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Original Research Article

The Medical Community Perspectives Regarding the Egyptian Medical License Exam: Mixed-Method Study

Running Head: Roadmap for EMLE 2023

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Abstract:

Background: Although National Licensing Examinations (NLEs) may be a costly process, they can predict better performance for many following years. The current licensing requirements will not entail and new requirements will be requested. Therefore, this study suggests a framework for the development of the Medical Licensing Exam through exploring the opinions of the Egyptian medical practitioners and educators regarding the exam format and criteria. **Objective and methods:** to describe the needed steps to develop the EMLE through a two-phase exploratory mixed-method study that had been conducted among the Egyptian medical sectors: medical practitioners and educators. **Results:** There were 50 clinical and academic educators shared in the online discussion about EMLE development. Then, a survey was carried out on 266 participants with various working places in which 198 of the participants were staff in the Higher Education Ministry and 68 physicians in the Ministry of Health. The input from both had contributed to the development of the following framework that is divided into two main sections; the Exam Logistics and the Exam Set up. The exam Logistics included the exam committee, prerequisites for the exam, the admission criteria and fees, and validity of the license. While the Exam Set up included exam setting, structure, standard-setting, pass marks, and reset policy. **Conclusion:** A Multidisciplinary team resources for the exam setting. Fairness and objectivity were highlighted through several factors; development of the exam blueprint, types of assessment methods, post-exam analysis, and standard-setting. Finally, the reset policy, fees and validity of the license were recommended with a student-centered perspective was suggested for the exam committee.

Keywords: National Licensing Exam, EMLE Framework, Exam Logistics, Exam Set up, Egypt

Introduction:

In response to the increased demand of social accountability over the last 20 years, many countries showed more tendency towards improving medical regulations. This in turn aroused the need for extensive examinations to assure that minimum standards for competent medical graduates are being met. [1] This is being coupled with increased mobility of medical professionals, and the

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dependence of some countries on international medical graduates. [2] Furthermore, it has been recorded that many professionals cross the borders to get a chance to become physicians at more lenient settings. [3] All these factors highlight the importance to adapt licensing procedures to ensure professionals' quality, patients' safety, and public trust maintenance. One of the main methods to ensure healthcare providers' quality, adhere to regulations, and meet optimum care standards is to apply licensing procedures on all future physicians. Although they may be costly, there is extensive literature about their ability to predict better performance of healthcare professionals, for many following years. NLEs could screen doctors with poor performance, improve their competencies, which consequently enhance medical education standards, quality, and guarantee patients' safety.[3]

Many economical, political, and socio-demographic factors affect the regulation and licensing of novice doctors causing variation from one country to another. [4] The available literature captured four essential different approaches to licensing examinations that range from an approach where all prospective doctors are required to pass the exam to an approach where no NLEs were in operation. [2] That is being said, there are common criteria that are reported for the majority of licensing exams. These include; (i) meeting educational requirements from a nationally accredited medical school, (ii) completing supervised and authorized clinical training period, (iii) ensuring candidates' competency, and finally (iv) passing National Licensing Exams (NLEs). [3]

In Egypt, the Egyptian Medical Syndicate (EMS), and the Ministry of Health and Population (MOHP) regulate the registration and licensing of physicians. [5] Medical students who successfully complete their six years of medical education and one year as house officers are granted the Bachelor of Medicine and Surgery (M.B.B.Ch). This allows the graduates to register, obtain their license, and become general practitioners. [6] There is no NLE in operation despite a large number of Medical schools, different curriculum approaches, instructional and assessment methods. However, the absence of NLE in Egypt is compensated by the implementation of accreditation schemes to ensure a high quality of education. Still, the accreditation standards are not obligatory. Even if they are encouraged, many are still in progress to get accreditation. [7]

There are many challenges that impact the quality of medical education in Egypt. For instance, there is lack of infrastructure capacities and financial resources allocated for medical schools [8-10], in addition, there is a yearly increase in the number of Egyptian medical students,

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which implicates class density, interaction with teachers, and their peers. [11] Although there is a high number of registered medical practitioners, many of them work in different countries resulting in the continuous insufficiency of well-trained physicians in Egypt, which in turn creates a vicious cycle. [12] This cycle aggregates with increased needs to improve medical education quality, ensure practitioners' competency, and meet the demands of establishing new medical schools. Currently, Egypt has 29 undergraduate medical education programs, with a sharp increase in private schools in the past years. [13] Thus, reforming the medical education in Egypt is being reformed currently by stakeholders, which focuses on unifying outcomes, using integrated curricula, early exposure of the students to clinical education, and adopting innovative teaching and assessment methods.[6] The newly developed Egyptian undergraduate medical education curriculum named '5+2' changes the duration of study to obtain a bachelor's degree (MBBCh) to five years (2 preclinical + 3 clinical) based on the credit hours or points system. Then, spending two years of supervised clinical practice followed by a medical licensing exam to get their license.[14]

A proposal for the Egyptian Medical Licensing Exam (EMLE) came to light in 2019, it was planned to be implemented this year 2020 as a pilot for all graduates of medical schools across Egypt, yet implementation was delayed, probably due to the COVID-19 pandemic. In case of the application of the Egyptian licensing exam, which is supposed to be issued by the year 2023, with the graduation of the first batch of the new medical education curriculum (5+2). It would be helpful to have a picture how the Egyptian medical practitioners and educators imagine or view the national licensing exam. Therefore, this study presents a framework for the EMLE through exploring the opinions of the Egyptian medical practitioners and educators regarding the exam format and criteria. Until the time of this research, it is the first study done in Egypt exploring the planning of the National Medical Licensing Exams. It will also be of help for other international health systems that are willing to implement a medical licensing exam, especially those of a similar educational strategy.

Material and methods

Study design

A two-phase exploratory mixed-method study had been conducted among the Egyptian medical sectors including both medical practitioners and educators as shown in Figure 1.

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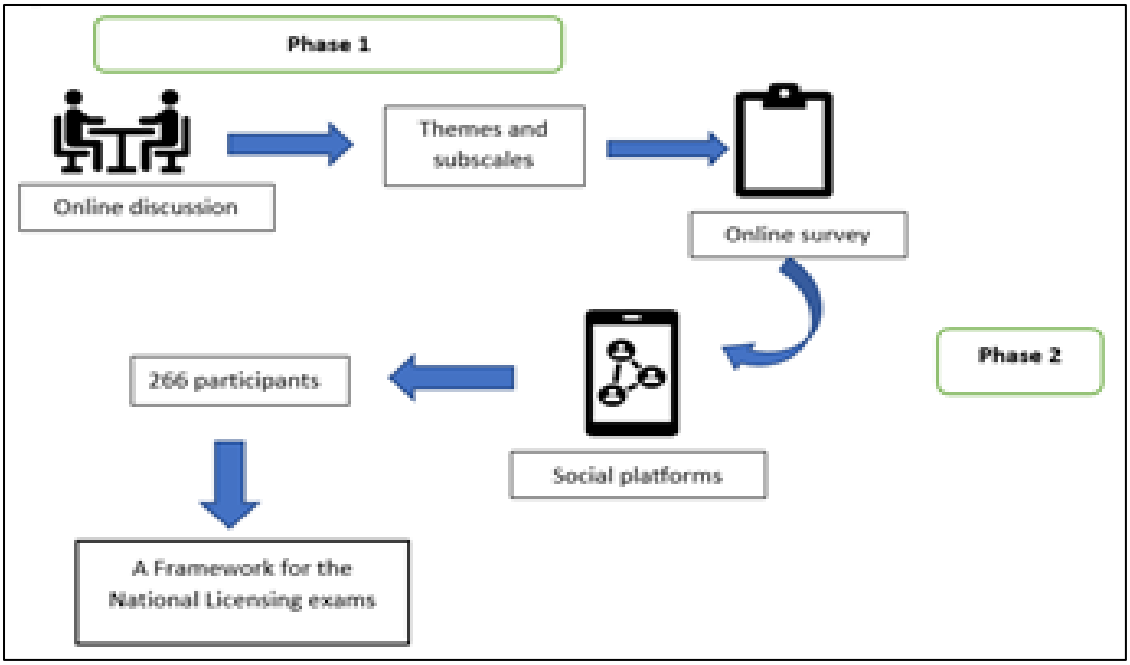

Figure 1. A Conceptual Model for the Study Phases

Phase one:

Context

The researchers constitute one of the learning groups of an online program of health professions education in Egypt. The program has a group-based learning component, where each selects a health profession education theme, and facilitates a critical discussion to present, learn, reflect, and contribute to building a base of in-depth knowledge supported by evidence, among their peers. The study team opted to utilize this activity in order to (i), explore the opinions of health profession education fellows and faculty members with respect to the purpose, context, preparation, and implementation of EMLE, in addition to (ii) design a survey tool to engage with Egyptian medical professionals, academic and clinical educators to explore their perceptions and opinions towards the EMLE.

Participants

Fifty participants responded to the discussion forum. Participants were fellows and faculty members in the online program. They varied in gender, specialty, academic rank, working place

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and residence; in and outside Egypt. Most of the participants responded at least once during the discussion.

Method

An online semi-structured discussion was moderated by the researchers. It was conducted using Google groups and sequential email threads. The researchers prepared the discussion guide including the objectives, questions, case scenarios, responsible facilitators, and the time frame for each objective. Each objective had a corresponding set of questions and prompts. The preparation was based on a review of the literature of medical licensing exams, which guided the objectives and discussion guide preparation. The objectives of the discussion included exploring and critiquing participants' opinions towards EMLE regarding the criteria for development and admission, assessment methods, implementation, and certification/licensing requirements. The discussion was carried out over two weeks during February, 2020. The discussion threads had reached 196 unique individual responses. According to the time frame of the discussion, the participants' responses were analyzed then summarized.

Analysis

The participants' responses of the discussion were analyzed thematically, and in part, contributed to the design of the survey and its sections as appears in their description in the second phase. Other findings are integrated into the results section.

Phase Two:

Method

Based on the results of the analyzed responses of the online discussion, an online survey was developed. It aimed to explore the opinions on a wider scale of medical educators, academics, and practitioners regarding the EMLE. The survey was composed of 17 MCQ items within four sections; participants' characteristics, EMLE admission criteria, the exam structure, and the medical license renewal process.

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The survey was sent to 10 medical education experts at the Medical Education Department, Suez Canal University (MED-SCU) for revision and piloting. The final version of the online survey was prepared and distributed, using an online platform Google forms (Appendix 1).

Eligibility criteria

Participants had to satisfy two criteria. The survey was open to participants who were (i) medical academics or professionals, and (ii) Egyptians. Participants were excluded if they were students, from other health professions, or non-Egyptian nationals. There was no exclusion based on expertise, rank, affiliation, or place of work, whether in the country nor abroad.

Recruitment and survey implementation

The survey was disseminated through various social media platforms to reach wide sectors of the medical community. The online mode was the most convenient method during the COVID-19 pandemic. These platforms included official, non-official groups, and web pages that had members from different groups of the Egyptian medical field workers. Participants joined the study on a rolling basis over a month duration, March 2020. The Egyptian Medical community was invited to participate and share their point of view in this study. A consecutive non-probability sample of 266 participants of the Egyptian Medical educators and practitioners responded to the online survey. The use of various social media platforms contributed to an equal chance for different Egyptian Medical educators and practitioners to be included in the sample.

Statistical analysis

The collected data was coded and analyzed using Statistical Package for Social Science (version 27, SPSS Inc., Chicago, IL). The results of the descriptive analysis were presented by calculating frequencies and percentages. Furthermore, bivariate analysis using a Pearson Chi-Square correlation test was used to compare differences in certain selected outcomes among groups of participants according to their affiliation and specialties. The results were considered statistically significant when P-value $\leq .05$.

Ethical Considerations:

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Ethical clearance for the study was obtained from the Faculty of Medicine Suze Canal University Research and Ethics Committee (FOMSCU 4317/2020). Data collection was done in accordance with the Helsinki Declaration.[15] All the participants were all informed about the purpose of the study and their right to refuse participation. Ethical conduct was maintained during data collection and throughout the research process. Participation in the study was voluntary and the confidentiality of the participants was maintained as the questionnaire was provided anonymously. Each participant had the right to withdraw from the study at any point without any consequences.

Results

Who are the participants?

An online discussion was prepared and conducted by the researchers, there were 50 participants (clinical and academic educators) shared in this discussion. Then, a survey was carried out on 266 participants with various working places in which 198 of the participants were staff in the Higher Education Ministry and 68 physicians in the Ministry of Health. The study participants varied according to their professional rank as shown in Table 1, the most shared professional rank were the assistant, associate, and full Professors 123 (46.2%). The study sample of both survey and the discussion covered 17 Egyptian medical universities; 15 public and 2 private schools.

Table (1) Characteristics of Survey Participants *(N = 266)*

	n (%) *
Affiliation	
University staff	198 (74.4)
Ministry of Health staff	68 (25.6)
Specialty**	
Academic	78 (30.6)
Clinical	177 (69.4)
Rank	
Assistant, associate and full Professors	123 (46.2)
Lecturers, assistant lecturers and demonstrators	75 (28.2)
Consultants	16 (6.0)
Specialists and commissioned doctors	52 (19.5)

Discrepancies in total number are attributed to missing values
* N=255

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Regarding the different specialties represented in the current study, clinical educators and practitioners showed the greatest contribution 177 (69.4%) while the academic educators represented 78 (30.6%) including 20 (7.5%) who purely specialized in medical education. Wide range of clinical disciplines were represented as 13 Internal Medicine subspecialties, 10 surgical subspecialties and 3 Basic science subspecialties.

The participants have highlighted the need for establishment of licensing exams for the Egyptian Medical graduates and a clinical educator mentioned that "*from my own point of view establishment of Egyptian Medical licensing Exam (EMLE) that assess the performances of the medical graduate is an urgent need, so it is applied on a wide scale in different countries worldwide".* An academic educator added that *"Application of this system serves the different dimensions such as; internationalization of the medical education (Globalization and cross border education), better opportunities for accreditation, and preparation of the medical graduates for the interconnected world*".

Another clinical educator mentioned that *"I think there are two important points that are driving forces for the establishment of licensing exams for the graduates of the new Egyptian Medical curriculum (5+2). Firstly, the increased number of medical schools in Egypt to ensure high-quality graduating medical students. Secondly, the use of a standardized exam will ensure that any medical graduate in Egypt has achieved at least common standards of medical knowledge and clinical skills".* And another academic educator added that *"It will ensure that minimal standards are met and will maintain the high reputation of Egyptian-trained physicians"*

What is the framework?

The aim of the study was to develop a roadmap or framework for the development of the EMLE exam through exploring the medical community opinion regarding the exam format and criteria. The input from the online discussion and the survey had contributed in the development of the following framework that is divided into two main themes A) The Exam Logistics and B) The Exam Set up as shown in Figure 2.

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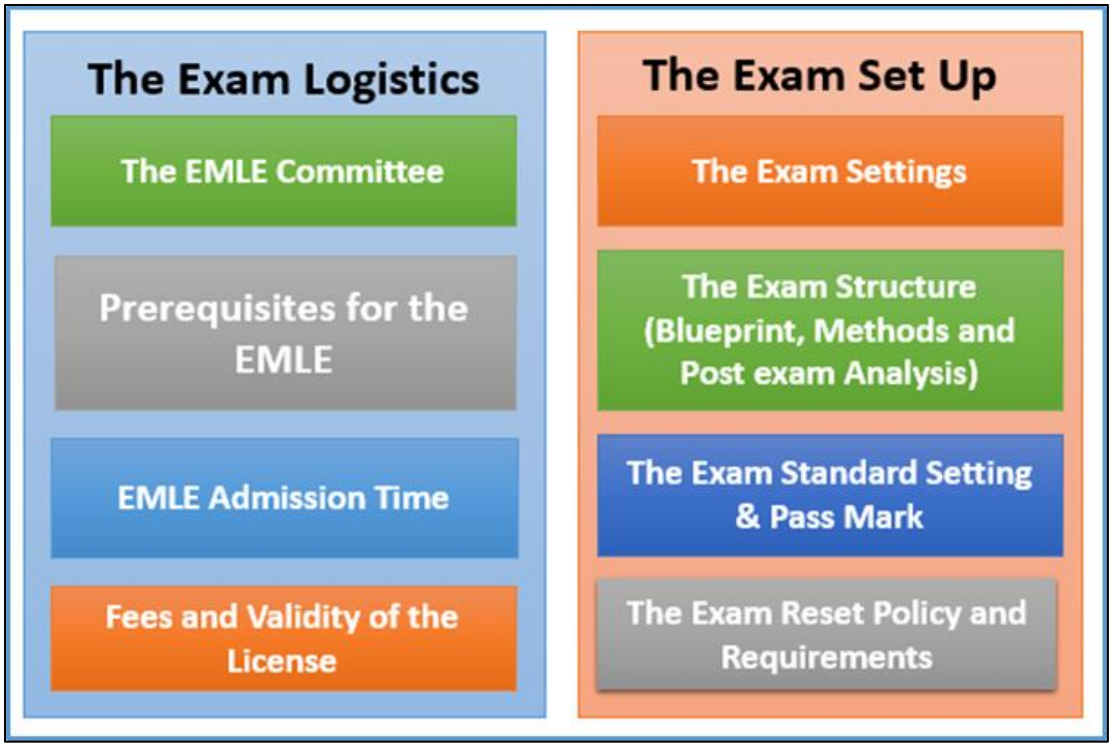

Figure 2. The Framework for the National Licensing Exam

The Exam Logistics

The EMLE committee (A Multidisciplinary Team)

Participants in the discussion forum highlighted that EMLE should be conducted and maintained by several parties; representatives from staff members of medical schools and consulting experienced organizations in exam conduction. Also, they recommended the recruitment of medical education experts to assist in the development, administration and psychometrics measures of these examinations seeking high test standards.

Also, the participants of the discussion had provided suggestions regarding the exam conduction team. They all agreed that the team should be a multi-disciplinary team in which a clinical educator had mentioned that *"The personnel who should be included in the multidisciplinary team, both clinical and basic science professors from different universities and ministry of health. Also, I recommended the presence of medical educationists, infection control, medical ethics and quality control members as well in the team".* While another academic educator added *"I recommended that an independent subcommittee must revise and validate the difficulty of the questions included in the question bank prepared by the multidisciplinary team of EMLE,*

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and I suggested an intensive training should be provided for this team prior to the preparation of the question bank".

Prerequisites for the EMLE:

Regarding the prerequisites of admission, all the participants agreed that "*the students should be holders of bachelor's degree and graduated from an accredited Egyptian -or international- medical school listed in the Egyptian Supreme Council of Universities*". However, specific credit hours for social, behavioral and clinical competencies, such as; communication skills, leadership skills, infection control and medical ethics were suggested. An English language certificate (TOFEL or IELTS) and computer skills courses were proposed as must. From the experience of some participants who are working in International medical schools, some schools request their students to successfully pass a formative assessment simulating min-licensing exam before allowing them to apply for their license. On the other hand, other colleagues cited that a proof of CME attendance of conferences, workshops and courses is also suggested.

According to the survey results, most of the participants selected the Basic Life Support (BLS) certificate (80.8%), an English language certificate passing a minimum determined score (72.6%), a basic computer skills certificate (i.e. ICDL) (63.2%), and an accepted house officer's portfolio /logbook (60.2%) as obligatory admission criteria for the EMLE (Table 2). There were some recommendations from respondents regarding the admission criteria that included emphasizing the importance of competent emergency skills, sharing health education activities in the community and safety outlines as well.

Pearson Chi-Square correlations showed a significant difference amongst participants affiliated to universities in comparison to those working at Ministry of Health with respect to their choices of EMLE prerequisites, such as the house officer's portfolio preference (*P*-value <0.001) and the presence of reference letter (*P*-value = 0.044) to be among the obligatory admission criteria. The ratio of university-affiliated participants who selected having a qualified portfolio and a reference letter as prerequisites for EMLE (68.7% and 26.8% respectively), as higher in comparison to those affiliated to the Ministry of Health (35.5% and 16.1% respectively). Furthermore, there was a significant difference between clinical and academic participants in regards to requiring clinical courses as an EMLE admission criteria, where a higher ratio of

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academic participants required clinical courses (46.2% versus 32.2%) as a prerequisite to EMLE (*P*-value = 0.033). Results are shown in Table 3. Analysis of selection of other perquisites did not show significant differences among participants according to affiliation nor specialty.

The EMLE Admission Time:

According to the discussion, if the candidates will be an attendant of the (5+2) new curriculum some clinical professors stated that *"they should Fulfilled two years' medical internship with an accepted portfolio or logbook".* Some academic educators suggested that *"The candidate can apply for the EMLE during the last year of the two years internship".*

The survey results added that most of the participants (63%) encouraged allowing the house officers to apply for the EMLE immediately after the end of the two years pre-registration house officers period (internship) of the (5+2) new curriculum. The rest of the participants recommended later admission that ranges from 2- 6 months after the completion of the (5+2) undergraduate Medical Education program as shown in Table 2.

Fees and validity of the license:

Most of the participants in the survey (65.8%) proposed that the first-time application for EMLE should be free of charge & that payment should be only in case of the exam reset. Regarding the License validity, 42.1% of participants recommended a 5 years validity period for the license obtained on passing the EMLE exam with Continuous Medical Education (CME) hours during this duration. While 39.1 % recommend an open validity duration till applying for a new position or promoting, with Continuous Medical Education (CME) hours during this period. Finally, few participants have recommended 10 years as a validity period or a single life-long licensing as shown in table 2.

The current study revealed a statistically significant difference between participants' affiliations and their preferences for EMLE fees, where the majority of participants (72.8%) who work at academic institutes preferred the exams to be paid for, in comparison to participants affiliated to the Ministry of Health who preferred that fees be paid only when exams are related to their promotion, rather than at each setting, even if the first one was waived (*P*-value = 0.019).

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There were no significant differences in preferences of EMLE fees according to participants' specialties.

Table (2) Survey Results "EMLE Logistics" (*N = 266*)	
	n (%)
EMLE perquisites*	
Basic Life Support skills	215 (80.8)
English language skills	193 (72.6)
Computer skills (ICDL)	168 (63.2)
Qualified portfolio	160 (60.2)
Clinical course	99 (37.2)
EMLE Formative exam	87 (32.7)
Communication and presentation skills	65 (24.4)
Reference letter	63 (23.7)
Research competencies	56 (21.1)
Participation at education events (e.g. conferences)	44 (16.5)
Publications	27 (10.2)
Time of administration	
Directly after Internship	167 (63.0)
Within 2 months after internship	44 (16.2)
Within 3 months after internship	30 (11.3)
4 months or more	14 (5.3)
Others	11(4.2)
Fees	
Paid for each setting	30 (11.3)
Free for first setting only	174 (65.8)
Paid for promotion purpose only	46 (17.3)
Others	15 (5.6)
Validity and Expiry	
2 years	36 (13.5)
5 years	112 (42.1)
Promotion	104 (39.1)
Others	14 (5.3)
*Answers are not mutually exclusive	

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Table (3) "EMLE Logistics" by participants' Affiliation and Specialty

	EMLE Prerequisites			EMLE Fees[#]			EMLE Renewal and Validity[#]		
	Portfolio	Reference Letter	Clinical Course	Paid each setting	Free first setting	Paid for promotion	2 years	5 years	Promotion
Affiliation *n (%)*									
University	136 (68.7)	53 (26.8)	77 (38.9)	24 (12.8)	137 (72.8)	27 (14.4)	28 (14.7)	85 (44.5)	78 (40.8)
Ministry of Health	24 (35.5)	10 (16.1)	22 (32.4)	6 (9.5)	38 (60.3)	19 (30.2)	8 (13.1)	27 (44.3)	26 (42.6)
P-value	<0.001**	0.044*	0.336		0.019*			0.954	
Specialty *n (%)*									
Academic	46 (59.0)	23 (29.5)	36 (46.2)	14 (18.5)	53 (69.7)	9 (11.8)	12 (15.8)	37 (48.7)	27 (35.5)
Clinical	108 (61.0)	36 (20.3)	57 (32.2)	16 (9.7)	114 (69.1)	35 (21.2)	21 (12.7)	68 (41.2)	76 (46.1)
P-value	0.759	0.110	0.033*		0.058			0.305	

[#] 'Others' category was excluded from bivariate analysis.
*P value ≤ 0.05
**P value <0.001

The Exam Set up

The Exam Settings (The EMLE Test Centers):

Many participants in the online discussion have highlighted the importance of convenient infrastructure, logistics, and human resources. A conclusion of the participants' opinions regarding the EMLE test center's criteria was mentioned as follows;

- **Infrastructure:** Responses mentioned the need to have a large air-conditioned exam hall, equipped with enough seats and desks, printed exam sheets, and pencils, where exams are collected and transmitted from secure areas and collected back. Setting should allow for distribution of seats at appropriate distances, between each seat and another. In the case of electronic exam, the participants highlighted that the infrastructure should have enough numbers of upgraded functioning computers, with high internet connection that is fast and secure. Computers could be password protected where each student is provided their own to enhance exam security. Besides, IT support teams could also include medical educators or e-learning specialists. If OSCE Exams are planned, centers should have skill labs, highly simulated mannequins and equipment.

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- ***Human* resources**: Some responses stressed on the importance of having invigilators to provide instructions and supervise the exam setting and process, in addition to a medical support team to attend to urgent matters, if needed.
- **Availability and accessibility**: Exam centers should be available in terms of number or geographical distribution with the capacity to accommodate a large number of Egyptian students, assuming the exam would be carried on a governorate or regional level. Furthermore, centers are preferred to be in accessible areas, taking in consideration the traffic, and large flow of students on exam day, with consideration for transportation means and availability of parking.
- **Comfort, safety and ease:** This was highlighted in terms of providing elements that allow students to perform without being exposed to internal or external factors, including environmental factors, in terms of seat comfort, adjusted temperatures, proper lighting, aeration and ventilation and noise levels.
- **Exam instructions:** Instructions are to be stated clearly. A clock should be visible as this would be a timed exam. Start and finish times should be noted, as well as center or exam codes, wherever they apply. Instructional notes and posters could be available to aid and remind examinees about exam process, and regulations. Exam support team should be ready and available to respond to inquiries."

The Exam Structure (Blueprint, methods and post-exam analysis):

The participants of the discussion have highlighted the importance to develop the EMLE blueprint before conduction of the exam. The online discussion participants have reached a consensus regarding the disciplines weight % to be included in EMLE blueprint. They suggested that it may contain Medicine (25-30%), Surgery (20-30%), Obstetrics and Gynecology (15-25%) and Pediatrics (15-25%). A good number of participants added Primary health care, ICU & Basic Sciences".

The survey participants have added the type of assessment methods and the appropriate number of test items in the exam as shown in Table 4. Most of the respondents 225 (84.6%) recommended to carry-out the EMLE theoretical part through a computer based versus 41 (15.4%) participants who recommended the paper-based exams. They have 200 (75.2%) recommended the

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use of MCQs, MEQs, and OSCE. MCQs were also highlighted by the online discussion participants. *According to an academic educator added that "MCQs carry the advantage of being able to efficiently test a broad range of knowledge and application in a single test, added to that, it is considered the easiest format to produce statistically reliable results and automated marking".*

Moreover, all the study participants agreed that the exam shall focus on interpretation & case-based scenarios. As mentioned by a clinical educator that "*The MCQs should be constructed to assess higher cognitive levels (application, analysis, synthesis and evaluation) of Bloom's taxonomy and the MCQs should be based on clinical vignettes to increase the likelihood of integrating the clinical sciences (e.g., diagnosis, investigation and management options). Added to that, other methods of assessment are expected good options".*

Other regulations regarding the EMLE were speculated in the current study as the duration of the exam and post -exam analysis. Most participants 137 (51.5%) recommend the exam to be carried out in 2 sessions separated by a break on the same day, with every session lasts for 1.5 hours. Followed by a recommendation of 85 participants (32%) to carry-out the exam on 2 sessions also, but on 2 separate days, each is for 2 hours for theoretical & another 2 hours for the clinical assessment sessions as shown in table 4. Other recommendations were divergent and included different combinations of hours allowed for different sessions.

More participants working in a university setting (81.4%) or who are academics (87.1%) selected a two part assessment method, including theoretical and clinical assessment. These differences were statistically significant as shown in table 5 (*P*- value = 0.014 and 0.023 respectively).

Most of the participants 115 (43.2%) suggested the exam number of questions should be 100-200 items, followed by 101 (38.0%) who chose the number of questions to be 150-300 items per exam paper as shown in table 4. There was a highly statistically significant difference (*P*- value <0.001) between the participants' affiliations and their responses in the number of items per exam as more university affiliated participants selected a higher number of questions, in comparison to those work within the Ministry of Health, as shown in table 5.

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Post-test analysis and psychometric of the exam were discussed by the participants of the online discussion which favored the selection of MCQs. *A clinical educator added that "There are certain criteria that judge the utility of any particular assessment method, it is necessary to apply these criteria such as; objectivity, validity, reliability, educational impact, and feasibility."* Another academic educator highlighted that *"After conduction of the exam, item analysis is a simple, yet valuable procedure performed after the examination to provide information regarding the soundness of an item/test by calculating difficulty index, discrimination index & distractor effectiveness. Also, it helps in detecting specific technical flaws in the questions. Poor items can be modified or removed from the score of questions. It also can help to improve the examiners skills in item writing".*

The Exam Standard-Setting and Pass Mark:

Regarding the standard setting and pass mark of EMLE, most of the participants of the survey 177 participants (66.5%) recommended a standard setting of ≥60% to pass the exam. 45 participants (16.9%) recommended the standard to be ≥70%, while 34 participants (12.8%) suggested the passing score to ≥50% as shown in table 4. These suggested pass score allocated to the theoretical part and the clinical part separately.

The Exam Reset Policy and Requirements:

In cases of the candidate failure, there should be another chance to apply for a reset exam. The survey's participants recommended a time interval for re-applying for the reset exam and additional prerequisites to be attached as evidence of competencies enhancement. The time interval ranged from zero to maximum 9 months. Most of the participants 155 (58.3%) suggested no added prerequisites before the rest exam, while some participants 106 (39.8%) requested additional prerequisites as interviews and CME hours as shown in table 4. More university affiliated (44.8%) and academic participants (50.6%) preferred that there should be an evidence of CME hours as a minimum requirement for EMLE reset, in comparison to Ministry of Health affiliated participants (28.4%) and clinicians (35.5%). The differences according to participants' affiliation and specialties were statistically significant as shown in table 5 (*P*-value = 0.018 and 0.025 respectively).

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Table (4) Survey results "EMLE Setup" (*N = 266*)	
	n (%)
Assessment	
Theoretical (e.g. MCQs and EMQs)	57 (21.4)
Theoretical and clinical (e.g. MCQs, EMQs, and OSCE)	200 (75.2)
Others	9 (3.4)
Mode of Administration	
Computer-based	225 (84.6)
Paper-based	41 (15.4)
Number of questions in theoretical components	
100-200 Questions	115 (43.2)
150-300 Questions	101 (38.0)
200-400+Questions	41 (15.4)
Others	9 (3.4)
Duration	
Single session	37 (13.9)
Two sessions within the same day	137 (51.5)
Two sessions on two separate days	85 (32.0)
Others	7 (2.6)
Pass grade	
>50%	34 (12.8)
>60%	177 (66.5)
>70	45 (16.9)
Others	10 (3.8)
Mandatory Duration prior to EMLE Reset	
Immediately after latest EMLE trial	71 (26.7)
3 months or more	148 (55.6)
6 months or more	45 (16.9)
9 months or more	2 (.8)
Others	
Reset Perquisites	
None	155 (58.3)
CME ± clinical rotation	106 (39.8)
Others	5 (1.9)

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Table (5) "EMLE Setup" by Participants' Affiliation and Specialty

	Assessment Parts[#]		Number of questions in Theoretical Part[#]			EMLE Reset perquisites[#]	
	Theoretical	**Theoretical and Clinical**	**100-200 Questions**	**150-300 Questions**	**200-400+ Questions**	**None**	***CME* ± *Clinical rotation***
Affiliation *n (%)*							
University	36 (18.6)	158 (81.4)	72 (37.3)	85 (44.0)	36 (18.7)	107 (55.2)	87 (44.8)
Ministry of Health	21 (33.3)	42 (66.7)	43 (67.2)	16 (25.0)	5 (7.8)	48 (71.6)	19 (28.4)
P-value		0.014*		<0.001**			0.018*
Specialty *n (%)*							
Academic	10 (12.8)	68 (87.2)	33 (43.4)	33 (43.4)	10 (13.2)	38 (49.4)	39 (50.6)
Clinical	43 (25.6)	125 (74.4)	79 (46.2)	63 (36.8)	29 (17.0	112 (64.4)	62 (35.6)
P-value		0.023*		0.561			0.025*

[#] 'Others' category was excluded from bivariate analysis.
**P* value ≤ 0.05
***P* value <0.001

Discussion:

The current study is important as it aims to suggest a framework for developing EMLE. The study gains its importance from the need for the Medical Licensing Exam in Egypt nowadays for several factors that were discussed before. The current study suggested a framework for the development of licensing exams that can provide evidence about potential healthcare providers' competency and determine those who are able to satisfy licensing requirements in order to practice according to regulatory standards. This would reassure the public that healthcare would maintained with high-performance providers across the different delivery indicators

The best time for EMLE application as suggested by the current study is immediately by the end of the 2 years' internship training. As fresh graduates are always enthusiastic and will be motivated to start their physician career. Moreover, being fresh graduates will help them to remember and easily study for the exam than a working physician. This has concurrently happened in many different countries at the global and international levels. [16&17] However, passing the exam may need clinical experience as the exam should be authentic and clinical based. Accordingly, others recommended later admission that ranges from 2- 6 months after completion of the 5+2 undergraduate medical curriculum.

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The current situation that the licensing in Egypt needed two obligatory criteria; 1) Bachelor degree in medicine from Egyptian public or private universities or from an international university that is accredited by the Egyptian Supreme Council of Universities, and 2) fulfilled the medical pre-registration house officer (internship) one year currently or two years in case of the application of the 5+2 new curriculum. The current study suggested other prerequisites as certain courses e.g. Basic Life Support (BLS), Basic Computer skills proof as ICDL certificate, English language certificate proof by TOEFL, IELTS, or other equivalent tests. The main purpose of all this evidence is to improve the professional life of the graduate through gaining skills that are essential for their career. English language plays an important role in medical studies to help graduates to be eligible for international mobility in an easier way. In line Eszter Kovacs (2014) had reported the need to balance freedom of movement with language competence, especially given the need for complex terminology in medicine and the degrees of inter-professional communication. [17] Moreover, basic computer skills are beneficial for reporting and documentation, communication, research and learning. After the COVID 19 pandemic, the use of computers and different forms of technology is highly mandatory through telemedicine and artificial intelligence concepts. It is reality today that the younger generations has embraced technology and subsequent impact on healthcare education and delivery faster than older ones, yet is it the appropriate technology that would help sustaining the medical care services during any crisis. [18]

Additionally, the study highlighted the importance of using a portfolio. It will help in the development of the physician throughout the reflection and self-assessment. It will also provide a longitudinal and continuous insight on the student progress. [19] Portfolio also will help the assessors to imagine a complete picture about the candidates' clinical performance. In Saudi Arabia, the candidate can apply for the SMLE, after completing MBBS degree from an accredited medical program and commenced training in the internship year or student who are one year away from the graduation with no more needed prerequisites set for the exam. [16] It is worth noting that more university affiliated participants required portfolios in comparison to their peers at the Ministry of Health, and this could be justified by the adoption and use of similar systems in students' evaluation, while they lack in the majority of work settings within the Ministry of Health. [20]

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EMLE is a high-stake exam; it may shape and control the physician's career. Therefore, it is important for the exam to fulfil all the criteria of objectivity and fairness. The framework included several parameters to ensure these points. First, a test blueprint is an important starting step to be planned in accordance with the National Academic Reference Standard and the national competencies of the Egyptian medical graduates. The purpose of the blueprint is to ensure that both content and face validity of the test are determined and the exam questions related to what is expected to be mastered by the graduates before entry into any kind of residency training. [21] Second, triangulation of assessment methods to ensure a wide coverage of the different learning domains. Most of the participants suggested that the MCQ will be a sufficient assessment tool for the first part of the exam including decision making, clinical reasoning, and problem-solving based MCQ. This type of test items will ensure objectivity, wider sample, easier scoring, and shorter time for answering and a feasible format for reliable automated grading. However, its preparation is time consuming and needs a well trained staff to develop. [22]

It is important to bear in mind that the exam is a multidisciplinary one that needs to test different levels and domains. Therefore, The MCQ format may be more applicable as it can be used in large numbers. These advantages guided the recommendation of the test item number that ranged from 100-200 items to 150-300 MCQs. But the MCQs should be constructed to assess higher cognitive levels objectives of Bloom's taxonomy, such as trainees' level of application, analysis, synthesis, and evaluation. MCQs should be based on clinical vignettes to increase the likelihood of integrating the clinical sciences (e.g., diagnosis, investigation and management options). In the United States, the first part of USMLE consists of a 322 MCQ to measure the basic science knowledge, divided into 7 blocks with 46 items per block, and each block for 1 hour with a maximum of 7 hours testing. [23]

However, other types of summative assessments were suggested; clinically related short essay questions, and Modified Essay Questions (MEQs) to assess the other levels of comprehension and theoretical knowledge while OSCE and simulated clinical exams are the best choice for the clinical skills assessment. This is the current situation in many countries all over the world like Canada, Ireland, Korea, Switzerland, United States, and the United Kingdom. [2] In Saudi Arabia, for the cognitive domain, they used MCQ or a short answer question test formats, an OSCE with a standardized patient or observed short case would be a better format for both Psychomotor

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and Affective domains. [24] The OSCE will provide a valid, standardized, and reliable clinical exam. It is the golden exam in most of the postgraduate degrees. [25, 26]

Adding another important point to the fairness and objectivity of the exam, the study suggested the use of a standardized setting as the national license exam is considered to be high-stakes one. The criterion-referenced standard is preferred for theoretical and clinical parts of the exam. Most participants recommended a standard set of ≥60% to pass each part of the exam separately. Additionally, the post-exam psychometrics analysis is of high importance as it considers the quality check of the exam items after its implementation. For instance, the Difficulty Index which is a measure of the ratio of correct answers within each item. Therefore, it could gauge how 'hard' or 'easy' the question is. [27] In addition, there is the Discrimination Index; where questions distinguish between higher and lower performing students. [28] Finally, there is the Distractor Effectiveness (DE), an indicator of alternatives ability to distract from the correct answer, where frequencies for each selected distractor are calculated. And hopefully each distractor is sufficiently selected achieving an 'Ideal Value' where selected distractors are equally popular. [29]

It is important to consider that the NLE is an obligatory exam. Therefore, flexibility and practicality are essential. This can be reflected in the reset policy, fees, and license validity period. The reset policy is recommended to be flexible in terms of time and requirements. In Saudi Arabia, all eligible candidates have the chance for three exam sittings since their first attempt, if they failed to achieve a passing score. The SCFHS classification and registration rules permit those who fail a 'two-years' validity period date starting from the date of the graduation to sit for the Exam. Furthermore, candidates who achieve a passing score, have the option to retake the exam to improve their grades, no more than twice, to increase their chances for matching with their preferred residency program. [16]

Regarding the fees, the current study defends the support of the medical graduates through waving them from the exam fees. EMLE should be free of charge & pay only for reset exams or any other attempts needed to improve their scores. It is an essential issue to be considered that the country provides the exam for the first attempt with free or even at low cost in relevance to the salary provided to the candidate during their internship training year. Exam costs should be

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considered, as they differ among different countries due to the nature of the implemented exams, available resources, and number of the applicants. In the United States, licensing exams total fees would amount to 3200 USD, comparable to 800 USD paid by international medical graduates. [2] While the absolute amount is higher in the case of the United States, the corresponding amount is much higher for international medical graduates, including Egyptian medical graduates, in comparison with individual and gross national incomes. [23]

Therefore, the salaries of the medical graduates should be considered. [30] Adding burden on the medical graduates as high fees regardless of their low income may contract with the main concern for all stakeholders in higher education and health care systems raising the quality of healthcare. This burden may affect the medical graduate motivation and performance that will in turn affect the quality of the health care negatively (1). Finally, the validity of the license was a point of difference and debate between the participants. In which the recommendation varies from a single life-long licensing, a validity period of 5 or 10 years for the license obtained on passing the EMLE exam with Continuous Medical Education (CME) hours during this duration or an open validity till applying for a new position or promoting & also with Continuous Medical Education (CME) hours during this period**.**

The validity period may vary but the fact that the NLE is a discriminating exam should be considered. Accordingly, it may be better to give the applicants the time for learning and maturity before re-taking the exam. Moreover, taking the exam several times may create wise students who can beat the system and pass the exam easily. Adding to this, the burden that will be posed on the test developers' team for continuous development, revision and adding new test items to safeguard the test from losing its main purpose. The current study revealed no differences between clinicians and academics in respect to their responses towards the validity of the license. More in both categories chose open validity until promotion. Promotion is a valued merit where progress in the field, acknowledgement by peers and salaries may depend upon, yet it was the least option that required renewal. Other options may have been perceived as burdening, yet regular intervals of certification and providing CME proof are universally recognized as means of ensuring quality of profession, and updating knowledge and competencies. [31]

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Over all the study showed many differences in the preferences and choices of those affiliated to universities and their peers in the Ministry of Health with respect to many outcomes, related to EMLE assessment methods, prerequisites, and validity, among others. Their preferences may be because university staff are more aware with assessment tools, and the evidence surrounding them, especially they are committed towards preparing the medical workforce and may aspire to better performance quality among the newer generations of medical practitioners. Nevertheless, the preferences of current generations of physicians may be influenced by some factors, showing the current burden that lies on them in terms of stressful workflow, financial burden, and other factors where adding a new exam, with a great value in terms of initial licensing and subsequent recertification to their clinical duties and responsibilities, is perceived as a burdening task, thus their choices leaned towards those of least effort, and longer validity. While we cannot be sure of the reason for these differences, capturing them is crucial as it informs about the variety of opinions towards EMLE preferences, and the necessity to further explore them in a more rigorous manner.

Limitations of the Study

Although the current study is a descriptive study that uses the suggestions of medical practitioners and educators regarding the suggested framework of the EMLE development, the findings must be interpreted with caution. The results might have related to the experiences of the sample presented and therefore not be transferable to a larger population. Likewise, it is important to note the sample size in the current study while interpreting the study findings. Despite this, we have tried to use all the available platforms, multiple mixed methods and reach diverse audiences but the sample may have been subjected to selection biases or limited recruitment. Additionally, a recommendation for further study to explore the views of the students about the EMLE after its real implementation by the year 2023.

Conclusion

The current study has developed a framework for the development of the Egyptian National Medical Exam. The framework focused on two main themes: the exam logistics and the exam setting. A Multidisciplinary team was suggested for the exam committee together with convenient infrastructure, logistics, and human resources for the exam setting. Fairness and objectivity was

highlighted through several factors; development of exam blueprint, types of the assessment methods, post-exam analysis and standard setting. Finally, the reset policy, fees and validity of the license was recommended with a student-centered perspective. We tried to suggest a roadmap through a critical reflection for the best of the Egyptian health care system. We want to stress that this exam isn't "the Magic Solution" for all our medical education system's challenges in Egypt. But, it is considered as a good starting point towards standardization and globalization of the Egyptian medical education.

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Competing interests:

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Authors' contributions:

AA conceptualized the study, supervised the study procedures, contributed to data collection, analysis and interpretation and drafted the first manuscript. AS and FE designed the survey, helped with data acquisition, analysis, and interpretation of the results. HA shared in reviewing the literature and the introduction section, in addition to data collection. AH and NMH contributed to qualitative data collection and analysis. EA and AKA contributed to data analysis, interpretation of the findings and the first draft of the overall manuscript. All authors made essential contributions, critically reviewed, and approved the final manuscript.

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