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Health Professions Education 4 (2018) 236–244

www.elsevier.com/locate/hpe

Medical Education in Egypt: Historical Background, Current Status, and Challenges

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Received 13 December 2017; accepted 29 December 2017
Available online 9 January 2018

Abstract

Background: From its beginnings in 1827, an important goal of medical education in Egypt has been to qualify physicians who can provide high-quality health care services for their local community and other communities in the Middle East region.
Objective and method: To describe the historical background, current status, and future challenges of medical education in Egypt, the authors conducted an extensive internet search, and made electronic communications as well as site visits to gather relevant data. In the final phase, the authors organized and interpreted their data with emphasis on the historical background, features of the curricula, practices of quality, and accreditation, as well as the challenges encountered. The authors collected data from 27 medical schools, all of which are supervised by Egypt's Supreme Council of Universities.
Results: The findings showed that the undergraduate programs (UGMEs) of medical schools in Egypt can be broken down into three categories reflecting the status of reform: innovative, traditional, or in transition. Areas of reform have included the main features of curriculum, teaching and learning methods, and assessment tools. Postgraduate studies in medicine (PGSM) in Egypt take place under two systems: the academic system, offered by universities, and the professional Fellowship of Egyptian Board (FEB) program, offered by the Ministry of Health. There are many initiatives to establish a national regulatory system for continuing medical education, but none of these initiatives is yet well established.
Conclusion: While UGME reform in Egypt is progressing, improvements are still required in both PGSM and CME.

Keywords: Egypt; Undergraduate medical education; Postgraduate medical education; Continuous medical education; Education reform

1. Introduction

Approximately 30% of Egyptians between 17 and 24 years of age attend university. Currently, nationwide, there are 25 public universities, 51 public non-university

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Peer review under responsibility of AMEEMR: the Association for Medical Education in the Eastern Mediterranean Region

https://doi.org/10.1016/j.hpe.2017.12.007

higher education institutions, 20 private universities, and 86 other private higher education institutions.[1] Two Egyptian universities also have branches in other Arab countries, and there is a considerable number of Egyptian faculty members working for other universities in the region.[2]

The modern history of Egyptian medical education begins in 1827, when Kasr Al-Ainy was established as a military teaching hospital in Abu Zaabal, to the northeast of Cairo.[3] The second medical school was established 115 years later, in 1942, at Alexandria; the third, Ain Shams, to the east of Cairo, in 1947, and the fourth, in Assiut, in the east of Egypt, in 1960. Since then, other medical schools have been established, mostly dependent on those first four schools for faculty and curricula.[3–5] Until the mid-1970s, there were only nine medical schools in Egypt, almost all of which followed discipline-based curricula. This changed with the tenth school to be established, in 1978, the Faculty of Medicine at Suez Canal University (FOM-SCU), in Ismailia, in the northeast of Egypt. Its curriculum development process was guided by the recommendations of a national symposium on innovation in medical education held in Al-Fayoum, southeast of Cairo, at the beginning of that year.[6,7] The first two private medical schools were established in 1996; however, due to concerns about the quality of clinical teaching and training of interns, it took an additional 20 years to establish the third private medical school, which opened in 2016[7] (Table 1).

In the last two decades, international medical education has been experiencing a range of challenges and changes that have called for significant reforms; for example, globalization, and advances in information technology, best evidence, evidence-based practice, quality practices and quality assurance, and accreditation.[8] In view of these challenges and changes, and the lack of published data on medical education in Egypt, we attempted to document the current situation of medical education in the country. Our ultimate goal was to provide a comprehensive case study to all stakeholders, including decision-makers, educators, scholars, and students.[9]

Data were gathered in two main phases. The first phase comprised an online literature search using relevant keywords in English and Arabic. The main search engines used were Google, Google Scholar, and PubMed. The second phase comprised communication with most Egyptian medical schools through a variety of means, including site visits. Then, to support the data obtained, we undertook an extensive documentation review of bylaws of and self-studies conducted by Egyptian medical schools. We also utilized data available from the Egyptian Central Agency for Public Mobilization and Statistics (CAPMS) and the Egyptian Medical Syndicate (EMS). We organized and discussed the data obtained under three main categories: undergraduate, postgraduate, and continuing medical education. We gathered information on logistical, curricular, quality, and accreditation issues.

Table 1
Medical schools, years of establishment, and state of recognition by the World Directory of Medical Schools.

No.	University/school name	City	Foundation year
1	Cairo *	Cairo	1827
2	Alexandria *	Alexandria	1942
3	Ain Shams*	Cairo	1947
4	Assiut *	Assiut	1960
5	Al Azhar (for males) *	Cairo	1961
6	Mansoura *	Mansoura	1962
7	Tanta *	Tanta	1962
8	Al Azhar (for females)	Cairo	1964
9	Zagazig	Zagazig	1970
10	Benha *	Benha	1978
11	Suez Canal *	Ismailia	1978
12	Minia *	Minia	1984
13	Menoufia* *	Shebeen Elkoum	1984
14	Al Azhar (for males in Assiut) *	Assiut	1984
15	Sohag *	Sohag	1992
16	Beni Suef *	Beni Suef	1996
17	Misr for Science & Technology *	October 6th	1996
18	October 6th *	October 6th	1996
19	Al Azhar Damietta, males *	Damietta	2001
20	Fayoum *	Fayoum	2005
21	South Valley *	Qena	2006
22	Portsaid	Portsaid	2013
23	Aswan	Aswan	2013
24	Helwan	Cairo	2015
25	Kafrelsheikh	Kafrelsheikh	2015
26	Suez **	Suez	2015
27	New Giza	October 6th	2016

*Included in the World Directory of Medical Schools, last updated June 25, 2015.

**First students' admission will be in the academic year 2018-2019.

2. Undergraduate medical education (UGME)

2.1. Admissions

Currently, admission to Egyptian higher education institutions, including medical schools, is managed centrally by a national coordination office. Students submit their credentials electronically, and are then

Table 2
Criteria and conditions for admission to Egyptian medical schools.

I. **Governmental medical schools:**

- Graduation from the sciences' track in an Egyptian high school or an equivalent degree.
- High school grand total compatible with the indicated minimum score for admission.
- Fees are indicated for non-Egyptian nationals.
- Fees are indicated for both Egyptians and non-Egyptians for enrollment in the innovative programs of schools adopting parallel tracks.

II. **Al-Azhar medical schools**

- Graduation from the sciences' track of Al-Azhar high schools.
- High-school grand total compatible with the indicated minimum score for admission to Al-Azhar medical schools.
- There are distinct schools for each gender.

III. **Private medical schools**

- Graduation from a high school sciences' track, either general or Al-Azahr or an equivalent degree.
- High-school grand total compatible with the indicated minimum score for admission to the private medical schools.
- Fees are indicated for both Egyptian and non-Egyptian students.

distributed amongst different institutions based on their order of preference and their high school grades. The criteria and regulations for admission of Egyptian students to public medical schools, Al-Azhar medical schools, and private schools vary. Foreign students can attend medical schools in Egypt, with some extra regulations (Table 2).[10]

The criteria for admission to medical schools in Egypt are similar in that high school final examination scores are the principal determinant, a situation that dates to 1887.[11]

The male-to-female ratio for admission and graduation is almost balanced, with an average of 10,000 physicians graduating annually from Egyptian medical schools.[12]

2.2. Educational programs

To date, Egyptian medical schools have followed the French model, comprising a six-year program of undergraduate medical education. This system features a clear preclinical–clinical dichotomy, and (in Egypt) takes English as the language of instruction. A Bachelor of Medicine and Surgery (MBBCh) is awarded upon graduation, but graduates must attend a full-year internship program before obtaining their license to practice as general practioners.[13]

Before 2009, the majority of medical schools in Egypt adopted *discipline-based curricula*, in which didactic large-group lectures and apprenticeship approaches to clinical teaching were the main methods of instruction. An exception was FOM-SCU, which since its establishment has applied an integrated curriculum that features innovative instructional methods, including simulation, early clinical exposure, and project-based learning, in addition to problem-based learning (PBL) and community-based education (CBE).[6] The PBL parallel track at Al-Mansoura Faculty of Medicine began in 2006, the integrated curriculum at Alexandria Faculty of Medicine in 2009, the modular parallel track at Ain Shams University in 2014, and the Integrated Program of Kasr Al-Ainy (IPKA) in 2015; all of these are alternative models using student-centered teaching approaches (Table 3).[14]

In view of these facts, the current spectrum of educational programs in Egyptian medical schools can be perceived as undergoing a gradual shift toward integration, student-centeredness, and early clinical exposure. This transition, which is indicated by the ongoing process of academic accreditation, is meant to test the implications of new approaches on a small scale first and to allow time for gradual capacity-building and overcoming any expected resistance.[7]

Almost all medical schools in Egypt have well-established teaching hospitals, and most confine the clinical training of students to these hospitals. However, a small number of schools use Ministry of Health hospitals or other health provision outlets affiliated with governmental or non-governmental agencies.[15]

2.3. Student assessment

Each medical school designs its own system for assessment according to its internal bylaws. In common and despite these variations; formative-type assessment, standard-settings, blueprinting, planning of test specifications, and upholding other quality standards in assessment are adopted as recommended by the National Authority for Quality Assurance and Accreditation in Education (NAQAAE).[18]

Innovative schools or programs tend to use assessment tools that match their educational approaches. For example, self- and peer-evaluation, direct observation, and quizzes may be used for formative assessment. For summative assessment, scenario-based multiple-choice questions (MCQs), triple-jump exams (TJEs), and

Table 3
Types/main features of the undergraduate curricula in Egyptian medical schools.

No.	University/School	Programs	Main Features of the Undergraduate Program
1	Cairo (Kasr Al-Ainy)	2	-Main program: discipline-based -New Integrated Program of Kasr Al-Ainy (IPKA): integrated modular-based
2	Alexandria	1	-Integrated modular-based
3	Ain Shams	2	-Main program: discipline-based -New parallel program: integrated modular-based
4	Assiut	1	-Discipline-based
5	Al-Azhar (for males)	1	-Discipline-based
6	Mansoura	2	-Main program: discipline-based -New parallel program: Mansoura-Manchester (PBL)
7	Tanta	1	-Discipline-based
8	Al Azhar (for females)	1	-Discipline-based
9	Zagazig	1	-Hybrid, mainly discipline-based with a few modules of an integrated nature
10	Benha	1	-Discipline-based
11	Suez Canal	1	-Integrated PBL/community-based/student-centered
12	Minia	1	-Discipline-based
13	Menoufia [a]	2	-Discipline-based
14	Al Azhar (for males) Assiut	1	-Discipline-based
15	Sohag	1	-Discipline-based
16	Beni Suif	1	-Discipline-based
17	Misr for Sciences & Technology (private)	1	-Discipline-based
18	October 6th (private)	1	-Discipline-based
19	Al Azhar (for males) Damietta	1	-Discipline-based
20	Fayoum	1	-Discipline-based
21	South Valley	1	-Discipline-based
22	Portsaid	1	-Integrated PBL/community-based/student-centered
23	Aswan	1	-Discipline-based
24	Helwan	1	-Integrated modular-based/clinical presentation-based
25	Kafrelsheikh	1	-Discipline-based
26	Suez	1	-Integrated PBL/competency-based
27	New Giza (private)	1	-Integrated modular-based

[a]Formal approval has been given to start a new parallel integrated program.

modified essay questions (MEQs), amongst other ordinary question types, are utilized.[19]

For assessment in clinical teaching, most medical schools use conventional long and short case examinations as well as the traditional oral examination (the viva). Several schools have introduced modifications to improve the effectiveness of these conventional methods of assessment.[19] Despite its history going back to the 1970s, the objective structured clinical examination (OSCE) is still in the process of being adopted on a wide scale in Egyptian medical schools[21]; it is now practiced in most, to varying degrees and with varying approaches.[21]

2.4. Quality and accreditation

"Quality culture" was introduced to the Egyptian higher education community in 2004 with the inauguration of the National Quality Assurance and Accreditation Project (QAAP). The main goal of the QAAP was to plan for the establishment of a national system for quality assurance and accreditation in higher education.[23] In 2006, the NAQAAE was established, previous to which Egyptian higher education institutes, including medical schools, had required no accreditation.[23,24]

Following the endorsement of the National Academic Reference Standards (NARS) for medicine in 2009, medical education institutions were mandated to develop internal quality assurance systems and to apply for accreditation within five to ten years.[25] In response, all Egyptian medical schools are now engaged in ensuring quality and obtaining national accreditation or preparing for re-accreditation. Many medical schools have been accredited, and four school have already been re-accredited.[25]

2.5. Challenges

The most important challenges facing Egyptian UGMEs are large numbers of students in some medical schools, particularly those established before 1970s, limited financial resources, lack of a sustainable financial policy, inadequate infrastructure, limited efforts to ensure that the number and competencies of graduates meet community and labor market needs, lack of interest of some staff in engaging in faculty development activities, and the brain drain of Egyptian medical faculty members to other countries.[16] The current moves to establish new public medical schools, support the private sector to make more investment in medical education, and allocate funding to educational enhancement projects may all help to overcome these challenges.[17,18]

3. Postgraduate medical education (PGSM)

3.1. Admission

Upon graduation, approximately 20% of Egyptian medical bachelor's graduates go on to training programs to obtain graduate degrees and, majoring in a certain specialty; the remaining 80% go directly on to practice as general practitioners.[28]

In Egypt, there are two main pathways to pursue postgraduate study in medicine (PGSM). The first is the academic pathway, leading to a scientific degree (MSc. or PhD.).[26] The second is the Fellowship of the Egyptian Board (FEB) program, leading to membership of the national board of medical specializations. The former is under the auspices of the universities, while the latter is a professional training program coordinated by the Ministry of Health.[27]

The procedures of the academic PGSM are regulated by the higher education *Unified Law No. 49* (1972); each university also has additional regulations (Table 4). In general, registered students must attend at least 75% of the allocated practical activities and provide evidence of continuity and progress in their professional practice. Additionally, students registered for masters' or doctoral degrees must write and defend a research thesis. Finally, all students must undertake summative assessment, usually comprising written, practical, and clinical parts.[26]

The FEB training program lasts between three and seven years, depending on specialty, and graduates are granted a professional degree. No research thesis is required for the FEB degree.[27]

Table 4
Outlines of the general rules for submitting to postgraduate studies in Egypt [a].

I. **To apply to an academic program, the applicant must have:**

- graduated with the minimum grade of "Good" (for holders of MBBCh) to apply for a Master's degree.
- completed a Master's program in the same specialty with the minimum grade of "Good" to apply for the Doctorate degree.
- obtained the TOFEL or IELTS and ICDL certificates with predefined standards.
- had experience working in the same specialty.
- The following documents are usually required:
  - a support letter from his/her employer.
  - a formal statement that s/he is not registered in any other graduate programs.

II. **To apply to an FEB program, the applicant must have:**

- completed the compulsory service (maximum of two years).
- spent at least six months in a relevant residency program.
- the approval of his employer for registration in the program.
- a proof of non-registration in any other graduate programs.
- a vacant place for study in the relevant program.
- obtained the TOEFL with a score of 500 or more.
- passed an exam in basic skills of Internet, Word, and PowerPoint.
- a certificate in the general specialty before applying for any subspecialty.

N.B. Registration for a subspecialty requires obtaining a higher degree in the general discipline relevant to the required subspecialty.

[a]These are just outlines for the application rules. There are some other details, exceptions or regulations for each university or FEB program.

The beneficiaries of the academic PGSM system are university hospital residents, Ministry of Health residents, and residents working in hospitals associated with other agencies. University hospital residents must pursue academic PGSM as a requirement for academic faculty status, although they do not necessarily go on to be academic faculty after obtaining their academic degrees. Since the inauguration of the FEB in 1998, the number of graduates from it has been increasing annually.[29]

3.2. Educational program

In the past, unstructured or opportunistic training used to be a major problem in academic PGSM. With the recent advent of greater concern with quality and accreditation, many initiatives have been implemented to overcome this problem.[31] Examples of these initiatives include the introduction of supervised

clinical training, logbooks, and portfolios. However, a large proportion of programs still adopt the classic "learning by doing" or "apprenticeship" models as their main teaching/learning approaches.[16]

The academic PGSM follows one of two systems. The first is the conventional contact-hour system, which requires physical attendance at indicated activities at a university hospital, a minimum number of study years, passing examinations (mostly in two parts administered at different times), and finally conducting and defending a research thesis. The other system is the credit-hour system, in which the graduate undertakes and is examined in a group of courses, and also conducts and defends a thesis. The academic supervisor is an integral component of the credit-hour system.[32] There are very few blended learning programs (where distance learning is used in addition to face-to-face learning) in PGSM.[32]

Clinical training in the FEB is conducted in training centers accredited by the FEB council. Training of fellows must be supervised by one or more consultants or professors in the same training specialty. Education is conducted as in-job training using a variety of instructional methods, such as lectures, small-group discussions, and library activities.[27]

3.3. Student assessment

Student assessment in PGSM is nearly the same across different universities. Assessment consists of written, oral, and practical components. Written assessment usually occurs in the form of traditional long essays and MCQs. Oral examinations are an integral part of assessment in PGSM. Practical assessment usually takes the form of short and long case examinations. A few medical schools use the OSCE in practical assessment. Conducting and defending a research thesis is a requirement for a PGSM degree from any Egyptian university.

Assessment in the FEB is conducted mainly as workplace-based assessment (WPBA). Examples of WPBA tools are the Mini-Clinical Evaluation Exercise (Mini-CEX) and procedure-based assessment (PBA). Other common exam formats include written exams, the OSCE, and portfolios.[33]

Fellows of the FEB should undertake a supervised audit project during their training. Though it does not necessarily need to be published, this project must be reported to a specialized committee for evaluation before the final examination.[34]

3.4. Medical education as a postgraduate specialty

Medical pedagogy is increasingly acknowledged as a specialty in medical schools.[35,36] The functions of a medical education department include research, teaching, and career development of staff.[36]

In Egypt, the first academic department for medical education was established at Suez Canal Faculty of Medicine in 2001.[7] Another department was established in 2009 at Alexandria University.[7] In 2016, The Egyptian Society for Medical Education (ESME), a national scientific NGO, was formally inaugurated in Ismailia to oversee the opportunities and challenges facing the specialty of medical pedagogy in Egypt.[7]

3.5. Quality assurance

The quality of academic PGSM is managed by internal quality assurance units in the different medical schools, conducted in the same manner as undergraduate education. Quality monitoring and accreditation of these programs is done by NAQAAE based on the national academic reference standards.[25]

Each medical school runs one educational program, of which the PGSM is considered an extension. Accordingly, there is no separate accreditation for the PGSM in isolation from the institution (Table 5).

Accreditation of FEB programs began simultaneously at the international and national levels. Since 2009, at least eight programs have been accredited by international bodies (Table 5). In 2014, NAQAAE and the Egyptian Ministry of Health agreed upon the review and accreditation of five FEB programs as an initial phase of national accreditation.[27]

3.6. Challenges

There are a number of challenges facing PGSM in Egypt. One is limited training capacity, which precludes the accommodation of all eligible program applicants. Aggravating factors include the deficient infrastructure and lack of financial support by health care institutions for affiliated physicians to pursue PGSM.[37] Another major challenge is the opportunistic curricular process used to complete assigned rotations. Moreover, assessment may be knowledge based, with assessment of skills acquisition and professional behaviors coming only later.[37]

As a requirement of national accreditation, medical education institutions are mandated to develop research needs assessments and identify priority health problems. These priority health problems should be

Table 5
National and international initiatives for accreditation of the FEB programs.

Year	Accrediting body	Targeted FEB Program
2009	The Royal College of General Practitioners (RCGPs)	• Family Medicine
2010	The Royal College of Emergency Medicine (RCEM)[a]	• Emergency Medicine
2012	The Royal College of Surgeons in Ireland	• Otorhinolaryngology • Ophthalmology • General Surgery • Orthopedics and Trauma
2013	The Royal College of Surgeons in Ireland (RCSI)	• Urology and Renal Surgery • Cardiac Surgery
2014–2016	National Quality Assurance and Accreditation Agency (NQAAA), Egypt [b]	• Health Management • Blood Transfusion • Pediatrics and Neonatology • Infection control • Applied Clinical Epidemiology • Anesthesiology

[a]Not fully accredited yet but the program has been recognized as a regional center of RCEM examinations.
[b]Accreditation of these programs is in process. It is planned to implement these programs within three years. The anesthesiology program received a pilot visit.

targeted by graduate research theses. However, most of the research theses conducted within the requirements of PGSM are not based on such needs assessment plans.[18–38]

In addition, to date, the distribution of physicians to different specialties has not matched the requirements of the health system; only a very small number of applicants are enrolled in specialties for which there is desperate need, such as family medicine, public health, and emergency medicine.[37]

Finally, the emigration of both qualified trainers and graduates is an important challenge facing PGSM.

Expanding the FEB programs to incorporate more specialties and to accommodate more students around the country could help overcome some of these challenges, reducing pressure on universities and offering an opportunity for professional training of doctors that is relevant to the needs of the health labor market.[39]

4. Continuing medical education (CME)

Continuing education is the continuous process of acquiring new knowledge and skills throughout one's professional life.[40] In countries where relevant systems are well established, continuing medical education (CME) is a customary prerequisite for the licensing, specialization, promotion, or re-licensing of medical doctors.[40]

In Egypt, before 2017, there was no regulatory system for accreditation of CME activities or their providers. After completion of the requirements of the MBBCh or a higher degree, graduates used to submit their credentials to the Egyptian Medical Syndicate to obtain a professional title. The assigned title is usually based only on the graduation credentials and the years of experience after obtaining the degree.[41] Based on the same criteria, a lifelong license to practice medicine is awarded by the Ministry of Health.[42]

There have been a few initiatives to establish centers for the provision of CME activities in Egypt.[43] However, these providing centers have been working without the umbrella of a national regulatory system, which has been the main challenge for CME in Egypt.[34] This has changed with the formal inauguration of the Egyptian Authority for Compulsory Training of Doctors, in 2017, which is expected to address most of the challenges of CME in Egypt. According to its founding declaration, this authority will have three main functions: provision of CME activities, accreditation of CME centers, and endorsement of obtained CME credits, with subsequent award of licenses to practice medicine.[44]

5. Conclusion

Egypt has one of the oldest medical education systems in the Middle East and Africa. With the exception of four older schools, the current spectrum of undergraduate educational programs can be perceived as being mid-transition to more integrated, student-centered, and community-oriented models. It is clear that individual medical schools have made and continue to make changes, exerting great efforts to achieve this transition at the level of UGME; however, more efforts are still needed in this regard for enhancement of PGSM and CME.

The lack of financial resources and the brain drain of trained personnel are among the main challenges facing medical education at the different levels.

Structuring training and assessment strategies in the academic path of PGSM, and the creation of a national system or agency for CME, would overcome most of the challenges at these two levels of medical education.

Limitations of this work include the lack of available data about Egyptian medical education institutions, whether in published research or in documents or on websites released by universities themselves. Often, institutional data -like number of admissions, graduates, male to female ratios and available resources- did not differentiate medical school data from those for higher education in general. To compensate for this deficiency, site visits and extensive communications were required. However, there was difficulty visiting all the medical schools in Egypt, which are distributed over a wide geographical area. When visited, some of the noted innovations in these medical schools are individual rather than institutional initiatives. Further research work is required to provide evidence of the success of these initiatives. Using the different available means of communication provided a partial solution and enabled us to obtain the needed data.

Acknowledgments

We would like to thank Editage (www.editage.com) for English language editing.

Formatting of funding sources

This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

Other disclosures

None.

Disclosure of ethical approval

N/A.

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