

## Competency-Based Medical Education: An Overview and Application in Biochemistry

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### Abstract

Competency-based medical education (CBME) is an approach to ensure that the graduates attain the competencies required to discharge their professional duties as health-care personnel. It de-emphasizes time-based training and promises greater accountability, flexibility, and learner-centeredness. Biochemistry is one of the basic subjects in medical curriculum. The comprehension of medical biochemistry is often considered to be slurred by medical students, may be due to complex chemical structures and complicated metabolic cycles. Competency-based medical education's competencies are so designed to bridge the gap between theoretical aspects with practical clinical skills of medical biochemistry. At the same time, it is applicable to consider the challenges shadowing its implementation.

**Keywords:** National Medical Commission (NMC), Competency-based medical education (CBME), Medical Council of India (MCI).

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### Introduction

The National Medical Commission (NMC) has been constituted by an act of Parliament known as National Medical Commission Act, 2019 which came into force on 25.9.2020 by gazette notification dated 24.9.2020. The Board of Governors in supersession of Medical Council of India constituted under section 3A of the Indian Medical Council Act, 1956 stands dissolved thereafter. The National Medical commission (NMC) is the apex body for establishing standards of medical education. In alignment with the global

movement toward competency-based learning, the MCI had undertaken a comprehensive revision of the undergraduate medical curriculum, after the last amendment done in 1998. The new curriculum titled "Competency Based Undergraduate Curriculum for the Indian Medical Graduate" is being implemented across the country, from the academic year 2019 to 2020[1].

Competency-based medical education (CBME) is an approach to ensure that the graduates attain the competencies required

to discharge their professional duties as health-care personnel. It de-emphasizes time-based training and promises greater accountability, flexibility, and learner-centeredness. This innovative curriculum has introduced many new curricular elements to the existing undergraduate medical training[2].

### **Why need competency-based medical education (CBME)**

The aim of medical education is to train graduates to efficiently take care of the health needs of the society. The past medical education system is based on a curriculum that is subject-centered and time-based. Most evaluations are summative, with little opportunity for feedback. The teaching-learning activities and the assessment methods focus more on knowledge than on attitude and skills. Thus, graduates may have extraordinary knowledge, but may lack the basic laboratory skills required in practice. In addition, they may also lack the soft skills related to communication, doctor-patient relationship, ethics, and professionalism[3].

Competency-based medical education (CBME) has been suggested and tried to work on these concerns. Competency is defined as “the ability to do something successfully and efficiently,” and CBME is an approach to ensure that the graduates develop the competencies required to fulfill the patients’ needs in the society. It de-emphasizes time-based training and promises greater accountability, flexibility, and learner-centeredness. This means that teaching-learning and assessment would focus on the development of competencies and would continue till the desired competency is achieved. The training would continue not for a fixed duration, but till the time the standard of desired competency is attained. Assessments would be frequent and formative in nature, and feedback would be inbuilt in the

process of training. Furthermore, each student would be assessed by a measurable standard which is objective and independent of the performance of other students. Thus, it is an approach in which the focus of teaching-learning and assessment is on real-life medical practice[4].

### **Need of competency-based medical education (CBME) in biochemistry**

Biochemistry is one of the basic subjects in medical curriculum. The comprehension of medical biochemistry is often considered to be slurred by medical students, may be due to complex chemical structures and complicated metabolic cycles.

Some students fail to realize importance of biochemistry in first year of curriculum and do not devote sufficient time to its learning. Experts emphasize importance of understanding the underlying principles and biochemical aspects, which if not learnt would lead to fragmented knowledge on applied clinical aspects. The knowledge of biochemistry is essential in context of disease or medical problem to facilitate their diagnosis and treatment. However, the current teaching-learning methods need to be improved so as to focus on clinically relevant topics and integrate with clinical subjects.

The restructured model of biochemistry curriculum as per CBME make interesting and meaningful subject in medical curriculum. In new curriculum undergraduate medical student in medical biochemistry are following as

- Be able to interpret to laboratory results and correlate with clinical conditions. Describe clinical importance of various serum enzymes as markers of pathological conditions.
- Be able to discuss the regulation, function and integration of carbohydrate, lipid and protein

metabolism along with associated disorders.

- Be able to interpret results of various lab analytes associated with disorders of carbohydrate, lipid and protein metabolism.
- Be able to discuss digestion, absorption and importance of nutrients and disorders associated with nutrition like Protein Energy Malnutrition and obesity.
- Be able to describe biochemical role of vitamins and minerals in the body and explain the manifestations of their deficiency and toxicity.
- Be able to describe the processes involved in maintenance of normal pH and electrolyte balance and interpret the Arterial Blood Gas (ABG) Analysis in various disorders.
- Be able to describe processes involved in genetics.
- Be able to describe the various tumor markers and biochemical basis of cancer therapy.
- Be able to perform and interpret biochemical analysis of urine & CSF
- Be able to describe processes involved in vaccine.

Early Clinical Exposure (ECE) advocated in CBME is another step to rationally link theory of basic science to clinical practice and bridge the gap between these disciplines. ECE is a teaching and learning methodology that emphasizes on exposure of medical students to patients (authentic human contact) in a social or clinical setting as early as in first year of medical college for enhancement of learning of health, disease and role of health professional. ECE in biochemistry should also include interpretation of various lab reports in background of clinical cases. This would enable a better understanding of clinical importance of various biochemical analytes, hormone assays and enzyme markers[5].

### **Pros and cons of competency based medical education:**

The strength of CBME is that it focuses on outcomes. Furthermore, it accepts that each learner is unique and learns at his/her own pace. There seems to be a better scope of teaching the “art” of medicine that includes attitudinal and communication skills and values related to ethics and professionalism. It promises greater accountability because the assessments are very close to what would actually be done in real life situations.

The new curriculum also creates confusion and sense of inadequate arrangement. A study among students and teachers with experience of new implemented new curriculum will be helpful to identify the challenges. Sensitization programs and brainstorming of the stakeholders (students, teachers and administrative authorities) with emphasis on handling of perceived and experienced challenges in Implementation of CBME are required for its smooth conduct. Training of faculty for using the different teaching learning and assessment methods is of utmost importance to make the new CBME a success

### **Conclusion:**

Competency-based medical education's competencies are so designed to bridge the gap between theoretical aspects with practical clinical skills of medical biochemistry. At the same time, it is applicable to consider the challenges shadowing its implementation.

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