Review Article

From siloed knowledge to competent healers: India's journey to advanced competency-based medical education

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Abstract

Indian medical education has historically been based on a discipline-bound, syllabus-driven and examination-based approach that churned out generations of committed academicians and clinicians. However, with increasing expectations of healthcare like patient-centred care, interdisciplinary collaboration, safety, and rapid advances in science, the time-bound, lecture-dependent pedagogy emerged as short-sighted. Dependency based on memorisation was found inadequate to build clinical judgment, compassionate communication, and procedural skills. Identifying such loopholes, the National Medical Commission (NMC) launched Competency-Based Medical Education (CBME), a revolutionary model that produces definite graduate outcomes, uniformity in teaching–learning approaches, and renovates assessment practices. This review identifies India's shift from traditional pedagogy to CBME, stressing its relevance in developing competent, ethical, and patient-centred physicians.

Keywords: Medical education in India; Competency-Based Medical Education (CBME); National Medical Commission (NMC); Traditional pedagogy; Outcome-based learning; Assessment reform

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1. Introduction

Indian medical education, for decades, has obeyed a conventional, discipline-based, extensive syllabi, factual knowledge, and a long-term examination system. This model made generations of hard-working academicians and clinicians who served society marvelously. As the advanced needs of healthcare towards patient-centred care, population health, interdisciplinary teamwork, safety, quality improvement and rapid scientific change, the restrictions of a predominantly time-based, heavy lecture pedagogy became obvious. Merely memorisation could no longer be helpful for clinical reasoning, empathetic communication, or safe procedural skills. The landmark reform in India was the establishment of the National Medical Commission (NMC), which recognised this gap and worked extensively to deliberate a shift to Competency-Based Medical Education (CBME). The CBME framework organised the vast curriculum into clearly defined outcomes, aligned the teaching-learning strategies and reformed the assessment systems. This review traces the transition from conventional pedagogy to advanced CBME guidelines.[1-3]

2. Historical Background of Older Teaching Methods in Indian Medical Education

Indian medical education is knotted with the 19th-century colonial project. Institutions such as Calcutta Medical College (1835) and Madras Medical College (1835) adopted curriculum ideas from the Flexner Report (1910), which reorganised North American medical schools. The post-independence expansion of medical colleges in India under the aegis of Medical Council of India (MCI) followed this discipline-based model, arranged into pre-clinical, para-clinical and clinical phases over 4.5 years, followed by compulsory internship of one year. The MCI's Graduate Medical Education Regulations (GMER) categorised duration, subject lists and minimum teaching hours.

Indian graduates skilled under this regime have significantly contributed to clinical services and leadership within India and abroad, yet critiques have been raised over time. The large-group lectures were sufficient for syllabus

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coverage and passive note-taking ability, but could not raise a query "why" over the symptoms. Summative assessment, memory recall-oriented exams, are curtailed to address the opportunities to practise complex reasoning and communication. Professional ethics, empathy, teamwork, and health advocacy were supposed to be 'picked up' in ward/ clinical teaching voluntarily rather than intentionally taught or assessed. By the early 21st century, shifts in India's epidemiology (rise of non-communicable diseases), technology (telemedicine), and societal expectations (patient safety, transparency, rights) put pressure on the contemporary model. While across the globe, educational models shifted to outcome-based education and authentic assessment of performance (Miller's pyramid and van der Vleuten's programmatic assessment).[4-5]

3. Key Characteristics of Older Teaching Methods (Strengths and loopholes)[6]

3.1. Lecture-dominant delivery

Extensive lectures covered the vast syllabus with the limited faculty numbers. Undergraduates received narratives from expert teachers, building a shared baseline of knowledge. However, passive reception benefited from lectures was difficult to diagnose misconceptions in real time and scope for deliberate practice of reasoning or communication. In very large lecture classes, the attendants' behaviours like note copying and last-minute cramming become usual.

3.2. Subject compartmentalisation

Disciplinary clarity (e.g., pharmacology distinct from pathology) raises depth and identity, but the clinical brain works only by integrating multiple disciplines. When human physiology is taught a year before medicine, learners struggle to transfer mechanisms to bedside decisions.

3.3. Time-based progression

The completion of the syllabus within the calendar was considered an advancement over capability. Students who require more practice in a skill (e.g., breaking bad news) could not have an alternate remedial option.

3.4. Predominant summative assessment

Extensive written and viva examinations reward recall over performance. Differences across different examiners further compromised the reliability of the reward-giving patterns.

3.5. Clinical exposure

Clinical/ ward teachings from real patient contact were truly an implicit learning from role models, arguably the system's greatest strength. But, learning opportunities were dependent on case-mix and supervisor inclination; deliberate practice of procedures was uneven; and explicit teaching of professionalism or communication was uncommon.

Advantages of this system included

1. Strong grounding in biomedical science;
2. Disciplined study habits;
3. Cost-efficient teaching at scale; and

Loopholes included

1. Over-reliance on memory;
2. Inadequate assessment of 'does' level performance (Miller Pyramid);
3. Insufficient feedback and mentoring;
4. Weak scaffolding for ethical reasoning and teamwork; and
5. Variable skill standardisation across institutions.

4. Transition to CBME – Reasons and Reforms[7-9]

CBME reframes the question from 'How long did the student sit in class?' to 'What can the graduate be trusted to do the skill safely, repeatedly, and independently?' This movement was driven by four principal drivers. Firstly, the global alignment, such as CanMEDS (Canada), ACGME milestones (USA) and GMC 'Outcomes for Graduates' (UK). Second, health-system needs (India's burden of communicable and non-communicable diseases requires clinicians who combine reasoning with prevention and counselling). Thirdly, educational evidence such as research on learning science, feedback, deliberate practice and programmatic assessment. Fourthly, public accountability means that patients and policymakers demand demonstrable competence and professionalism. With the establishment of the National Medical Commission (NMC), the whole system was updated to provide more specific guidance on AETCOM, horizontal and vertical integration, skills laboratories, formative assessment, internal assessment, mentorship structures, electives, and blueprinting of summative examinations.[4]

5. Salient Features of the CBME Guidelines[9]

1. **Clearly defined outcomes and competencies:** The curriculum specifies what a graduate must know and be able to know, along with the Knowledge, Skill, Attitude and Communication.
2. **Horizontal and vertical integration:** Teaching the clinical scenario while teaching the pre- or para-clinical subjects helps the graduates to join the lines of teaching efficiently.
3. **Early clinical exposure and skills laboratories:** Students interact with patients from the 1st year under supervision, while simulation (task trainers, manikins, standardised patients) allows safe practice before real encounters. It improves confidence, reduces errors, and normalises feedback. OSCE/OSPE stations are used to assess procedural and communication skills with checklists.
4. **AETCOM (Attitude, ethics and communication):** Besides making better clinicians, the objective is to make more professionals like obtaining informed consent, disclosing errors, respecting diversity,

handling conflicts of interest, and engaging with families. Teaching methods include role-plays, narratives, and ethical case discussions.

5. **Self-directed learning (SDL) and electives:** SDL habits central to lifelong learning. Electives create space for choosing their postgraduate branch and research, innovation.

6. **Mentorship and learning communities**: Formal mentor–mentee pairings provide support, academic advising, and career guidance.

7. **Programmatic assessment:** CBME aggregates multiple low-stakes data points (DOPS, case-based discussion, OSCE, MCQ with item analysis) across time, deliberately sampling the competency domain.

8. **Quality assurance and graduate attributes:**

6. Comparison: Older vs. CBME

The contemporary time-served to competence achieved shapes how content is selected, taught and assessed. In traditional pharmacology, for example, students memorise mechanisms and doses of antihypertensives and reproduce them in essays. In a CBME design, it frames the outcome as 'prescribe and monitor antihypertensives safely in a newly diagnosed adult', requiring students to integrate pathophysiology, shared decision-making, counselling on lifestyle, cost considerations, and follow-up planning. Similarly, communication training in the older model was implicit and opportunistic; CBME renders it explicit, structured and assessable.[4-6]

Table 1: Below mainly differentiates between traditional versus new CBME designs.

Aspect	Traditional System	CBME System
Curriculum philosophy	Discipline and time-based; coverage of content is primary goal.	Outcome and competency based; demonstration of abilities is the goal.
Curricular structure	Minimal integration of clinical subjects with pre and para clinical subjects.	Horizontal & vertical integration across phases.
Learning approach	Teacher centred; didactic lectures dominate; passive learning.	Learner centred; active learning, SDL reflection.
Clinical exposure	Begins after 1 years of basic sciences.	Early clinical exposure from 1st year; simulated practice precedes clinical.
Skills training	Variable training standardisation across colleges.	Skills labs & simulation with checklists; standardised OSCE/OSPE.
Professionalism (AETCOM)	Implicit; rarely taught or assessed explicitly.	Attitude, Ethics & Communication module longitudinally taught and assessed.
Assessment strategy	Predominantly summative; end-of-term written/viva/practical.	Programmatic: frequent formative + workplace-based + summative; blueprinting.
Assessment tools	Long essays, short notes, viva; limited standardisation.	OSCE/OSPE, DOPS, CBD, MCQ with item analysis.
Feedback	Infrequent, often judgmental; limited documentation.	Regular, narrative, actionable feedback; mentoring culture.
Flexibility/electives	Rigid schedules, minimal student choice.	Electives, SDL hours, research/community options; flexibility within guardrails.
Use of technology	Variable AV aids; simulation uncommon.	Technology blended learning encouraged; simulation & virtual cases.
Social accountability	Community postings exist but not well integrated with learning outcomes.	Competencies tied to population needs, primary care, prevention and equity.
Quality assurance	Periodic inspections; focus on inputs (beds, staff).	Alignment to outcomes & graduate attributes; continuous quality improvement.

7. Advantages of CBME Over Traditional Methods[11-13]

1. Holistic competency formation.
2. Clinical readiness and patient safety.
3. Feedback-rich learning.
4. Better alignment with workforce needs.
5. International portability.
6. Professional identity formation.
7. Equity and social accountability.

8. Challenges of CBME Implementation[14,15]

Implementation, not merely an intent, will determine CBME's success. Predictable challenges include:

1. Faculty preparation.
2. Infrastructure requirements.
3. Assessment workload and reliability.
4. Superficial integration.
5. Cultural resistance and change management.
6. Regulatory–institutional alignment. If high-stakes university examinations remain largely recall-based, they can nullify CBME's formative ambitions. Assessment blueprints and external quality assurance are therefore essential.

8. Recommendations to Strengthen CBME in India

1. Scale faculty development with assessment literacy at the core.
2. Invest in learning environments.
3. Implement programmatic assessment with clear blueprints.
4. Make feedback timely, specific and usable.
5. Deepen integration without cognitive overload.
6. Strengthen AETCOM through authentic tasks.
7. Embed community and primary care.
8. Support student well-being and professional identity.
9. Enable educational innovation with governance.
10. Align high-stakes examinations.
11. Data-informed quality improvement.

9. Conclusion

Competency-Based Medical Education is best seen not as a fixed curriculum but as an educational philosophy. It emphasises what truly matters in medical training and teaching with definitive and fixed goals in mind, assessing learners in real-life contexts while offering constructive guidance. India's traditional system brought important strengths, like discipline, strong knowledge foundations, and a spirit of service, that remain valuable. The challenge ahead is to strengthen CBME by investing in three key areas: people (both faculty and students), places (supportive learning environments and communities), and processes (robust assessment and quality assurance). When these elements work in harmony, India can prepare physicians not only clinically skilled but also ethical, reflective, collaborative, and dedicated to equity, doctors who will earn and sustain public trust in a rapidly changing world.

10. Acknowledgement

11. Source of Funding

12. Conflict of Interest

None.

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