



Review Article

Holistic, collaborative and innovative approach in teaching and assessing immunisation concepts for undergraduate medical students

Dr. V. Hrritik¹, Dr. Sherin S S¹, Dr. Punitha. J¹, Dr. Ganavi.Ramagopal²

¹Post Graduate, Dhanalakshmi Srinivasan Medical College and Hospital, Perambalur

²Professor And HOD Pediatrics, Dhanalakshmi Srinivasan Medical College and Hospital Perambalur

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Corresponding Author:

Dr. Ganavi.Ramagopal

Professor And HOD Pediatrics,
Dhanalakshmi Srinivasan Medical
College and Hospital Perambalur.

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ABSTRACT

Background: Immunization is one of the more important medical interventions. Over the course of history, it has helped keep millions of us protected against some of the most devastating and deadly diseases ever to befall mankind. Thus, immunisation is a critical component in medical training, forming an essential part of the curricula. With the introduction of the Competency-Based Medical Education (CBME) curriculum by the National Medical Commission (NMC), there is an increasing emphasis on skill acquisition, communication, clinical reasoning, and real-world application. For developing a comprehensive understanding of vaccination principles, national immunisation programs, cold chain management, and safe vaccine administration we need an integrated approach.

This article aims to map immunization-related competencies across the three departments of Microbiology, Community medicine and Paediatrics and implement an integrated CBME teaching-learning model and also assess improvements in student knowledge, skills, and communication with few suggestions for innovative teaching ,learning and assessment.

Traditional methods such as lectures, tutorials, and small-group discussions remain essential for conceptual clarity. However, innovative strategies significantly enhance competency achievement. Simulation-based training improves procedural skills such as vaccine administration and AEFI management. Digital tools increase learner motivation and retention of immunisation schedules. Community-based teaching through PHC visits, exposure to cold-chain points, and participation in National Immunisation Day improve programmatic understanding. Role-play and standardised patient encounters enhance communication and counselling competencies. A blended and integrated approach incorporating traditional, skill-based, and innovative methods is most effective for teaching immunisation concepts. Aligning TLMs with NMC competencies ensures holistic learning, promotes active participation, builds confidence, and prepares future physicians to deliver safe and effective immunisation services which is one of component of sustainable development goal ,reaching the global health care.

Keywords: Medical Education, Teaching–Learning Methods, Integrated Medical Teaching, Undergraduate Medical Curriculum.

BACKGROUND

Immunization is one of the more important medical interventions. Over the course of history, it has helped keep millions of us protected against some of the most devastating and deadly diseases ever to befall mankind. Thus, immunisation is a critical component in medical training, forming an essential part of the curricula. With the introduction of the Competency-Based Medical Education (CBME) curriculum by the National Medical Commission (NMC), there is an increasing emphasis on skill acquisition, communication, clinical reasoning, and real-world application. For developing a comprehensive understanding of vaccination principles, national immunisation programs, cold chain management, and safe vaccine administration we need an integrated approach.

This article aims to map immunization-related competencies across the three departments of Microbiology, Community medicine and Paediatrics and implement an integrated CBME teaching-learning model and also assess improvements in student knowledge, skills, and communication with few suggestions for innovative teaching ,learning and assessment.

COMPETENCIES AS PER NMC CURRICULUM RELATED TO IMMUNISATION

DEPARTMENT OF MICROBIOLOGY

MI1.7 : Describe the immunological mechanisms in

MI1.8 : Describe the mechanisms of immunity and response of the host immune system to infections

MI1.9: Discuss the immunological basis of vaccines and describe the Universal Immunisation schedule

DEPARTMENT OF COMMUNITY MEDICINE

CM10.5: Describe Universal Immunization Program; Integrated Management of Neonatal and Childhood Illness (IMNCI) and other existing Programs.

DEPARTMENT OF PEDIATRICS

PE19.1 :Explain the components of the Universal Immunization Program and the National Immunization Program - INTEGRATION

PE19.2 : Explain the epidemiology of Vaccine preventable diseases. -INTEGRATION

PE19.3 : Vaccine description with regard to classification of vaccines, strain used, dose, route, schedule, risks, benefits and side effects, indications and Contraindications.-INTEGRATION

PE19.4 : Define cold chain and discuss the methods of safe storage and handling of vaccines -INTEGRATION

PE19.5 : Discuss immunization in special situations – HIV positive children, immunodeficiency, pre-term, organ transplants, those who received blood and blood products, splenectomised children, adolescents, travellers - INTEGRATION

PE19.6: Assess patient for fitness for immunization and prescribe an age appropriate immunization schedule

PE19.7 : Educate and counsel a patient for immunization

PE19.8; Demonstrate willingness to participate in the National and sub national immunisation days -INTEGRATION

PE19.9 ; Describe the components of safe vaccine practice – Patient education/ counselling; adverse events following immunization, safe injection practices, documentation and Medico-legal AETCOM

PE19.10 : Observe the handling and storing of vaccines -INTEGRATION

PE19.11: Document Immunization in an immunization record

PE19.12 : Observe the administration of UIP vaccines -INTEGRATION

PE19.13: Demonstrate the correct administration of different vaccines in a mannequin

PE19.14: Practice Infection control measures and appropriate handling of the sharps

PE19.15: Explain the term implied consent in Immunization services

PE19.16: Enumerate available newer vaccines and their indications including pentavalent pneumococcal, rotavirus, JE, typhoid IPV & HPV

DOMAIN-WISE TEACHING–LEARNING METHODS (TLMs) FOR IMMUNISATION AS PER NMC CBME CURRICULUM

1. Knowledge (K) Domain - including vaccine schedules, AEFI, cold chain, and UIP guidelines are best taught through

Teaching -learning methods
Interactive lectures
Small-group discussions
Case-based learning
Digital modules
Gamification
Virtual reality/Augmented reality
Stories and mind maps

Assessment
long essay
short essay
short answer
quiz
MCQS
viva

2. Skill (S) Domain - vaccine administration, cold chain handling, and documentation is strengthened through

Teaching -Learning-Assesment
Simulation-based demonstrations

OSCEs
Clinical postings
PHC visits
Community outreach activities
High-fidelity simulation
Virtual skill lab and skill carousel
Troubleshooting workshops
Mobile simulations
Mini-internship with ANM

Assessment
DOPS
OSCE

3. Attitude (A)/ AETCOM Domain - such as communication, empathy, professionalism, and addressing vaccine hesitancy, are fostered through

Teaching-Learning Methods
Reflective learning
Ethical discussions
Participation in community programs like Pulse Polio and Immunization Day
Role-plays
Community immersion
Standardized patients
Video reflection
Debates and social media campaigns

Assessment
DOPS
OSCE

FIG 1: COUNSELLING SESSION -AETCOM



FIG 2: QUIZ PROGRAM ON IMMUNISATION



FIG 3: COMMUNITY AWARENESS PROGRAM



FIG 4: DOAP SESSION –VACCINATION



CONCLUSION

Traditional methods such as lectures, tutorials, and small-group discussions remain essential for conceptual clarity. However, innovative strategies significantly enhance competency achievement. Simulation-based training improves procedural skills such as vaccine administration and AEFI management. Digital tools increase learner motivation and retention of immunisation schedules. Community-based teaching through PHC visits, exposure to cold-chain points, and participation in National Immunisation Day improve programmatic understanding. Role-play and standardised patient

encounters enhance communication and counselling competencies. A blended approach incorporating traditional, skill-based, and innovative methods is most effective for teaching immunisation concepts. Aligning TLMs with NMC competencies ensures holistic learning, promotes active participation, builds confidence, and prepares future physicians to deliver safe and effective immunisation services and also motivates students for research and project based learning.

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