Teaching Our Students, Our Residents and Ourselves

Öğrencilerimizi, Asistanlarımızı ve Kendimizi Eğitmek

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Abstract / Özet

Even though postgraduate medical education has been the focus of interest in anaesthesiology education, in a broader sense the entire medical community can be considered appropriate learners of anaesthesiology. Anaesthesiologists are equipped to teach physiology, pharmacology, resuscitation, pain management, perioperative assessment, and medical technology. For residency training, an approach based on competencies, skills and professionalism should be used instead of the traditional "apprenticeship" model. When teaching ourselves as qualified anaesthesiologists, areas of continuing professional development, academic career training and continuing medical education should be taken into account. Whereas the responsibility for undergraduate medical education rests with university medical schools, postgraduate medical education is carried out by universities and/or the national health authorities/services. Establishment of partnerships between healthcare services and universities should be central to the provision of postgraduate education so as not to dissociate various stages of education. When determining educational strategies, institutional preferences, target populations and their learning styles should be taken into account. To this end, especially for high risk situations simulation-based approaches, scenarios, standardized patients, research, mentoring, journal clubs, seminars, lectures, case discussions, bed-side discussions, courses, games and portfolios have been and are being used widely. Departments of anaesthesiology should establish and maintain a strong presence in undergraduate medical education. Besides being good clinicians, anaesthesiologists should understand all aspects of education and educational outcome in order to better teach students, residents and themselves. Quality of education and the teaching environment should continually be evaluated within the context of quality assurance.

Key Words: Medical education, anaesthesiology education, teaching responsibilities, teaching methods

Anesteziyoloji eğitimi, yoğunlaştığı alan tıpta uzmanlık olmakla birlikte, tıp eğitiminin tüm kademe ve alanlarını kapsamalıdır. Anesteziyologlar, çok-disiplinli yaklaşımları, temel ve klinik bilimleri entegre edebilmeleri ve cerrahi-dahili bilimler arasındaki köprü rolleri ile özellikle mezuniyet öncesi eğitimde yararlı olabilirler. Asistan eğitiminde geleneksel usta-çırak modeli yerine temel yeterlikler, beceriler ve profesyonellik ilkelerine dayalı bir model benimsenmelidir. Kendimizi yani uzmanları eğitirken ise, sürekli mesleki gelişim, akademik kariyer ve sürekli tıp eğitimi alanlarındaki ilkelere göre planlama yapılmalıdır. Mezuniyet öncesi eğitimin sorumluluğu üniversitelerde iken, uzmanlık eğitimininki üniversiteler ve ulusal sağlık kurumlarındadır. Bu kademelerin birbirinden kopuk olmaması için sağlık eğitimi kurumları arasında sıkı işbirliği gerekir. Eğitim yaklaşımları belirlenirken, kurumsal tercihler, hedef kitlenin özellikleri ve öğrenme stilleri dikkate alınarak, çeşitli eğitim yaklaşımları örneğin; özellikle riskli ve beceri gerektiren alanlarda simülasyona dayalı eğitim, senaryoya dayalı eğitim, standardize hasta, araştırma, e-Portfolio, koçluk, dergi kulüpleri, seminerler, konferanslar, kurslar, olgu sunumları, yatakbaşı tartışmalar, oyunlar kullanılabilir. Eğitim kalitesi ve ortamı kalite güvencesi kapsamında sürekli olarak değerlendirilmelidir. Anesteziyoloji departmanları sağlık eğitiminin her aşamasına ağırlıklarını koymalı, programda kendilerine mutlaka yer açmalı; anesteziyologlar, iyi klinisyen olma yanında öğrencileri, asistanları ve kendilerini daha iyi yetiştirmek için eğitimin tüm yönlerini anlamalıdır.

Anahtar Kelimeler: Tıp eğitimi, anesteziyoloji eğitimi, eğitim yöntemleri, eğitim sorumluluğu

Introduction

Education is a process that results in a change of behaviour based on a variety of experiences, and is focused on the learner not the teacher. Such experiences should encourage student interaction with their tutor, providing this engagement supports the educational process and plan (1). Even though postgraduate medical education (PGME) has

been the focus of interest of anaesthesiology education, in a broader sense the entire medical community can be considered appropriate learners of anaesthesiology. This review will focus on teaching of medical students, residents and ourselves in general, accompanied by the training strategies that can be tailored to accommodate specific training requirements.

Responsibility of education

Whereas the responsibility for undergraduate medical education rests with university medical schools, postgraduate medical education is carried out by universities and/or the national health authorities/services. Separation of postgraduate education in the health services from undergraduate education in universities "the dissociation of hospital from university" causes concern about the continuum of undergraduate and postgraduate education. Therefore establishment of partnerships between health-care services and universities should be central to the provision of postgraduate education. This facilitates the seamless provision of opportunities for acquisition of knowledge and experience across undergraduate and postgraduate education while maintaining accountability to the professional regulatory bodies at all stages of medical education. To this end, postgraduate deaneries in collaboration with university-based clinical academics should provide a teaching input into the foundation and specialty programmes. Additionally, they should construct and run academic programmes combining specialty training with research and teaching. They should have a joint role in commissioning placements, and manage the quality of training by adopting standards set by the relevant professional regulatory bodies (2).

Target populations

Medical students (Undergraduate medical education, UGME)

Undergraduate exposure is as important for the specialty of anaesthesiology as postgraduate medical education (PGME). Unfortunately, the relevance of anaesthesia to UGME has been questioned in the past. In the nineteen sixties, Griffith wrote: "perhaps it is partly our own fault, because in the past we have done very little to bring the picture of anaesthesiology before the medical student in his early and formative years" thus bemoaning the specialty of anaesthesiology's contribution to this situation (3). Fortunately, things have changed with the well reasoned arguments justifying the contributions anaesthesiologists can make to UGME, so perfectly volunteered by Brull and Bradley (4)

- Given the broad-based knowledge and technical skill of anaesthesiologists, they represent a rich resource.
- They are ideally equipped to teach physiology, pharmacology, resuscitation, pain management, perioperative assessment, and medical technology.
- As intensivists, many of them are well suited to teach medical ethics, including consent, allocation of scarce resources, and end-of-life decision-making.

- They have insight into the practice of ambulatory medicine and efficient health care management.
- They play an integral role in a variety of hospital settings including the operating room, the recovery or post- anaesthesia care unit, the intensive care unit, pre-admission clinic, obstetric suite, and pain clinic.

Undergraduate exposure to anaesthesiology will also contribute to the recruitment of the best and brightest medical students to the specialty. Therefore undergraduate anaesthesia rotations should be mandatory and efforts should be spent not to lose them. During these rotations a national undergraduate anaesthesia program with emphasis on core competencies in areas such as airway, breathing and circulation, as well as basic competencies in resuscitation should be implemented.

Anaesthesia residents (Postgraduate medical education-PGME, residency training)

Many believe that the traditional "apprenticeship" model of residency, developed a century ago in an era involving primarily office-based private practitioners, is outdated and in need of modernization. Furthermore, concerns have been raised about whether residency graduates are properly prepared for today's practice environment and demands, and about aspects of physician competency (5).

Accreditation councils, societies and boards of medical specialties require that newly graduated physicians are properly prepared and competent to practice, known as competency-based training. They emphasize and rely on the competencies in certain domains. For example; the Accreditation Council of Graduate Medical Education (ACGME) of USA identified 6 general core competencies defining the desired outcome of training as follows (6);

- *Systems-based practice.* Residents must be able to demonstrate an awareness of and responsiveness to the larger context and system of health care and the ability to effectively call on system resources to provide care that is of optimal value.
- *Medical knowledge.* Residents must be able to demonstrate knowledge about established and evolving biomedical, clinical, and cognate (e.g. epidemiological and social-behavioural) sciences and the application of this knowledge to patient care.
- *Interpersonal communication skills.* Residents must be able to demonstrate interpersonal and communication skills that result in effective information exchange and teaming with patients, patients' families, and professional associates.
- *Professionalism.* Residents must be able to demonstrate a commitment to carrying out professional responsibilities, adherence to ethical principles, and sensitivity to a diverse patient population.
- *Practice-based learning and improvement.* Residents must be able to investigate and evaluate their patient care practices, appraise and assimilate scientific evidence, and improve their patient care practices.

- *Patient care*. Residents must be able to provide patient care that is compassionate, appropriate, and effective for the treatment of health problems and the promotion of health.

Based on this concept, resident training programmes are required to educate, evaluate, remediate, determine and document that their graduates are competent in these domains (7).

Residency training should also take into account the increasing number of residents seeking additional training in areas such as pain medicine, critical care medicine, cardiothoracic anaesthesia and paediatric anaesthesia, partly to fulfil their quest to gain more experience and partly to enhance their prospects for employment. In addition; fellowships in obstetric anaesthesia, patient safety and crisis management, clinical research, laboratory research, management of perioperative services, neuro-anaesthesia, difficult airway/ear-nose-throat, regional anaesthesia, liver transplantation, paediatric pain management, and informatics may gain recognition in the near future (8). Therefore at least some residency programmes should formulate plans to offer fellowships in these subspecialties.

Ourselves (Qualified anaesthesiologists)

Continuing professional development (CPD) is the process by which individuals keep themselves up to date and maintain the highest standard of professional practice. It complements formal undergraduate and postgraduate education and training. CPD requires doctors to maintain and improve their standards across all areas of their practice. Specific changes in practice and career development can be encouraged and supported by CPD which also has a role in helping doctors to keep up to date when they are not practising (9).

Academic career training. In order to foster academic teachers, training bodies should develop dedicated academic training programmes such as academic clinical fellowships alongside clinical residency programmes. This may be achieved through integrated programmes, a master's degree in education, increasing exposure through teaching, to undergraduate/preclinical medical students, and making academic modules in anaesthesia available to trainees (10).

Continuing medical education (CME) places greater emphasis on the individual requirements of practitioner-learner and relate more specifically to the needs of medical practice. It has received little direct attention in the anaesthetic literature. CME may offer new opportunities for anaesthetists interested in education which may be directed either towards maintenance of competence or recertification.

Training strategies - How to teach ?
The use of specific teaching methods depends on the target population's requirements, their educational goals and the content to be taught. Some of these methods are discussed below.

Learning styles
Residents, CME recipients and those training as teachers are adults who can capitalise on a wealth of previous experience and who are actively engaged in the educational process. The key for the tutor is to acknowledge previous experience, thus providing the foundation upon which new educational principles can be built. Learning styles employ a variety of approaches including those with visual, auditory, verbal, physical, logical, social emphasis, either in isolation or together, tailored to the individual student. Better recognition and understanding of these styles can improve the speed and quality of learning and result in a better outcome (11). The concept of individualised "learning styles" originated and became popular in the 1970s. Although children and adults express personal preferences as to how they prefer to learn, there is no evidence that identifying a student's learning style produces better outcomes.

Simulation-based training
The specialty of anaesthesiology has pioneered the use of simulation for training and assessment. Hence simulation is now a widely used in the training of anaesthesia residents. Depending on the trainee's experience, the use of simulation can be extended from the demonstration of individual skills to complex scenarios (12). Comprehensive simulators, computer models and manikins have been used to this end (13). This equipment can be housed in specialised simulation laboratories or centres permitting more efficient use of the resources by the various target groups.

Comprehensive simulators, including simulated patients, anaesthetic machine, ventilator, monitors, drug and fluid administration equipment, have the advantage of closely mimicking the working environment. They allow clinical scenarios to evolve without harm to a *real* patient, and provide the opportunity for the same problem to be addressed several times by the same trainee, or, alternatively, by several trainees in succession. Simulation provides the capacity to create and confront problems that are rare in clinical practice as frequently as is necessary in order to record trainees' responses and provide feedback. There is the additional benefit of being able to stop, restart, restructure and repeat any scenario. The principal disadvantage of comprehensive anaesthesia simulators is that they are expensive.

Computer simulators lack the ability to replicate the working environment as accurately as that found in comprehensive simulators. Nevertheless, computers reproduce complex clinical problems. Similarly, the trainees' responses can be recorded and timed. Errors can be identified and summarised following the encounter. A major advantage of computer simulation is that "off the shelf" systems can be acquired relatively cheaply. In contrast to the comprehensive simulators, computer simulators do not require an attending supervisor and can be used at any time.

Mannequins are the least technologically sophisticated form of simulation and are used for teaching manual skills, most commonly epidural catheterisation and fiberoptic bronchoscopy. Mannequins may usefully assist orientation and practice of techniques, but may offer little advantage over traditional one-to-one clinical teaching in the long term.

It should be kept in mind that simulators are just tools that can be employed to create an effective learning experience. The education, training, commitment and overall ability of the instructors are of the utmost importance (14). Use of simulators for the purpose of evaluating the performance, scoring or certifying competence is less well validated than their use as a teaching tool. With respect to UGME, both simulator and problem-based discussions in small groups have been found to lead to comparable short-term outcomes in theoretical knowledge and clinical skills. Whether utilisation of simulation-based undergraduate training with respect can justify the cost and resources associated with its use remains controversial. Currently, there is a lack of robust data clearly demonstrating an advantage in acquisition of clinical knowledge or "soft-skills" through simulation-based training (15). For simulation to realize its potential impact, further research is needed to understand how to optimize this modality of learning more effectively, how to transfer knowledge of research findings to practice, and also how to broaden the simulation modalities used in anaesthesia. In future, the optimal use of simulation will depend on a clear understanding of what can and cannot be accomplished with simulation and its various modalities (16).

Scenarios
They are an integral part of simulation-based training. The design of scenarios for simulation is demanding. They are usually designed to achieve learning objectives with relevance to the trainee's background and experience, and the method of conducting the scenario (14).

Standardized patient
Since optimum clinical performance is the most important outcome underpinning medical education; consistent measurement of that performance is essential. To overcome the complexities of comparative evaluation of different students with different patients, standardised patients can be employed. Generally these are non-physician actors, who have been trained to act and respond appropriately and consistently so as to emulate a patient encountered by the trainee.

There is a general misconception amongst many health care workers that anaesthesiologists do not need to demonstrate effective communication and interpersonal skills because their patients are "asleep". This view is misplaced because safeguarding the patient requires excellent communication skills, interpersonal skills, and professionalism. Anaesthesiolgists are required to interact effectively with patients, their families, surgeons, nurses, and other personnel during the highly stressful perioperative period. Standardised patient–based ed-

ucation is an ideal format for teaching and evaluating these skills in anaesthesiology residents. Standardised patients may be incorporated into mannequin-based simulation scenarios to teach, evaluate and improve clinical competencies (7).

Virtual humans (patients)
A virtual human is the creation or re-creation of a human being using computer-generated imagery and voices. Virtual humans may enable the consistent and, where required, repeated presentation of abnormal physical findings to many students. They offer structured training in the type of clinical decision making that experts normally acquire only after considerable experience and practice, and to do so in a safe and controlled environment. In a study comparing standardised patients with virtual humans in the preoperative assessment of obstructive sleep apnoea, Wendling et al. (17) observed that virtual humans performed at least as well as standardised patients. They suggested that virtual humans offered the potential to portay the physical abnormalities of an almost limitless repository of diseases consistently and repetitively.

Research
Residents should be encouraged to join basic or clinical research projects to gain experience in this field.

e-Portfolio
This web-based system allows trainees to assemble their educational portfolio with supporting evidence, activities, events and qualifications. Trainees, consultant anaesthetists and administrators can be provided with secure individual access to the e-Portfolio system and interact with the system's features and functions. Information can be uploaded, created, edited or removed and, when submitted as supporting evidence, can be approved, assessed, marked as completed and signed-off (18). By standardising evaluation of competency, e-portfolios enable trainers to compare the individual resident with their peers, to observe their educational progress and enhance self-learning by encouraging self-reflection (12).

Mentoring
Mentoring can be described as a complex, mutual process that occurs between two people of different levels of knowledge and expertise (19). This interaction integrates and enhances career, educational, interpersonal, and psychological development. Therefore, a mentor program between senior and junior residents should be established during residency training.

Others
Journal clubs, seminars, lectures, case discussions, bed-side discussions, courses and games have been and are being used widely.

Assessment and evaluation
Undergraduate and graduate programmes need to be continually re-evaluated and developed, preferably by specially trained anaesthesiologists. This should be done according to

guidelines set by an appropriate educational body. Although some skills can be measured objectively, reliable assessment is challenging in areas such as professionalism and communication. Additionally, each resident's training is monitored by a system of feedback and in-training evaluations. Clinical teachers should be qualified to deliver formal teaching as well as in-training assessment (structured observation, written assignments, etc.) (20). Fortunately, the number of faculty interested in educational theories has increased recently, supported by academic degrees in education. Residents should evaluate each rotation and the teaching faculty anonymously.

Quality assurance

The quality of both the teachers and the learning climate/environment are important topics. In daily practice, supervising physicians contribute to learning by demonstrating skills, explaining management and in general serving as a role model (12). However, only few of them have received formal training to be a clinical teacher. This has led to the development of faculty training and assessment programmes.

A positive learning climate is also important for effective learning. Attention should be paid to such aspects as supervision, teaching qualities of the faculty, and the environment.

Key Learning Points

- The wider medical community are appropriate recipients of the key principles that underpin anaesthesiology.
- Besides being good clinicians, anaesthesiologists should understand all aspects of education and educational outcome in order to better teach students, residents and themselves.
- Departments of anaesthesiology should establish and maintain a strong presence in undergraduate medical education by offering mandatory courses and taking part in the development and improvement of the curriculum.
- A variety of teaching strategies should be adopted depending on the institutional preferences and target populations.
- A clearly identified path for academic career training should be available for those interested.

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