

ORIGINAL ARTICLE

IMPACT OF CLINICAL SKILL LAB ON STUDENTS' LEARNING IN PRECLINICAL YEARS

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Background: As 1st year students have no prior training in handling and facing patients, Clinical Skill Lab (CSL) is the most suitable place to avoid direct doctor/patient interaction. The objective of this study was to evaluate the performance of recently established CSL and its impact on student learning in basic science subjects. **Methodology:** This study was carried out at the Departments of Physiology and Medical Education, Foundation University Medical College Islamabad, from January to October 2012. In this observational study, 150 of 1st year students were divided into 5 batches. Each batch attended clinical skill lab once a week. Each batch was subdivided into 6 batches of 5 students each to be facilitated by one postgraduate trainee from clinical subjects. Overall supervision was done by a consultant of status of Assistant Professor qualified to teach Medicine, Surgery and/or Physiology. Sessions were conducted for 2 hours daily (6 days a week) in which after an initial briefing, students were taught the communication skills, clinical skills and art of history taking and physical examination. Clinical integration of various modules taught in 1st year, i.e., skin, muscle and skeletal system (SMS), upper limb and breast, immunity and haematology, respiratory and cardiovascular modules was done from January to October 2012. Methods of teaching involved large group interactive sessions, small group interactive sessions, self-directed learning, tutorials, revision on computer and recordings of sessions given to students on flashes. Multiple choice questions and observed structured clinical examination were the main assessment tools. Combined assessment of 2 consecutive modules was done at the end of 2nd module making a total of 3 assessments for 1st year. Absentees were included in failures in view of impact of end of modules examinations on overall final assessment. **Results:** More than 73% students passed examination of clinical skills securing more than 50% marks in each module. Overall impact of CSL was also seen in the subjects of Anatomy and Physiology. Result of purely anatomy SMS and breast modules increased from 64% (year 2011 class) to 79% (year 2012 class). Result of purely Physiology modules (Immunity and Haematology) increased from 77% (year 2011 class) to 94% (year 2012 class). Similarly Respiratory and Cardiovascular modules result improved from 68% to 90.5%. **Conclusion:** The performance of CSL in imparting clinical skills, communication skills, history taking and physical examination was satisfactory. The experience of integrating clinical teaching with basic sciences not only improved students' clinical experience reflected by evaluation, but was also rewarding in improving the results of various modules related to anatomy and physiology.

Keywords: Clinical skill lab, Module, Integration, Curriculum, Medical Education, Physiology teaching

INTRODUCTION

Modular teaching system was introduced at Foundation University Medical College (FUMC) Islamabad in 2009. As a part of structured program, Clinical Skill Lab (CSL) embarked on gigantic task of imparting communication skills and skills of history taking/physical examination related to the module being taught to 1st year students. Relevant clinical subject's integration was started in a planned manner following vertical, horizontal and spiral integration model being practiced worldwide. As 1st year students have no prior training in handling and facing patients, CSL is the most suitable place to avoid direct doctor/patient interaction. Teaching relevant skills to medical students in CSL is highly efficient and cost effective.¹

Bradley *et al* noticed that CSL cannot be considered an alternative of training with real patients but a gradual introduction of methods to have interaction with sick and highly sensitive community of patients.²⁻⁴

Open and virtual CSL, and clinical skill bus are further ramification and extensions of pioneer CSL.⁵⁻⁷ Most of medical institutions in the world started CSL 2-3 decades ago. In Pakistan this step was taken in the light of instructions issued by PMDC on this subject.⁸ As per PMDC regulations more than 500 hours of teaching have to be allocated in the form of clinical training to 1st and 2nd year (Table-1).

Table-1: Hours allocated for various subjects in 1st and 2nd year MBBS

Class	Subjects	Hours	Subjects	Hours
1 st and 2 nd year	Anatomy	600	Islamiat	25
	Physiology	600	Pak Studies	25
	Biochemistry	300	Communication skills	50
	General Surgery	125	Medical ethics professionalism	50
	Medicine	125	Behavioural Sciences	40
	Gynaecology	50		
	Paediatrics	50		
	Clinical Methods	100		

This makes a total of 590 hours of clinical teaching that is equal to hours allocated to Anatomy and Physiology teaching and twice the hours allocated to Biochemistry.

Community based education (CBE) and problem based learning (PBL) are two main pillars of educational strategy. CSL can help to achieve the objectives of these strategies in various phases and its involvement would vary according to the educational phase of life of a medical student.

In phase 1 the educational problems can be categorised into blocks in order to address normal human development, i.e., from prenatal life to senescence. CBE can be imparted by practicing clinical skills in relatively healthy population, e.g., peer pulse and BP measurement, checking visual acuity of school children or ECG/exercise tolerance tests of peons and lab staff. In CSL students are instructed clinical skills using standard checklist before practicing on real patients.

In phase 2 of PBL, various problems form student's core activity that is used to understand basic and clinical sciences. Students need to explain underlying mechanism of signs and symptoms of disease and not the diagnosis or management plan. Thus, the skills on which students are trained in CSL are intimately related to the problems they take in their small-group classes. For example they are trained on clinical examination of the lung during the block of respiratory problems.

In phase 3, i.e., clinical clerkship, students learn interventional skills like passing nasogastric tube or suturing techniques. They are more confident and less liable to commit mistakes as they now practice their learnt skills on real patients initially under supervision and later on independently

First year students have little background knowledge of clinical sciences and in the beginning no knowledge of anatomy, physiology or biochemistry as they are not taught basic science subjects before induction into medical school which is done in USA. Integrating clinical science with basic subjects is an upheaval task that requires teaching students background knowledge of subject before embarking on imparting clinical knowledge. This requires dedication on part of clinical faculty handling 1st year and 2nd year students. It can only be implemented by multiple teaching methods including large-group interactive sessions (LGIS), small-group interactive sessions (SGIS), self-directed learning (SDL), tutorials, computer and video based sessions and revision by providing recorded sessions on individual student's flashes.

MATERIAL AND METHODS

Clinical skill lab was established at Foundation University Medical College (FUMC) Islamabad in Jan

2012 to impart clinical skills to 1st year students. Additional task assigned was to integrate clinical teaching to these students including art of history taking and Physical examination. Clinical skills were imparted using the manikins while history and physical examination were taught on simulators. Simulators were provided by administration from local staff of basic sciences that were spared by their departments for 2 hours in the morning. Class of 150 students was divided into 5 batches of 30 students each to report for 2 hours in the morning from 8 AM to 10 AM. Peyton 4 stage model was adopted for clinical teaching.

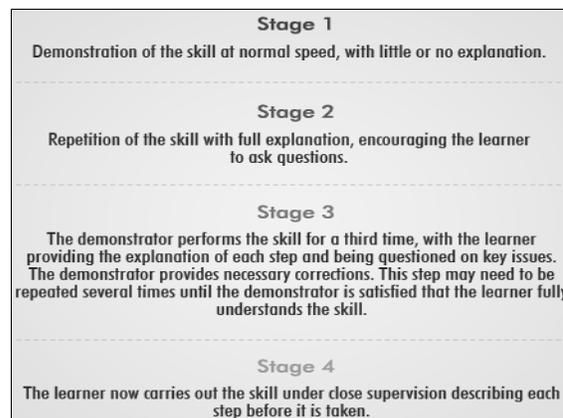


Figure-1: Peyton 4 stage approach of clinical teaching

After an initial briefing session for 30 minutes students were further divided into 5 subgroups comprising of 6 students each for supervised training by facilitators. Clinical skills and clinical teaching was imparted by 7 PG trainees of various specialties spared by clinical departments for CSL under supervision of a consultant of Assistant Professor status qualified in Medicine, Surgery and Physiology. Clinical teaching was integrated with modules being taught to these students in basic science subjects. Method of teaching involved LGIS, SGIS, SDLs, videos prepared for the subject, revision on computers in computer lab and recordings of various sessions loaded on flashes of each student. Evaluation system was mainly MCQs and OSCE based on checklists prepared for the scenarios. All students after a debriefing session on the performance of examination were required to fill a feedback performa related to teaching and examination.

Data was analysed using SPSS-11. Differences between groups were compared using Fisher's Exact test, and $p < 0.05$ was considered significant.

RESULTS

In the initial module of 'Professionalism' students were taught the concepts of modular system, evaluation system, PBL, ethics, feedbacks, PubMed, computer search and communication skills especially related to history taking and clinical examination over a period of 7

days. Students were evaluated formally in communication skills over simulators. Out of 150 students 120 students appeared in the examination, 82% cleared the 3 components prepared for communication skills examination scoring $\geq 50\%$ marks. In the 2nd module 'Breast and SMS' students were evaluated by a theory paper pertaining to upper limb and breast followed by OSCE comprising history taking skills related to trauma upper limb and breast. Out of 150 students 130 students appeared in all components of examination, 83% students cleared the examination by securing $\geq 50\%$ marks.

As the students of 1st year lacked any knowledge of art of communication skills and various modules related to trauma upper limb, breast, immunity and haematology, training was conducted as introductory sessions of each subject as LGIS and revised as SGIS in Computer Labs and at home in the form of recorded sessions on flashes. The integration of clinical teaching with basic sciences was reflected in the results of modules in anatomy and physiology whose modules were taught and integrated during 10 months. Morgan R *et al*¹ observed similar results in integrating basic sciences and clinical curriculum taught to nurses. Anatomy result of 'SMS' modules was 79% compared with 64% of year 2011 improving by 15% ($p=0.01$). Physiology result of 'Immunity and Haematology' module improved to 94% (year 2012) compared to 77% of year 2011 improving by 17% ($p=0.0005$). Physiology result of 'Respiratory' and 'CVS' modules improved from 64% of year 2011 class to 90.5% of 2012 class improving by 25.5% ($p=0.00003$). During these 2 years students inducting criteria, curriculum, course, teaching staff and methods of teaching remained the same. The only addition was CSL in year 2012.

Two workshops were also conducted by CSL during this period, i.e., CPR training and Blood pressure recording. Both these training sessions were manikin based. Students participated in both sessions enthusiastically and especially enjoyed CPR and Defibrillation sessions conducted and instructed on individual basis to all students of 1st year MBBS.

DISCUSSION

Most of medical curriculum still revolves around the Abraham Flexner's report which forms the basis of medical reforms in USA.¹⁰ Peeraer G *et al*¹¹ using OSCE as evaluation tool comparing clinical training in skill lab with skill training in internship found that on global OSCE scores, renewed curriculum students had significantly higher overall scores and they scored significantly higher at 6 of 15 stations. There was no significant difference at 8 stations, while traditional curriculum students scored better at station 1. Five years and 200 hours of integrated undergraduate skills training is more effective as a method of learning basic clinical

skills, compared to learning these skills through 75 hours of traditional skill training and reinforcement of these skills in 12 month clinical internships, when measured by means of an OSCE.

Quadri *et al*¹² shared similar experience using CSL and Medical Informatics laboratory focusing on overall impact on students learning by 3rd years students. The undergraduate basic medical skills program should be designed to support the intended learning outcomes and be integrated within the overall curriculum, including within the assessment strategy.³ Simulation-based testing methods have been developed to meet the need for assessment procedures that are both authentic and well-structured.¹³

On the 'show how' level of Miller's Pyramid, we find the OSCE, which combines the reality of live clinical interactions with the standardisation of problems and the use of manikins.¹⁴ The OSCE is considered to be one of the most reliable and valid measures of clinical performance ability currently available, with global ratings which are at least as reliable as checklist scores. Miller's 'pyramid of competence' is also useful for mapping assessment methods against the various tiers of the pyramid.¹⁵ The 'knows' level of the pyramid can be assessed using simple knowledge tests, e.g., multiple-choice questions (MCQs). The 'knows how' level can be assessed using unfolding patient management problems (PMPs) or essay questions. OSCE can assess the 'shows how' level. The difficulty has always been assessing the 'Does' level, which in professional practice refers to performance in context.

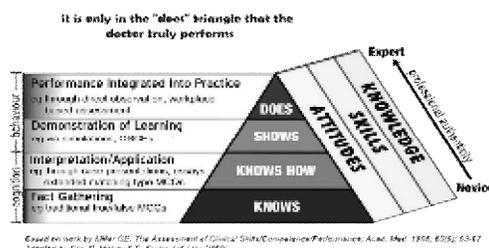


Figure-2: Miller's Prism of Clinical Competence (Miller's Pyramid)

However, despite having learnt clinical skills in CSL most of the students have problem in practicing them on real patients.¹⁶ There is a constant need for CSL to respond to the new challenges and demands of the future. Some of these have been depicted in Figure-3.¹⁷

Repeatedly practicing these skills and subsequently evaluation these skills in scenario of workplace assessment including mini-CEX (mini clinical evaluation exercise), DOPS (Direct observation of procedural skills), CbDs (case based discussion) and CSR (chart stimulated recall) assess 'does' level of Miller's pyramid. These and other recommendations of Ottawa Conference 2010 needs to be implemented in true spirit.¹⁸ CSL carries certain financial burden with it

but should not be made an excuse as we would be denying our medical students this opportunity to become an efficient medical health professional.¹⁹

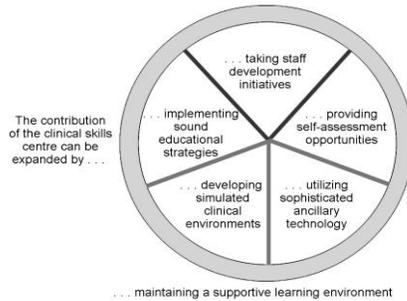


Figure-3: Adding more to the clinical skills centre pie

In our study, more than 80% students cleared both component of examinations conducted for each module by securing $\geq 50\%$ marks. As clinical teaching involved introduction of basic science subjects' knowledge before imparting actual clinical knowledge, this exercise had a positive influence on enhancing the understanding of basic sciences subjects by the students. The results of Anatomy and Physiology modules improved by 15–25.5% compared with results of last year's class. This improvement in our results is a tremendous achievement for a private institution where failure means student migrating to a low-grade medical institution charging less fee. In a class of 150 students 15–25.5% improvement means 23–39 more students clearing the examination who would have otherwise failed thus preventing a loss of 13.5–23.4 million rupees to the institution considering PKR 0.6 million as average annual fee of a medical student. Not only 15–25.5% improvement was noted but this improvement was also seen at all levels with improvement in maximum marks achieved by students. This is even further remarkable in view of the fact that all staff of CSL at FUMC performed their duties at CSL in addition to their primarily assigned duties. Full-time staff and incentives would have further positive impact on achieving future realistic objectives.

CONCLUSION

CSL achieved its primary objective of teaching history taking and examination skills. The results of various modules taught in Anatomy and Physiology improved by 15–25.5%. Further studies need to be conducted on larger scale and for extended period of time to include all modules of basic sciences.

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