit Mehndiratta, University of New South Wales, Faculty of Medicine and Health, Sydney, Australia

Background

Artificial intelligence (AI) is increasingly integrated into radiology workflows for lesion detection, segmentation, quantification, and clinical decision support. As AI-assisted interpretation becomes part of routine practice, radiology training should equip junior residents and radiologists to understand AI-enabled workflows, interpret AI outputs, and integrate them with clinical judgment.

Objectives

To develop an AI-enabled interactive platform that combines pulmonary nodule analysis with AI-assisted learning for thoracic CT interpretation.

Methods

A PyQt5-based application was developed by integrating deep learning models for pulmonary nodule detection, segmentation, and benign–malignant classification. The platform provides interactive CT visualization, automated nodule analysis, quantitative measurements, longitudinal comparison of serial CT scans, structured clinical metadata entry, and automated report generation. Users can compare their interpretations with AI-generated analyses while documenting morphological findings and reviewing longitudinal patient cases.

Results & Critical Reflections

Evaluation on 70 patients achieved >93% detection sensitivity for nodules >10 mm and 82% for nodules <5 mm. The classification model achieved >80% accuracy with >90% sensitivity for malignant nodules. The platform enables residents and radiologists to interact with AI-assisted workflows, compare human and AI interpretations, and gain practical experience using AI in routine reporting.

Conclusion & Relevance

This platform translates validated AI into an interactive learning environment while preserving the radiologist's role in patient care. Its modular design supports future expansion through specialty-specific modules, comparative case learning, competency assessment, and longitudinal case management, facilitating continuous professional development and wider adoption across health professions education.

Artificial Intelligence in Health Professionals' Education: Knowledge, Attitudes and Practices Among Medical Learners at a Tertiary Care Institution in New Delhi, India

Dr Surbhi Khanna; Dr Kinshuk Gupta; Dr Anshita Mishra; Dr Shweta Goswami -
Community Medicine Department, Maulana Azad Medical College, New Delhi, India

Background

Artificial intelligence (AI) is transforming healthcare and medical education. However, evidence regarding medical learners' knowledge, perceptions, and educational needs remains limited in India. Understanding these aspects is essential to guide AI integration into health professions education.

Objective

To study the awareness and utilisation pattern of AI tools among medical students at a tertiary care institution.

Methodology

A cross-sectional study was conducted among undergraduate students and postgraduate residents at a tertiary care institution after Institutional Ethics Committee approval. Participants were selected using simple random sampling. A pre-tested, semi-structured questionnaire assessed knowledge, attitudes, and practices regarding AI in healthcare. Descriptive statistics and Chi-square test were used for analysis.

Results

Of 361 participants, 82.3% were undergraduate students and 57.6% were males. Most recognised AI's role in disease prediction and diagnosis (89.5%) and that it is not always error-free (86.7%). Overall, 72.9% had used AI despite 84.0% never receiving formal AI training. Most users relied on self-learning (58.2%), mainly for examination preparation (60.8%). Participants expressed favourable attitudes towards AI for improving diagnostic accuracy (69.0%) and healthcare efficiency (79.0%), while emphasising that AI should assist rather than replace clinicians (80.1%). Fear of AI errors (52.5%) and lack of formal training (30.0%) were the main barriers. Overall, 71.8% were willing to adopt AI with institutional support, and 61.2% favoured integrating AI training into medical curricula.

Conclusion

Medical learners are embracing AI, but formal educational preparation has not kept pace. Integrating structured AI competencies, ethical guidance, and faculty-supported training into health professions curricula may promote responsible AI use and inform curriculum development in India and other low- and middle-income settings.

Artificial Intelligence in Health Professions Education: Exploring Its Influence on Critical Thinking, Academic Performance, and Research Skills Among Health Professional Students

A. Ramalingam, S. Govindharaj, A. Karthick, S. Valarmathi - Department of Epidemiology, The Tamil Nadu Dr M.G.R. Medical University, Chennai, Tamil Nadu, India

Background

Artificial Intelligence (AI) tools such as ChatGPT, Gemini, and Copilot are increasingly used by health professional students for learning, academic writing, and research. While these tools may enhance learning efficiency and access to information, concerns remain regarding their impact on critical thinking, academic performance, and independent research skills. Evidence from India remains limited.

Objective

To assess the association between AI tool use and critical thinking, academic performance, and research skills among health professional students.

Methods

A cross-sectional analytical study will be conducted among 400–500 health professional students using a semi-structured questionnaire. Data on AI usage patterns and educational outcomes will be collected and analyzed using descriptive and inferential statistics.

Results

The study will identify patterns of AI tool use and examine their relationship with critical thinking, academic performance, and research skills.

Conclusion

Findings may support the responsible integration of AI in health professions education and guide the development of AI literacy and ethical use policies.

Artificial Intelligence-Augmented Standardized Patient Models for AETCOM (Attitude, Ethics, and Communication) Competency Evaluation: A Pilot Study

Dr Nayyar Iqbal, Professor, General Medicine; Dr Magi Murugan, Professor Anatomy; Dr Sunil Subramanyam, Professor Forensic Medicine; Dr.Sandesh Venu, Asst. Professor Psychiatry; Dr Manikandan Mani, Professor Community Medicine; Dr Renu G'Boy Varghese, Professor Pathology - PIMS; Dr Ramachandran Thiruvengadam, Assoc. Professor Biochemistry, BRIC - Translational Health Science & Technology Institute

Introduction

Communication skills are a core competency in the AETCOM (Attitude, Ethics, and Communication) module of the Competency-Based Medical Education curriculum. They are essential for building trust, taking accurate history, explaining interventions, obtaining informed consent, showing empathy, and managing challenging situations. Traditional assessments, such as Objective Structured Clinical Examinations (OSCEs), standardized patients, and mini clinical evaluation exercise (mini-CEX), are reliable but resource-intensive, are limited in frequency, and often provide delayed feedback.

Methods

The study was conducted at Pondicherry Institute of Medical Sciences, Puducherry, India, after obtaining approval from the Institutional Research and Ethics Committee. Following expert discussion, informed consent was selected as the AETCOM competency to assess. To achieve the study objectives, two AI chatbots were developed: a virtual standardized-patient chatbot simulating a spinal injury scenario and an AI-based evaluation chatbot incorporating a 19-item content-validated scoring rubric. Thirty-three interns interacted with the virtual patient, and anonymized transcripts were independently evaluated by the AI system and five subject experts. AI reliability was assessed using intraclass correlation coefficients (ICCs), and agreement between AI and expert scores was evaluated using Bland-Altman analysis.

Results

Expert ratings showed moderate reliability individually ($ICC(2, 1) = 0.536$) but improved significantly when averaged ($ICC(2, 5) = 0.852$), highlighting the benefit of consensus scoring. AI scoring demonstrated excellent internal reliability ($ICC(2, 1) = 0.904$; $ICC(2, 5) = 0.979$) across repeated assessments. Bland-Altman analysis revealed a small negative bias (-0.529) with acceptable limits of agreement (-1.998 to 0.940), indicating close alignment with expert consensus.

Conclusion & Relevance

The findings show that AI is highly reproducible, consistent, and standardized. AI virtual patients provide immediate feedback, support repeated practice, and reduce variability in assessment. Combined with expert assessment, AI-based systems may offer a scalable, standardized, and learner-centred approach to communication-skills assessment that warrants further evaluation in larger multicentre studies.

Beyond AI Adoption: Ethical Awareness, Misuse, and Overreliance Among Indian Medical Students — A Scenario-Based Cross-Sectional Study

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Background

Despite the rapid integration of generative artificial intelligence (AI) into undergraduate health professions education, evidence evaluating ethical behaviour in realistic academic and clinical scenarios remains limited, particularly in low- and middle-income countries. Most studies assess awareness rather than behavioural decision-making. This study used a novel, scenario-based, content-validated instrument to evaluate ethical awareness, misuse, and overreliance among undergraduate medical students.

Methods

An institution-based cross-sectional study was conducted among 177 undergraduate medical students using a content-validated questionnaire assessing AI use, a 10-item Ethical Awareness Scale, and scenario-based measures of misuse and overreliance. The Ethical Awareness Scale showed good internal consistency (Cronbach's $\alpha = 0.827$). Data were analysed using descriptive statistics, Mann-Whitney U, Kruskal-Wallis, Spearman correlation, and multivariable linear regression.

Results

Almost all participants (99.4%) had used generative AI, with 83.1% reporting daily use. AI was mainly used for concept learning (97.2%), clinical understanding (76.3%), and examination preparation (76.3%). Mean Ethical Awareness, Misuse, and Overreliance scores were 40.16 ± 6.38 , 1.40 ± 1.33 , and 0.95 ± 1.16 , respectively. Ethical Awareness differed significantly across academic years ($p = 0.003$), while male students had higher Misuse scores ($p = 0.004$). Higher Ethical Awareness was associated with lower misuse and overreliance. Final-year MBBS status independently predicted higher Ethical Awareness.

Conclusion & Relevance

Medical students demonstrated high ethical awareness and low misuse despite widespread AI adoption. Structured AI ethics, digital professionalism, and responsible AI literacy should be integrated into undergraduate curricula to promote safe and ethical AI use.

BUILDER: Bridging AI Users to AI Innovators in Health Professions Education (2016–2026): A Scoping Review, Stakeholder Perspectives, and an Illustrative Case

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Background

Artificial intelligence (AI) is transforming Health Professions Education (HPE), yet one question remains largely unanswered: who builds these technologies? Despite 14 years of AI scholarship, including a 278-study systematic review, AI adoption has been widely studied; AI authorship has not. Although students are increasingly recognised as educational partners, their participation in AI development remains poorly characterised.

Objectives

To map AI and large language model (LLM) applications in HPE (2016–2026); characterise trainee participation across the AI innovation lifecycle; identify barriers to trainee-driven AI innovation; propose the Trainee AI Innovation Framework (TAIF); validate literature-derived findings through stakeholder perspectives; and demonstrate educational translation via ZEZE.

Methods

A PRISMA-ScR scoping review following Arksey and O'Malley, refined by Levac, synthesised 61 publications (53 eligible studies) identified through PubMed, Scopus, ERIC, and Google Scholar. Findings were contextualised through an anonymous stakeholder survey (n=176). ZEZE, a trainee-developed platform built under clinician supervision, patient-professional relation, evidence synthesis, and medicine learning, and is presented as an illustrative Builder-level case.

Results

Framework mapping demonstrated a progressive decline in trainee participation across the AI innovation lifecycle, with trainees represented predominantly as Users (40/61; 65.6%), Evaluators (7/61; 11.5%), Co-designers (6/61; 9.8%), Builders (8/61; 13.1%); no publication demonstrated sustained Innovation Leadership. Existing competency frameworks consistently culminated at AI literacy and ethics, stopping where innovation begins. Stakeholder findings reinforced this gap: 85.2% (n=150) supported trainee participation in AI development, yet only 25.0% (n=44) had built or co-designed an AI tool. Clinician feedback indicated ZEZE addressed gaps in patient and professional education. These findings informed the proposed five-level TAIF.

Conclusion

Consistent with a recent 278-study systematic review, HPE has largely produced AI users rather than AI builders. TAIF reframes this gap through a progression from AI users to AI innovators. Advancing this shift requires clinician-supervised innovation, interdisciplinary collaboration, and institutional support, particularly in resource-limited settings.

Effectiveness of AI-Assisted Infographics as Teaching-Learning Tool in Biochemistry for MBBS Students: An Interventional Study

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Introduction

Biochemistry is challenging for medical students due to its vast syllabus and complex concepts. AI-assisted infographics may improve understanding, retention, and engagement.

Objective

To assess the effect of AI- assisted infographic-based teaching on MBBS students' biochemistry learning outcomes.

Methods

Design: This 6-month interventional study at AIIMS Bibinagar used infographic-based sessions on selected biochemistry topics, with pretest and posttest assessments to measure knowledge gain.

Setting: Department of Biochemistry, AIIMS Bibinagar, from December 2025 to May 2026.

Participants: Eighty-nine MBBS students from the 2025-2026 batch participated.

Exposure: Infographic-based teaching was used in biochemistry sessions.

Outcome: Pretest and posttest scores were compared, and student perceptions of AI-assisted infographics were assessed using a structured feedback questionnaire.

Results

Posttest scores were significantly higher than pretest scores [14.1 ± 5.26 vs 10.5 ± 4.62 ; $P < 0.001$]. Most students reported better retention, understanding, and engagement.

Conclusion & Relevance

AI-assisted infographic-based teaching improved learning outcomes and student perceptions, supporting its use alongside traditional biochemistry teaching.

Longitudinal Visual Organ Health (LVOH) for Experiential Learning

Dr Shweta Bhatnagar (PhD), Independent Researcher

All the EBDM decisions are based on recent and historical patient data points. A generic three dimensional visual synthesis of the patient longitudinal organ health data points across all departments can improve the understanding of treatment line with junior doctors, while reducing the rate of error in diagnosis.

Creating AI generated comprehensive three dimensional human anatomy, based on patient health data, allows a colour coded organ health (based on health severity) analysis. This increases the speed and accuracy of treatment in community healthcare. Including data points like body constitution, key lifestyle habits, prominent health issues with colour code, allows students to analyse individual patient cases interdepartmentally.

The training data images used in VR Human Anatomy imaging, MRI scans and X ray images can be fed into AI and ML for generating patient organ anatomy. Details on colour coded organ health are added as comments using Premiere tool by lab technicians. Clickable and expandable organ detailed reports allows deeper analysis.

3D Organon developed using Unity 3D is a suitable platform for enhancing Human Anatomy to include treatment time lapse (easy navigation of longitudinal results into one visual).

This technique combines all three, the illness, the anatomy, and the test reports. Many years of patient's history of treatment builds predictive prescriptions using AI. Long term diseases impacting multiple organs can be managed better through longitudinal studies.

A visual three dimensional image with comments and colour codes saves time in prescribing medicines, while increasing the efficiency of prescription in community health. The need for files and reports is compressed across years and departments into one visualization.

To Assess the Prevalence and Patterns of AI Powered Tools Usage Among MBBS Students for Learning

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Background

Artificial intelligence (AI) is increasingly integrated into medical education through tools like ChatGPT, UpToDate AI and other digital learning assistants. These tools offer new avenues for self-directed learning and enhanced clinical reasoning, but their effectiveness, ease of use, and acceptance among MBBS students remain underexplored. Understanding students' perceptions and usage patterns is essential for the responsible integration of AI in medical curricula.

Methods

A prospective observational cross-sectional study was conducted over six months among MBBS students from all academic years at the All India Institute of Medical Sciences, Patna. After obtaining institutional ethics committee approval and written informed consent, 350 participants were enrolled. Data on the prevalence and patterns of AI-powered tools (e.g., mobile apps, virtual simulations, study aids) used for learning were collected and analyzed.

Results

The study found that 88.6% of participating MBBS students reported using AI-powered study aids for their learning needs. Students generally perceived these tools as useful and easy to use. However, challenges such as concerns regarding reliability, ethical awareness, and potential overdependence on AI were noted.

Conclusion

The findings highlight the need for structured digital literacy training and the establishment of ethical guidelines to ensure the responsible use of AI in medical education. Incorporating AI literacy modules into educational policies will foster balanced, effective, and ethical use of emerging technologies for future healthcare professionals.

Advanced Teaching & Learning Methods (ATLM)

2

A Comparative Study of Concept Map and Tutorial As Teaching Methods in Physiology Among First Year MBBS Students

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Background

Physiology is a foundational subject in medical education; however, traditional didactic teaching often promotes passive learning and rote memorization, limiting long-term retention and clinical application. With increasing emphasis on active learning strategies, concept mapping has emerged as a learner-centered tool, however, its evidence regarding its effectiveness as a small group teaching method in Physiology remains inconclusive.

Objectives

To compare the effectiveness of concept map in Physiology by evaluating the differences in pre- and post-test scores among First year MBBS students using concept map versus those participating in standard tutorial following didactic lectures.

Methods

This study was conducted in the Department of Physiology at ABVIMS & Dr. RMLH among first-year MBBS students. A total of 92 students participated in the Platelets module, while 76 students participated in the Blood Coagulation module. Participants were divided into two groups and sequentially exposed to traditional tutorials and concept mapping through a crossover design. Prior to the small group sessions, all students attended didactic lectures on the respective topics. Learning outcomes were assessed using validated pre- and post-test questionnaires. Student perceptions of concept mapping were evaluated using a structured five-point Likert scale feedback questionnaire.

Results & Findings

Results demonstrated a significant improvement in post-test scores in both tutorial and concept map groups compared to pre-test scores. However, no statistically significant difference was observed between the post-test scores of students taught using concept maps and those taught through tutorials. Feedback analysis revealed a highly positive perception of concept mapping, with over 90% of students reporting improved visualization of concepts, enhanced understanding, increased interest in the subject, enjoyment of the activity and support for self-directed learning.

Conclusion

In conclusion, concept mapping was found to be as effective as traditional tutorials in improving cognitive performance while offering added benefits in terms of student engagement and learning experience

Development and Evaluation of the TRACE Framework in Undergraduate Medical Education Through a Modified Pictionary Intervention: A Quasi-Experimental Study

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Background

Competency-based medical education (CBME) emphasises learner-centred teaching; however, didactic lectures remain the predominant instructional approach despite their limitations in promoting active learning. Educational interventions are increasingly recommended to be grounded in learning theory rather than introduced as isolated classroom activities, yet evidence evaluating such theory-informed instructional strategies using objective learning outcomes remains limited.

Objectives

To develop and evaluate the TRACE (Trigger–Retrieve–Apply–Collaborate–Embed) Framework, a theory-informed instructional model operationalized through Modified Pictionary, to improve knowledge among undergraduate medical students.

Methods

A quasi-experimental pre–post study was conducted among undergraduate MBBS students. The TRACE Framework, integrating sequential learning mechanisms including visual cueing, retrieval, application, collaboration, and reinforcement, was implemented through Modified Pictionary activity across three Community Medicine topics. Knowledge was assessed using a 20-item MCQ before and after each session, and scores were compared using paired t-tests.

Results

Seventy-three undergraduate medical students participated in the study. The TRACE Framework was successfully implemented across the three topics, demonstrating its applicability across diverse teaching contexts. Knowledge scores improved by 4–9 marks (out of 20) across all sessions (all $p < 0.001$).

Conclusion, Implications & Transferability

The TRACE Framework provides a theory-informed instructional model that translates established learning principles into a practical classroom strategy. Operationalized through Modified Pictionary, it improved knowledge among undergraduate medical students across multiple teaching topics. As a simple, low-cost, and transferable framework, TRACE offers a practical approach for designing active learning interventions in health professions education.

Flipped Classroom: A Scoping Review and Implementation Framework in Medical Colleges

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Background

Irrespective of the existing challenges in the medical curriculum, the predominant traditional lecture-based teaching needs to be re-examined. To ensure learner-centred, active pedagogy, a flipped classroom is an excellent framework for delivering foundational content before class, reserving contact time for active learning.

Objective

To conduct a scoping review on the existing evidence on the effectiveness, perceptions, and implementation challenges of the flipped classroom in medical curriculum pedagogy.

Methods

The scoping review of 2150 existing studies from 2020 to 2026, focusing on peer-reviewed work, was conducted using PubMed, Scopus, Web of Science, and Google Scholar. Keywords used were flipped classroom, medical curriculum, medical pedagogy, and implementation challenges.

Results

There are mixed results regarding the favourable engagement with the flipped classroom in medical colleges. While globally, there is a consistent benefit in improving engagement and higher-order learning. In India, studies show higher rates of student acceptance and reported benefits, although the differences are not statistically significant. Few studies reported confounding factors, as the studies were conducted close to the university exam date, which could increase the number of extra hours of preparation and retention. Increased workload, inconsistent pre-class preparation, and variability in the presupposed benefits of the approach were common implementation barriers.

Conclusion

To best adapt to the flipped classroom, its implementation should be phased and supported by Learning Management System analytics monitoring. The proposed framework to enhance comprises three modules: pre-class, in-class active learning, and an analytics feedback loop. One limitation of this proposed framework is that its implementation may be limited to medical colleges with better infrastructure and resources; therefore, it will likely not be transferable beyond them.

Flipped Classroom Versus Traditional Lecture As a Teaching Tool for 2nd Year MBBS Students in Microbiology

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Background

Traditional lecture-based teaching may encourage passive learning and may be less effective for deep understanding and retention of complex subjects such as Microbiology. The flipped classroom approach promotes pre-class learning followed by interactive, application-oriented classroom activities and is aligned with competency-based medical education (CBME).

Aim

To compare the effectiveness of flipped classroom with traditional lecture as a teaching tool for 2nd year MBBS students in Microbiology.

Methods

An experimental case-control study with crossover design was conducted from August to November 2025 at the Department of Microbiology, ABVIMS & Dr. Ram Manohar Lohia Hospital, New Delhi. 100 second-year MBBS students were divided into two equal groups. One group received traditional lectures, while the other underwent flipped classroom teaching comprising pre-class online learning followed by interactive classroom sessions. The groups subsequently crossed over to the alternate teaching method using a different subtopic. The same faculty, duration, and assessment tools were used. Learning outcomes were assessed using structured pre- and post-tests, while student perceptions were evaluated using a five-point Likert-scale feedback form.

Results

Ninety-one students were assessed. Both teaching methods significantly improved post-test scores. The mean score increased from 6.13 to 7.97 with traditional teaching and from 5.75 to 8.52 with flipped classroom teaching ($p < 0.001$ for both). The mean knowledge gain was significantly greater with the flipped classroom (2.77 vs. 1.85 marks; $p < 0.001$). Student perception was favorable, with more than 75% agreeing or strongly agreeing that flipped classroom teaching improved understanding, relevance, clinical application, and overall satisfaction.

Conclusion

Flipped classroom teaching demonstrated significantly greater knowledge gain than traditional lectures and was well accepted by students. It promoted active learning, deeper understanding, clinical reasoning, and learner autonomy, supporting its feasibility as a CBME-aligned teaching strategy in undergraduate Microbiology education. Larger multicentric and long-term studies are warranted.

From Knowing to Doing: Developing SMART-MED, a Blended Learning Innovation for Undergraduate Medical Education

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Background

Early exposure to research is essential for developing scientific inquiry, critical appraisal, and evidence-based practice among medical students; however, structured opportunities to acquire research competencies remain limited in undergraduate medical curricula. Bridging the gap between acquiring research knowledge and applying it to research problems may therefore be important for meaningful early research engagement.

Objective

To develop SMART-MED, a competency-based blended learning programme designed to provide structured and mentored research training for undergraduate medical students.

Methods

SMART-MED is a four-week blended course for undergraduate medical students, structured around four competency domains: cognitive, practical, collaborative, and critical thinking skills. The programme integrates asynchronous e-learning, interactive face-to-face workshops, guided learning activities, and mentored group-based research protocol development. Experiential learning and iterative feedback are embedded throughout the course to facilitate progressive development of research skills. Educational outcomes will be evaluated using Kirkpatrick's four-level framework, including learner feedback, pre-post assessment of research knowledge, and rubric-based evaluation of student-developed research protocols. Qualitative analysis of learner feedback will provide additional insight into programme acceptability, perceived learning, and areas for improvement.

Proposed Outcomes

The proposed programme provides a structured pathway from foundational research knowledge to its practical application. Through mentored protocol development, peer-assisted learning, and repeated opportunities for feedback and refinement, students are expected to integrate research concepts with authentic problem-solving. The blended format is expected to provide flexibility while retaining opportunities for peer interaction, collaboration, and faculty mentorship.

Conclusion

SMART-MED represents an innovative, competency-oriented approach to embedding early exposure to research within undergraduate medical education. By combining blended learning, experiential activities, mentorship, and structured assessment, the programme has the potential to strengthen research competencies and encourage sustained engagement with scholarly inquiry and academic medicine. Prospective implementation and evaluation will determine its effectiveness and scalability across medical institutions.

From Paper to Portfolio: A Moodle-Native e-Logbook in Saral 2.0 LMS for Longitudinal Competency Tracking

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Background

Competency-based medical education (CBME) requires the longitudinal documentation of clinical training, the attainment of competencies, and faculty-supervised assessment. In postgraduate medical education, logbooks provide a structured record of clinical activities to support the development of competencies and facilitate the provision of formative feedback. However, maintaining, verifying in real time, and integrating conventional paper-based documentation as a learning record can be difficult. In line with the National Medical Commission (NMC)'s emphasis on competency-based training and rigorous faculty assessment, appropriately designed e-logbooks and e-portfolios can effectively support workplace-based assessment and longitudinal learning.

Aim

The aim is to develop and implement an electronic logbook within the Saral 2.0 institutional learning management system (LMS) at AIIMS Delhi for postgraduate training in emergency medicine. The study also aims to describe the system's architecture and role-based workflow, as well as its potential for cross-specialty adaptation.

Methods

The modular e-logbook framework was integrated directly into the Moodle-based Saral 2.0 LMS; institutional user authentication, role-based access, competency-linked clinical documentation, and faculty validation use Moodle's native architecture. A junior resident, senior resident, faculty, and site administrator workflow was created with different training record permissions. A longitudinal digital record of postgraduate training was created by recording clinical activities as competency-coded entries linked to faculty verification.

Results

The integrated e-logbook established a seamless workflow within the Saral 2.0 standard environment. Residents entered competency-coded clinical activities, and faculty could efficiently review and validate these entries. This provided continuous and organized documentation of training evidence. The system's modular architecture made it possible for the curriculum components and competency structures to be configured directly in the LMS, without having to redevelop the system or allowing direct configuration in the LMS. Having been successfully deployed in the Department of Emergency Medicine at AIIMS Delhi, this framework can be used to create reusable architectures that are adaptable for other postgraduate programs with similar LMSs.

Conclusion

Integrating a Moodle-native e-logbook into an institutional LMS transforms standard documentation into an authenticated, competency-linked, longitudinal learning portfolio. The implementation of Saral 2.0 shows that role-based documentation can be integrated into existing LMS infrastructure feasibly and efficiently. This framework provides the foundation for the adaptation of longitudinal competency tracking to other clinical specialties and contexts of medical education.

Implementing Spaced Retrieval Practice in Undergraduate Pharmacology Education: A Sequential Mixed-Methods Participatory Action Research Study

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Background

Pharmacology knowledge retention declines rapidly after teaching. Spaced retrieval practice (SRP) improves retention and clinical reasoning, yet its feasibility in routine undergraduate education remains underexplored.

Objectives

To implement and refine a spaced retrieval toolkit using Participatory Action Research (PAR) and evaluate engagement, feasibility, acceptability, and retention outcomes.

Methods

A mixed-methods crossover PAR study at AIIMS Patna (IEC approval: December 2025) enrolled 94 of 125 eligible MBBS students (75.2%). Participants were randomised across two teaching blocks (ANS and Autacoids) to receive conventional lectures with or without the SR Toolkit, with crossover for the second block. Four spaced retrieval bursts (Days 3, 7, 14, 28) used crossword puzzles, fill-in-the-blanks, Script Concordance Tests, and Modified Essay Questions. Student co-designers iteratively refined the toolkit.

Results

SRP yielded retention of 90.9% versus 75.1% in controls (decay: 9.1% vs 24.9%). Burst completion rates were 75–95%. Mixed-effects regression confirmed SRP as an independent predictor of retention ($\beta = 2.58$; 95% CI: 1.19–3.97; $p < 0.001$), alongside Composite Engagement Index ($\beta = 0.18$; $p = 0.002$). High engagers (CEI > 85) achieved 93.4% retention versus 72.1% ($p < 0.001$). Qualitative themes included enhanced recall, clinical relevance, structured accountability, and metacognition.

Conclusion

SRP significantly improved pharmacology knowledge retention. The PAR crossover design demonstrated feasibility and acceptability, with engagement as a key mediator. Clinically contextualised formats and reflective practice were particularly effective.

Learning by Moulding: Low-Cost Tactile Pedagogy for Conceptual and Collaborative Learning in Undergraduate Medical Education

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Background

Abstract pharmacology concepts are difficult to visualise through conventional two-dimensional teaching. Resource-limited settings need affordable, engaging and scalable strategies that improve conceptual clarity, collaboration and learner interest.

Objectives

To design and evaluate a low-cost tactile pedagogy model using simple classroom materials to support conceptual, collaborative and hands-on learning.

Methods

This mixed-methods educational innovation was implemented among 55 second-year MBBS students during pharmacology and integrated learning sessions under IEC-approved project JIP/IEC-OS/2024/628. Activities included clay-based drug-receptor modelling, a beads-and-clots exercise for anticoagulant pharmacology and a clay-puzzle icebreaker for problem-based learning team formation. Students constructed models, demonstrated mechanisms, solved clues and engaged in peer explanation. The design drew on constructivism, Kolb's experiential learning cycle, Bloom's revised taxonomy, Tuckman's group development model and embodied cognition. Pre-post tests were used where applicable; feedback and observations were analysed thematically.

Results

Knowledge scores improved from 7.0 ± 1.5 to 9.2 ± 0.8 , with a mean gain of 2.2 marks ($t = 11.64$, $p < 0.001$). Student-generated models represented receptors, anticoagulant mechanisms and team-based concepts. Themes included creative do-it-yourself learning, positive attitudes toward pharmacology, knowledge reinforcement, metacognition, concept-based learning and multisensory learning.

Conclusion

Low-cost tactile pedagogy is feasible, scalable and transferable, and may improve conceptual understanding, engagement, teamwork and hands-on participation in undergraduate medical education.

Perceptions of Undergraduate Medical Students and Faculty About Formal Mentor Mentee Program in a Govt. Medical College- a Qualitative Study

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Introduction

Mentoring programs for undergraduate medical students are recommended by the National Medical Commission (NMC) in Indian medical colleges. This study explored the perceptions and experiences of undergraduate medical students (mentees) and faculty (mentors) regarding a formal mentor–mentee program in a government medical college.

Methods

A descriptive qualitative study was conducted over two months in the Department of Biochemistry using purposive sampling. Data were collected through free listing and pile sorting. Smith's salience index and associations among salient variables were analyzed using R software.

Results

Students identified academic guidance ($S = 0.72$) and emotional support ($S = 0.51$) as the main benefits, while communication gaps with senior faculty ($S = 0.47$) and irregular meetings ($S = 0.34$) were the main challenges. Faculty highlighted academic doubt clarification ($S = 0.57$) and students' sharing of personal concerns ($S = 0.54$) as key strengths. Major barriers were lack of dedicated meeting time ($S = 0.29$), unclear implementation guidelines ($S = 0.29$), and inadequate mentor training ($S = 0.25$). Ward's hierarchical clustering and multidimensional scaling grouped responses into four cognitive domains, with convergence between the two analytical methods. Faculty viewed mentoring as promoting competence and well-being, whereas students experienced it as academic and emotional support limited by trust issues and inconsistent implementation.

Conclusion

Students and faculty agreed that the program offers valuable academic and psychosocial support but differed in perceived barriers.

Transforming Small-Group Physiology Teaching Through Structured Classroom Learning Activities: A Randomized Crossover Trial

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Background

Active learning strategies integrated into classroom teaching promote student engagement, critical thinking, and formative feedback. However, evidence supporting their effectiveness in improving learning outcomes during undergraduate physiology teaching remains limited. This study evaluated the effectiveness of structured classroom learning activities integrated into small-group teaching among first-year medical students.

Methods

A randomized crossover trial was conducted among first-year medical students at a tertiary care teaching institute in India. Fifty-two students were randomly assigned to either an intervention group receiving structured classroom learning activities or a control group receiving conventional small-group teaching. The intervention comprised four weekly sessions using the 3–2–1 strategy, Memory Matrix, Application Article, and Recall–Discuss–Connect–Summarize. Learning outcomes were assessed using a validated 30-item multiple-choice questionnaire before and after each four-week instructional block. Following a one-month washout period, the groups crossed over using different physiology topics. The primary outcome was improvement in assessment scores.

Results

Students receiving structured classroom learning activities demonstrated significantly greater improvement in assessment scores than those receiving conventional instruction. Mean score improvement was 10.22 versus 5.60 marks in Phase 1 and 11.42 versus 5.90 marks in Phase 2 ($P < 0.001$). The intervention also enhanced active participation, collaborative learning, reflection, and application of physiological concepts.

Conclusion

Structured classroom learning activities significantly improved short-term learning outcomes compared with conventional teaching. This learner-centred, low-cost, scalable intervention can be readily integrated into undergraduate medical curricula to strengthen formative learning, enhance student engagement, and improve educational outcomes.

Digital Technology and Learning

3

A Comparative Study to Assess the Knowledge Retention and End-Posting Performance of Phase II MBBS Students in Community Medicine: Flipped Classroom Versus Traditional Teaching

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Background

The Competency-Based Medical Education curriculum emphasizes transforming students into active, self-directed lifelong learners. The flipped classroom is an innovative approach that delivers foundational content online before class, allowing in-person time for interactive application-based learning.

Objective

To compare knowledge retention and end-posting performance between Phase II MBBS students exposed to flipped classroom versus traditional teaching in Community Medicine, and to explore student perceptions of the flipped classroom.

Methods

This interventional study was conducted at Father Muller Medical College over six months. Forty-nine Phase II MBBS students participated (26 intervention, 23 control). The intervention group received pre-class e-modules followed by in-class small-group problem-solving sessions, while the control group received traditional lectures. Knowledge was assessed using pre-test, immediate post-test, and retention test at four weeks. End-of-posting performance scores were compared using independent t-tests and repeated-measures ANOVA.

Results

The intervention group demonstrated significantly higher mean scores on the immediate post-test (7.73 vs 7.04, $p=0.000$) and retention test (7.27 vs 5.35, $p=0.000$). While both groups showed initial knowledge gain, the control group experienced significant knowledge decline over four weeks ($p=0.000$), whereas the intervention group maintained knowledge without significant decline. End-of-posting performance was significantly higher in the intervention group (13.19 vs 8.26, $p=0.000$).

Conclusion

The flipped classroom significantly improved immediate knowledge acquisition, knowledge retention, and end-of-posting clinical performance compared to traditional teaching methods, supporting its integration into Community Medicine curricula.

A Cross-Sectional Study on Undergraduate Medical Students' Perception of Recorded Lectures As a Learning Tool

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Background

Recorded lectures support flexible, self-directed learning and revision in medical education. Their value may depend on students' perceptions, usage patterns, preferred duration, and presentation format. This study assessed perceptions of recorded lectures and their association with these factors.

Objective

To assess perceptions of recorded lectures and their association with frequency and purpose of use, preferred duration, presentation format, and demographic characteristics

Methods

A cross-sectional questionnaire-based study included 183 MBBS students. The questionnaire assessed demographics, frequency and purpose of use, duration, format, and perceptions. Perception was measured using seven five-point Likert-type items, including one reverse-coded item. Internal consistency was assessed using Cronbach's alpha. Mann–Whitney U, Kruskal–Wallis, Dunn's post-hoc test with Bonferroni correction, and Spearman's rank correlation were used; $p < 0.05$ was considered significant.

Results and Critical Reflection

The scale showed acceptable internal consistency (Cronbach's $\alpha = 0.71$). Overall perception was favorable (median 3.86, IQR 3.57–4.14). Enhancing understanding was the commonest purpose (44.3%), followed by clarifying difficult concepts (29.5%). Perception differed by frequency of use ($\chi^2 = 26.36$, $df = 4$, $p < 0.001$), including daily versus occasional users (adjusted $p < 0.001$) and 2–3-times-weekly versus occasional users (adjusted $p = 0.049$). Preferred lecture duration was also associated with perception ($\chi^2 = 19.37$, $df = 3$, $p < 0.001$). Gender, MBBS year, age, and main purpose were not associated. Most students (95.6%) preferred recordings with the teacher's face visible.

Conclusion, Implications, & Transferability

Students had favorable perceptions of recorded lectures. More frequent use and preferred duration were associated with perception, supporting thoughtful integration, appropriate duration, and learner-oriented design. Findings may inform recorded teaching resources in undergraduate medical education.

DINE Framework: A Conceptual Model for Integrating Digital Health Literacy Into Undergraduate Nursing Education in India

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Background

Despite rapid expansion of Ayushman Bharat Digital Mission (ABDM), undergraduate nursing curricula in India lack structured digital health literacy (DHL) integration. Nurses are expected to navigate electronic health records, telemedicine, and digital diagnostics, yet no standardized framework guides this preparation — creating a critical workforce readiness gap.

Objective

To propose the DINE (Digital Integration in Nursing Education) Framework mapping DHL competencies across B.Sc. Nursing curriculum, aligned with NMC guidelines and ABDM goals.

Methods

Integrative review of WHO Digital Health Competency Framework, TIGER Initiative, and IMIA recommendations, combined with B.Sc. Nursing syllabus analysis. Thematic synthesis identified competency domains contextualised for Indian low-resource settings

Results

Five competency domains identified: (1) Digital Device Proficiency, (2) Health Informatics Basics, (3) Telemedicine & e-Health Navigation, (4) Data Privacy & Ethics, (5) Community Digital Health Facilitation. A year-wise scaffolded curriculum integration plan with simulation and case-based learning strategies is proposed.

Conclusion

DINE Framework provides a policy-aligned pathway for nursing workforce digitalisation under ABDM. It addresses a critical curriculum gap and is transferable to other LMIC nursing education contexts, with potential for empirical validation through future curriculum pilots.

Evaluating the Utility of Moodle for Undergraduate Medical Students With Diverse Learning Styles

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Background

Moodle supports blended learning, but evidence on its effectiveness across diverse learning styles in medical education remains limited. Evaluating this is vital for designing inclusive digital learning environments.

Objective

To evaluate Moodle's effectiveness across learning styles, examine the relationship between Moodle engagement and academic performance, and assess student perceptions.

Methods

An observational study was conducted among Phase I MBBS students (Batch 2025) at UCMS, Delhi. Learning styles were identified using the Grasha–Riechmann Student Learning Style Scale (GR scale). Three physiology modules (Respiratory, Vision, and Motor System) were delivered through lectures supplemented with Moodle resources, including videos, notes, and MCQ quizzes. Moodle activity logs, quiz performance, and item analysis were evaluated. Student perceptions were assessed using a validated 24-item questionnaire. Associations between learning styles, Moodle engagement, and academic performance were analysed using Kruskal-Wallis H test with automatic Dunn's post-hoc (pairwise, Bonferroni-adjusted).

Results

From 84 initial active Moodle participants, 69 completed the GR scale questionnaire. A Kruskal-Wallis test indicated significant test score differences across five GR learning styles ($p = .038$), though Moodle activity and overall academic performance showed no variations. Avoidant learners scored the lowest (11.71 ± 3.92), while Participative (23.3 ± 6.75) scored the highest in test. Bonferroni-corrected post-hoc analyses revealed that on quizzes, Participative learners performed significantly worse than both Independent (Adj. $p = 0.008$) and Collaborative learners (Adj. $p = .009$). Overall satisfaction reached 81.71%, peaking among Collaborative learners (4.09 ± 0.7) and lowest among Participative types (3.5 ± 2.12).

Conclusion and Significance

Avoidant learners struggle with test scores compared to engaged peers. Participative learners underperform on asynchronous Moodle quizzes, suggesting self-directed environments clash with their social learning needs. Online and blended courses must account for learning styles. Participative students need interactive tools (e.g., live sessions) for optimal engagement, guiding inclusive digital medical education.

Watching From Afar: Can CCTV Camera Replace In-Person Assessment of Communication Skills in OSCE?

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Background

Assessment of communication skills in Objective Structured Clinical Examination (OSCE) traditionally relies on direct observation. However, the use of digital devices like Closed-Circuit Television (CCTV) or camera-based evaluation can be explored as an alternative. Evidence comparing their effectiveness, acceptability, and validity remains limited.

Objective

To evaluate the effectiveness and acceptability of CCTV-based observation as an alternative to direct in-person observation for communication skills assessment in OSCEs.

Methods

A cross-sectional study was conducted among 50 nursing officers, who underwent communication skills assessment using simulated patients through OSCE. Performance was evaluated through both CCTV-based and in-person observation by Senior Resident examiners (n=6). Quantitative ratings (0–10 scale) on comfort, fairness, acceptability, satisfaction, feasibility, validity, and reliability were collected. Open-ended responses from examinees and examiners were analyzed using thematic content analysis.

Results and Critical Reflection

Examinees rated CCTV significantly higher than in-person OSCE for comfort (9.1 ± 0.9 vs 7.9 ± 1.5), fairness (9.0 ± 0.9 vs 8.4 ± 1.5), acceptability (9.3 ± 0.8 vs 8.5 ± 1.5), and satisfaction (9.2 ± 0.8 vs 8.6 ± 1.5). Qualitative findings showed that 64% preferred CCTV, citing reduced anxiety and improved confidence, while OSCE was valued for immediate feedback and realism. Examiners, however, rated in-person OSCE higher in ease (8.7 vs 6.5), feasibility (8.8 vs 7.2), validity (8.7 vs 7.7), reliability (8.5 vs 7.5), and satisfaction (9.2 vs 7.3). Key challenges with CCTV included technical issues (83%) and limited non-verbal assessment (50%), whereas OSCE was associated with performance anxiety (74%) among examinees.

Conclusion

CCTV-based assessment enhances comfort, confidence, and natural communication, while in-person OSCE provides greater validity, reliability, and feedback quality.

Health Professions Education (HPE) Research

4

A Comparative Study on Game-Based Angiogram Learning Versus Conventional Learning Method: A Gamified Innovative Study

Sukesh Kumar .V, Dr Thirumurugan. E, Dr Kalpana Devi .V

Background

Coronary angiogram interpretation is an essential skill for allied health science students. Conventional teaching methods are effective but often lack interactivity and engagement. Game-based learning (GBL) has emerged as an innovative educational strategy that promotes active participation and improves knowledge retention.

Aim

To compare the effectiveness of Game-Based Angiogram Learning with the Conventional Learning Method in improving coronary angiogram interpretation skills among allied health science students.

Methods

A quasi-experimental study was conducted among 208 allied health science students, who were equally divided into a Game-Based Learning group (n=104) and a Conventional Learning group (n=104). Both groups received a 10-minute introductory lecture followed by a pre-test consisting of 30 questions. The intervention group underwent one hour of game-based angiogram training, while the control group received one hour of conventional lecture-based teaching. A post-test using the same questionnaire was administered. Data were analyzed using paired and independent t-tests, with $p \leq 0.05$ considered statistically significant.

Results

Baseline knowledge was comparable between both groups. Following the intervention, the Game-Based Learning group demonstrated significantly greater improvement in post-test knowledge scores than the Conventional Learning group ($p < 0.001$). More than half of the students in the game-based group achieved good knowledge levels, whereas fewer students reached this level in the conventional group. No significant difference was observed in the time required for angiogram interpretation between the groups.

Results

Severe coronary calcification increases procedural complexity and the risk of suboptimal stent deployment. IVL combined with IVUS guidance provided effective plaque modification and favorable procedural outcomes, particularly in lesions with deep "tram-track" calcification where conventional atherectomy was insufficient.

Conclusion

Game-Based Angiogram Learning is an effective and engaging teaching strategy that significantly improves coronary angiogram interpretation skills without increasing learning time. It may serve as a valuable supplement to conventional medical education.

Building Capacity in Public Health Data Science Through a Multi-Cohort Transformative Training Model: A Five-Year Evaluation (2021-2026)

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Background

Health professions education in India invests heavily in one-off research methodology training, yet rarely evidences whether capacity takes root. Reviews of public health data science curricula find few offerings for practising professionals, and most evaluations stop at satisfaction or self-rated competence. Evidence on what sustained multi-cohort training achieves, and on how established capacity can be recognised, remains limited.

Objectives

To evaluate the Transformative Training Model (TTM), a multi-cohort public health data science training programme, across five years (2021–2026), and to identify observable indicators that research capacity has been established.

Methods

Retrospective descriptive evaluation of a programme delivered between September 2021 and 2026 by the data science group of an institution of national importance. Records of approximately 40 training events across all formats were reviewed, including workshops, faculty development and short-term training programmes, national workshop series, summer schools, and long-term mentorship. Free-text statements of expectation submitted at enrolment by 193 participants of five in-person cohorts were analysed thematically, and training domains introduced over the period were mapped chronologically against them.

Results

Baseline statements named domains rather than techniques: spatial epidemiology, infectious disease modelling, health technology assessment, health economics, reproducible workflows and research communication, expressed before any specialised offering existed. Delivery subsequently differentiated from a single introductory course into five verticals matching those domains, with antimicrobial resistance (AMR), and One Health in development. This also led to the establishment of a data science lab at the institute.

Conclusion

Learner-stated aspirations preceded and predicted curricular differentiation, which we propose as an observable indicator that research capacity has taken root, distinguishing durable capacity building from event-based training. Materials are open educational resources grounded in reproducible research, adaptable to other low- and middle-income settings.

Bridging the Knowledge–Practice Gap in Hospital Hyperglycaemia Management: A Prospective Interventional Study With Longitudinal Behavioural Evaluation

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Background

Hospital hyperglycaemia is common and clinically significant, contributing to increased morbidity, mortality, and healthcare costs. Despite well-established glycaemic management guidelines, adherence remains suboptimal, reflecting a persistent knowledge–practice gap. Educational interventions improve short-term knowledge, but their effect on sustained clinical behaviour and guideline adoption remains inadequately studied. This gap is addressed under the Partnership for Education of Health Professionals (PEP) Phase II programme at the All India Institute of Medical Sciences (AIIMS), New Delhi, a joint India–Denmark initiative strengthening institutional capacity in cardiometabolic disease education.

Objective

To assess the impact of a structured educational intervention on health professionals' knowledge, clinical behaviour, and guideline-based practice adoption in hospital hyperglycaemia management, and to identify implementation barriers and facilitators.

Methods

A prospective, single-arm, longitudinal interventional study is being conducted among clinical residents at AIIMS New Delhi, recruited by consecutive sampling (target N=125). Participants complete an online course via the Student Advanced Resource and Learning Platform (SARAL 2.0), followed by an interactive, case-based workshop. A validated questionnaire assesses knowledge, clinical behaviour, guideline adoption, self-efficacy, and barriers/facilitators, administered pre-workshop and at four follow-ups (immediate, 3, 6, 12 months). Analysis will use paired t-tests/Wilcoxon signed-rank tests, Friedman and McNemar's tests for longitudinal outcomes, and thematic analysis for qualitative data.

Results

This study will be undergoing enrolment and baseline data collection, which are currently in progress. Findings on immediate knowledge gain and 3/6/12-month behavioural and practice-adoption outcomes will be available for presentation as data accrue.

Conclusion and Significance

This study will clarify whether structured, case-based education translates into durable clinical behaviour change, not just knowledge gain, in hospital hyperglycaemia management. Findings will inform scalable, evidence-based capacity-building strategies for future PEP training programmes and are transferable to similar cardiometabolic-education initiatives across India and East Africa.

Critical Appraisal of Oral Care Guidelines in Paediatric Oncology: Identifying Evidence Gaps for Future Practice and Research

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Background

Oral complications are common among children undergoing cancer therapy and require evidence-based preventive and therapeutic care. Clinical practice guidelines serve as essential educational resources for training healthcare professionals; however, their methodological quality, reporting standards, and consistency of recommendations have not been systematically compared. This review critically appraised oral care guidelines in paediatric oncology.

Objective

To evaluate the methodological and reporting quality of oral care guidelines for paediatric oncology, assess concordance of their recommendations and identify evidence gaps.

Methods

A systematic search of bibliographic databases and grey literature identified guidelines addressing oral healthcare in children and adolescents receiving cancer therapy. Methodological quality was assessed using the Appraisal of Guidelines for Research and Evaluation II (AGREE II) instrument, while reporting quality was evaluated using the Reporting Items for Practice Guidelines in Healthcare (RIGHT) Statement. Recommendations across 38 clinical topics were compared using a structured concordance matrix, followed by evidence-gap mapping.

Results

Fourteen eligible guidelines were included. Overall AGREE II scores ranged from 19.6% to 90.3%, with Clarity of Presentation consistently scoring highest, whereas Rigour of Development and Editorial Independence demonstrated substantial variability. RIGHT reporting completeness ranged from 42.9% to 87.1% and showed a weak, non-significant correlation with AGREE II scores (Spearman's $\rho = 0.44$; $p = 0.112$). High concordance was observed for oral hygiene instruction, toothbrushing, dietary counselling, and multidisciplinary referral pathways (92.9–100%). In contrast, fluoride varnish, chlorhexidine and benzydamine mouthwashes, and antibiotic and antifungal prophylaxis demonstrated low or conflicting concordance (14.3–42.9%), highlighting priority evidence gaps.

Conclusion and Significance

Considerable variability exists in the quality and consistency of oral care guidelines used to inform paediatric oncology practice. Strengthening guideline development and harmonising recommendations can enhance evidence-based teaching, curriculum design, and continuing professional education, thereby supporting more consistent clinical decision-making and improving the translation of evidence into practice.

Decentralising Postgraduate Medical Education Through a ‘District Hospital Model’ in Eight Indian States (2018–2026) Namely Bihar, Uttar Pradesh, Karnataka, Meghalaya, Gujarat, Odisha, Haryana and Punjab.

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Background

India faces an acute shortage of medical specialists in publicly funded secondary care facilities, with vacancy rates of 65-85% in DHs and CHCs. NHP, 2017 highlighted, need for having DH Model to address dearth of medical specialists.

Objectives

To decentralise PG medical education by converting district-level public facilities particularly DH into NBEMS accredited training sites, thereby expanding medical specialist supply while strengthening secondary-care services across eight Indian states.

Methods

Public Health Foundation of India (PHFI), designed and adopted alternate models (2018–2026) to address medical specialist shortages by decentralising PG education through a 'District Hospital Model', providing technical assistance across eight states. Key activities included gap analysis, NBEMS accreditation facilitation, faculty capacity-building, steering committee engagement, buddy pairing, cross-learning, and quality assurance.

Results

As on 30th June 2026, the initiative reached 142 districts (54% of the eight states; 17.7% of India), 334 institutions and 2,108 accredited PG seats, up from 989 in 2021 (113% increase). Overall, 1,913 trainees were enrolled, and 3,805 medical specialists graduated, with approximately 50% absorbed into the public sector. RMNCH+A disciplines accounted for 1,162 seats (54.7%).

Conclusion

Repurposing district hospitals into NBEMS-accredited training sites increased medical specialist supply and strengthened 24x7 secondary-care delivery. By repurposing 'district hospitals' into accredited postgraduate training sites, the model offers a scalable, system-embedded pathway for medical health professions education reform.

Hidden Curriculum and Professional Identity Formation Among Undergraduate Medical Students in Bengaluru, South India: A Multicentric Mixed Methods Study

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Background

Professional Identity Formation (PIF) is a key outcome of Competency-Based Medical Education (CBME) and is shaped not only by formal curricula but also by the hidden curriculum operating through clinical environments, institutional culture, role modelling, mentorship, and workplace interactions. Evidence from Indian medical schools remains limited.

Objectives

To assess PIF and its association with hidden curriculum experiences and educational and institutional factors among undergraduate medical students, and to explore perceptions regarding the influence of hidden curriculum on professional identity development during clinical training.

Methods

A multicentric sequential explanatory mixed methods study was conducted across three government and three private medical colleges in Bengaluru between March 2025 and February 2026. The quantitative phase included 360 Phase III MBBS students and interns selected using multistage stratified random sampling. Validated instruments assessed PIF and hidden curriculum experiences. Subsequently, six Focus Group Discussions and twelve In-Depth Interviews were conducted using purposive sampling and analyzed thematically.

Results

Hidden curriculum experiences were positively associated with PIF ($r=0.58$, $p<0.001$). Role modelling ($\beta=0.34$), mentorship ($\beta=0.26$), and supportive institutional culture ($\beta=0.21$) predicted higher PIF scores, whereas hierarchical learning environments negatively influenced PIF ($\beta=-0.17$; all $p<0.05$). Qualitative findings highlighted the importance of clinical experiences, faculty behavior, and mentorship.

Conclusion

Hidden curriculum significantly influences PIF among undergraduate medical students. Strengthening role modelling, mentorship, and supportive learning environments may enhance professional identity development within CBME.

Need Assessment for Developing a Viva Question Randomization Software

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Background

Viva voce examinations are an essential component of assessment in medical and health sciences education. However, conventional viva practices often suffer from inconsistency in question difficulty, examiner bias, and lack of standardization, raising concerns about fairness and reliability. Digital solutions that enable systematic randomization of questions may help overcome these limitations.

Objective

To evaluate current viva voce examination practices, identify the challenges faced by medical teachers, and assess their perceived need and expectations for a Viva Question Randomization Software.

Methods

A cross-sectional, questionnaire-based need-assessment survey was conducted among medical teachers involved in conducting viva voce examinations. The survey explored current viva practices, perceived challenges, and expectations regarding a proposed Viva Question Randomization Software.

Results

A total of 242 faculty members participated in the survey, representing a range of teaching and examination experience. Current major challenges were “Difficulty in covering the syllabus uniformly” and “Unequal question difficulty”. Most respondents (4.46 ± 0.93 on a 5-point Likert scale) acknowledged that software that generates randomized viva questions would be useful, and they would like to use such software if made available (4.29 ± 1.08 on a 5-point Likert scale). Key anticipated benefits included “equalized question sets for each student,” “topic-wise question grouping,” and “difficulty level-wise question access.”

Conclusion

The findings indicate a perceived need for viva question randomization software in medical education. Faculty members recognize its potential to enhance the uniform distribution of questions from all chapters. These results provide empirical support for the development of a user-oriented, evidence-based digital tool to improve oral assessment practices in health professions education.

Revolutionary Role of AI in Coronary Interventions and a Novel Case Presentation Built on Recent Advances in Coronary Interventions

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Background

Artificial intelligence (AI) is transforming interventional cardiology by improving procedural planning, lesion assessment, intracoronary imaging interpretation, calcium modification strategies, device selection, and outcomes in complex percutaneous coronary interventions (PCI).

Aim

To highlight the emerging role of AI in coronary interventions and present a complex case demonstrating the application of advanced calcium modification techniques.

Discussion

AI-assisted technologies integrated with intravascular imaging have the potential to optimize procedural planning, improve workflow efficiency, and support real-time clinical decision-making in the catheterization laboratory, particularly in complex lesions such as calcified vessels, bifurcations, in-stent restenosis, and chronic total occlusions.

Case Presentation

A 46-year-old man with severe calcific multivessel coronary artery disease underwent multivessel PCI. Rotational atherectomy failed to achieve adequate calcium modification because of deep circumferential calcification. Bailout intravascular lithotripsy (IVL), guided by intravascular ultrasound (IVUS), enabled successful calcium fracture, optimal stent expansion, and complete revascularization of the left anterior descending, left circumflex, and right coronary arteries.

Results

Severe coronary calcification increases procedural complexity and the risk of suboptimal stent deployment. IVL combined with IVUS guidance provided effective plaque modification and favorable procedural outcomes, particularly in lesions with deep "tram-track" calcification where conventional atherectomy was insufficient.

Conclusion

AI is becoming an integral component of contemporary coronary interventions through advanced imaging analysis and decision support. Combined with modern calcium modification technologies such as IVL and IVUS, AI has the potential to improve procedural precision, optimize device selection, and enhance clinical outcomes in complex PCI.

Simulation Based Teaching

5

Bridging Learning and Practice: A Design-Based Study of Blended Training for Simulation-Based Ultrasound Diagnostics

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Point-of-care ultrasound has become a vital diagnostic tool in different clinical settings, and healthcare professionals need to receive structured and scalable training. Simulation-based learning, when supported by rigorous instructional design, holds a promise in addressing the skill acquisition challenges. Our study used a design-based research approach to carefully develop, implement, and assess a blended learning model aimed at strengthening the ultrasound-guided diagnostic competencies among in-service clinicians. The interventions, which were carried out in an academic tertiary care facility, included both high-fidelity simulation and asynchronous e-learning modules. A total of 51 in-service healthcare professionals were enrolled, and the curriculum was refined through iterative cycles of the performance measure and participant feedback. Outcomes were evaluated through a combination of module-specific performance analysis, pre- and post-intervention assessments, and subgroup analysis depending on curriculum completion. There was a statistically significant improvement in the knowledge acquisition was observed. Trends in certain modules showed that the lung and ocular ultrasound modules were consistently more successful, which suggests that the instructional design strategy was effective. The cardiac ultrasonography module, on the other hand, exhibited a higher degree of individual variability, which highlighted a need for module modification. The design-based research method facilitated continuous alignment of the teaching methods to fit the demands of the participants and the practical use in the clinic. This study demonstrates the utility of a structured, evidence-informed design process in enhancing the effectiveness of blended learning models for diagnostic skill development. The results indicated a possible scalability for the wider implementation within India's clinical training and public health systems, as well as supporting the integration of the frameworks into continuing professional development programmes.

Development and Evaluation of Low-Cost Non-Animal Biological Simulation Models for Undergraduate Surgical Training in Trauma Tissue Reconstruction: A Randomized Controlled Study

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Background

Commercial surgical simulators are expensive and inaccessible in resource-limited settings. Plant-based materials offer a sustainable, ethical alternative for teaching operative skills, but evidence is limited.

Objectives

This study evaluated low-cost, non-animal biological models — banana peel for suturing and rose stem for tendon repair — against commercial simulators in improving technical skills among undergraduate medical students.

Methods

A three-month RCT was conducted at AIIMS New Delhi among 45 MBBS students (IEC-AIIMSA3409), randomised to banana peel (n=12) versus suture pad (n=13) for suturing, and rose stem (n=10) versus silicone tubing (n=10) for Modified Kessler tendon repair. Performance was assessed using OSATS (Objective Structured Assessment of Technical Skills), an 11-item Likert feedback survey (max 55), and pre/post skill scores (0–10). Cost was compared; independent-samples and paired t-tests were used ($p < 0.05$).

Results

No significant between-group differences were observed. For suturing, mean OSATS scores were identical (banana peel 7.08 vs suture pad 7.08; $p = 0.982$), feedback sums were near-maximal (54.33 vs 54.38; $p = 0.917$), and post-training scores were equivalent (8.83 vs 8.85; $p = 0.969$). For tendon repair, OSATS scores were comparable (rose stem 7.40 vs silicone tubing 8.00; $p = 0.404$), as were post-training scores (9.20 vs 9.00; $p = 0.431$). Feedback trended toward silicone (51.00 vs 53.60; $p = 0.097$), likely reflecting rose stem fragility. All groups improved significantly pre- to post-training ($p < 0.0001$). Banana peel (₹10) was 90 times cheaper than the suture pad (₹900); rose stem cost nothing versus ₹50 for silicone tubing.

Conclusion

Non-animal biological models deliver technical proficiency, realism, and satisfaction equivalent to commercial simulators at negligible cost, offering accessible alternatives for surgical training in resource-limited settings and warranting further validation.

Effect of Simulation-Based Education Versus Traditional Clinical Training on OSCE Outcome in Undergraduate Medical Education: A Systematic Review and Meta-Analysis

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Background

Simulation-based education (SBE) is increasingly utilized in undergraduate medical training. However, its comparative efficacy against traditional didactic and clinical training methods in Objective Structured Clinical Examinations (OSCEs) requires precise quantification to guide curriculum development.

Objectives

To conduct a systematic review and meta-analysis evaluating the impact of SBE versus traditional clinical training on OSCE scores among undergraduate medical students, and to determine the modulating effect of simulation fidelity.

Methods

A search was performed in PubMed, Embase, Web of Science, and Scopus. Five eligible studies were identified that compared an experimental SBE group to a traditional training control group. Meta-analysis was conducted using a random-effects model. The primary outcome was OSCE performance, expressed as the Standardized Mean Difference (SMD) using Hedges' g . A subgroup analysis was performed to identify the effect of simulation fidelity (High vs. Low).

Results

SBE was associated with a significant overall improvement in OSCE scores compared to traditional training, with an SMD of 0.95 (95% CI: 0.46; 1.44). Stratification by fidelity level (high/low) reduced heterogeneity; I^2 was 0% for both subgroups, with an SMD of 1.36 in the high-fidelity group.

Conclusion

Simulation-based education enhances OSCE performance in undergraduate medical students compared to standard training paradigms.

Effectiveness of Artificial Intelligence-Platform-Based Simulated Patients in Enhancing Clinical Skills Among Medical Students: A Scoping Review

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Background

Competency-Based Medical Education (CBME) requires consistent opportunities for deliberate clinical practice, yet traditional training is limited by variable patient volumes, uneven case exposure, geographic and linguistic diversity, and ethical constraints on bedside learning. LLM-driven and generative AI-based simulated patients may address these gaps through interactive, on-demand clinical encounters and broader exposure to diverse presentations beyond local clinical settings. However, synthesized evidence on their educational impact, assessment approaches, and implementation barriers remains limited.

Objectives

This scoping review maps evidence on the use, evaluation, pedagogical value, and implementation challenges of AI-driven simulated patients in medical education.

Methods

Following JBI methodology and PRISMA-ScR guidelines, electronic databases including PubMed, Scopus, Web of Science, CNKI, WanFang Data, and CQVIP were searched for literature published from 2000 to July 2026. The review used the Population-Concept-Context framework, with data extracted and synthesized inductively.

Results

AI-simulated patients provide scalable, reproducible training environments that may support individualized feedback and deliberate practice. Key challenges include learner acceptance, technical fidelity in assessing complex reasoning, algorithmic bias, weak alignment between AI-generated metrics and clinical performance, and limited standardized validation benchmarks such as FACETS, affecting curricular integration and cross-study comparability.

Conclusion

AI-based simulation integration requires faculty development, ethical governance, and standardized competency-based frameworks. Scalable AI simulation may help address clinical exposure gaps, especially in resource-constrained countries.

Empowering Social Interaction in Children With Autism Spectrum Disorder Through Virtual Reality

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Background

Autism Spectrum Disorder (ASD) is a neurodevelopmental condition characterized by difficulties in social interaction and restricted, repetitive behaviors, leading to social isolation and reduced adaptive functioning. Conventional training may not reflect real-world social situations. Limited research has evaluated virtual reality (VR)-based social skills training using community-based scenarios, particularly in low- and middle-income countries, highlighting the need for scalable interventions to improve social interaction and quality of life.

Aim

This study aims to develop tailored VR interventions for children with ASD, evaluate their effectiveness in improving social interaction and reducing social anxiety, and assess VR acceptability and user experience.

Methods

VR interactive scenarios will be designed and validated by experts. Content validity will be assessed using the Content Validity Index (minimum acceptable score: 0.78). A single-blind randomized controlled trial will include 30 children with ASD aged 8–13 years. Group A will receive VR-based intervention with standard care, while Group B will receive standard care alone. Both groups will undergo 12 sessions over 4 weeks. Outcomes will be assessed at baseline and post-intervention. Participant recruitment and intervention are underway. The study will also evaluate the feasibility, acceptability, and user experience of the VR intervention in a rehabilitation setting and is expected to provide evidence on the feasibility and effectiveness of immersive VR for social skills training in children with ASD.

Proposed Outcomes

The findings may support its integration into pediatric rehabilitation as a scalable, contextually relevant approach to improving community participation and social functioning.

Evolution of Advocacy–Inquiry Debriefing During Neonatal Resuscitation Simulation Scenarios: A Prospective Mixed-Methods Study

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Background

Debriefing is widely regarded as the most influential component of simulation-based learning, yet little is known about how facilitators' debriefing skills evolve with repeated practice, or how changing debrief quality shapes learner engagement and reflective learning. We examined the longitudinal evolution of Advocacy–Inquiry (AI) debriefing during a structured neonatal resuscitation simulation programme.

Aim

To evaluate changes in debriefing quality over six months using a validated assessment tool together with behavioural indicators of learner engagement and reflective practice.

Methods

A prospective mixed-methods observational study was conducted during fortnightly neonatal resuscitation simulations for residents at a tertiary teaching hospital over six months. Twenty-four scenarios across twelve sessions were facilitated by the same faculty member using a standardised AI framework. All debriefings were video-recorded and independently scored by two reviewers using the Objective Structured Assessment of Debriefing (OSAD), grouped into Early (months 1–2), Middle (3–4) and Late (5–6) phases. Behavioural indicators and analysis of transcripts were also performed.

Results

Twenty-four debriefings involving the residents were analysed. Mean OSAD scores rose significantly across phases (repeated-measures ANOVA, $p < 0.001$). Learner speaking time increased from 19% to 56%, with facilitator-directed teaching falling proportionately, while facilitator open-ended questions, learner reflective statements, learner-generated action plans and peer discussion all increased markedly. Reflective coding shifted from predominantly descriptive (61% to 18%) toward analytical and transfer-level reflection. Analysis showed progression from early technical issues (airway, mask seal, ventilation) to leadership, situational awareness, communication and cognitive bias in later phases.

Conclusion

Repeated facilitation with the AI model produced progressive improvement in debrief quality, accompanied by greater learner participation, deeper reflection and stronger learner ownership of improvement strategies. Faculty development in structured debriefing may be as important as simulation design itself for maximising educational impact.

From Equations to Exploration: An Interactive MRI Simulation Platform for Teaching Quantitative MRI Concepts

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Background

Magnetic resonance imaging (MRI) is conceptually challenging to teach due to its interdisciplinary nature, requiring fundamentals of physics, mathematics, engineering, and clinical knowledge. Traditional lecture- and equation-based teaching makes it difficult for learners and faculty to visualize how acquisition parameters influence image formation and clinically relevant quantitative biomarkers, creating barriers to teaching advanced concepts such as Quantitative MRI and field-inhomogeneity effects.

Innovation

Drawing on quantitative MRI research experience, we developed an interactive simulation-based platform that transforms complex MRI principles into an exploratory learning experience. It currently focuses on MRI-based fat quantification but can be extended to other techniques such as IVIM, perfusion, and QSM. Learners can manipulate key parameters, including tissue fat fraction, B_0 field variation, and echo time, and instantly visualize effects on signal evolution, water–fat phase behaviour, image artifacts, and biomarker estimation, clarifying not only how MRI works but why quantitative measurements may fail under challenging imaging conditions or in typical clinical scenarios.

Implementation

Designed as a faculty development resource, the simulator can be integrated into postgraduate radiology teaching, biomedical engineering education, and interdisciplinary workshops, encouraging guided exploration using authentic research-based examples.

Potential Educational Impact

By translating active MRI research into an interactive tool, the platform can improve conceptual understanding and strengthen faculty and resident confidence in teaching advanced MRI topics, bridging the gap between imaging research and clinical education and offering a scalable model for incorporating emerging quantitative imaging technologies into medical curricula.

From Skills Lab to Bedside: Simulation-Based Multidisciplinary Training to Improve Emergency Endotracheal Intubation Performance

Dr Radhika Sabnis, Senior Resident; Dr Akshay Kumar, Additional Professor; Dr Bharath Gopinath, Assistant Professor; Dr Soorya Suresh, Assistant Professor; Dr Charu Malhotra, Assistant Professor - Department of Emergency Medicine, All India Institute of Medical Sciences, New Delhi, India.

Background

Emergency endotracheal intubation (EEI) carries a high risk of major adverse events (MAEs). In Indian emergency departments (EDs), airway teams rarely receive structured simulation-based training, and evidence on translating simulation into improved clinical airway outcomes is limited.

Objectives

To increase first-pass success (FPS) in adult EEI to >80% within 15 months and reduce peri-intubation MAEs through a simulation-based quality improvement (QI) program.

Implementation Strategy

This three-phase QI project was conducted from September 2021 to November 2022 using WHO Point-of-Care QI methodology. Training initially focused on task-trainer sessions to develop core airway skills, followed by low- and high-fidelity mannequin sessions involving doctors, nurses, and technicians. Multidisciplinary teams practised equipment preparation, drug administration, airway management, and closed-loop communication. Scenario-based modules addressed challenging airways, including ramped positioning for obese or short-neck patients, delayed sequence intubation in the agitated hypoxic patient, SALAD for heavy secretions or vomitus, and failed intubation requiring surgical cricothyrotomy. When simulation training did not adequately translate into clinical practice, we shifted to in-situ high-fidelity simulation at the bedside, replicating real patient-care workflows. Every intubation was followed by a mandatory debrief that discussed what went wrong and fed back into the training.

Results

Median FPS increased from 72% at baseline to 83%, while MAEs decreased from 35.8% to 21.7%. As training progressed, teams increasingly incorporated rigid suction, push-dose pressor, and difficult-airway preparation into clinical practice.

Conclusion

Moving from skills-lab training to bedside in-situ simulation, with regular debriefing, was associated with better airway performance in our ED. The experience suggests that simulation is more useful when it reflects the challenges teams face during real world situations.

"It Felt Like the Real Thing": Surgical Trainees' Experiences of Stress, Realism, and Learning During Non-Animal Biological Simulation Training for Trauma Tissue Reconstruction — A Qualitative In-Depth Interview Study

Dr Tanmay Gupta: MBBS Intern; Dr Suvashis Dash: Assistant Professor, Department of Plastic and Reconstructive Surgery, All India Institute of Medical Sciences, New Delhi, India.

Background

Low-cost non-animal simulation models are increasingly promoted in resource-limited settings, yet trainees' subjective learning experience remains poorly understood. Quantitative metrics alone cannot capture how learners perceive realism, manage anxiety, or build confidence on plant-based analogues.

Objectives

This study explored medical students' lived experiences of stress, realism, and learning during training on banana peel (suturing) and rose stem (tendon repair) models.

Methods

Qualitative descriptive study nested within a parent RCT. Sixteen MBBS students (8 suturing, 8 tendon repair) were purposively selected from 45 RCT participants and interviewed within one week of training. Semi-structured interviews (20–30 minutes) were conducted face-to-face, audio-recorded, and transcribed verbatim. Data were analysed using Braun and Clarke's six-step reflexive thematic analysis. Trustworthiness was established via member-checking, triangulation with OSATS and feedback data, and researcher reflexivity. Ethics approval: IEC-AIIMSA3409.

Results

Five themes emerged: (1) perceived realism, with banana peel resembling human skin and rose stem providing tendon-like resistance despite fragility; (2) initial stress driven by self-expectations and peer observation rather than faculty pressure; (3) instructor patience, guidance, and peer support as key stress-moderating factors; (4) substantial confidence transformation from near-zero baseline to self-efficacy for supervised practice; and (5) recommendations for rose stem durability and increased practice repetition.

Conclusion

Non-animal models generate sufficient realism to support meaningful skill acquisition. Initial anxiety is universal but self-limiting with structured teaching and practice. These findings corroborate the parent RCT, providing a mixed-methods evidence base for adopting plant-based simulation in undergraduate surgical education.

Impact of Longitudinal Simulation-Based Neonatal Resuscitation Training With Advocacy–Inquiry Debriefing on Knowledge, Attitude and Self-Reported Practice Among Residents

Dr Shoham Majumder, Assistant Professor, Department of Neonatology, AIIMS Kalyani, West Bengal; Dr Shilpa Kalane, Deenanath Mageskar Hospital, Pune, Maharashtra; Dr Nandini Malshe, Bharti Vidyapeeth Deemed University, Pune, Maharashtra; Dr Aditi Das, Assistant Professor, Department of Paediatrics, AIIMS Kalyani, West Bengal; Dr Nihar Ranjan Mishra, Additional Professor, Department of Paediatrics, AIIMS Kalyani, West Bengal, India.

Background

Neonatal Resuscitation Program (NRP) training traditionally emphasises psychomotor skill acquisition across six skill stations, yet translating isolated skills into coordinated team performance during real emergencies remains difficult. Repeated simulation with structured debriefing may strengthen experiential learning, non-technical skills, and learner confidence.

Aim

To evaluate the effect of a longitudinal simulation-based NRP curriculum with Advocacy–Inquiry debriefing on knowledge, attitude, and self-reported resuscitation practice among residents.

Methods

In this prospective educational interventional study at a tertiary-care teaching hospital, residents underwent monthly high-fidelity simulation sessions over six months in place of conventional skill-station revision. Each session used neonatal resuscitation scenarios emphasising technical skills, teamwork, communication, leadership, and crisis resource management, followed immediately by facilitated Advocacy–Inquiry debriefing. Knowledge (30-item MCQ), attitudes (5-point Likert), and self-reported practices were assessed before the first session and after curriculum completion, then compared using paired tests.

Results

Knowledge attrition was mitigated. Attitude, leadership confidence, and self-reported team behaviours improved significantly (Table 1). Ninety-six percent agreed that simulation prepared them for delivery-room emergencies better than conventional skill stations, and Advocacy–Inquiry debriefing was consistently rated the most valuable curriculum component.

Impact of Longitudinal Simulation-Based Neonatal Resuscitation Training With Advocacy–Inquiry Debriefing on Knowledge, Attitude and Self-Reported Practice Among Residents (continued)

Results (continued)

Table 1. Pre- vs post-intervention outcomes (n=46)

Measure Pre Post p

Knowledge score (mean±SD) 84.8±9.6 85.9±6.8 >0.05

Attitude score (mean±SD, /5) 3.9±0.5 4.7±0.3 <0.001

Confidence leading resuscitation 34.8% 82.6% <0.001

Closed-loop communication 43% 89% <0.01

Role allocation 52% 91% <0.01

Anticipation of equipment needs 61% 94% <0.01

Structured post-event team debriefing 18% 83% <0.01

Conclusion

Longitudinal scenario-based NRP training with Advocacy–Inquiry debriefing significantly improved residents' attitudes, confidence, and self-reported team practices and prevented knowledge attrition. Integrating regular simulation beyond conventional skill-station teaching may better prepare residents for real-world neonatal resuscitation.

Operation Outbreak: Evaluating a Gamified Educational Escape Room for Teaching Outbreak Investigation to Undergraduate Medical Students

Dr Arpit Nagpal, Junior Resident (2nd year), Dr Monica Agrawal, Professor and Head, Department of Community Medicine and Public Health, King George's Medical University, Lucknow, Uttar Pradesh, India.

Background

Outbreak investigation is a key competency in Community Medicine requiring epidemiological knowledge, critical thinking, teamwork, and decision-making. Traditional teaching often provides limited opportunities to apply these skills in realistic public health settings. Gamification promotes active participation and collaborative learning but remains underutilized in undergraduate medical education. Operation Outbreak was conceptualized as an immersive simulation to bridge this gap.

Objectives

To develop and evaluate a gamified educational escape room for teaching outbreak investigation among undergraduate medical students, including interns, and assess its impact on knowledge, teamwork, learner engagement, and satisfaction.

Methods

A quasi-experimental educational study will be conducted among undergraduate medical students, including interns, at a tertiary care teaching institution. Participants will work in teams of five to six and complete a 60-minute simulated outbreak investigation through sequential mission stations involving identification of the index case, line listing, epidemic curve construction, interpretation of epidemiological and laboratory findings, outbreak control planning, and risk communication. Knowledge gain, teamwork, learner engagement, and satisfaction will be assessed using structured questionnaires and feedback forms.

Results

The intervention is expected to improve understanding of outbreak investigation while fostering active learning, collaboration, critical thinking, problem-solving, and learner engagement.

Conclusion

Operation Outbreak is an innovative, low-cost, and adaptable teaching strategy that supports competency-based medical education through experiential learning. If effective, it can be integrated into undergraduate curricula and adapted across health professions education programmes to strengthen outbreak preparedness.

Radiologist Training Simulation Platform for Image-Guided Interventional Procedures

Varun Nair, Centre for Biomedical Engineering, Indian Institute of Technology Delhi, Devasenathipathy Kandasamy, Department of Radio Diagnosis, All India Institute of Medical Sciences, New Delhi, Amit Mehndiratta, Centre for Biomedical Engineering, Indian Institute of Technology Delhi

Background

Interventional radiology (IR) training demands fine motor skills, hand-eye coordination, and real-time imaging interpretation. Conventionally, this learning relies on direct patient exposure, limited by ethical constraints and patient safety considerations. Pre-clinical modality-specific phantoms have high maintenance costs and offer limited anatomical variability. The cost of high-fidelity simulators restricts their adoption in resource-constrained settings and low- and middle-income countries (LMICs). These limitations highlight the need for a cost-effective training platform that replicates realistic IR scenarios with real-time performance feedback.

Objectives

This study aims to develop a simulation platform for IR training, integrating inertial sensor-based needle tracking with a multimodal 3D visualization interface.

Methods

The platform comprises three integrated components. A tracking system was built using inertial sensors for needle pose estimation. A visualization interface was developed enabling trainees to load DICOM or NIfTI imaging data, view the surface-rendered volume, navigate orthogonal slices, define target regions, and observe a tracking-synchronized virtual needle. An image processing pipeline for abdominal and thoracic CT volumes was developed.

Results

Bench testing showed sub-millimeter positional errors under static conditions. Dynamic testing across orthogonal and oblique 3D trajectories yielded maximum errors of 2.77 ± 0.90 mm, 1.32 ± 0.60 mm, and 1.46 ± 0.62 mm along the three axes, respectively.

Conclusion

This study demonstrates a low-cost CT-guided IR simulation platform. Integrating image visualization with real-time tracking enables patient-specific procedural training without radiation exposure risk to trainees or inadvertent harm to patients. The hardware-light, software-driven architecture is scalable for resource-constrained settings and LMICs.

Simulate Before You Operate: Bridging the Gap Between Theory and Practice Through Virtual Simulation in Allied Health Education

Unnati Kain, Department of Allied Medical Sciences, Delhi Skill and Entrepreneurship University, Dwarka, New Delhi; Laxmi Dheer Singh, Department of Allied Medical Sciences, Delhi Skill and Entrepreneurship University, Dwarka, New Delhi, India.

Background

Allied health education typically involves theoretical training followed by limited clinical practice. Students in Medical Laboratory Sciences, Physiotherapy, and Radiology frequently enter clinical settings inadequately prepared — not because they were untaught, but because passive learning rarely prepares students for real-world procedures. Virtual simulation (VS) has been recommended as a solution, yet remains largely unintegrated in allied health curricula, particularly in low- and middle-income countries (LMICs) like India.

Objectives

This study aimed to assess the level of awareness of and exposure to virtual simulation among allied health students in India, and to examine whether early, consequence-integrated VS could bridge the gap between theoretical knowledge and clinical competence.

Methods

A cross-sectional survey was conducted among undergraduate allied health students using a structured questionnaire assessing simulation exposure, awareness of virtual tools, and learning preferences. Descriptive statistics were applied.

Results

Thirty students participated, including Medical Laboratory Sciences (n=13), Physiotherapy (n=5), and Radiology/Medical Imaging (n=4). Simulation exposure was low — 57% had never received simulation-based training. Awareness was limited, with 57% only somewhat aware and 27% having merely heard the term. A notable theory-practice gap was identified, with 60% agreeing or strongly agreeing that they understood theory but felt unprepared during their first real procedure. Despite this, 70% preferred VS before hands-on practice, and 50% considered simulation-integrated approaches their most effective learning method. Key barriers were limited infrastructure (37%), high cost of technology (30%), and resistance to change (30%).

Conclusion

Integrating virtual simulation in the early years of allied health education, guided by experiential learning and spiral curriculum principles, could be transformative. Findings may encourage curriculum planners in LMICs to consider VS as a standard prerequisite to laboratory practice.

Teaching Eye Ultrasound Using Goat Eye Model: A Novel Low-Cost Simulation-Based Approach for Emergency Medicine Trainees.

Dr Abhiraj R, Dr Vineeth Chandran K P, Dr Ashwin S Raj, Dr Sanjeev Kumar Bhoi - Department of Emergency Medicine, All India Institute of Medical Sciences, New Delhi, India.

Background

Ocular point-of-care ultrasound (POCUS) is increasingly used in emergency medicine to diagnose conditions such as vitreous hemorrhage, retinal detachment, retrobulbar hematoma, lens dislocation, and intraocular foreign bodies. Training remains challenging because of the delicate nature of the eye and limited opportunities for hands-on practice. We developed a low-cost goat eye simulation model and evaluated its educational utility.

Methods

A cross-sectional observational study was conducted during a POCUS workshop at a tertiary trauma center in Northern India. Fresh goat eyes were used to simulate normal ocular anatomy and pathologies including vitreous hemorrhage, retro-orbital hemorrhage, and intraocular foreign body. Participants received structured teaching followed by hands-on training. An 18-item Likert-scale questionnaire assessed anatomical clarity, pathology recognition, realism, ease of use, comfort, and confidence.

Results

Sixty-five participants were enrolled. Most had limited prior ocular ultrasound experience. Positive ratings (Likert score ≥ 3) were reported by 97–100% of participants for image acquisition, specimen handling, image quality, ease of use, confidence, and realism. Mean composite scores for anatomical structure identification and pathology recognition were 32.78 ± 5.69 and 10.98 ± 2.76 , respectively. Foreign body detection achieved the highest recognition ratings, while retro-orbital hemorrhage was comparatively more difficult to identify. Outcomes were similar across different experience levels and professional designations.

Conclusion

The goat eye model is a feasible, inexpensive, and well-accepted simulation tool for ocular ultrasound training. It provides realistic visualization of ocular anatomy and pathology, improves learner confidence, and may be particularly useful in resource-limited settings.

Virtual Reality for Procedural Skill Training in Medical Education: An Exploratory Study

Dr Akash Gajanan Prabhune - ADMIRE Centre for Advancing Digital Health, Institute of Health Management Research, Bangalore, Karnataka; Ragaviveka Gopalan - Research Department, MediSim VR Private Ltd; Dr Chaithanya V.N. - Research Dept, MediSim VR & ADMIRE Centre for Advancing Digital Health, Institute of Health Management Research, Bangalore, Karnataka; Dr Adith Chinnaswami - Co-Founder & COO, MediSim VR Private Ltd.

Background

Procedural skill training in medical education is constrained by limited opportunities for repeated hands-on practice, patient-safety considerations, and variable clinical exposure. While virtual reality (VR) provides a safe environment for experiential learning, evidence on its effectiveness for developing complete ECG procedural competency remains limited.

Objectives

To evaluate the effectiveness of VR-based ECG training in improving procedural knowledge and skills, and to explore learners' experience, usability, presence, cognitive load, and engagement.

Methods

A mixed-methods study was conducted with 30 second-year medical students in India. Pre- and post-training procedural knowledge and skills were assessed following a Virtual Reality ECG training session. Usability, sense of presence, cognitive load, and user experience were assessed using standardized instruments, supplemented by semi-structured interviews and thematic analysis.

Results

Following a single VR training session, mean knowledge scores increased from 6.07 to 7.77/10 (17% increase; $p < 0.001$; $d = 0.91$), while procedural skill scores increased from 48.67% to 81.90% (33% increase; $p < 0.001$; $d = 1.20$). Usability was rated good (SUS 70.91/100), with excellent spatial presence and experienced realism. Participants demonstrated moderate overall cognitive demand (5.60 ± 3.73), with minimal extraneous load suggesting engagement with learning-relevant processing. Qualitative analysis identified four themes: experience with VR, learning process, engagement and motivation, and application in the real world. Learners described increasing comfort with practice, opportunities for safe error correction, and greater confidence in real-world ECG performance.

Conclusion, Implications & Transferability

VR-based ECG training demonstrated significant improvements in procedural knowledge and skills after a single exposure, alongside favourable usability, spatial presence, learning experience. VR may complement conventional teaching by providing opportunities for repeated, safe procedural practice before supervised patient encounters and could be adapted to other health professions education contexts.

Translational

6

Implementing a Competency-Based Methodology for a Novel National Capacity Building Program on Oxygen Management (Clinical and Managerial Domains) for Doctors & Nursing Officers in India

Vijaydeep Siddharth - On behalf of the Expert Advisory Group for National Capacity Building Program on Oxygen Management for Doctors & Nursing Officers.

Introduction

Globally the importance of medical oxygen as a drug was realized in an unprecedented manner during COVID 19 Pandemic and it also exposed the fault lines in the management of medical oxygen in healthcare facilities. Therefore, Ministry of Health & Family Welfare (MoHFW), Government of India (GOI) resolved to enhance the capacities of healthcare facilities through a national capacity building initiative on oxygen management covering both clinical and managerial aspects, thereby ensuring standardization and quality improvement.

Methods

MOHFW, GOI collaborated with All India Institute of Medical Sciences, New Delhi, from February 2025 to June 2026, for implementing the national capacity building program. An Expert Advisory Group (EAG) consisting of domain experts from various parts of the country to identify the various competencies needed for Doctors and Nursing Officers for administering oxygen therapy in neonates, children and adults, by reviewing the existing evidence and experiential learnings. EAG also identified competencies for establishing and managing medical gases supply system. Thereafter, the training curriculum and pedagogy involving interactive lectures, site visits, demonstration of oxygen administration devices and hands on skill stations were defined for National Capacity Building Program. A cascading training approach shall be utilized for this initiative.

Results

Training of Trainers (ToT) program was delivered through nine INIs in India and included various theoretical as well practical aspects on medical oxygen management, aligned with identified competencies, through standardized training curriculum followed by the post training assessment. TOT adopted and content at all centers. A total of 706 healthcare professionals from 35 States and Union Territories participated in the ToT.

Conclusion

This competency-based, standardized curriculum for National Capacity Building Program successfully equips healthcare workers with vital oxygen management knowledge and skills. It will ensure nationwide training uniformity, promoting the safe, effective, and rational use of medical oxygen.

Others

7

Comparative Study to Assess Mothers Perception and Satisfaction Regarding Care of Neonates Admitted in MNCU(Mother Neonatal Care Unit) and NICU(Neonatal Intensive Care Unit) at Tertiary Level Facility..

Kiran Kumari, Nursing Officer AIIMS Delhi, India.

Background

Admission of a newborn to NICU is an emotionally challenging experience for mothers. Conventional NICUs may limit maternal participation, affecting bonding, confidence, and satisfaction. The Mother Newborn Care Unit (MNCU) model promotes family-centered care by enabling maternal presence and active involvement. This study aimed to compare mothers' perception and satisfaction regarding neonatal care in MNCU and NICU.

Methods

A comparative descriptive study was conducted at Vardhman Mahavir Medical College and Safdarjung Hospital, New Delhi, after ethical approval (IEC: VMMC/SJH/CERT/DEC-2024/156). Data were collected from 300 mothers (150 MNCU and 150 NICU) between January 29 and March 19, 2025, using structured tools and convenient sampling. Data were analyzed using SPSS version 23 and Microsoft Excel.

Results

Demographic characteristics were comparable between groups. Mothers in MNCU reported better perception of neonatal care, with 89.3% showing good perception compared to 56.7% in NICU. MNCU mothers had significantly higher scores in bonding and maternal self-efficacy domains. Satisfaction was higher in MNCU, with 97.3% mothers highly satisfied compared to 70.7% in NICU. Improved satisfaction was observed in areas of parental involvement, quality of care, and information, education, and communication.

Conclusion

The MNCU model enhances maternal perception and satisfaction by promoting bonding, caregiving confidence, and active participation. Implementation of MNCU can strengthen family-centered neonatal care and improve quality of neonatal services.

Development and Validation of ASSISTE-O, a Tool for Assistance & Evaluation of an OSCE/OSPE

Ankit Chandra, Parshav Gilhotra, Alka Kumari, Reetika Biswas, Anwita Khaitan, Sunanda Gupta - Department of Community Medicine; Sanjeev Lalwani, Chief - AIIMS-CAPFIMS, New Delhi, India.

Introduction

Objective structured clinical and practical examinations (OSCE and OSPEs) are important assessment tools in competency-based medical education (CBME) for undergraduates. Currently there are no validated tool available to comprehensively assist in planning, implementation and evaluation of OSCE/OSPE examinations. This study aimed to validate a tool to assist in planning, implementation and evaluation of an OSCE/OSPE examination (ASSISTE-O).

Methods

The study was conducted in three phases. In phase I, 37 English language items across six domains were generated through a literature search. In phase II and III, face and content validity were assessed independently by subject matter experts using the Face Validity Index (FVI), Content Validity Index (CVI), and item-level modified kappa (K^*) to adjust for chance agreement.

Results

The final tool comprised of 34 items under six domains. The item-level modified kappa (K^*) values ranged from 0.6 to 1.00, indicating good to excellent agreement after adjusting for chance. The final tool had excellent face validity with scale level S-FVI/Ave = 0.99 and S-FVI/UA = 0.97. Tool also had excellent content validity with S-CVI/Ave = 0.99, S-CVI/UA = 0.97.

Conclusion

ASSISTE-O is a valid instrument to assist in planning, implementation and evaluation of an OSCE/OSPE examination.

“First Impression Is the Last Impression”: Need of Communication Skill Training for Hospital Support Staff at a Tertiary Care Institute

Ankit Chandra, Department of Community Medicine, All India Institute of Medical Sciences - Central Armed Police Forces Institute of Medical Sciences (AIIMS-CAPFIMS), New Delhi, India

Background

It is essential to know how much of patient experience and satisfaction is contributed by the hospital support staff and what are the barriers to effective communication for staff?

Objectives

This study aimed to assess patients' perceptions and expectations regarding the influence of communication skills of hospital support staff. It explored communication practices, perceived training needs, and barriers to effective communication among hospital support staff in a tertiary care hospital setting.

Methods

A sequential mixed-methods study was conducted. Quantitative data were collected from 105 patients and 110 hospital support staff enrolled through universal sampling. Data were collected using semi-structured questionnaires. FGDs with patients and staff, and key informant interviews with supervisors and hospital administration. Quantitative data were analysed using descriptive statistics, while thematic analysis was performed for qualitative findings done.

Results

Among patients/attenders, the most common support staff interaction was done with registration clerks (84.5%), followed by security guards (68.2%), sanitary/hospital attendants (55.0%), and lift operators (37.3%). Among them, 81.9% perceived communication by support staff as having a high or very high influence on overall hospital satisfaction. The mean proportion of the contribution of support staff communication to overall patient satisfaction was perceived to be 66.6% (SD 27.8). Among staff participants, 70.9% had not received prior communication skills training. Language barriers (53.6%), dealing with anxious or angry patients (33.6%), and lack of training or clear instructions (22.7%) were identified as major communication challenges.

Conclusion

Hospital support staff highly influence patient experience and satisfaction. Communication challenges related to language barriers, workload, and limited training highlight the need for structured communication skills training programmes.

Medical Device Regulation in India: Balancing Innovation and Compliance

Rupak Kumar, ICMR (HQ), New Delhi, India.

Indian medical device sector is 4th largest medical devices (MD) market in Asia and largely rely on import dependency of 75-80%. Earlier, there were limited and no specific guidelines for the regulations of MD for import, manufacture, clinical investigation etc. for MD in the law and only certain MD were regulated under Drugs and Cosmetics Act, 1940. In order to strengthening the healthcare ecosystem, more and more stagnant regulations are evolving. In this regard, In India, Medical Devices Rules-2017 (MDR) is the regulatory framework for MD and In-vitro Diagnostics (IVD) medical devices that has been controlled by Govt. of India, Ministry of Health and Family Welfare's Central Drugs Standard Control Organization (CDSCO) headed by Drug Controller General of India (DCGI). The present talk embarks a critical explanation and significance of the regulatory framework's governing to MD/IVD, aiming to elucidate how such pivotal approval have shaped the current regulatory landscape and influenced the medical devices industry in India. It is mandate that, an applicant can initiate the regulatory approval by applying the test license for manufacturing/import small quantity of MD/IVD for the purpose of clinical investigation, test, evaluation, examination, demonstration, or training to make three consecutive test batches (irrespective of availability of predicate device in India or not) with a validity of three years. Moreover, if no such predicate device available in India against the proposed device; meaning that it comes under the scope of investigational MD/new IVD; the applicant can also initiate the regulatory approval by applying test license application followed by clinical investigation, permission to manufacture and finally commercial license of manufacture.



Submissions for Outstanding Research Paper Awards

01 A multimodal blended learning curriculum for ultrasound-guided diagnostics and needle navigation: development and early implementation in an Indian tertiary care setting

Frontiers in Medicine

Submitted by

Kritika Sharma, Educational Research Specialist (First Author)



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02 Blended learning course for ultrasound-guided diagnostic skills: A design-based research study

Frontiers in Medicine

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Rashmi Ramachandran, Professor (First Author)



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03 Blended learning in medical education in India: A literature-based analysis and description

Frontiers in Medicine

Submitted by

Akanksha Pal Singh, Consultant (Corresponding Author)



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04 Comparative evaluation of large language model-based AI chatbots in solving ophthalmological clinical case vignettes

Eye

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Abhishek Onkar, Additional Professor (Corresponding Author)

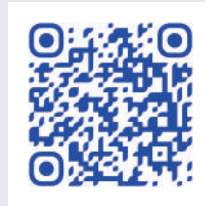


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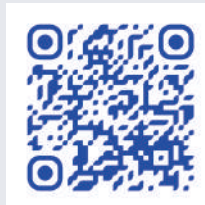


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06 Competency-based medical curriculum: Exploring the preclinical medical teachers pedagogical and technical readiness levels

The National Medical Journal of India

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07 Developing critical appraisal skills among undergraduate students by early research exposure: An interventional study

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Simran Kaur, Professor (First Author)

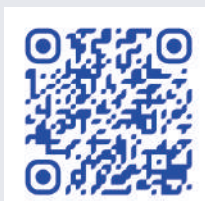


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08 Ethical issues and proposed solutions in conducting practical assessment of medical students involving patients

Indian Journal of Medical Ethics

Submitted by
Ankit Chandra, Assistant Professor (First Author)

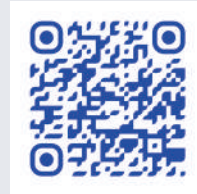


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09 **Evaluation of blended learning method versus traditional learning method of clinical examination skills in physiology among undergraduate medical students in an Indian medical college**

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Ayesha Juhi, Additional Professor (First Author)

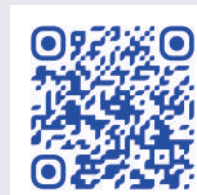


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10 **Exploring the potential of virtual reality-based procedural skill training in reducing medical errors: A pilot study**

IEEE Xplore

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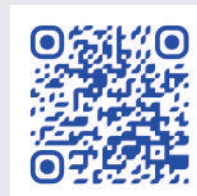


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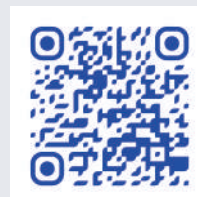


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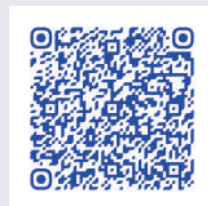
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14 **How to use large language model chatbots in multiple-choice question generation**
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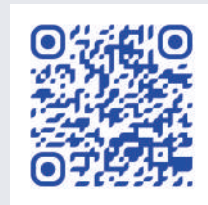
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15 **Implementation of self-directed learning in physiology for phase 1 undergraduate medical students**
Medical Science Educator

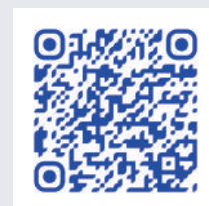
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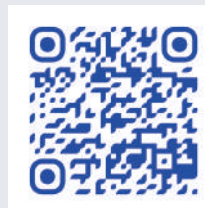
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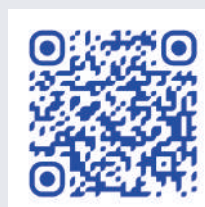
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