

Techniques in medical education

The clinical skills unit

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Summary

Clinical skills units offer exciting and innovative ways of learning about clinical skills. Links between theoretical knowledge and clinical practice are appropriate for both undergraduate and postgraduate training. Students and doctors can practice and acquire technical and examination skills in a standardised and protected environment without being concerned about the distress such learning may cause real patients. Models and simulators used in skills units are being developed to keep pace with demand, with a corresponding increase in standards of quality and durability. As undergraduate medical courses respond to the demands of modern clinical practice the use of such facilities will increase. This paper describes the functions of skills units and provides practical examples of educational strategies in use.

Keywords: clinical skills units, education

Alimentary tract X-rays for a clinical skills session

- plain abdomen
- erect abdomen with fluid level in descending colon
- plain abdomen with opacities in right upper quadrant
- plain abdomen (child) with coin-like opacity in stomach
- cholecystogram with radiolucent stones
- cholecystogram showing bile duct
- barium enema anterioposterior view
- barium enema lateral view

Box 1

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Many medical schools are introducing students to clinical activity early in their careers. Such introductions include family and case studies,¹ out-patient attachments,² and general practice sessions.^{3,4} The use of clinical skills laboratories or units is another approach that has proved popular in new medical schools. Clinical skills units are not entirely new to medical education and have been in use for some time, especially in the US and in Europe (at the University of Limburg at Maastricht, The Netherlands). In the UK, St Bartholomew's and Leeds have established units whilst others, for example, Liverpool, Dundee and Glasgow are planning to incorporate units into their undergraduate medical programmes. Clinical skills units are dedicated areas where students can learn about clinical examination skills with models or simulations. These areas may be purpose-built or rooms converted for the purpose. A key feature of clinical skills units is their flexibility.

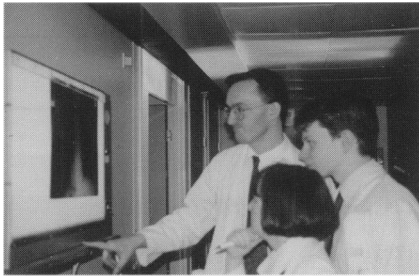
Space is needed to provide students with models, examination couches and tables on which to work. As some practical procedures are 'wet' in nature, eg, learning scrub techniques or passing nasogastric tubes, and because there is a need to dispose of body fluid specimens, eg, urine, washing and hygiene facilities are essential.

A common arrangement allows students to rotate through a series of stations as they work in a session. Additionally, a clinical teacher may demonstrate examination skills that would be difficult to acquire during ward work, for example, venesection skills may be safely and painlessly learned in the skills units before students start work with patients.

The clinical skills unit serves two main education functions. Firstly, the unit provides a 'safe' environment where students learn and practice clinical skills without being concerned about the effects on 'real' patients. Competence in practical skills and understanding of underlying theoretical concepts can be acquired through live demonstrations and observation of videos, use of anatomical models, computer simulations and by practising on themselves or standardised patients. In most medical schools such standardised patients are used for communication skills training, but in Europe and the US some patients are available on a professional and trained basis to provide experience of intimate clinical examinations. Checklists of the steps involved to carry out a skill are made available to students, and facilitate the assessment of practical competence by tutors.

Secondly, the clinical skills unit is a place where theoretical teaching can 'come alive'. Organising teaching sessions to match the concurrent teaching programme encourages integration of basic science ideas with clinical examples. In problem-based or problem-solving curricula, the clinical skills unit stations offer many opportunities that encourage students to use their basic science knowledge when analysing and finding solutions to clinical problems.

The atmosphere of a clinical skills unit is important. Such units are 'clinical' areas, ie, students must leave bags outside and wear white coats when necessary. Walls and surfaces may display medical posters (eg, first aid instructions and action plans). Essential facilities include X-ray viewing boxes and clinical examination equipment (eg, ophthalmoscopes, otoscopes, tendon hammers, pins, etc.) In one unit in Malaysia (at the International Medical College),⁵ a section is fitted out as an emergency room (with trolley, 'grab' rack with endotracheal tubes, laryngoscopy equipment, resuscitation equipment and dummy, etc). This area is used for teaching and assessing basic and advanced cardiopulmonary resuscitation and life support techniques. The main part of this unit is equipped with four screened areas, one with a hospital bed and associated furniture, another set up as a typical living-room, and two as general interview/reception areas. Each of these has a remote camera and microphone connected to a centrally located room. At St Bartholomew's Hospital in London, the skills unit has a number of hospital beds where student nurses learn about turning and lifting – skills that are very difficult to teach in the ward setting.



Stations for alimentary tract session

- completing a dental chart
- identifying the parotid and submandibular openings
- practising the Heimlich manoeuvre
- passing a nasogastric tube
- basic clinical examination of the abdomen
- examining various X-rays

Box 2

Table 1 End of term revision practical

Station	Practical assessment
1	measurement of body mass (body fat, Quetelet's index, weight, height)
2	blood pressure measurement
3	choking mannequin
4	ophthalmoscope technique
5	examination of the heart (surface markings, auscultation points)
6	X-rays of the chest (pneumothorax, fluid level, what do you see? what might have caused this?)
7	X-rays of the chest (normal posteroanterior view, enlarged heart, coronary angiograms)
8	plain abdominal X-ray child (with foreign body in stomach; how did it get there? how might it get out? Cholecystogram and cystic duct (what are the structures? how did the dye get there?)
9	venesection model and practice (technique, sharps disposal)

A typical clinical skills unit session

Below is a description of a typical 90-min session in a skills unit. In the example, clinical skills are integrated into the curriculum with students learning practical skills in conjunction with theoretical learning. Students attend in groups of 15–20, working in pairs and spending 10–15 min at each of a number of stations. Occasionally, more than one pair of students work at the stations at the same time. Each clinical skills session has a study guide that sets out clear objectives for each station. Students assess their basic science knowledge and practical performance by answering a number of questions. The study guide cross-references key features of the clinical skill learned to sections of the core basic science texts and to lecture classes and practicals.

The stations are designed to integrate practical experience, theoretical learning and laboratory work each week. For example, students may see a film of the function of the alimentary system and then review the anatomy and physiology of the system during the lecture course. Later, they pass a nasogastric tube on each other (usually with varying degrees of success!) and use the gastric juice collected in a subsequent practical laboratory session. Box 1 shows examples of X-rays that students may study during the alimentary system sessions. Questions such as 'What structure is shown in the X-ray?', 'How did the dye get there?', and 'Why does a fluid level form?' stimulate the student to puzzle out relationships between clinical information and basic medical science. Box 2 gives examples of other stations for alimentary tract sessions.

An end-of-term revision session is shown in table 1 to illustrate the range and type of station. Students are free to come and go as they please during the session and can attend at unscheduled times if the unit is available.

Student evaluation

What do students think about skills units? At the end of the first term 55 (73%) students at the International Medical College in Malaysia completed an evaluation sheet asking them to rate their agreement with a series of 10 statements about the clinical skills unit. The results are shown in table 2.

A total of 93% of the students thought that the clinical skills unit sessions were relevant to their learning and over 90% felt the sessions helped them to understand theoretical teaching and form links with clinical ideas. Over half the class (52.7%) felt that there were too many students in the unit at any one time while 40% would like more staff available to help them during the sessions.

Discussion

Curriculum integration and the early introduction of clinical skills teaching are educational goals recommended by the world Conference on Medical Education⁶ and the General Medical Council in the UK.⁷ Many medical schools are reviewing their own teaching in the light of these and other goals. McManus *et al*⁸ have drawn attention to the decline in clinical experience offered to students in UK medical schools between 1981 and 1986 associated with NHS reforms. Skills laboratories do not replace clinical experience but they do allow early practice of difficult, painful or embarrassing procedures in the 'safety' of a supervised environment.⁹ The clinical skills unit serves two major purposes. Firstly, it is a resource for students as they learn basic clinical skills, such as cardiopulmonary resuscitation or the examination of the heart and of the abdomen. It has models

Table 2 Agreement by students with statements about the Clinical Skills Unit (CSU)

Statement	Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree	n
CSU sessions help me to learn more about the theoretical things I am working on	13 (24%)	35 (64%)	3 (5%)	3 (5%)	1 (2%)	55
CSU sessions are mostly irrelevant to my learning	0	2 (4%)	2 (4%)	13 (24%)	38 (69%)	55
Time spent in the CSU is time well spent	13 (24%)	31 (56%)	6 (11%)	4 (7%)	1 (2%)	55
When I'm working in the CSU, I feel there are enough teachers to help me	3 (6%)	17 (31%)	11 (20%)	17 (31%)	5 (9%)	53
There are usually too many students in the CSU at one time	10 (18%)	19 (34%)	12 (22%)	12 (22%)	2 (4%)	55
The CSU helps me to link basic science with clinical ideas	20 (36%)	31 (56%)	1 (2%)	2 (4%)	0	54
I find the CSU practicals boring	0	1 (2%)	2 (4%)	19 (34%)	33 (60%)	55
I would like more time available for CSU work	27 (49%)	16 (29%)	10 (18%)	2 (4%)	0	53
I would rather work in the library than work in the CSU	2 (4%)	0	7 (3%)	15 (27%)	30 (54%)	54
I find examining other students uncomfortable	6 (11%)	5 (9%)	5 (9%)	20 (36%)	19 (34%)	55

Percentages do not add up to 100% because of rounding-off.

Learning/summary points

Clinical skills units:

- prepare medical students for clinical practice without distressing patients
- use dummies, models, simulations and computers
- allow students to learn at their own pace and practice skills safely
- link underlying theory and knowledge with clinical practice
- encourage teaching to a 'standard'
- offer a supervised, protected learning environment
- can be used by other health care professionals, eg, nursing, orthoptics and physiotherapy
- are appropriate across the entire 'continuous curriculum' of medical education, from undergraduate education to continuing professional development

that may be used to assist in practising newly acquired skills, for example, ophthalmoscopy, and models for intimate procedures such as rectal and vaginal examination. Secondly, it is a link in the educational chain connecting theoretical teaching about the basic sciences, practical laboratory demonstrations and experiments with clinical applications. Learning in a clinical skills unit is an enjoyable experience for students who see it as a valuable way of teaching.

Linking curriculum themes through the application of newly acquired systems-based knowledge to clinical and practical issues is highly motivating for students who also benefit from seeing a range of clinical materials (for example, simple and contrast X-rays, magnetic resonance scans, coronary angiograms and simple medical diagnostic equipment such as sphygmomanometers and ophthalmoscopes) and relating them to the information learned during the course.

A clinical skills unit can provide preparation for clinical experience in hospitals and the community. It may also be used by postgraduate students preparing for examinations and by nurses and other professions allied to medicine to acquire the practical skills associated with their speciality.

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Box 3

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