The clinical skills laboratory as a learning tool for medical students and health professionals

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ABSTRACT

Clinical skill laboratories (CSL) have become one of the essential facilities in an undergraduate medical curriculum. A wide range of training skills were recently introduced which includes clinical examination, diagnostic and therapeutic skills as well as communication skills. Although the educational value of the CSL is very well recognized, very little is written about it in the literature. The purpose of this paper is to provide an overview of the skills laboratory integrated in an undergraduate medical curriculum, highlight the nature of this trend, look at the advantages and disadvantages and suggest some guidelines for implementation.

The clinical skill laboratory (CSL) is a multidisciplinary educational facility that provides clinical skills training and practice. It is equipped with facilities to conduct physical examination, diagnostic, therapeutic procedures, and communication skills. This is achieved by using models, simulations, peer group "role-playing," mannequins, simulated patients and standardized patients. A simulated patient is a person well trained to simulate a patient's illness. Standardized patient is an umbrella term for both, a simulated patient and an actual patient who is trained to present his/her illness in a standardized way.[1] Students'"role playing" is when students play as patients, and interviews or examinations are conducted by their peers. In simulation technology, devices are used with or without multimedia computer programs constructed to mimic certain clinical conditions. A high level human patient simulator is a whole body mannequin with driven mechanical and computer software.[2] The CSL provides hands-on learning experiences to medical students to practice clinical skills, which are deemed essential for effective management of their future patients. It does not replace learning in the clinical setting. It is aimed to prepare students for clinical problems in a less threatening environment. Although CSL offers training primarily to medical students, residents, faculty and any other health related professionals might use it for development of new skills or refinement of those previously acquired. In addition to development of clinical skills, the CSL promotes use of Objective Structured Clinical Examination (OSCE) and standard patients for teaching and testing.[3] It also provides a milieu where research can be conducted. Moreover, it is a setting suitable to conduct certain skill courses periodically for medical students and for health care staff.

Distribution of clinical skills laboratories. The first CSL was established in 1976 in Maastricht, the Netherlands, Limburg University. It has then spread to become an integral part of a clinical competence.[4] The paradigm shift from a disease centered to a patient centered approach underlies the need for students to be proficient in communication skills. Communication skills are therefore a major focus in CSL.[5] Skills taught in CSL include communication and interviewing skills physical examination skills, therapeutic and diagnostic skills and laboratory

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skills. Most CSL's integrated in undergraduate curriculum has basic equipment required for interviewing. Video cameras and microphones installed in each room allow for recording sound and video, which can be played back in an adjacent media room for reflection and feedback. Audiovisual equipments are ideal for refining communication skills. Some CSL's are equipped with simulators and models where scrubbing and dressing for surgical and aseptic procedures. Some CSL's are equipped for basic and advanced cardiopulmonary resuscitation (CPR) so medical students are trained and certified in CPR during their first year of training. In addition to the above, some CSL's have information technology facilities, presentation facilities, and self help materials such as CD ROM's and other educational programs.

Factors and forces which led to the trend. As of less access to inpatients, teaching basic clinical skills to medical students has become difficult. Although health care teaching has shifted to ambulatory care, many clinical skills are not suitable for teaching in the outpatient setting. Even in a hospital with many patients, it is difficult to find suitable patients for bedside teaching. In situations where some patients are suitable for teaching, it is very difficult to find the right patient to practice history taking pertinent to certain disease conditions. In hospitals where patients are available for teaching, using sick patients as teaching aids is far from ideal. Furthermore, most medical schools nowadays adopt early clinical exposure when medical students are very inexperienced. Involving such students in bedside teaching places both students and patients in a threatening environment. Indeed, it was found that a substantial proportion of medical students enter their internship year without any basic skills experience.[6] This affects the quality of care interns provide, weakens the confidence of nursing and medical staff in new graduates, and poses a significant source of stress for many junior doctors.[7,8] Remmen et al[9] reported that relying solely on clerkships to provide students with skills training is inadequate. Taylor[10] and McMahon et al,[11] have shown that medical students typically acquire their basic skills on the ward from interested registrars in an ad hoc opportunistic manner. Subsequently medical graduates often enter their internship without ever having received any formal training in some basic skills.

In addition to the above forces, socio-cultural forces cannot be over-emphasized. Breast, vaginal, genital and rectal examination quite often raise ethical and cultural issues[4,12] and can cause psychological distress.[13] However, teaching some diagnostic and therapeutic procedures may cause pain and discomfort. Shortage of staff, large number of multicultural students, the need for small group teaching, early exposure to clinical practice,

self-directed learning compelled innovation in teaching methods. Clinical skills laboratory in one innovation that was born because of the interplay of all the above, educational, economical, social and cultural factors. In addition to the aforementioned forces, it is noteworthy that technology was and continues to be a major force for CSL. This is exemplified by cardiovascular disease simulator (Harvey), multimedia computer system, anesthesia simulator and so on.[14]

Advantages and disadvantages. Clinical skills laboratory in an undergraduate setting aiming at preparing students to practical skills provides non-threatening learning environments. Students can afford to make mistakes without emotional reaction of the standardized patient, computer or mannequins to incorrect responses. Moreover, they can repeat procedures as often as they like. They can also focus on individual skills in a controlled manner. Learning in a CSL provides standardized experience to all trainees. Furthermore, one important advantage seems to be the fact that social and ethical problems are overcome when students learn intimate examination skills in the CSL. Using mannequin's students may perfect these skills and can then approach patients with more confidence. Most skills labs are equipped with video recording of history taking on simulated patients. Using simulated patients in CSL is consistent, reproducible and adjustable to match the stage of training of the learner. Unlike real patients they are available when and where needed and can be used for several patients consequently without risk of their presentation altering. This obviously enables students to practice dealing with problems, which if handled inexpertly could be very distressing for real patients. Video recording of interviews usually takes place in CSL. This allows feedback on history taking and interviewing skills, which improves their communication skills in practice. The CSL provides a wide range of learning skills for undergraduates and builds confidence in their capabilities.[15] Indeed, CSL provides longitudinal integration between basic and clinical sciences, which is ideal for an undergraduate medical curriculum.[12] Although use of CSL has all the above advantages, a number of disadvantages are evident. The main disadvantage of the CSL is its cost, which can be expensive (about $150,000) if high fidelity systems are used.[14] Clinical skills laboratory can also be expensive to run in terms of staff and consumables. According to Bradley and Bligh,[15] the total cost used for CSL renovation was around £150,000 and an additional £50,000 for equipment. Replacement, maintenance and consumables costs were approximately £25,000 per annum. In CSL's where teaching takes place by analyzing pre-recorded videotapes and using CD ROMs there is always a risk of technical hitches. Although the use of simulated patients was proven

to be a useful learning aid, some clinical signs are impossible to simulate. Besides that students are generally fascinated with the hospital environment and are more keen on real patients. This can affect their enthusiasm on learning in the CSL.

Guidelines for implementation. The CSL is a high calibre professional resource body, which requires careful planning for implementation. The key questions to be answered are: What skills should be learned? How and when will training take place? Who will provide the training? How to make sure it works? As far as what skills can be learned, a wide range of skills is described in the literature. The precise skills to be taught may be defined by the school through a process of discussion and drawing out of consensus. The participants in the process might include faculty and non-faculty clinicians and other health care professionals. Some skills need to be covered early in the curriculum such as communications, history taking and physical examination to provide foundation for students preparing for clinical attachments. In the later years more sophisticated skills are added ie. clinical reasoning, advanced practical procedures, patient management and investigations. How and when these skills are learned must be guided by clear aims and objectives, a clear understanding of the level of achievement and proficiency expected at different points throughout the undergraduate medical curriculum and a defined set of intended outcomes. As far as the venue is concerned, as far as possible, it should be as close to the real clinical world as possible. This can be in a hospital setting or in a medical school's laboratory. Training providers can be qualified clinicians; both hospital and community based. However, a number of other groups can also be involved such as nurses; allied health professionals such as occupational therapist, physiotherapists, paramedics and ambulance staff; and students as in peer tutoring and role-playing. An appropriate mix of backgrounds of teachers should be sought to provide input at appropriate points in the undergraduate teaching. Proper training of teachers must include the teachers being aware of the learning outcomes of the curriculum. The teachers' opinions and views should not be ignored, and their input into curriculum evaluation should be encouraged. There should be an ongoing evaluation of the training in the CSL. Feedback should be given to students, tutors and faculty concerning the

value of training. Assessment of students through use of appropriate methods to test knowledge, skills and attitudes. This also provides information on the quality of skills training. Other feedback on the success of the CSL come from external review, external examiners and accrediting bodies.[16]

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