Teaching technical skills to medical students: Beyond '*see one, do one, teach one*'

Previous generation of doctors were taught psychomotor skills based on the '*see one, do one, teach one*' ethos. By trial and error, medical students and residents practiced directly on frightened patients who were often powerless to resist. Such was the supreme irony for a profession that espoused the prevention of harm (non-maleficence) as its highest ethical duty, yet tolerated a process of medical learning that was at the detriment of patients. It is little surprise that such crude methods of learning have become increasingly unacceptable to patients, teaching faculty, and even students themselves.

Beside the ethical conundrum, there is also evidence, as reported by Jebbin and Adotey in this issue of the journal, that some traditional methods of instruction produce doctors lacking in fundamental skills, notably basic airway techniques, insertion of nasogastric tubes, venous sampling, and others.[1] The authors have done a great service by highlighting a problem that is likely pervasive in the region, and which has also been widely reported even in developed countries. The study assesses questionnaire responses by final-year medical students in a Nigerian medical school, who graded their own familiarity with eight basic procedural skills. Of the 84 respondents, the proportions that had never performed these procedures were staggering: arterial blood sampling (100%), nasogastric tube insertion (76%), bag–mask ventilation (38%), urinary catheterization (38%), venipuncture (11%), and intravenous cannula insertion (4%). The problem possibly runs deeper, because self-assessment by the students was not validated by direct observation of their competency in performing these skills.

While commending the authors for providing an excellent description of the problem, and recognizing the need for curriculum change in their own institution, their examination of potential solutions was very limited in scope. In suggesting the teaching of procedural skills on patients who are under general anesthesia, the authors may have focused primarily on how best to alleviate students' anxiety and patients' discomfort. However, such an approach side-steps questions about informed consent and the possible harm to patients. Furthermore, there is little evidence to suggest that anesthetized human subjects are more effective than awake patients for teaching procedural skills to medical students. One hopes, therefore, that additional solutions will be explored beyond those recommended in the article.

Perhaps we can draw clues from adult learning theory, which identifies several key characteristics of adult learners that are relevant to medical students.[2] They are independent, self-directed, and well-motivated to learn. However, effective teaching of technical skills requires a proper pedagogical approach that begins with building cognitive skills, which can then be translated into medical procedures. Approaches to skill-based medical education that are theory based include the use of simulators and virtual reality. Additional strategies include video modeling,[3] skills training workshops,[4] peer-assisted learning,[5] and instruction by non-physician skills facilitators.[6] Whatever strategy is used, the objective structured clinical examination (OSCE) method, developed primarily for testing clinical skill performance and competence, can be adapted for use as a teaching tool.[7] Administered to the subjects before and after participation in a skills training course, OSCE can measure the effectiveness of the training, more objectively than self-report surveys of the participants.

One of the most widely used methodologies for teaching skills in situations requiring high decision-making ability and independent functioning is simulation. Simulators have been used extensively for training airline pilots and healthcare professionals, including medical students, resident doctors, and nurses, and for continuous professional development of practicing doctors.[8] The advent of human patient simulators (HPS) or full-body mannequins promises to improve drastically the intensity and quality of cognitive and psychomotor skills training at all levels of proficiency. Unfortunately, the cost of these simulators is prohibitive for many medical schools in developing countries. However, the same principles can be applied to low-fidelity simulators, many of which can be made locally.[4]

With only a little imagination and creativity, low-fidelity simulation models can be developed at a fraction of the cost of more expensive simulators. Such a system is currently being used at the Muhimbili University in Tanzania.[4] Simulators allow medical students to learn foundational skills in a supportive environment, gain confidence, and achieve mastery over techniques, without exposing patients to harm. At the Ohio State University, our preclinical students complete simulated skills training modules prior to their clinical rotations. Teaching faculty are also able to schedule dedicated simulator laboratory practice sessions for individual or small groups of students to reinforce specific skills. The Muhimbili experience demonstrates that such a strategy can be implemented even in medical schools with limited resources.

Forward-thinking leadership should be alarmed by this report by Jebbin and Adotey suggesting that some medical schools are failing to train doctors with the basic competence in core technical and procedural skills.[1] It is clear that creative curricular changes are required to recapitulate the high standards that were once the hallmark of many medical schools in the region. We should be under no illusions that the introduction of any curricular changes will be easy. Jebbin and Adotey correctly underscore the urgency of this task.

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