

## **COMPETENCY-BASED MEDICAL EDUCATION IN NIGERIA: A MUCH-NEEDED APPROACH FOR UNDERGRADUATE MEDICAL TRAINING**

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### **ABSTRACT**

Competency-based medical education (CBME) is an outcome-based training model that focuses on equipping the graduate with the essential competencies of knowledge, skills and experience that are relevant for producing physicians that are fit-for-practice. This review highlights the essential competency domains during undergraduate medical education as defined by the Association of Medical Schools of Africa (AMSA), TUNING Africa, Makerere University, Uganda and the Core Entrustable Professional Activities for Entering Residency (CEPAER) of the American Medical Colleges. The methods for assessing and ensuring that the desired competencies are achieved are also presented. The last section highlights the factors mitigating against the acquisition of clinical skills by undergraduate medical students and the current efforts by the African Forum for Research, Education and Health to have a Taskforce Working Group to push for the promotion of CBME during medical training.

### **INTRODUCTION**

The World Health Organization in her 2012 publication titled: “Road Map for Scaling Up the Human Resources for Improved Health Service Delivery in the African Region 2012-2025” identified issues and challenges and stated that: “Of the 46 countries in the region, 36 have a critical shortage of HRH [Human Resources for Health] with only about 0.8 Health Professionals (physicians, nurses and midwives) per thousand population; while the minimum acceptable density threshold is 2.3 per thousand population, ....”. Thus, it is imperative to produce more physicians, well trained and assessed in the best traditions of the art and science of medicine for optimal healthcare delivery and administration to the individual and population.

The saying that nothing is permanent in life except change is particularly true with regard to medical education in the aspect of the curriculum contents and the mode of delivery. The traditional medical curriculum

inherited at independence, that placed emphasis on some medical conditions which are peculiar to Europe and North America, but not commonly encountered in the tropical environment, has been largely replaced by new training curricula. The word “decolonization” has crept into the discourse on medical education as a result of this change<sup>1</sup>. New curricula are currently being implemented in many institutions in sub-Saharan Africa (SSA) medical schools. For instance, the University of Ibadan in 2010 approved a revised curriculum tagged: “THE 2010 M.B.,B.S. CURRICULUM: Building Bridges to Produce Tomorrow's Doctors Today - An Integrated, System-based, Person-Centred, Community-oriented, Competency-driven Curriculum”<sup>2</sup>. This curriculum has progressed into becoming the template for medical and dental education in Nigeria<sup>3</sup>. The objective of this presentation is to shed some light on competency-based medical education.

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## **BACKGROUND TO COMPETENCY-BASED MEDICAL EDUCATION**

Africa carries 24% of the global disease burden with only 3% of the world's Health Workforce and less than 1% of the world's financial resources available for health<sup>4</sup>, hence the need to review training of manpower for optimal care in the face of these inequalities. The Survey of Medical Schools in sub-Saharan Africa (SAMSS) in 2011 revealed the deficiencies in training curricula and the narrowness of the methods of teaching which warranted change<sup>5</sup>. The findings included outdated curricula and lack of contemporary methods of teaching in most training institutions. The survey reported that the upheavals at the end of the 20th century had left most African medical schools in disrepair and demoralised, lacking essential infrastructure and depleted of faculty<sup>6</sup>.

There is therefore the need to review how best to utilise the limited available resources and declining manpower for better health provision in these countries. It was noted that modern methods of instruction such as student-centered approach, case-based learning, and integrated learning with early community orientation, team-based learning and competence acquisition were seldom used or non-existent in most of the schools, due to the state of affairs<sup>5</sup>. The report<sup>5</sup> further advised that these modern methods of instruction should be introduced for better and more comprehensive learning experience. The recent wave of migration of trained health personnel to western countries for better professional experience, coupled with economic considerations, has worsened the situation for experienced teachers to disseminate clinical competencies as well as the dearth of medical education departments to drive and sustain the additional requirements for 21<sup>st</sup> century physicians.

## **COMPETENCE DOMAINS**

Competency-based medical education is an outcomes-based approach to the design, implementation, and assessment of medical graduates training programme, which aims to equip the graduate with the contemporary competencies that are relevant for producing physicians that are fit-for-practice.

Competence is the ability to do something repeatedly correctly. For the training of health workers, competence entails the habitual and judicious use of communication, knowledge, technical skills, clinical reasoning, emotions, values, and reflection in daily practice to ensure quality health service for the benefit of the individual and the community.

The Association of Medical Schools of Africa (AMSA) listed competencies as the essential professional duties for a medical graduate in SSA<sup>7</sup>. These include 18 items under 7 domains namely: Basic Patient Care (3 items), Basic Emergency Care (3 items), Basic Administrative and Entrepreneurial skills (4 items), Communication (3 items), Inter-professional activities (1 item), Self-directed learning (2 items) and Social responsibilities (2 items). TUNING Africa, which is one of the key joint initiatives of the African Union and the European Union for harmonizing higher education in Africa<sup>8, 9</sup> categorized the competencies into core generic competencies as well as medicine specific competencies comprising Clinical expertise and knowledge, Community and environmental health, Professionalism, Effective and sensitive communication, Teamwork-leadership-management, Engagement in a “learning journey” or continuing professional development and Adaptability to ICT and new technology<sup>8</sup>. To complete the competency domains from African sources, the listing from Makerere University, Uganda, Africa's oldest university<sup>9</sup> is also cited.

By contrast, the Medical Education Cluster of the Association of American Medical Colleges in November 2013 published the Core Entrustable Professional Activities for Entering Residency (CEPAER)<sup>10</sup>. (Table 1) These are in the following domains: Patient Care, Knowledge for Practice, Practice-Based learning and Improvement, Interpersonal & Communication Skills, Professionalism, Systems-Based Practice, Inter-professional Collaboration and Personal & Professional Development. Table 1 shows the commonalities between the various documents available on competence-based medical education. Whilst knowledge,

clinical care, communication skills, professionalism, continuous professional development are common to all, certain domains were not universal.

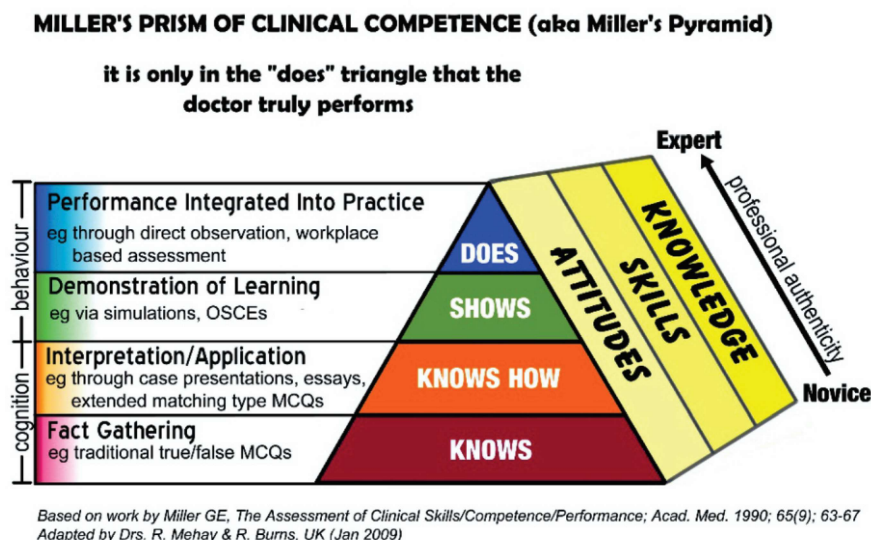
To simplify things, the competencies can be grouped as cognitive, performance-related (skills) and attitudinal. The cognitive domain would include knowledge, continued professional development, self-directed

learning and population health. Clinical practice also involves knowledge but this overlaps with performance. Performance-related competences are communication, basic emergency care, management and clinical expertise. The attitudinal competences are professionalism, team-work and social responsibilities.

**Table 1: Compilation of Competences Domains**

<b>TUNING Africa (8, 9 )</b>	<b>AMSA (7)</b>	<b>Makerere Univ. (10)</b>	<b>CEPAER (11)</b>
Knowledge		Medical knowledge	Knowledge for practice
Community and Environmental health		Population health	
		Critical inquiry and Scientific methods	
Clinical expertise	Basic patient care	Clinical skills and patient care	Patient care System-based practice
	Basic Emergency care		
Effective and Sensitive communication	Communication	Interpersonal and Communication skills	Interpersonal and communication skills
Team work, leadership, management	Basic Management and Entrepreneurial skills	Leadership and Management skills	
Continuous Professional Development; Adaptability to ICT and new technology	Self-directed learning activities	Continuous improvement of care through reflective practice	Practice-based learning and improvement; Personal and Professional development
Professionalism	Inter-professional activities	Professionalism and Ethical Practice	Professionalism; inter - professional collaboration
		Health system management	
	Social responsibilities		

**Figure 1:**  
Miller's Pyramid/Prism of Clinical Competence



- **Knows** : equipped with essential information
- **Knows how**: knows how to apply that knowledge
- **Shows**: shows how to apply that knowledge
- **Does**: actually applies that knowledge in practise

**Assessing competence**

Assessment drives learning is a popular cliché in medical education and what is not assessed is never considered important and may be a shortcoming in acquired competencies for enhanced and qualitative practice. It is therefore important that both formative and summative assessment of competencies should take place. Competent medical graduates should be able to carry out the specific tasks independently upon graduating for appropriate diagnosis and optimal management of patients and community. The CEPAER document placed emphasis on performance metrics whether these roles can be performed as Novice (beginner), Competent (trained and capable) or in Exceptional capacities (expert)<sup>11</sup>. Residents ideally should be exceptional for them to participate in training medical undergraduates. Detailed coverage of the various methods for assessing the various domains is outside the scope of this review but it is essential to recognize the essential roles of the Miller's pyramid in the assessment of training which also evaluates performance metrics.

Miller argued that the traditional assessment of medical competencies relied too much on testing knowledge, and not enough on assessing how the products would behave in a real-life

consultation<sup>12</sup>. Essentially most institutions assess competencies in different ways, however, they meekly comply with the Miller's pyramid.<sup>13</sup> Miller appropriately described the assessment of competencies by a hierarchical means and the model divides the development of clinical competence into four levels. On the lowest level of the pyramid is 'knowledge' which is tested by written examinations and traditional multiple-choice questions (MCQs). The next level stands for 'application of knowledge', assessed by essays, clinical problem-solving exercises and extended MCQs. The third tier of the pyramid represents 'clinical skills competency', assessed by standardized patient exercises, simulations and clinical examinations. Finally, on top of the pyramid is 'clinical performance', assessed by direct observation in real clinical settings. (Figure 1). The lower level processes account for the cognitive components of competence and involves classroom-based assessments, while the two higher tiers of the pyramid account for the behavioural components of clinical competence, which involve assessment in simulated and real clinical settings.<sup>14</sup>

However, suffice it to mention that multiple choice questions (MCQ), essay questions, objective structure clinical examination (OSCE),



360-degree assessment, reflections, direct observation of procedural skills (DOPS), mini-clinical evaluation exercise (Mini-CEX) etc. can be employed as deemed appropriate for the domain being assessed<sup>15</sup>. There is also the concept of deliberate practice and mastery learning proposed by McGaghie and colleagues that individuals that are judged to be incompetent with the performance of certain procedures or tests should be made to undergo retraining and then tested again<sup>16</sup>. Such students should not be allowed to proceed to the next stage of instructions unless they are certified as proficient. This view should be universally accepted by those involved in training.

System-based competence is listed in the CEPAER document, and this would be particularly useful for rotations in the various specialties. For instance, a student rotating through neurology would be expected to focus on localization of lesions within the nervous system based on the clinical features. This would guide the choice of relevant investigations in a cost-effective manner and planning appropriate management. This can be developed for each system to determine the key competencies and how best to assess them.

### **Enhancing Competence**

This should be of interest to anyone involved with CBME. The popular saying that “See one, do one, teach one” is metaphorically appropriate. This is possible through supervised training since medical education is a form of apprenticeship. Proper supervision and encouragement of hands-on training will ensure that necessary skills are acquired and reinforced. Mentoring of trainees will also ensure that this is possible.

The use of manikins for skills acquisition is necessary. This is particularly important with the dearth of patients for teaching and the necessity of covering the syllabus. Various manikins are available ranging from simple ones to more sophisticated computerized models. It would be desirable if funds are provided for the purchase of multi-use manikins for acquiring various clinical signs repeatedly until trainee is proficient and case scenario simulations. Telemedicine is another approach for ensuring that competencies are taught by experts in remote locations, provided internet access is available. Workshops that encourage hands-on skills acquisition are also necessary.

A questionnaire survey of 163 new interns that graduated from 11 medical schools was carried

out at the University of Ilorin Teaching Hospital, Ilorin on proficiency and factors mitigating against clinical skills acquisition during undergraduate education<sup>17</sup>. The authors reported that cannulation, urethral catheterization, digital rectal examination, aseptic gloving, blood transfusion, suturing of wounds and airway suctioning, in that order of frequency were the most common procedures attempted, whilst nasogastric intubation, chest tube insertion and fracture reduction/splinting were less frequently attempted. The mitigating factors were competition between undergraduate and postgraduate trainees on the few available but reluctant patients and inadequate training facilities. The recommendation was the use of simulation for clinical skills acquisition in the face of these challenges.

### **The way forward:**

The Medical Education Partnership Initiative (MEPI) was at the forefront of improving the quantity and quality of medical graduates in Africa between 2011 and 2015 using a grant from the Presidential Emergency Plan for AIDS Research (PEPFAR) of the US government<sup>6</sup>. MEPI had Task Work Groups (TWGs) on various aspects of medical education of which CBME was a major consideration. MEPI then transformed into the African Forum for Research, Education and Health (AFREHealth) which has continued with this quest for excellence in medical education and research. The challenge of ensuring competency-based curriculum is now a continental affair which should be taken seriously. In this regard, the following ideas should be key in advancing CBME:

1. Defining performance metrics for health workers according to training requirements, the needs of patients and society in emergency and day-to-day practice.
2. Categorizing skills to be acquired according to performance level
  - i) Proficiency in procedures and each trainee **MUST BE ABLE TO DO** the following such as basic life support, venepuncture, urethral catheterization, intravenous infusion setting/regulation, fluid aspiration, suturing and uncomplicated deliveries etc.
  - ii) Proficiency in procedures and each candidate **MAY BE ABLE TO DO WITH TIME** such that each trainee can carry out under supervision which include but

not limited to electrocardiography, biopsy, incision and drainage, intubation, fracture reduction, exchange blood transfusion, etc.

iii) Proficiency in procedures restricted only to experts with trainees CAN ASSIST such as major surgery, bouginage, laparoscopy and bronchoscopy.

iv) Each trainee MAY ASSIST in Electives such as Caesarean section, minimally-invasive procedures (ENT, Ophthalmology etc.), mental health assessment skills and research

3. Designing assessment methods (performance metrics)
4. Provision of training opportunities for further acquisition of prerequisite competences.
5. Ensuring compliance with benchmark and international standards.

#### **CONCLUSION:**

CBME and assessment of competence acquisition are considered very essential for ensuring completeness of training with adequate acquisition of skills necessary for optimal health care delivery. In this era of globalization, the products of our medical schools should be competitive by acquiring essential skills<sup>18</sup> that are nationally and globally comparable. CBME is particularly beneficial when there are challenges with trained manpower and facilities for patient assessment. CBME and depth of assessment engender confidence in professional engagements and it is a much-needed method of instruction in undergraduate medical training.

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