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Chapter

Perspective Chapter: Reflection from the Field of Medical Education in the COVID-19 Pandemic—New Strategies and Practices in Achieving Needed Competencies for Students

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Abstract

The COVID-19 issue forced necessary changes in medical education that have been demanding and adjusting for different medical colleges, but they also provide a great opportunity for the betterment and possible challenging and useful transformation of medical education. This chapter examined the responses of medical organizations to this pandemic, its merits, and its challenges. It analyzed the potential effects of new strategies' recognition and application on medical education in the post-COVID-19 period. The status of medical education before COVID-19 and the challenges of adopting competencies have been reviewed. The teaching and assessment strategies innovated in the COVID-19 era and reflections from faculty and students were discussed. Over the previous years, the pandemic has questioned concepts about how medical education should be delivered. The COVID-19 pandemic offers the medical education community a unique chance to reorient itself away from outdated standards and practices and toward more societally responsible and accountable standards and practices. All involved in medical education should all work together to prevent situations from “snapping back” to how they have always been because they were accepted practices and would be lost if the pandemic had the potential to disrupt growth and reform.

Keywords: medical education, post covid, competency, new strategies, societally, accountable standards

1. Introduction

Following the COVID-19 pandemic, several questions arose regarding deliberate and major communal reflection on current and upcoming medical education procedures worldwide. The COVID-19 issue forced necessary changes in medical education that have been demanding and adjusting for different medical colleges,

but they also provide a great opportunity for the betterment and possible challenging and useful transformation of medical education. We will examine the potential effects of new strategies' recognition and application on medical education in the post-COVID-19 period. We will analyze how the appreciation and adoption of new approaches may impact medical education in the post-COVID-19 era. Medical education should not be rigid but rather flexible and, via continual reflection, must be able to respond to social requirements. We will review the status of medical education before COVID-19 and the process of transition from the traditional curriculum to a competency-based one and the challenges of adopting competencies by medical students in teaching and assessment. The teaching and assessment strategies innovated in the COVID-19 era and reflections from faculty and students will also be discussed. The chapter will end with lessons learned and recommendations for both practice and research.

2. Medical education before COVID-19

2.1 Historical perspectives

There are three basic eras of medical education. Prior to Flexner (up until 1910), there was the first one that was based on the master-apprentice paradigm. Principles outlined by Abraham Flexner and William Osler served as the basis for medical education during the Flexner era (1910–1970) [1]. According to Flexner, there needs to be more stress on knowledge in medical education because the master-apprentice paradigm did not produce trained physicians [2]. This lengthy time was defined by a curriculum that included clinical clerkships in the clinical phase and biological science courses in the preclinical phase [3]. With the help of this curriculum, medical schools implemented a discipline-based approach with a rising information load and offered all phases of education in classrooms, laboratories, and university hospitals or institutes of tertiary healthcare [4].

The third phase, which began in the early 1980s, focused on raising the standard of medical education. A significant turning point was reached with the 1993 World Summit on Medical Education recommendations (Global Standards). The Edinburgh Declaration said that the goal of medical school is to prepare doctors to be attentive listeners and observers, skilled communicators, and capable clinicians who strive to enhance everyone's health. The idea of society-based education has emerged, according to which kids should be exposed to health issues as early as their first year of school [5]. Even though medical education has made considerable strides in recent years, there is still potential for upgrades and new ideas to better prepare doctors for societal health [6].

2.2 Medical education trends today: shifting educational paradigms

“Despite being continuously identified, most medical schools have done little to correct the severe problems in the manner they educate their students during the previous 60 years,” [7]. Given the flow of medical information and innovative technologies, as well as the rapidly changing needs of future practice, medical school was soon becoming an ineffective and cruel means of teaching students. This was particularly true given the demanding schedule of lectures on foundation sciences followed by equally demanding clinical teaching courses. Medical educators have frequently

expressed their growing worry about the limitations of traditional medical education over the course of several decades [8].

Three significant difficulties (the “unholy trinity”) of concern have been listed in the reports of the General Medical Council, UK (1993), World Federation for Medical Education [9], and Association of American Medical Colleges [10–12]. This concern included lecture-based instruction, a curriculum that is highly discipline-specific, and education that is highly teacher-centered [13]. The preclinical/clinical division has persisted to this day in many locations, with each course component growing independently of the others. Each component of the course was spread out without the other’s moderating influence or a coordinated analysis of the course’s overall objectives [14]. Medical students were primarily engaged in compartmentalized discipline-specific learning because of being immersed in such an educational environment. As a result, they frequently are deficient in the capability to integrate, assess, and utilize knowledge from various specialties to solve common health problems. Abrahamson (1996), in his authoritative book “Diseases of the Curriculum,” has already thoroughly documented these issues related to the creation and delivery of the medical curriculum. The fundamental criticism of teacher-centered education is that it fosters a culture of authority reliance where teachers determine what, how, and when pupils should learn things. Skills for self-directed learning include the vital requirement for continuous continued self-education, so important to medical practice, is therefore never cultivated and developed in students, and as a result, it is not ingrained in student mindsets and learning attitudes [11].

We can be sure that the physicians of the future will be applying the know-how competencies and utilizing talents that are now unforeseeable given the rate at which the horizons of medical science and technology development. But some elements of modern medicine’s art and science are crucial to its practice and undoubtedly will endure. For the rest, our most excellent bet is to cultivate doctors who can adapt to change, have brains open to new ideas and innovations, and have learning mindsets that encourage continuing education throughout their professional careers [14].

A concern has been being stated that a significant shift in the direction of medical education to make it more relevant to societal requirements is required, inescapable, and urgent [15], with the retention of some of the contemporary art and science of medicine that is important to its practice and will likely endure. Global reforms in medical education typically entail the following paradigm shifts: to interdisciplinary integrated curricula (designed to maximize horizontal and vertical integration of the medical course); to problem-based (or assignment-based) educational approaches that inspire active-interactive learning in small groups; and to more student-centered (learner-centered) and self-directed learning. The SPICES model for curriculum planning also includes a shift from a hospital-based to a community-based, one-size-fits-all obligatory course program to contributions of electives to further reassure self-directed learning, and from an apprenticeship to a more systematic approach to curriculum planning and scheduling. These modifications are in addition to the paradigm shift toward a student-centered, problem-based, integrated curriculum [16].

Significantly reducing the “burden of factual information imposed on students,” enhancing “learning through curiosity, the exploration of knowledge, and the critical evaluation of evidence,” and “ensuring a capacity for critical evaluation of evidence” are just a few of the clear-cut recommendations made by the Education Committee of the General Medical Council of the United Kingdom (1993). These recommendations also included teaching students “attitudes of thought and behavior that befit a doctor... with traits acceptable to his/her future duties to patients, coworkers, and

society in general” and emphasizing “communication skills and the other basics of basic clinical procedure” throughout the course. •The curriculum emphasizes “public health medicine... embracing health,” adjusting clinical teaching “to changing patterns in health care and... provide the experience of primary care and community medical services as well as hospital-based services,” which includes “health promotion and illness prevention, assessment and targeting of population needs, and awareness of environmental and social factors in disease.” [11, 17].

Education in medicine has the potential to be revolutionary [18]. Since delivering a product crucial to individual and societal well-being is the goal of medical education, the educational process itself should not be viewed as a finished product but rather as one that is continually responsive to shifting societal needs [19, 20]. This is because the social community itself is continuously moving under a diversity of demands in knowledge, technology, finances, and societal conditions [21].

2.3 Current trends in medical education: challenges and opportunities

The capacity to design educational activities for the classroom and clinic that maximize learning is necessary for teaching [22]. The teaching abilities of medical professors are, of course, essential to the success of curricular revisions. For our instructors to implement excellent teaching methods that will maximize the educational results of student learning, we must make sure that their teaching skills are constantly improved [23]. The adoption of curriculum changes in medical education will have a substantial impact on the construction and provision of the curriculum, learner assessment, teaching and learning strategies, and competencies achieved by graduates. Given that educators are answerable to all parties involved, it is crucial for medical educators to reevaluate their positions to guarantee that the standards of medical education they deliver can keep up with the escalating needs of medical practice in the new millennium. An academic who merely gives data is not a teacher. A teacher is someone who encourages learning, which leads to lifelong changes in behavior and mental processes [24].

To improve their knowledge of learning theories and the educational process, medical educators must examine their own attitudes, actions, perceptions, and assumptions regarding teaching and learning. It is no longer acceptable to assume that a teacher is competent and effective just based on their subject-matter (content) knowledge. Teachers need to sincerely consider whether they are willing to adjust their beliefs and behaviors to conform to the changing paradigms in education. Teachers must shift from playing the position of the “sage on the stage” to that of the “guide by the side,” facilitating and fostering the thought and learning processes [25]. To enable their students to take greater initiative and responsibility for managing their own learning as well as their own academic and personal growth, teachers must establish partnerships with their students to foster a sense of community and bonding in the classroom. Teachers will need to research the best ways to use technology to improve the learning environment for kids in the digital age. Medical students, patients, and the community will all benefit from the education provided by medical teachers who can effectively blend their subject-matter expertise with sound pedagogical principles. Teachers must therefore do a good job of preparing today’s medical students to become the capable, compassionate physicians of tomorrow.

The future of medical education is uncertain. Although the undergraduate, graduate, and continuing education levels each have their own distinctive characteristics, the similarities among the three levels are particularly telling and serve

as the foundation for making well-informed decisions about the future of medical education. Some of the internal and external difficulties that undergraduate medical education faces are described in [26]. Internal obstacles include a staff whose research is primarily concentrated at the molecular or sub-molecular level, implications of inpatient vs. outpatient teaching, and implications of an emphasis on sickness to the relative exclusion of behavior. The exponential expansion of information-related technological (“disruptive”) developments and societal changes are examples of external forces. In order to overcome these obstacles, the institution must take bold leadership with a view toward the time following 2020, when current matriculants will start their careers. The Accreditation Council for Graduate Medical Education (ACGME) and the American Board of Medical Specialties (ABMS) developed a set of competencies in 1999 in response to criticism of traditional curricula from the public. Competencies are observable qualities that articulate the knowledge understanding, psychomotor skills and beliefs, and attitudes required for graduates to be able to provide healthcare for individuals and societies. These learning outcomes are used by competency-based medical education (CBME) to structure medical curricula and evaluate students’ progress in acquiring these competencies [26, 27].

Competency-based medical education emphasizes skills gained during that time rather than the amount of time spent learning the content. Contrary to the traditional medical curriculum, CBME adopts the Dreyfus model of skill development, which consists of a number of milestones for learners to pass through, starting with novice and ending with master. Every learner will progress at a different rate and may be at a different stage of mastery for various skills. As a result, the precise measurement of competencies through continuous evaluation in CBME acts as a forewarning mechanism that gives feedback to students and enhanced the capability of residency training mentors to identify performing deficiencies in trainees and programs in time for them to address these practice gaps. Clear descriptions of the competencies and the milestones for each competency, precise assessments of learners, and the procedures for evaluating those competencies, and the resources for giving learners feedback to support learners’ progression are necessary for CBME to be successful [27, 28]. In CBME, the assessment of competency serves the dual purpose of identifying what has been learnt as well as what is necessary to pass the following milestone stage. These tests are meant to be formative rather than summative, which means that their purpose is to provide informational feedback to direct a learner’s development. Summative evaluations, on the other hand, are meant to assess current proficiency levels in order to guide grade assignments, rank advancement, or scoring. Miller’s pyramid represents various levels of assessment in which lower-level talents lay the groundwork for increasingly difficult tasks [29]. When examining the obstacles to the implementation of CBME and how to overcome them in 2022, Jayson M. Stoffman focused on three major themes: the value of stakeholder and administration engagement, the significance of supervisors and resident training for the specific duties and necessities of CBME, and the application of the necessary educational and technological strategies for this novel training model [30, 31].

2.4 The world before COVID-19: CBME prior to the pandemic

A competent person is one who “possesses the required abilities in all domains in a specific situation at a defined stage of medical education or practice,” according to Michael S. Ryan et al. (29). The variety of abilities across different areas or dimensions of physician performance in a specific environment, competence is multidimensional

and dynamic, is how competence is defined. It alters with passing years, experience, and situations. Historically, “time-in-seat” has been used as a subpar but workable and practical proxy to assess trainee competence. Contrarily, CBME places more obvious stress on a learner’s capabilities as the result of their training. To describe how CBME is implemented effectively, consensus recommendations on the concept of CBME, efficient techniques for assessment, essential elements to build CBME courses, and the function of instruction in promoting physician development are needed [32].

The terminology used to discuss curriculum and assessment procedures is distinct. This includes words like “competencies,” “milestones,” and “entrustable professional activities (EPAs)” which are similar but distinct. While milestones represent the progressive stages that doctors advance through within a specific competency in description terms, competencies illustrate the skills and qualities of physicians. EPAs adopt a slightly different perspective; they discuss the job done by doctors. Eight CBME frameworks have been quickly embraced and adopted, but there have still been several noteworthy difficulties. A CBME model is for assessment calls for a variety of techniques, assessors, rater selection and training, psychometrics, and group-based decision-making. The deficiency of funding for medical education and research, the dependance on expectable numbers of residents and fellows to encounter patient care needs, controlling supplies for the profession, and complacency on the part of educational leaders and healthcare systems are additional problems along with assessment-related challenges. While there has been significant progress toward realizing CBME in the months and years leading up to COVID-19, much more work is still needed [33].

3. Consequence of COVID-19 on medical education: what happened and what are the reflections

The COVID-19 outbreak has resulted in the tragic loss of human life, enormous economic effects, and widespread societal unrest. The global response, changes, and changes prompted by the COVID-19 pandemic will undoubtedly serve as a milestone of the twenty-first century. Many nations instituted harsh lockdowns, effectively preventing everyday human interaction, in order to slow the virus’ spread. While no sector remained untouched, the global educational system saw well over a billion children barred from traditional classroom settings [34]. The epidemic has brought about and hastened new development and established a necessary change culture in all facets of education. Accepted and widely used methodology in teaching, learning, and assessment have been called into question, and despite their longevity and perceived significance, they have been replaced by cutting-edge online teaching and assessment techniques [35].

The shift to a range of online learning modalities from largely in-person lectures, tutorials, skill building, and clinical experiences was highlighted as a significant transition in medical education. E-learning, which is defined as the delivery of educational experiences via the internet, has been examined as a useful teaching method for the medical field for more than 20 years [36].

The transition to online learning presented significant challenges for medical schools to guarantee an effective learning setting for medical students by accentuating tech-based instruction, counseling, inspiring, and encouraging feedback from medical students as well as supporting medical instructors in adjusting to the new environment [37, 38]. Medical students are often able to acquire online distance

education (ODE) through one of two main systems: asynchronous (recorded) distance education (such as podcasting and recorded lectures) or synchronous (live) distance learning (such as video conferences and virtual classrooms) [39]. One of the new prototypes is the “flipped classroom.” It is a hybrid learning approach that combines an asynchronous component that enables medical students more scheduling flexibility with a synchronous component that facilitates interaction between medical students and faculty members [11, 40].

Exams for medical students were another aspect of medical education influenced by the COVID-19 epidemic [41]. In various countries, clinical and written tests have been canceled, postponed, delayed, or replaced with online exams or other evaluation methodologies [41]. Universities and educators had to respond to the new reality of the pandemic, which sparked a debate between open book examinations (OBEs) and closed book exams (CBEs) (CBEs). Due to their complementing advantages, OBEs and CBEs can both share a blended assessment system. This pandemic’s changes present a crucial chance to test different approaches to medical education and assessment [42].

More significant was the change affecting CBME undergraduate training in medicine, in a way that implies support for the CBME model [32]. The LCME specifically emphasized that the main factor determining a learner’s preparedness for advancement was the learner’s fulfillment of programming objectives [43]. Medical schools were able to concentrate on achieving competency but even despite this, the LCME has continued to support objectives rather than rotating duties in its support of curricula and evaluation frameworks that are outcomes-based. The requirement to convert from conventional face-to-face education to alternative modalities like virtual simulation or telemedicine is another issue that is relevant to CBME. These pandemic-inspired instructional innovations may ultimately turn out to be advantageous in the long run. For instance, there is a large amount of academic research supporting the idea that learners might benefit from performing patient care tasks in a simulated venue before delivering real patient care. This has been demonstrated in healthcare practice, using task trainers that follow procedures and simulation-based training for high-risk circumstances like codes. This raises the issue of whether students of medicine and other health professions should first prove their proficiency in a virtual setting before moving on to actual practice. The impact on testing and grading is one indirect effect of CBME models. Anecdotally, several schools reported that when National Board of Medical Examiners subject exams were given prior to the beginning of the clinical immersion phase, students’ performance on them was comparable or, in some cases, even improved. Additionally, because there was little time for observation, medical schools had to deal with the problem of grading. This led to the conversion of many to a pass/fail scoring system for advancement. Collectively, these difficulties caused individuals involved in medical education to re-evaluate advancement ideology and evaluation grading [44].

Milestones 2.0, the new milestones that the ACGME first announced in 2018 and have continued to release over the previous 4 years, are what first signaled the advancement of CBME in GME. Traditional training methodologies that mainly relied on progress occurring based on amounts of time spent and number of cases/clinical situations were questioned because of COVID-19. The American Board of Medical Specialties and the ACGME both responded by issuing guidelines that emphasized the importance of competency attainment by laying out the minimal standards for competency-based assessments necessary to make “defensible, high-stakes entrustment” decisions for specific learners [45]. Clinical competency committees (CCCs) were urged to assess each learner’s current competence and work with them to develop a

personalized learning plan to fill in any gaps [46]. The COVID-19 disruptions provided brand-new opportunities for in-person evaluation of residents and fellows. During the pandemic, interprofessional and interdisciplinary teamwork grew, creating novel and more regular opportunities for multisource assessment and feedback (i.e., 360-degree evaluation) [47]. Additionally, fresh windows of observation, like telehealth, opened up. Finally, out of need, fellows and residents were given more authority with supervision titrated to entrust ability for particular duties, including letting fellows temporarily assume the position of attending in their primary field of study [48]. The pandemic increased the CCC's significance for programmatic assessment as well. The crucial function of the CCC was fortunately supported by a body of research on group dynamics and the usage of CCCs in GME, which was formalized in the summer of 2020 with the publication of the third edition of the Clinical Competency Committee Guidebook. The complete impact of the adjustments to the assessment inputs used by the CCC to make developmental judgments is not yet understood [49].

The UME-to-GME transition is the other significant pandemic-related disturbance. While some specializations offered “boot camps,” in most cases, there was no systematic “warm” handoff from UME to GME. Both the class of 2020 and, possibly more so, the class of 2021 encountered difficulties because of this gap. By the time the pandemic-related interruptions occurred in 2020, graduating students had finished most of their training; many students in the class of 2021, however, witnessed a decrease in clinical experiences, notably in electives. The American Association of Colleges of Osteopathic Medicine, AAMC, ACGME, and ECFMG developed a toolkit in response to these significant concerns of the 2021 transition to provide support and supplies for learners and educational program managers [17].

3.1 Expected developments on medical educations

The forced changes brought on by the pandemic crisis were difficult, but they also represented a huge opportunity to pause and consider the area of medical education's future in depth and reflection [33]. The purpose of medical education, the competencies that must be attained, the methods of delivery, and the characteristics of students and graduates are the four main subjects that merit reflection.

3.1.1 The purpose of medical education

Within the confines of a controlled healthcare workforce equation, the healthcare system and medical education programs are intricately linked and frequently reliant on patient care revenues. Because clinical services account for a sizable percentage of an academic center's revenue in many countries, its teaching emphasis are likely to be geared toward cost-effective preventative care for society rather than specialized expert treatment for individuals who can provide it in tertiary hospitals [50]. It is time to question our reliance on this paradigm of educational and healthcare delivery given the public health constraints and inequity issues it has brought to light and to consider alternate futures. Academic institutions and the healthcare industry should work together to reimagine the healthcare system such that it rewards public health and preventative care rather than focusing solely on diagnosing and treating terminal illnesses. For this health-based strategy to be promoted, community involvement is essential. The widespread adoption of telemedicine, which was prompted by social pressure to distance patients from their doctors, presents a chance to enhance preventative care, patient well-being, and health at a reduced societal net cost [51, 52].

Patient-physician communication could increase if doctor visits are quicker and less time-consuming for patients. This would free up more time for discussion of common behaviorally modifiable preventive health issues like diabetes, hypertension, and weight management [53]. All medical students in today's medical education must complete years of general training before concentrating on a specialization. Many students may feel the necessity to select a specialty based on higher fee and the related business system where disease creates cash to offset the cost of medical training. The maintained dependency between healthcare business delivery sectors and medical education should be disrupted to address this systemic issue. This would promote progress toward a more equitable system of medical education and service delivery.

3.1.2 The competencies to be attained

The pandemic has revealed that many medical schools are incapable of producing clinicians who can respond to areas at increased risk of negative effects. The substance of medical curriculum must be radically altered to meet societal demands and fill the gap revealed by recent occurrences. Three aspects that need be addressed for this move toward community and public health are disaster management, social accountability and complexity, and the ability to handle uncertainty through a range of paradigms. The pandemic demonstrates that the elegance of each specialization restricts the fundamental and universal functions and scope of medicine and is driven more by self-interest than by societal demands and excellent quality [54]. Although skilled in their fields, doctors find it difficult to act as a generalist during an epidemic. The irony of specialization is that it may leave the public's basic and general needs unmet. It would seem essential for medical schools to collaborate with local organizations and learn how they might support projects and improvement plans. Medical colleges must make sure that their graduates have the professional and social skills required to be accountable to the populations with the highest requirements and possess the resources needed to minimize inequalities in advance of pandemics or other catastrophic situations [55]. The epidemic has served as a reminder of the nature of uncertainty in the practice of medicine and the need for a variety of paradigms. In addition to pharmacological and extirpative methods, medical students' toolkits should be expanded by investigating paradigms that increase their ability to adapt in uncertain situations with strategies that promote holistic wellness and help navigate uncertainty [56].

3.1.3 The approach

To modify the way medical education is given examining how teachers instruct and how successful the existing delivery mechanism is crucial. Community-based learning and open-lens medical education are two important lessons that can be drawn from the outbreak. Instead of just denoting the transfer of the curriculum to a virtual environment, the recent move to online learning in preclinical medical education opens the door to open-lens medical education [57]. There are essential medical principles that all medical students should understand, as a result, preclinical medical education should move toward "open" learning that is shared outside the bounds of specific medical schools. Institutional collaboration in order to curate new information and provide an organized, standardized, and shared curriculum of fundamental medical knowledge for all medical schools may result in the emergence of a new paradigm toward a lean medical education structure for preclinical medical education, including some of its interprofessional components. This cutting-edge medical

education strategy would increase accessibility for all students and demonopolize preclinical instruction without respect for socioeconomic class [58].

3.1.4 Characteristics of undergraduates and graduates

If social accountability is a goal that should be pursued in medical education, then the method of instruction should be in line with the context of the goal. Medical schools must prepare doctors for their future environments, including those that go beyond the confines of the lecture hall and the clinic. It is interesting to note that there is a trend to question the conventional idea of “learner-only” student activity, which is motivated by the necessity to deal with the current pandemic. The Medical Schools Council in the UK has published extremely precise guidelines outlining the function of medical students who volunteer at work [59].

The epidemic is making it more difficult for students to distinguish between practicing to learn and learning to practice in medical schooling. Medical educators should be able to manage this conflict in the future both pedagogically and socially. The practice of medicine is governed by a social compact that calls for both scientific expertise and professional ethics. Future doctors should be chosen by medical schools if they are ready to accept the professional obligations required in underserved and varied populations, especially in times of emergency. Choosing a different labor force with strong internal enthusiasm rather than an external drive, a highly developed idea of social accountability rather than personally engaged attainment, and the ability to comprehend and communicate with diverse communities will help achieve this. The qualities that should be prioritized for such a workforce are probably different from those from the past [60].

3.1.5 Blind areas in competency-based medical education that COVID-19 has brought to light

The pandemic amply illustrated the need for ongoing assessment development. We must move more quickly to measure skills like professionalism, interdisciplinary coordination, quality improvement and patient safety, care coordination, and cost sensitivity. In many GME programs, these competencies are still not frequently evaluated, let alone taught [61]. We must then reevaluate end-of-rotation testing. The future of medical education will better support learner growth and evaluate the caliber of our training programs by combining assessment for learning and coaching technologies. At the same time, we must make investments in reliable systems for training faculty. Progress testing, which evaluates developmental progression across training years, has been introduced by medical educators; this may be valuable [62]. To facilitate a more organized, effective transition, work is needed to achieve a more significant alignment of evaluation methods between UME and GME. We lack a true continuum of medical education, and the UME, GME, and continuing medical education all operate under different accrediting bodies, with various standards and methods for implementation and competency assessment. These discrepancies are the root of the detrimental effects on patient care to address these issues, and creative systems are required. Both intern boot camps and capstone courses for medical schools have proved effective. Others have strengthened feedforward operations across and within settings, or they have experimented “warm handoffs” between UME and GME leaders [40]. The integration of coaching programs along the continuum from UME to GME may be one of the other models [63].

Following our experience with the COVID-19 pandemic and the tensions contained within the questions, Michael S. Ryan et al. (REF) suggested some significant

CBME-related questions that stay for the medical education group and suggested recommendations to advance CBME [63]. Is broad-based training best or specialty-centered training better? Although basic and comprehensive knowledge may be applicable throughout contexts and specialties, it might not be as useful in the course of daily work. How do we bargain over trainees' service and learning needs is the second query? Dedication to meeting customer demands validates the trainee's worth and offers a real apprenticeship experience with increasing responsibilities. However, relying too heavily on the trainee to execute tasks they are underqualified to do could compromise patient care and reduce other learning chances for a well-rounded education. Is using rotating models to demonstrate proficiency effective? is the third query [64].

While longitudinal approaches encourage earned trainee autonomy and the development of relationships between trainee, patient, and supervisor, rotational (i.e., block) rotations give scheduling convenience and the chance for exposure to diverse professions. Can the student drive their own learning? is the fourth query. Learner-centered curriculum is better for developing skills and knowledge, but they are challenging to standardize and use. Is it possible to advance beyond time-based advancement? is a different query. A competency-based model frequently views time variability as essential, but in actuality, incorporating it may be difficult. What are our financial limits for promoting CBME? Although some may counter that there has already been considerable investment in a medical education system that has not produced the required outcomes, CBME is an expensive proposition. To obtain desired results, it is necessary to think about whether existing resources should be relocated and better aligned. In response to these queries, several suggestions have been made. General physician competencies should be covered in training by all levels of medical educators. Leadership in the health systems should offer just-in-time training for competencies and entrustable professional tasks required in emergency settings. We should work to strike a balance between classroom instruction and hands-on experience (sometimes known as "service"). The patient care responsibilities of learners should be such that they advance their learning and enable involvement with different educational and multimodal learning methodologies. Leaders in medical education should look for chances to expand and further analyze longitudinal rotations. In order to assist the development of competence, coaching programs should be designed throughout the educational continuum. They provide a chance to embrace learner centeredness. Medical education should make use of individualized, trainee-led learning programs as a common practice. Promotion at your current position (with improved and progressed responsibility) presents a chance to advance in a temporally varied manner [11, 32, 35, 64].

Educational leaders must engage with accreditors, licensing authorities, and credentialing organizations to eliminate structural barriers to a time-variable program of growth across the continuum and stimulate progress. Additional funding is undoubtedly required to support programs for faculty/learner development, assessment, and curriculum creation in order to achieve CBME. The most effective use of money should be prioritized in medical education. Educational leaders should work together to exchange novel ideas and successful strategies [11, 32, 35, 64].

4. Situation analysis: egypt as an example

4.1 Recent efforts of reform of medical education in Egypt

From early 2015, the national Committee of the medical studies in the Supreme Council of Egyptian Universities (SCU) has started a plan for medical education

development at its three levels: undergraduate, medical internship, and postgraduate phases. The main target is to achieve a shift to competency-based education and training. Egyptian reform efforts for undergraduate medical education are as follows:

Several national committees for reform of undergraduate medical education program representing national and international medical education experts, deans of medical schools, members from supreme council of Egyptian university hospitals, ministry of health leaders, medical syndicate leaders, and other stakeholders have been assigned for this task and started their work June 2016 till now. Most of the medical schools in Egypt delivered a traditional Flexnerian undergraduate medical education program for a long period of time. The notion of reforming the conventional program was seriously considered in response to major circumstantial changes and the WFME 2015 recommendations.

A comprehensive context evaluation was conducted to explore the challenges of the traditional program from the stakeholders' perspective, evaluating the quality of the traditional program in graduates' perceptions, and assessing the educational environment from the students' perspectives using focus group discussions with the deans and vice deans of all medical schools, as well as a questionnaire for a representative sample of students. A road plan and medical education methods applicable to the country in changing situations have been accepted, such that medical education is innovative and capable of preparing students to function in a changing medical science setting and to implement quick answers and offer a framework for a new curriculum to be adopted by all medical schools. This included incorporating newer teaching elements into the undergraduate course, such as the introduction of a foundation course after admission to effectively prepare a student to study medicine; facilitation of horizontal, vertical, and spiral integration between different disciplines; advocating for early clinical exposure beginning in the first year (viz. case scenarios for classroom discussion/case-based learning); and encouraging the student doctor method of clinical comprehensive training and learning.

An awareness campaign started in first trimester of the academic year 2016/2017. All governmental, Al-Azhar, and private medical schools all over Egypt at that time were included. The awareness package was delivered to the stallholders in each school including students and recent graduates, and their reflection was reported through focus group discussions. A Google form web-based questionnaire was disseminated to all medical schools to get their feedback regarding the challenges of implementation of the new program. A final collective report was prepared for all visits and presented to SCU. The report emphasized the needs for reform and adoption of new curriculum including active learning and competency-based assessment strategies and elaborated the medical schools' recommendations regarding its implementation.

A series of meetings and focus group discussions were made between reform committees, the head of the medical studies committee, and the secretary general of the SCU and the relevant ministers to propose the frame work for the reform and the required changes in the laws and bylaws so that the period of undergraduate studies for the medical school in Egypt should be 5-year integrated program using credit points or hours followed by 2 foundation years and a license exam before starting the medical profession. The supreme council of universities approved that the new program should be implemented by all medical schools at the academic year 2018/2019.

Two documents stating a framework for preparing the bylaws and curriculum maps were prepared by and issued to all schools from the SCU. There was a continuous communication with the curriculum committees in each medical school during its

work on bylaws and map to be ready for the approval of the new reform. A workshop was conducted at January 2018 by the SCU and involved all high education ministry leaders and academic leaders of each medical school to present and discuss each curriculum map. Before the start of the academic year 2018/2019, all medical school's bylaws were approved by the high authority.

A technical support has been provided to all medical schools in their process of reform by helping them in designing their own curriculum according to the standards. A series of workshops under the title of excellence in medical education were conducted by Medical Military Academy in collaboration with EKB, where international medical education experts were invited to raise the capabilities of the curriculum committee's members of all medical schools regarding the integrated program. These workshops were considered a TOT for continuing training of all involved faculty in all schools. Each medical school started its own faculty capacity building with the support of RUMP members. Upon RUMP recommendation, this is a continuous process targeting to train 90% staff members.

In September 2018, the curriculum model was approved. This featured horizontal and vertical content integration, new examination processes that replaced departmental oral tests with integrated examinations, the addition of an orientation module, a greater clinical orientation beginning in the first semester, and additional optional components. The new block and vertical line components (mainly organ/function modules lasting 3–6 weeks supplemented with semester-vertical courses) were introduced in the curriculum. A curriculum plan detailed the sequencing and duration of each component, as well as the number of credits. Following an application procedure, each medical school picked coordinators for all modules of the new curriculum. These coordinators were in charge of assembling an interdisciplinary planning committee of at least six individuals, comprising academics from both nonclinical and clinical topics. These planning teams were tasked with determining the content of their module as well as the relevant learning strategies.

A thorough, multi-component monitoring system for the entire program has been devised. The framework envisions the program's quality as consisting of four major components: curriculum and resources; personnel and teaching; student experience; and management support. The adopted audit's key principles include the belief that both student and staff experiences provide valuable information; that evaluation of teaching, learning, and assessment methods is required; that action after evaluation is critical (closing the loop); that strategies and processes must be continuous rather than episodic; and that evaluation should be used to recognize, report on, and reward excellence in teaching. Teachers, course coordinators, and administrators were involved in the evaluation and improvement activities. Three monitoring visits were conducted; twice in the first year of implementation/once per semester and the last one was conducted within the first term of the academic year 2020/2021. The later visit was laying stress on the period following the evolving COVID-19 pandemic. Because of the COVID-19 lockdown, auditing was hanged last academic year. In each auditing visit, two assigned members have to visit the school. An external auditing checklist is fulfilled by the assigned audit members and included in a final report. Expert in the field may share in the auditing visit whenever needed. Also, a questionnaire link is sent to students and staff members in each medical school to get their feedback regarding the proper implementation of the new program. Analysis of results and recommendations are documented, and a final collective report is presented to medical sector committee – SCU. Each school report is endorsed by the Medical Sector Committee of SCU and sent to the school dean for corrective action plan.

More than 1 year ago, several actions have been done to prepare for the new Egyptian National Compulsory Medical Internship 2-year program through joint cooperation between Egyptian supreme council of universities (SUC)/committee of medical studies, Compulsory Egyptian Medical Training Authority (CEMTA), and Egyptian supreme council of university hospitals. Representatives from these organizations finally issued a specification of the program and provide guide to implementation. The program is an essential requirement for being licensed as medical practitioner in Egypt. The program is competency based using entrustable professional activities, blended learning, and assessment mainly workplace-based. Roles and expectations of interns have been illustrated, and processes and tools are to support the implementation. It aims to facilitate interns, their educators and supervisors, and directors of the program in each school in building valuable workplace learning, teaching, and assessment experiences in 2 years. The program is specified to support safe, effective patient care and promote the establishment of a culture of lifelong learning and reflection among interns. A training program is currently in process to qualify the trainers from all accredited training hospitals to ensure proper implementation.

Postgraduate Medical Education in Egypt is defined as the phase in which doctors train under supervision toward independent practice after completion of their basic medical qualification and internship compulsory training years. It comprises professional training, specialist and subspecialist training, and other formalized training programs. Upon completion of a formal postgraduate training program, a degree is usually granted. However, there were variations in the programs and degrees given in this phase essentially between universities and ministry of health. There were no standards to specify the broad components in the structure, process, and outcome of postgraduate medical education. Two major steps have been done recently to reform postgraduate medical education in Egypt. The first is a national law setting the establishment of the Egyptian health council that governs all postgraduate and continuing medical education for all graduates of health schools including medical ones. The second step is to establish standards for the creation and design of postgraduate medical (board) curriculum. These requirements demand that curricula specify high-level generic, shared, and specialty-specific outcomes, identify common areas of training, and place a higher emphasis on the generic professional competencies shared by all doctors. Each clinical specialty committee must explain and provide evidence to demonstrate how these criteria and requirements were handled in the design and implementation of the proposed curriculum. A curriculum must cover several interdependent variables in order to be useful, including clinical safety, anticipated levels of performance, standard maintenance, patient expectations, equity and diversity needs, strategic workforce challenges, and operational and professional viewpoints.

4.2 The reaction to COVID-19 in Egypt

Through a survey and focus group discussion, a 2020 study in Egypt investigated how medical schools in Egypt responded to the COVID-19 epidemic in terms of teaching, learning, and evaluation for undergraduate students [64]. Increased understanding and utilization of currently accessible technology in medical education has been one of the most important responses to the epidemic. This study found that universities' ability to respond to COVID-19 effects was fairly acceptable, with an emphasis on six imperatives: establishing multilevel contingency plans, leadership support, staff preparedness, infrastructure, technology, and multidisciplinary collaboration. Collaboration across disciplines is to create or carry out tasks. Difficulties

were evident in schools that had never utilized an LMS previously and had no prior experience. But finally, since they were obligated to, the majority of the personnel and all students were participating. Furthermore, about half of the survey participants (50%, 39/78) indicated that faculty engagement in various educational activities was appropriate. Academic professors and tutors play an important role in guiding and assisting with this shift. However, it has been acknowledged that changes and advancements in medical education place additional strain on faculty [64].

4.3 Challenges and opportunities

Some points cannot be dismissed as challenges that must be addressed. Staff capacity building needs additional attention now that the environment is set for innovation and validation of the use of online learning that arose during the epidemic. Communication between decision-makers, staff, and students has been highlighted as a critical success element for the Medical Education transformation [65, 66]. When making decisions that impact the learning process, national decision-makers must recognize and consider the unique nature of Medical Educational Institutes. They must also consult medical school management and major national entities in the judgments they make. “COVID-19 is an eye-opening experience,” which assisted us in identifying our areas of strength and weakness. Despite the time constraints, it enabled us to employ our full potential to develop new teaching abilities, produce online learning materials, and sustain the learning process. However, our capabilities were not completely utilized since we lost contact with students and decision-makers, resulting in a different unique circumstance in each institute. COVID-19 was such a beneficial experience that there would have been no fundamental shift in medical education without it. Employees would not expand their talents or apply what they were learning. Some flaws would be concealed [67].

5. The way forward: summary and recommendations

COVID-19 aided to spark the fire for medical education reform in Egypt and throughout the world. Online learning has been integrated into the curriculum in such a way that it may account for 20–30% of the curriculum, particularly in the early years of medical education. It is critical to encourage engagement in online learning and to offer students with the information, skills, and attitude required for successful online learning. This might help pupils prepare for comparable scenarios or future emergencies. On the staff side, significant faculty development through training on various kinds of online and electronic assessment, such as online MCQs and open book examinations, was strongly recommended [68]. Furthermore, clinical clerkship evaluation modes such as virtual OSCE, virtual VIVA, and virtual patients were used. To create rapport and trust, open genuine and regular lines of communication are needed between students, faculty, and decision-makers. Mentorship would aid in the development of these channels. Increased efforts should be made to change student attitudes. However, the number of students in each faculty may be a significant difficulty that must be addressed in the future. Finally, national entities should create a road map/action plan that includes student union bodies. This route plan should be shared with higher-ups and decision-makers. More focus should be made on leveraging national governmental agencies to help professors and curriculum. This can be accomplished by formalizing their function in medical education. Medical Education departments and units must develop a rapid reaction plan for future management

of unforeseen incidents, which must include a viable communication strategy that begins with a stakeholder analysis [69, 70]. The supreme council of universities took action through its medical sector to support the teaching and training of primary healthcare and family medicine in the undergraduate curriculum and, more importantly, in the mandatory foundation training for all medical school graduates.

6. Summary and conclusion

Medicine is always a “child of her age” in terms of social, scientific, and service constructs. The epidemic has called into question how medical education should be given in prior years. Everyone participating in medical education has a responsibility to take use of this opportunity to promote medicine and its worth to society while also engaging in self-reflection that has the potential to transform lives. The COVID-19 epidemic provides a rare opportunity for the medical education sector to reposition itself away from obsolete standards and procedures and toward more societally responsible and accountable standards and practices. We should all work together to prevent situations from “snapping back” to how they have always been because they were accepted practices and would be lost if the pandemic had the potential to disrupt growth and reform.

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