

The structure and function of a new Clinical Skills and Medical Informatics Laboratory (SCIL) in a developing country — a two year institutional experience

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Abstract

Objective: To combine clinical skills and medical informatics learning by offering a combined 'SCIL' rotation to third year medical students and to determine its long-term impact .

Methods: A combined clinical skills and medical informatics laboratory (SCIL) was set up at our institution with international collaboration. Nine months to one year after formal third year SCIL rotations were conducted, a questionnaire rated on (1-5) Likert Scale was administered to the inaugural class undergoing this rotation.

Results: The rotation was rated positively in terms of both acquisition of clinical skills as well as medical informatics skills. (overall rotation rating: 3.32±0.53)

Conclusion: Our results have shown the positive long-term impact on undergraduate medical students of a combined clinical skills and medical informatics rotation (JPMA 58:612; 2008).

Introduction

Clinical skills laboratories have become an integral part of the curricular requirements in most modern medical schools and postgraduate centers, worldwide.¹ In an effort to standardize the acquisition of cognitive, psychomotor and affective skills in simulated settings structured at various levels of

complexity, such centers are replacing the previous practice of learning clinical skills by trial and error on real patients.^{2,3}

In the new millennium, it is expected that students in their early years of medical schooling would go through required 'skill based competencies' before actual patient exposure and have the option to

retrain and recertify at subsequent stages of training.⁴

In Pakistan, the newer curricular initiatives being undertaken at most medical schools in response to Higher Education Commission and Pakistan Medical and Dental Council recommendations, have included the setting up of Clinical skills and information technology facilities.⁵ Whereas pre-defined psychomotor and affective domain based competencies have traditionally included manikin based learning, the use of standardized patients, audiovisual aids and medical informatics have now become routine components of modern clinical skills laboratories.⁶

Clinical Skills centers also reduce the difficulties encountered in medical and nursing colleges in ensuring adequate exposure to clinical problems.⁷ Ledingham and Harden emphasize that medical schools cannot rely on clerkship experiences alone to provide adequate basic skills training.⁸ Williams and colleagues through a questionnaire study of senior house officers work related stresses, concluded that psychological distress is linked to confidence amongst senior house officers in performing clinical tasks.⁹ A complete clinical Skills and medical informatics center under one roof to date to our knowledge, is non-existent in Pakistan.

At Shifa College of Medicine, Islamabad, following a 5 year medical curriculum, we embarked on an ambitious venture towards the realization of this goal.

We also hoped to achieve our required student based competencies inclusive of cardiopulmonary resuscitation training and literature search skills, by incorporating a clinical skills and informatics rotation in the early clinical years.

Our objective was to combine clinical skills and medical informatics learning by offering a combined 'SCIL' rotation to third year medical students and to determine its long-term impact.

Methods

In September 2002, the project at our College of Medicine was conceived and initiated following the Deans' directives, by a select group of faculty members (the authors).

A preliminary survey of available resources and literature was followed by a personal non-institution sponsored visit of the principle author to University of Cincinnati, Ohio, USA where an

informal relationship was established with the Director of clinical skills laboratory and the Assistant Dean for Medical Education. Brochures related to the development of clinical skills laboratories and various vendors were obtained and subsequently a more formal relationship between the two centers developed over ensuing years and visits. On one occasion, the principle author "enrolled" as a learner with third year medical students in an actual skill acquisition learning session, inclusive of the art of intramuscular and intravenous injections and starting intravenous lines, placing a Foley's catheter in male and female models, passing a nasogastric tube and intubating a manikin.

A 220 m² area was identified in order to develop a custom built facility. The main theme was to have an 'activity' based center, offering clinical skills and medical informatics rotations (SCIL), workshops in basic and advanced cardiac life support, medical informatics courses, OSCE (objective structured clinical examination) testing stations, video tutorials for physical examination and procedural simulation under a single roof throughout the year at pre-defined Schedules. Forty desktop computer stations equipped with internet facilities have been integrated in SCIL. An assessment of the performance on the two components of the rotation was routinely done on the final days of each component by clinical instructors (authors 2 and 8) under a senior faculty member tutelage.

The first batch of students to undergo this new rotation at the third year Level in 2005, was given a rotation evaluation form, 9 months to one year after the rotation to determine long term impact of the training on the subsequent acquisition of cognitive and psychomotor skills. A pooled analysis of the rotation feedback was then performed. Each rotation evaluation form had five items rated on a 1-5 Likert scale.

The pooled data from this was subsequently analyzed using SPSS Version 13.0. Data was reported as Mean±SD for each variable under study.

Results

A list of desired competencies defined for the clinical skills and medical informatics component of the two week third year M.B.B.S rotation and list of essential supplies, models and manikins are shown in Tables 1 and 2 respectively.

Table 3 illustrates the results of the rotation questionnaire administered to senior medical students 9

Table 1: Desired competencies for clinical skills and medical informatics.

S.No	Competencies of Clinical Skills and Medical Informatics in two weeks SCIL Rotation:
(1) Cognitive & Affective Skills:	
a	Communication Skills
b	History Taking Skills
c	Breaking Bad News
(2) Psychomotor Skills:	
a	I/V Injections
b	I/M Injections
c	I/V Line & Drip set-up
d	Arterial Blood gas
e	Nasogastric tube placement
f	Foley Catheterization(male/Female)
g	Suturing Techniques
h	Endotracheal intubations
i	B.L.S and A.C.L.S
j	Breast Examination
k	Pelvic Examination
l	Spontaneous Vaginal Delivery(Model).
m	Standardized Patient evaluation
(3) Medical Informatics:	
n	Identify the Role of Medical Informatics in the various disciplines of Medicine
o	Understand the different components of Medical Informatics.
p	Learn how to do Research Article formatting using APA Style in Microsoft Word. Research Proposal writing and use of Statistical software.
q	Learn how to make a Medical Presentation using Basic and Advance features of PowerPoint.
r	Learn how to use Pubmed site for effective research article searching.
s	Introduction to data analysis with S.P.S.S
t	Internet-based Medical Informatics Tasks.

Table 2: Essential Supplies, models and mannikins.

S.No	Models and Manikins	Contact / E-mail
1	Various ACLS,BLS models	export@enasco.com
2	Defibrillator	Hospital Provided.
3	Arterial/Venous Training Arm SB 26040 U	export@enasco.com
4	Life form Pediatric Arm	export@enasco.com
5	I/V Training Arm and Hand	export@enasco.com
6.	Advanced Grandma Chase Patient care Manikin (P.No: AA-8501)	djoseph@armstrongmedical.com
7.	Noelle Maternal and Neonatal Birthing	sweeney@mpltx.com
8.	Clinical Female Pelvic Trainer Part 60280	Medi Urge (Pvt) Ltd. Lahore. ph:042-75811746
9.	Male Pelvic Trainer Part No 60278)	Medi Urge (Pvt) Ltd. Lahore. Ph:042-75811746
10.	Web Sites:	
	1.www.medicalplastics.com	
	2.www.enasco.com	
	3.www.limbsandthings.com	

Table 3: Distribution of Survey Score on a Likert Scale of 1 to 5 N=35.

Items, n= 35	Mean +/-	S.D
1. The Objectives of the rotation were clearly defined	2.96 +/-	1.17
2. The Instructors were able to achieve the learning objectives	2.96 +/-	1.10
3. The medical informatics skills taught have helped in our learning objectives as senior medical students.	3.00 +/-	1.32
4. The Clinical Skills taught have helped in improving our procedural skills as senior medical students.	3.00 +/-	1.04
5. Should SCM Continue with SCIL rotation?	4.16 +/-	1.28

Overall Rotation Rating:
(Mean +/- SD) : 3.32+/- 0.53 where n = 35. : 3.32+/- 0.53 where n = 35.

months to one year after completion of the SCIL Rotation. Each item was rated on a 1-5 Likert Scale and reported as Mean \pm Standard Deviation. A total of 35 participants took part in the survey. The overall rotation rating taking account of all the variables as documented in Table 3 was 3.32 ± 0.53 . The highest rating was given for the item addressing whether our college of Medicine should continue or discontinue the SCIL rotation.

Discussion

Our journey towards the structural and functional organization of a unique clinical skills and informatics laboratory in a developing nation such as Pakistan has been a long and challenging one. The delivery of material in time and budget constraints were issues we had to contend with.

However the overall response pooled from the participating clinical groups nine months to one year after their rotation appears to be positive and the desired competencies attained should be able to add to students confidence and psychomotor skills considerably in times to come with further refinements in our program. A long term comparison of classes such as our inaugural class exposed to a clinical skills and medical informatics rotation and beyond with previous classes not having gone through this regimen may be done with a graduation questionnaire administered to both groups. At the time of writing this manuscript author no.4 has already planned and developed a pre-clinical physiology project incorporating clinical skills instruction to first and second year medical students, in the process securing the FAIMER International Fellowship.

Of the surveyed participants there was a strong consensus for continuation of the SCIL rotation at Shifa

College of Medicine and overall satisfactory evaluation of the rotation experience well beyond the concluding date of these rotations .and the majority of participants viewed the SCIL experience as a positive one.

SCIL aims to develop tools for clinical competency assessment for clinical rotations in the form of standardized checklists for grading examinations, central bank of clinical material for use in clinical examinations (x-rays, EKGs etc), OSCE stations for clinical competency testing and development of a program for Standardized Patient recruitment and training.

Activities of SCIL also include Basic Life Support and Advanced Life Support under the Life Savers Foundation, Pakistan. These courses are open for all the health care workers across Pakistan. Of these, 20 courses were conducted in SCIL and complemented by similar courses in ten major cities of Pakistan. To date, nearly 5000 participants have been trained thus far in these courses.

Medical Informatics courses including basic to advanced features of computers skills are conducted by Author No.2 in SCIL e.g. Research Article Formatting using APA Style in MS word, making a medical presentation using basic and advanced features of PowerPoint. Data analysis is done in S.P.S.S 13.0 12 for research projects assigned by senior faculty members to 3rd and 4th Year students. In addition, use of Endnote X 13,14 as a reference manager is facilitated.

Evidence Based Medicine (EBM) workshops for fourth year medical students will be conducted by author No.6, as another FAIMER fellowship project, during the Medicine rotation. Towards this end, a Center for Evidence Based Medicine (CEBM) has already been incorporated in SCIL and is currently operational.

Conclusion

Our results have shown the positive long-term impact on undergraduate medical students of a combined clinical skills and medical informatics rotation .We have thus embarked on a challenging and mostly successful

course towards developing a state of the art clinical skills and informatics laboratory both structurally and functionally at our College of Medicine.

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