Improving Postgraduate Anaesthesiology Training in a Low-Middle Income Country by Embracing the New Trends in Medical Education

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ABSTRACT

Postgraduate medical training has increasingly adapted to competency-based medical education (CBME). In an endeavour to stay abreast with the new trends in medical education and adapt to CBME frameworks, an in-depth review and revision of the Anaesthesiology training curriculum were conducted. The authors worked on the task from December 2020 to December 2021. Learning outcomes were defined and corresponding competencies were identified and relevant teaching, learning and assessment strategies were aligned with each learning outcome. Additionally, lists were devised for topics to be covered through didactic lectures and simulation-based workshops. The revised curriculum is currently being implemented in a phased manner. Formative workplace-based assessment tools are being introduced to complement CBME. Moreover, daily clinical assessments, entrustable professional activity (EPA), simulation-based workshops and assessments have been introduced.

Key Words: *Anaesthesiology, Postgraduate training, Curriculum revision, Competency-based medical education, Low-middle income country, Simulation-based training.*

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A well-conceived and comprehensive curriculum serves as a road map for both teachers and learners and helps in ensuring that they stay on track and advance smoothly.[1] Moreover, it is the pathway for progressing from basic skills to increasingly advanced and complex skills.[1] This is especially pertinent to postgraduate training in medical specialities. Over the last two to three decades, there have been many developments in medical education, including innovations in teaching and learning strategies and assessment methods. In recent years, postgraduate medical training programs have increasingly adapted to competency-based medical education (CBME).[2-6] The focus of CBME is on the outcomes of training, *i.e.*, demonstration that the trainee has achieved competence to progress to the next level of training or is competent to enter professional career.[2,7]

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In this era of globalisation of healthcare, it is crucial to stay abreast with the current trends in medical education. College of Physicians and Surgeons of Pakistan (CPSP), the regulatory authority for postgraduate training in all specialities in the authors' country has adapted to CBME and has advised the national training programs to revise the curricula accordingly. Hence, the Anaesthesiology residency committee at the authors' institution considered it a timely call to review the existing curriculum, define clear learning outcomes, and align them with appropriate teaching and learning strategies and assessment methods to embrace competency-based education in its true spirit and stay abreast with the changing trends. To achieve this, a dedicated committee comprising of subject and education experts worked diligently on an in-depth review and revision of the Anaesthesiology residency training curriculum. In this article, the authors narrate the process followed by them for a step-wise revision of the curriculum.

A needs assessment was conducted before the formal initiation of review and revision of the curriculum. It is apparent from the literature that, in recent years, CBME has increasingly been taken on as the prevailing method for PGME.[2-6] Moreover, the use of simulation-based learning for clinical and procedural skills has been adopted for both undergraduate and postgraduate medical education.[8-10] A sub-committee of the Department Residency Committee (DRC) worked on the review and revision of the

curriculum from December 2020 to December 2021. A rotation-wise review and revision were performed. Detailed tables of specifications were formulated covering the curricular content for each rotation, learning outcomes/objectives, appropriate teaching and learning methods and assessment strategies. The alignment of the curriculum with the College of Physicians and Surgeons of Pakistan (CPSP) syllabus was ensured. Some gaps were identified in the existing curriculum, including an absence of the competencies of critical thinking, professionalism, teamwork, advocacy, collaboration, leadership, *etc*. These competencies were incorporated against relevant objectives/outcomes.

Simulation-based training sessions were added in the teaching and learning methods. Workplace-based assessment methods for formative assessment of clinical and procedural skills included mini-clinical evaluation exercises (mini-CEX), direct observation of procedural skills (DOPS), entrustable professional activity (EPA), *etc*. The committee also devised a list of topics for interactive tutorials, didactic lectures, and simulation-based workshops.

In the revised curriculum, the development of SMART (specific, measurable, achievable, relevant, and time-bound) objectives/learning outcomes for each curricular content helped in categorising all competencies which need to be learnt and assessed during training. Moreover, the introduction of a standardised table of specifications with columns for curricular content, objectives/learning outcomes, competency to be achieved, teaching and learning strategies, and assessment methods guided the authors in addressing the gaps in the teaching, learning and assessment strategies. Gaps identified in assessment methods were filled by the introduction of workplace-based and simulation-based assessment activities. The authors believe that curricular revision in this format will also be helpful in developing blueprints for assessment.

After approval by all stakeholders, the revised rotation curricula were shared online with the respective residents and faculty on January 01, 2022, for implementation. Since the overall curriculum review, revision and approval process took almost a year, parallel work had been initiated simultaneously by the authors on the development of formative workplace-based assessment tools to complement CBME. The tools are being piloted for faculty sensitization and smooth introduction. The aim is to implement them for all clinical and procedural skills over the next two years. The assessment structure recommended in the revised curriculum is provided in Table I.

Parallel work continues to be in progress during the implementation of the revised curriculum.

Mini-CEX and DOPS tools have been developed and are presently being implemented for some clinical and procedural skills. The minimum number of times formative assessment is required for different skills has also been defined. The trainees are responsible for ensuring the timely completion of their clinical assessment through coordination with relevant faculty. Formative feedback is provided by the faculty at the end of each assessment session.

Table I: Assessment structure for anaesthesiology residency training recommended in the revised curriculum.

Formative
Daily clinical encounter assessment
DOPS/Mini-CEX during clinical rotation
EPAs (in some rotations)
Presentation evaluation (journal club, morbidity & mortality)
Sign-off checklists following simulation-based workshops
Clinical evaluation during and at the end of clinical rotations
Logbooks (online)
Summative
Structured viva voce at the end of clinical rotation
End-of-year MCQs and SAQs (conducted by PGME)
End-of-year OSCE (conducted by DRC)
Intermediate Module examination at the end of Year II (CPSP)
FCPS II (Exit exam after completing four years of training (CPSP)

DOPS = Direct observation of procedural skills, Mini CEX = mini clinical evaluation exercise, EPA = Entrustable professional activity, MCQ = Multiple choice question, SAQ = Short answer question, OSCE = Objective structured clinical examination, PGME: postgraduate medical education, DRC = Department residency committee, CPSP = College of Physicians and Surgeons, Pakistan, FCPS = Fellow of College of Physicians and Surgeons.

Entrustable Professional Activity (EPA) tools are gradually being implemented for relevant skills in each year of training according to year-wise milestones. Phased introduction will continue throughout the training period. Before the introduction of EPAs, a framework of basic core competencies was made. Initially, four EPA assessment tools were developed for the most common Anaesthesiology procedures, selected from a comprehensive list. These were shared with the Department of Educational Development (DED) for expert opinion. The EPAs were piloted on residents before being regularly implemented.

Simulation-based workshops are being introduced in a phased manner. The skills to be learnt through simulation have been identified for each year of training. Checklists have been prepared for each procedure and after the workshop, residents are signed-off for the skill in a simulated scenario.

Building up and maintaining an appropriate workforce is essential for meeting the demands for service provision in healthcare.[11] Scarcity of adequate resources is a problem faced by many healthcare systems in low-middle income countries (LMICs). This scarcity is reflected in the availability of effective teaching and learning resources for postgraduate programs. In the present era of globalization of medical education, it is important to establish comparable standards in education worldwide, while adjusting the training to local contexts.[12] Postgraduate medical training programs have increasingly adapted to CBME in recent years. CBME plays an important role in training competent doctors through standardized teaching and assessment methods.[13]

The authors' institution aspires to keep pace with the progress in healthcare provision and education taking place in other parts of the world. At the same time, it endeavours to enhance the academic standards and quality of regional healthcare institutions by conducting courses, workshops, symposia, conferences, *etc*. In line with these objectives, the DRC planned to closely review the curriculum, define clear learning outcomes, and replace the traditional time-based educational methods

with carefully designed strategies to embrace contemporary techniques of teaching, learning, and assessment. It is hoped that this revision would serve as an example for academic leaders of Anaesthesiology training programs at other institutions in the region.

Traditionally, PGME has been time-based with intermittent summative assessments and limited feedback. The main focus has been on the attainment of knowledge as compared to skills and attitude, with hardly any assessment of communication skills, teamwork, professionalism, etc. The norm was to acquire knowledge and reproduce it in final examinations. The authors aimed to revise the curriculum in line with the goal of training physicians who can independently provide safe and effective management to their patients and worked towards adapting to the CBME framework in the Anaesthesiology residency training program. In this framework, the trainees take responsibility for their learning, and the training program adapts to their progress and development.[14] Furthermore, assessments are more frequent and formative, including assessment of the application of knowledge, skills and attitude to clinical situations.[14] The gist of the competency-based training is to graduate specialists capable of independent practice. Implementation of a major change in the curricular framework cannot be achieved overnight. It is a long-drawn process that requires the cooperation and training of all stakeholders. Regular program evaluation guides in strengthening and fine-tuning the recommended learning and assessment methods.

It is imperative for Anaesthesiology training programs to ensure that the passing out graduate is a professional, a good communicator, an effective team player, and can effectively lead a team during crisis, rather than just being knowledgeable and having expertise in technical skills.[15] The authors have incorporated these competencies in the revised curriculum and have aligned them with relevant learning and assessment methods.

A robust assessment of trainees' performance is recommended for competency-based training programs. For desired achievement of the outcomes defined in the revised curriculum, formative assessment tools, including tools for WBA, EPAs, simulation-based assessment, and daily clinical assessments have been developed and are being piloted and implemented in a phased manner. WBA plays a central role in CBME for formative assessment and feedback and helps in monitoring trainees' progress.[16] Different WBA tools are used to assess various facets of clinical practice. Mini-CEX and DOPS have been introduced at the authors' department and their use is gradually catching momentum.

An EPA is a segment of clinical practice that is entrusted to a resident trainee once he or she can exhibit the essential competence to perform it without supervision.[17] EPAs assess skill acquisition simultaneously in multiple competencies.[17,18] Thus, EPAs are useful in linking the assessment of competencies to clinical practice,[18] and this method of assessment is useful in making summative entrustment decisions regarding specified units of practice.[17] To truly ensure the individualised acquisition of the required competencies, time-variable flexible training is the most recent innovation recommended for Anaesthesiology speciality training programs.[19]

Simulation-based training enables the trainees to learn and practice skills in a safe environment, without the stress of causing harm to patients.[9,20] It provides the opportunity for repeated practice with the potential for improving patient safety. This learning strategy is specifically useful for uncommon scenarios that the trainee might not get the opportunity to see during training. Furthermore, simulation-based training is very useful for training and assessment of crisis management and in enhancing teamwork and communication skills.[8,21]

Daily assessment of the residents based on their clinical encounters with faculty is a feasible and reliable method of formative assessment that allows for immediate, specific and effective feedback that can occur regularly.[22,23] It also guides the trainers in improving their teaching strategy to increase its effectiveness.[24]

The curriculum revision process was rigorous and followed the widely recommended Kern's steps for curricular development.[25] Kern's steps ensure a systematic approach to curricular development. The collaboration of experienced faculty with input from DED and feedback from the stakeholders ensured the content validity and relevance.

Safety in anaesthetic practice has improved markedly over the last 50 years. Effective training of future specialists is essential for ensuring patient safety and maintaining high standards of practice. Training programs need to keep pace with the ongoing developments in teaching, training, and assessment methods. However, limited resources often prevent training programs in LMICs to maintain this pace. It, therefore, becomes imperative for the more resourceful centres to take the lead in adapting to the emerging trends and assume the role of a resource for the other regional centres.

The implementation process of the revised curriculum has highlighted the need for 'educating the educators' for improvement in the quality of education delivery and conducting educational research for further enhancing the standards. Faculty needs to be trained in providing formative feedback to learners following assessment sessions. Towards this end, workshops and courses are organised by DED, which are also offered to the faculty of other training centres of the country. Moreover, with the aim of keeping abreast with ongoing changes and innovations in medical education, program directors and academic leaders at the authors' institution are increasingly expected to pursue higher degrees in education.

The strengths of the revised curriculum include alignment of the content with the postgraduate outcomes/competencies defined by the national training authority, relevant and feasible teaching, learning and assessment strategies aligned with the defined learning outcomes, inclusion of work-place based assessments, use of simulation, and emphasis on role-mod-

elling by faculty. The approach taken for curricular revision by the committee can be a model for other postgraduate programs in the institution and region. The limitation in the process, which was identified by the authors retrospectively, was the absence of trainee representation during the entire process of curriculum revision. Since the trainees are the key stakeholders, the authors recommend that a resident representative should be an invited member of the curricular revision committee and residents' feedback must be considered when finalising and implementing the revised curriculum.

COMPETING INTEREST:

The authors declared no competing interest.

AUTHORS' CONTRIBUTION:

AA: Contribution to the concept, formulation of learning objectives, learning and assessment methods, drafting of the manuscript, and its multiple revisions.

AA: Contribution to the concept, curricular design, formulation of learning objectives, learning and assessment methods, and critical review and revision of the manuscript.

SK, MFK, KS: Contribution to the learning objectives, learning and assessment methods, and critical review of the manuscript.

HU: Assignment of tasks and critical review of the manuscript.

SSA: Identification of core topics and review of the manuscript.

AR: Contribution to the learning and assessment methods, and review of the manuscript.

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