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## Postgraduate medical education: The history and development of competency-based training program in Nepal

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### Abstract

Nepal is a small, lower-middle-income country; with a population of around 30 million. As per WHO, Nepal has a low doctor-patient ratio (0.7/1000) and even lower specialists (e.g., surgical) workforce (0.003/1000); additionally, data from Nepal Medical Council show the number of postgraduate specialists is 1/3rd of the total registered doctors. The mismatch in the doctor-patient ratio is further aggravated by the overwhelming number of doctors in urban areas; when 80% of the population are in rural Nepal. This inequitable discrepancy in the healthcare system requires: proper training of competent medical graduates, a fair distribution across the country, and effective changes in the healthcare system. Competency-based medical education plays an important role in: standardizing education, training competent doctors, and deploying them where they are needed the most. The Government of Nepal has recently established Medical Education Commission-which plans to oversee the entrance exams; and expand the postgraduate training to be conducted by private hospitals, previously not affiliated with any medical colleges or universities.

Historically, Civil Medical School started training compounders and dressers in Nepal in 1934. A big milestone was achieved with the establishment of the Institute of Medicine under Tribhuvan University in 1972, which has continued to train all categories of health manpower needed in the country. In 2006 Nepal Medical Council developed "Regulations for Post-graduate Medical education". Thereafter, several institutions started providing postgraduate training, for example: the BP Koirala Institute of Health Sciences, Kathmandu University, National Academy of Medical Sciences, and Patan Academy of Health Sciences (PAHS). The PAHS conducts PG programs and post-PG fellowships in line with competency-based medical education. In addition to formative assessments, research thesis, and a publishable article; PAHS requires its trainees to be certified in a pre-set of entrustable professional activities (EPAs) and to master eight Core Competencies domains in: Professionalism, Patient-centered care, Procedural skills, Clinical Reasoning, Communication, Scholarship, Leadership, Community orientation.

The number of medical colleges in Nepal has since expanded to 24 (medical 21 and dental colleges 3). Private medical colleges make up about 3/4th of the total medical colleges in Nepal. This makes the inclusion and regulation of more components of the competency-based curriculum in postgraduate training programs, and its monitoring, somewhat of a challenge.

**Keywords:** competency-based medical education, development, history, Nepal, postgraduate training program

## Introduction

Nepal is a small, lower-middle-income country; with a population of around 30 million.<sup>1</sup> The postgraduate (PG) training is a huge undertaking for all concerned parties: the trainee, the institute, and the society. Nepal has low doctors: patient ratio of 0.7/1000 and an even lower specialists (surgical) workforce of 0.003/1000 as per the World Health Organization's (WHO) Global Health Workforce Statistics.<sup>2</sup> Lower-middle income countries have a doctor-patient ratio of 0.8/1000, a stark contrast to Cuba's 8.4, the highest in the world.<sup>2</sup> The doctor-patient and specialist ratio mismatch are further aggravated by the overwhelming number of doctors in urban areas, for example, one doctor for every 150 000 people, compared to one for every 850 people in the Kathmandu valley<sup>3-5</sup>; when 80% of Nepal's population is rural.<sup>6</sup> This raises an urgent need for the regulated distribution of manpower across the country, taking into account the immense socio-economic disparity between urban and rural Nepal.

To address this inequitable discrepancy in the healthcare system, there is a need for proper training of competent medical graduates and a fair distribution of skilled medical personnel across the country. Besides many factors, the competency-based medical education (CBME) program plays an important role in: standardizing education, training competent doctors, and deploying them where they are needed the most.<sup>7-8</sup> In recent years, CBME has been the focus of attention concerning PG curricula formulation and modification in Nepal. In this review, we discuss the historical milestones of CBME and the development of the PG training programs in Nepal.

## History and development of PG programs in Nepal (Figure 1)

The Nepal Medical Council (NMC) requires 5.5 years of undergraduate (UG) medical training which includes 1-year of mandatory internship to be eligible for NMC licensing. The UGs registered with the council far outnumber postgraduates. As of Dec 2020, the number of

registered PGs (specialists) is 7685, i.e., 1/3<sup>rd</sup> of 24814 medical doctors (Bachelor of Medicine and Bachelor of Surgery- MBBS). With limited slots for PGs, this gap is widening with the addition of approximately 2500 medical doctors every year from 21 indigenous medical colleges and academia, and overseas graduates. The PG training in Nepal is usually of 3 years duration. The eligibility criteria for postgraduate includes: NMC license, a year of services after the MBBS, and a merit score in the PG entrance exam.<sup>9-10</sup>

The newly established Medical Education Commission (MEC) by the government of Nepal in 2019 (National Medical Education Act 2075) is mandated to conduct common entrance exam; and has published the details on its website for a total of 1572 PG seats for the year 2021- which includes: medical (clinical and basic science), dental, nursing and public health disciplines.<sup>10</sup> The commission aims to further define, regulate and monitor the medical education of all disciplines and levels related to the health profession. The commission also aims to coordinate the management of medical and dental colleges which have been regulated by three main regulatory bodies: Nepal Medical Council, Ministry of Education, and Universities & Academies- each institution differing in its evaluation system.

Historically, in 1934, the Civil Medical School started training compounders and dressers in Nepal, followed by Nursing School and Health Assistant training at Bir Hospital in 1956 under the Ministry of Health (MoH).<sup>11-12</sup> The need for the establishment of medical school was discussed and help was sought in the early 1960s from the WHO Regional Office for South-East Asia.<sup>13-14</sup> Subsequently, the responsibility was transferred to the Ministry of Education (MoE) to train basic level health care workers. Institute of Medicine (IoM) under Tribhuvan University (TU) was founded in 1972 to train middle-level health care manpower in Nursing, Medicine, Laboratory, Pharmacy, Radiotherapy, Physiotherapy, etc.<sup>15</sup> The notable milestone was the year 1978, which marked the beginning of a community-

oriented integrated medical doctor (MBBS). In 1982, a master level 3-year PG of Family Physician (MD GP) was started in collaboration with the University of Calgary, Canada. A one-year Diploma level PGs were also started by IoM, for example, Diploma in Anesthesia (DA in 1984) and Diploma in Gynecology and Obstetrics (DGO in 1986), Diploma in Otorhinolaryngology (DLO in 1987), diploma in child health (DCH in 1987) and a diploma in medical radio diagnosis (DMRD in 1988).<sup>11,15</sup> The super specialization in surgery: Gastroenterology, Urology, Neurosurgery, Cardiothoracic, and Vascular surgery were started in 2008, and expanded with DM/MCH/Ph.D. (DM/MCH in clinical discipline is considered equivalent to Ph.D. in basic/allied sciences).<sup>15-18</sup>

The BP Koirala Institute of Health Sciences in Dharan started its postgraduate program in 1999.<sup>19</sup> Kathmandu University (KU) began PG programs at various sites in Kathmandu valley (MS Orthopaedics at B&B Hospital in 1999, MCh Neurosurgery at Bir Hospital in 2000) and outside the valley (MD Pathology at Manipal School of Medical Sciences in Pokhara in 2000).<sup>17</sup>

The government of Nepal reached another significant milestone with the establishment of the Postgraduate Medical Education Coordination Committee (PGMECC) under the Ministry of Health. Thus, the expansion to PG programs began in 1994 by utilizing the hospitals of Kathmandu valley. In 2003, the ministry of health established the National Academy of Medical Sciences (NAMS) at Bir hospital, with the priority of training and deploying doctors of the government healthcare system. This was a transformation of the earlier PGMECC program. The NAMS program included rotation of trainees in Maternity Hospital Thapathali, Kanti Children Hospital, Nepal Army hospital, Patan Hospital, and Nepal eye hospital.<sup>11,17,20-22</sup>

### Regulation of medical education

In addition to the regulation of UG program, the Nepal Medical Council also began regulating the PG program with the

development of “Regulations for Post-graduate Medical education” in 2006.<sup>9</sup> The NMC has outlined that PG Medical Education Programs should be conducted by the recognized University/Institution. A degree of Doctor of Medicine (MD) or Master of Surgery (MS) in basic, para-clinical, and clinical subjects can be awarded upon: completion of a minimum of three years of course in competency-based training including exposure to the community-oriented learning, and a research thesis. As per NMC guidelines, both types of institutions- those conducting undergraduate and postgraduate programs, and those imparting only PG programs, are required to fulfill the minimum requirements in terms of: infrastructure, faculties, and curriculum delivery. In 2017, NMC updated its regulation and has added further requirements to be eligible to partake in PG entrance exams-which includes at least one year of service after UG prior to entering into a PG program, and also a mandatory 3 months posting in peripheral/district hospitals during postgraduate.<sup>9</sup>

With the establishment of the Medical Education Commission (MEC) in 2019, the government of Nepal aims: to regulate and monitor the medical education of all disciplines and levels of health professionals; and coordinate among the Ministry of Education, the Universities, and the NMC to fulfill the needs and quality of health manpower in the country.<sup>10</sup> To ensure the production of adequate human resources for health service delivery in the country, at least one health science institution/university in each of the seven provinces has been planned by the government in line with the WHO 2018 slogan of Universal Health Coverage by integrating various allied health sciences into the national healthcare system.<sup>23</sup>

In Nepal, the PG programs in clinical and basic sciences in medical, nursing, and public health disciplines are offered by: Institute of Medicine Tribhuvan University (IOM-TUTH) and its affiliated medical colleges, the Kathmandu University (KU) its affiliated medical colleges, and health science academies (deemed

universities), e.g., B.P. Koirala Institute of Health Sciences (BPKIHS), National Academy of Medical Sciences (NAMS), Patan Academy of Health Sciences (PAHS).<sup>16,19,21,24-25</sup> Others, like Purbanchal university, offers a master's in public health (MPH), and the Karnali Academy of Health Sciences, Pokhara Academy of Health Sciences, Rapti Academy of Health Sciences are starting their PG programs in the upcoming future.<sup>26-29</sup>

### Development of Competency-Based Medical Education (CBME)

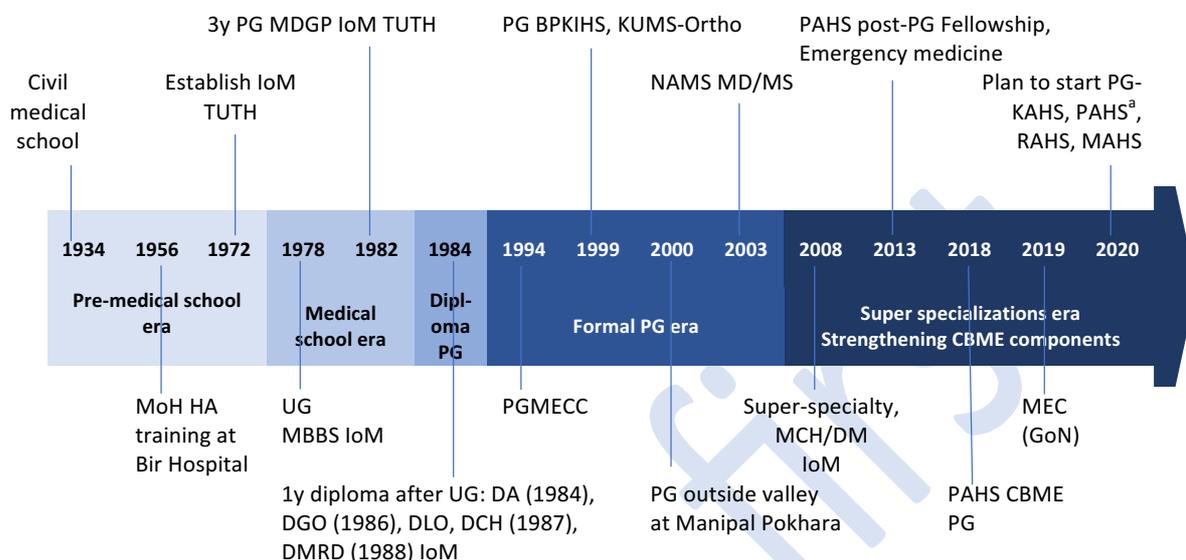
Worldwide, there is a trend towards competency-based medical education (CBME), more so in PG training.<sup>30-42</sup> The competency program ensures 'you don't just acquire knowledge and then spit it back at the time of a final exam'.<sup>35</sup> Some of the important concepts and components of CBME include: Competency, Entrustable Professional Activity (EPA), and developmental Milestones during the training. The competency is achieved step-by-step. It includes the ability of the trainee which can be observed for knowledge, attitudes, skills, and habits (KASH) required from a health professional. The EPA is the 'groups of tasks' used as a descriptor to interpret the transition of theoretical knowledge into the ability to practice competencies in an integrated and holistic manner.<sup>34,43</sup> The gradual, step-by-step progress of competency are the milestones measured at different levels from 'a novice' observer to a 'competent expert' who performs independently. The robust assessment in CBME is multifaceted, work-based, continuous formative assessments and feedback to guide the student's progress and to achieve a defined criterion required to meet the standard of care. Some of the objective numeric scores from multiple assessment tools are mini-clinical evaluation exercises (mini-CEX), objective structured practical examinations (OSPE), Objective Structured Clinical Examination (OSCE), logbooks and portfolios of clinical work etc. These objective scores are complemented by subjective assessments and feedbacks by experts to provide a meaningful direction for the learner. Canada has been a leader in the development

and implementation of CBME across all disciplines.<sup>41-42</sup> Canadian Medical Educational Directives for Specialists (CanMEDS) framework identifies and describes the abilities (grouped thematically under seven roles) of physicians to meet the health care needs of the people they serve.<sup>44</sup> Regulatory medical boards and universities/academia face the challenge of development of effective competency-based trainings. The Dutch specialist training programs based on the CanMEDS has taken steps in designing a curriculum by dividing the entire content of a specialty into logical units of 'themes' based tasks to guide, and assess the trainees. Based on CanMEDS, the training cycle can be divided into three steps, 1<sup>st</sup>- trainees gather evidence in a portfolio on their development, 2<sup>nd</sup>- the evidence stimulates the trainee and the supervisor to regularly reflect on a trainee's global development on the performance in specific tasks, and 3<sup>rd</sup>- individualized structured development plan for learning goals and strategies.<sup>45</sup>

In CBME, the outcome of the graduate competencies or abilities are predefined. The teaching-learning and the assessments are organized in the curriculum to enable trainees to progress and become competent physicians.<sup>33,35</sup> The CBME is a learner-based approach, keeping in view that each individual has their own pace of learning- which is achieved by continuous and effective feedback through formative assessment rather than the accumulation of knowledge and skill judged solely by yearly exams.<sup>35,46-47</sup> The subject-centered, time-based traditional curriculum with summative evaluation focuses on knowledge accumulation than on: aptitude and practical clinical skills, and other soft skills (communication, doctor-patient relationship, ethics, and professionalism) required for clinical practice.<sup>33,48</sup> The communication pattern plays an important role in promoting the autonomy of patients vs. physician's personal choices in clinical practice.<sup>49</sup> The Good Clinical Practice (GCP) is an internationally recognized, ethical, and scientific quality standard for the design, conduct, performance, monitoring, auditing,

recording, analyses, and reporting of clinical trials. It assurance that the data and reported results are credible and accurate, and that the rights, integrity, and confidentiality of patients and/or subjects are respected and protected.<sup>50-53</sup> The changing scenario of CBME

is already being felt by university and academia in Nepal. A need for implementation and monitoring was felt, and this lead to the establishment of the National Board of Medical Specialties by the Government of Nepal.<sup>54</sup>



**Figure 1. Historical milestones of today’s competency-based medical education (CBME) postgraduate training (PG) in Nepal**

Note: MoH-Ministry Of Health, HA-Health Assistant, IoM-Institute of Medicine, TUTH-Tribhuvan University Teaching Hospital, PG-Postgraduate, MDGP-Master Degree in General Practice, UG-Undergraduate, MBBS-Bachelor of Medicine Bachelor of Surgery, DA- Diploma in Anaesthesia, DGO- Diploma in Gyne/Obst, DLO- Diploma in Otolaryngology, DMRD- Diploma In Radiodiagnosis, DM/MCH-Doctorate in Medicine/Master of Chirurgiae, PGMECC-Postgraduate Medical Education Coordination Committee, BPKIHS-BP Koirala Institute of Health Sciences, KUMS-Kathmandu University Medical School, NAMS-National Academy of Medical Sciences, PAHS-Patan Academy of Health Sciences, CBME Competency-Based Medical Education, MEC Go N- Medical Education Commission Government of Nepal, KAHS-Karnali Academy of Health Sciences, PAHSa-Pokhara Academy of Health Sciences, RAHS-Rapti Academy of Health Sciences, MAHS- Madhesh Academy of Health Sciences

**Development of PG training based on CBME**  
 Nepal Medical Council has emphasized the implementation of a Competency-Based teaching-learning curriculum in its revised "Regulations for Postgraduate Medical Education MD/MS program -2017". In contrast to the stereotypical training that focuses on serving urban tertiary care hospitals; Community-based education (CBE) provides medical graduates with the skills necessary to serve the community with a sense of social justice, by understanding the social dynamics. The CBE remains an important component of the medical and public health curriculum of the IoM-TUTH since its establishment in 1972.<sup>55-56</sup> On the initiation of the health minister (1994) Dr. Rambaran

Yadav, PGMECC was formed following the discussion involving local medical educationists, doctors, and experts; Dr. S.K. Kakkar from All India Institute of Medical Sciences (AIIMS), Delhi, India; and, the WHO adviser Dr. PT Jayawickramarajah.<sup>11-12</sup> The Shanta Bhavan Hospital<sup>57</sup> moved into a new structure to become Patan Hospital (PH)<sup>58</sup> in 1982. Shanta Bhavan: Palace of Peace, has kept alive and maintained the spirit of service with heart and soul.<sup>59</sup> The PH has been involved in PG training for 3 decades, starting with the PGMECC in 1994. Later PH was a major training site of NAMS (Bir Hospital<sup>22</sup>, the oldest hospital established in 1889 in Nepal). And, Patan Hospital developed into Patan Academy of Health Sciences (a public not for

profit health science university)<sup>60</sup>, starting medical school with a competency-based undergraduate (MBBS) program in a hybrid model utilizing problem-based learning (PBL) in basic science years and clinical presentation (CP) in clinical years at its main teaching site, the Patan Hospital.<sup>5,7,61-62</sup> The competency-based postgraduates (3-years training as per NMC requirement) programs have successfully trained 1<sup>st</sup> batch of MD/MS by the end of 2020.<sup>24</sup> Recently, the Government of Nepal, Medical Education Commission (MEC)<sup>63</sup> in 2020 actively implemented the common entrance exams for UG and PG. The commission also plans to allow non-university-affiliated private hospitals to run a master's program (equivalent to MD/MS awarded by the universities and academia). This differs from the earlier regulation by the NMC that only the university/academia should conduct a PG program.<sup>9</sup> Over 80% of the health and educational institutions are dominated by the private sector while less than 20% are under the government and public sector. Out of the 24 (21 medical college, 3 dental) only 5 are in public-government sector.<sup>64-66</sup> The numbers of government doctors are approximately 1500 as per Government doctor association of Nepal.<sup>4-5</sup> Frequent transfers, rural postings, inadequate working facilities and remunerations; combined with the fact that only 1/4<sup>th</sup> of medical school graduates can further their postgraduate training owing to limited slots; are some of the reasons why doctors and specialists are not interested to work in government/public health services.<sup>67</sup>

#### **Political commitment for health education and performance**

There is a lack of health programs in developing countries to measure and identify the competency gaps and conduct periodic assessments to improve the quality of medical education and health service delivery.<sup>68</sup> In observation of recently graduated clinicians from nine LMIC, Nepal has shown poor performance; raising concerns about the models of clinical education and need for CBME.<sup>4,69</sup>

Competence is the ability to perform a specific task to yield desirable outcomes based on: knowledge (understanding facts and procedures), skills (capacity to perform specific actions), abilities (based on previous experience to perform a new task), and traits (personality characteristics to respond in a certain way).<sup>68</sup> Measurement of competency is based on competence (can do) and performance (does). Competency helps in outcome analysis, for example, 'healthcare reform, organizational performance, liability and ethics, risk management, certification of providers, planning for new services, measuring training outcomes, selection of staff, individual performance improvement, and supervision. Competency can be evaluated by experts in the field, trained observers including structured patients, and objective structured clinical examinations (OSCEA). A survey of young doctors who were deployed in peripheral health facilities felt that they were inadequately prepared for the local environment; and that the limited facilities had hindered their potential to serve the community, and also stunted their growth as medical doctors, leaving them uncompensated for their time and service.<sup>70</sup> Thus, even though competency can predict performance, competent health personnel may not always perform because of internal factors (motivation, agreement with a standard, self-efficacy, and inertia, etc.) and external factors (supervision, feedback, availability of resources, community, peer expectations, and incentives).

The school education system before university is important to support the competency during university. A multimodal approach including teachers' recruitment and their professional development adds value.<sup>71</sup> Sufficient funding is important for a fundamental system, yet after an optimum threshold, other factors play a greater role, for example, the governance and political commitment demonstrated by Sri Lanka (which has managed to transform itself into a middle-income country). In Nepal, the introduction of free secondary education has been a political convenience without a clear rationale; and the quality of education

remains poor despite an allocation of 17% of the national budget on school education (in 2012).<sup>71</sup> Postgraduate medical education, fellowships, and superspecialist training in terms of governance have been a topic of debate.<sup>54,56,66</sup> The competency-based specialist fellowship training for the varied duration (months to years) is yet to materialize in Nepal due to rigid certificate/degrees (for DM/MCH) programs.

#### **Exemplary CBME PG-training at PAHS Nepal**

Patan Academy of Health Sciences (PAHS) main aim is to train competent graduates to provide needed health service including rural Nepal; with the hopes that they will eventually become leaders in health care policy, and improve the overall health of populations. The PG program started in 2017 focuses to implement the changes required in traditional medical education via CBME teaching-learning, giving a significant weightage to formative assessment and continuous effective feedback. PAHS took a bold step (in the country) to include a publishable journal article together with a research thesis for the PG program. Trainees are required to be certified for pre-sets of entrustable professional activities (EPAs), and to cover the 8-Core Competencies in various domains in: Professionalism, Patient-centered care, Procedural skills, Clinical Reasoning, Communication, Scholarship, Leadership, Community orientation.<sup>72</sup> The PG program is free for candidates, with a subsistence allowance sponsored by the Ministry of Health. In return, the candidates are required to work for a defined period as designated by the ministry.<sup>72</sup>

Some of the teaching-learning methods at PAHS include: Small group discussions, Case Presentation and Case-based Discussion, Seminars/Lectures/Journal club, Core content review, Ward based teachings, Ward work/ward rounds, Outpatient clinic exposures, Skill teaching/Practical sessions/Demonstrations, Procedural skill teaching, Operation theater exposures, Clinico-radiological and clinicopathological meetings, Clinical audits/Quality Improvement

projects, and peripheral hospitals postings. Formative Assessments are used for the mastery of content (knowledge and skills) and the process (learning process and development of professional values and behaviors) to provide students and faculties the feedback on residents' academic growth and for timely corrective measures. The Comprehensive Summative Examinations, the annual exams in year 1 & 2, and a final exam at the end of the 3<sup>rd</sup> year include theory and practical. The final transcript includes marks allocated for research thesis development, thesis presentation and defense, and for producing a publishable article.

The trend of including more and more components into the competency-based curriculum in PG training programs in the medical and allied field will become a reality in Nepal.

#### **Challenges and future direction**

Postgraduate medical education and CBME is a relatively novel endeavor in Nepal with less than five decades of history since the establishment of the first medical college, the IoM TUTH in 1972. Political instability, fast and ongoing privatization of education and health is a challenge for equitable service delivery. Political commitment, sensitization, and training of stakeholders would be necessary to ensure uniform implementation of the CBME across all medical schools in the country. Comprehending competency, EPA, developmental milestones, and integration of 'Knowledge, attitude, skill, habit' (KASH) into the competency domains are necessary to bring out the desired paradigm shift in teaching-learning and assessment. Logistics and resources; de-emphasizing the tradition of time-based training are some of the factors for apprehension among teachers, learners, and administrators.

#### **CONCLUSION**

The Healthcare System of Nepal needs more health workforce, trained and competent to sustain and improve the serve the need of diverse population across the country without

any bias. From the beginning of medical education to the present-day scenario, post-graduate medical education has made a great achievement, with several institutions adopting competency-based training. Major challenges in the mismatch of the location of doctors in urban areas and 3/4<sup>th</sup> of health education and service offered by the for-profit private sector is a challenge for the equitable healthcare system. Patan Academy of Health Sciences (PAHS) has adopted exemplary mission and vision, implemented competency-based medical education (CBME) curricula in postgraduate training. The trainees are required to be certified for a pre-set of entrustable professional activities (EPA) and assessments to ensure the competency in '8-Core Competencies domains'. In the future, the post-graduate training will require refinements and inclusion of components of the competency domains, the policies, and regulations tailored: to achieve the required level of competency for an effective and equitable health service delivery.

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The authors declare no conflict of interests.

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