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TECHNOLOGY DRIVEN TEACHING HOSPITAL;
FOR MULTIPLE MEDICAL SCHOOLS – A PROSPECTIVE VIEW

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ABSTRACT: Bedside teaching is the heart of clinical teaching in a medical programme. Most of times, it is conducted inside the ward which hinders the privacy of patients and enhances the disturbance of other inpatients. In resource constrained countries, a teaching hospital serves for multiple medical schools. It is major challenge to provide satisfactory clinical teaching to students of multiple medical schools because of shortage of teaching hospitals in those countries. The present article presents a proposal to enhance clinical teaching for multiple medical schools being attached to a single teaching hospital. Its template and potential benefits are discussed.

Key words: Assessment, Bedside teaching, Clinical environment, Teaching hospital

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INTRODUCTION

Clinical teaching is the heart of medical education because it directly involves patients and their problems. At undergraduate level, medical schools strive to give students as much clinical exposure as possible. In new development of curriculum, students are given an increased contact with patients even earlier in the course.

Bedside teaching, as part of clinical teaching, has been a major method for clinical skills of medical education. This method is a patient centre approach and cannot be ignored. Students are motivated through active participation because this is the only setting in which skills of history taking, physical examination; clinical reasoning, empathy and professionalism are taught to them. Students are able to diagnose patient problem almost upto 50% from the history and upto 75% after a thorough physical examination.[1]

Bedside teaching provides the opportunity to medical students to focus on real problems in the context of professional practice. It is mainly conducted in hospitals and community settings each with their own distinct challenges. Looking at the medical and teaching hospitals ratio, it can be seen that there is considerable shortage of teaching hospitals if compared to number of medical colleges which offer medical education. For example, there are 92 teaching hospitals recognized by Pakistan medical and dental council for 98 medical colleges.[2] There are quite low numbers of recognized teaching hospitals for 29 medical schools in Malaysia for undergraduate medical degree programmes.[3] Teaching hospital is a requisite because students learn clinical skills while having been posted in clinical departments.

The existing or old constructed teaching hospitals are unable to accommodate large number of medical students who are taking courses in various public and private medical schools in Malaysia and many other South East Asian countries. In fact clinical teaching is an integral part of undergraduate training in medical schools. It has long been observed that many medical schools especially those with few resources and large number of patients teach skills without involving medical students on real patients and prior preparation of the medical instructors.[4]

Bedside teaching is oftenly conducted at the ward in many teaching hospitals where a patient is

seldom isolated or if isolated, other neighbouring patients get disturbed by the presence of a group of medical students. This situation is worsen if two or more groups from different medical schools conduct bedside teaching at the same ward choosing different patients or it is conducted at 'Free time' when patients relatives, friends are allowed to meet them as part of social meeting and culture. The situation is worsened when clinical examinations are conducted. Many teaching hospitals are lack of proper infrastructure for clinical teaching. In order to provide a good clinical teaching for multiple medical schools by one teaching hospital, we propose a new setting of teaching hospital.

METHODS

Infrastructure of technology driven new teaching hospital

The proposed teaching hospital has two components 1) Health care component 2) Teaching component. The healthcare service part consists of all outpatients areas and inpatient wards of respective disciplines e.g., medicine, surgery, paediatric etc which may be located appropriately at different levels within one multi-storey building or as separate ground level buildings.

Other than health care service part, the proposed teaching hospital is sketched (Figure-1) which contains

1. Objective Structured Clinical Examination (OSCE) Hall
2. Lecture Halls connected with BST rooms via IT technology
3. Bed Side Teaching (BST) room connected with each respective ward but outside the ward.
4. Seminar / Tutorial (SRT) room connected with BST in respective ward but outside the ward

Objective Structured Clinical Examination (OSCE) Hall

The objective structured clinical examination introduced by Haden and Gleeson[5] has become a standard method of assessment in undergraduate medical education. In the beginning it was described as 'a timed examination'. The purpose was to assess the clinical skills of medical students by their action with simulated patients involving history taking, physical examination counseling or patient management.[5] This method has undergone a lot of modification to suit peculiar circumstances.[6-8]

The basic structure of OSCE consists of a series of assessment stations where examiners using previously determined criteria assess range of clinical skills.[9] The stations could involve several methods of testing including history taking, demonstration of clinical signs, skills and counselling.[10-11] Many existing hospitals do not have space area for OSCE.

The purpose built hospital has an OSCE area which could be located at appropriate floor where getting OSCE items is easier for its smooth running. The OSCE area consists of main OSCE hall and pre and post OSCE quarantine also (Figure-1). The OSCE hall is equipped with its basic items. However, changes could be made according to the needs of the discipline set as station.

The rule is two OSCE and three Quarantine (O2 Q3) and it could be repeated at least twice either at same floor or occupying two floors if cohort is big ≥ 200. The layout of OSCE hall with 24 rooms per (medical or surgical base) halls is shown in Figure-2A. The halls could be rectangular in shape. Ten rooms (five pair) at each north and south side and four rooms (two rooms at each east and west) would be furnished. Each OSCE hall could be divided horizontally by putting a wall which has communication with all directions. Putting a wall in middle would provide additional space to put students in the OSCE (Figure-2B). That wall will be used for OSCE stations for unmanned stations e.g., putting a radiograph on computer, heart sound to be listened on computer or a small specimen to be displayed.

OSCE rooms are used for assessment of clinical and soft skills. They are required to be sound proof

and equipped with audio video system to record the students' performance as well examiners role. Purpose of recording students' performance in OSCE would further provide to re assess the marking scheme or if a student appeals against any misleading marks, the recording would be evidence.

Advantages

The advantages of OSCE hall to be inside the hospital, it provides a convenience space for students and they are familiar with the environment. In addition, it is easy to transport the patients within the hospital building. Patients know the place so they could reach in time on OSCE day. In summary, having OSCE inside teaching hospital provides one roof for all activities.

Lecture Halls

A lecture hall allows the students to learn through seeing and hearing the teaching material presented to them. Lecture hall is a part of a teaching hospital used for delivering lectures to medical students. Various designs of lecture halls Rectangle, Semi D, U shaped and 360 degree designs have been proposed with their advantages.[12-15]

One distinct feature of a lecture hall in purpose built hospital is that it is connected with BST room located in each discipline inpatient ward via IT facilities. It provides a live video of a real patient who can be brought from inpatient ward to BST room. Visual display improves the success in learning process.[16] Thus lecture in purpose built hospital would be delivered at all times by two teachers. One teacher explains the theory (contents) to students in the lecture hall and 2nd teacher will show the physical examination / patients sign symptoms from the BST room with the help of audio visual facility. The potential benefits would be enhanced learning of students by watching real patients with signs and symptoms.

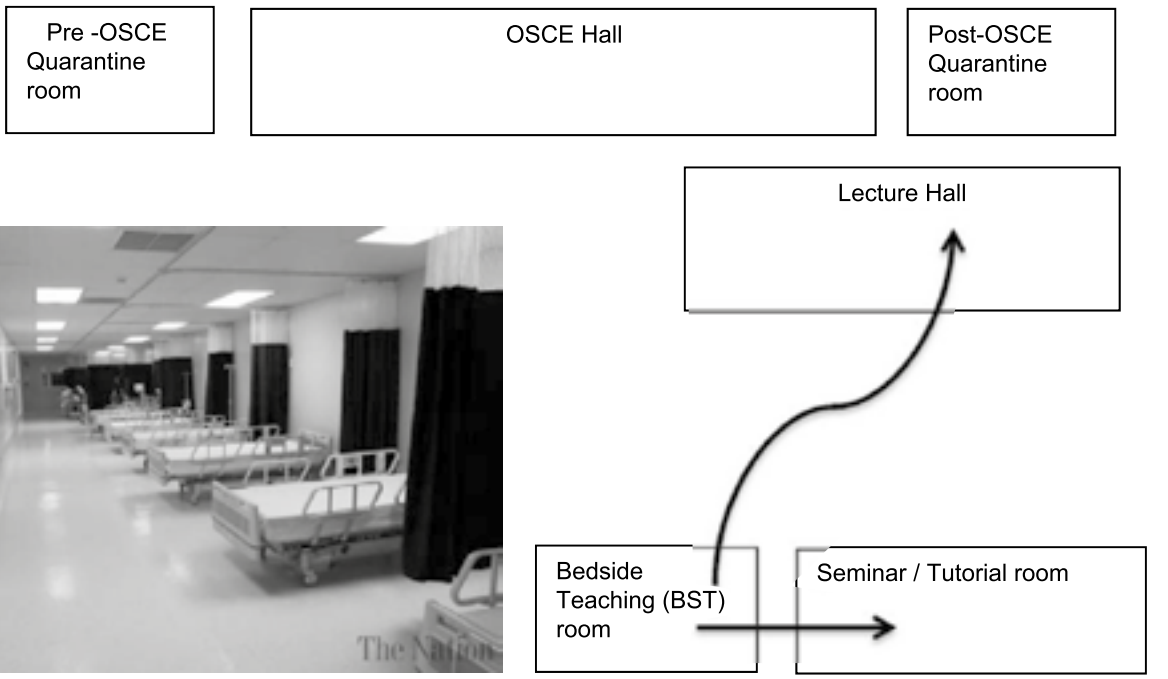
Bedside Teaching (BST) and Seminar/ Tutorial (SRT) rooms

As there are less teaching hospitals and medical schools are more, normally in one teaching hospital, three to four medical schools conduct their clinical training. We suggest to have minimum four BST and SRT rooms attached to each ward of concerned discipline. BST rooms are linked with four DVRs and four DSRs and Lecture halls.

Teaching part of the hospital consists of In order to avoid BST inside the ward and run smoothly the seminar and tutorial without disturbing the health care services, the proposed new teaching hospital has minimum two additional rooms located next to the ward. The room very adjacent to ward is bedside teaching (BST) room, and next is seminar / tutorial (SRT) room. The distinct features of BST and SRT rooms are that both rooms are well connected with audio video and other IT facilities. The size of SRT room is bigger than BST room (Figure-1).

BST and SRT rooms are connected in architectural design as well as IT facilities. Bedside teaching would take place at the room which is separated from the ward and students would observe the procedure while sitting in the SRT room through audio video system (Figure-3). It would provide an isolation space where there is minimum disturbance. A patient would feel comfortable as there is less number of personal around him. Because of isolation, the remaining patients won't be disturbed in the ward. The bedside teaching can be conducted at even 'free time'. However, there could be a challenge if female patient is chosen as patient of the bedside teaching without presence of any nursing staff or female students if lecturer is male especially in eastern culture. This would minimize the uneasiness of patients and especially in front of many new faces, some patients face hesitation or refuse to be examined.

To maximise the teaching in this way, a series of 3-4 BST and SRT rooms could be constructed around a single indoor discipline based ward which would provide an avenue for multiple teaching groups from 3-4 medical schools at same time (Figure-3).



Ward of a teaching hospital.www.nation.com.pk

The proposed teaching hospital would have a separate BS T room reserved for bedside teaching along with seminar room. BST room can be for teaching as well as assessment purpose while tutorial and seminar would be held in seminar room. Both rooms are equipped with audio video and other IT technology. This is a proposed one teaching ward set. In addition, the teaching hospital would have a lecture hall and Objective structured clinical examination (OSCE) hall. The lecture hall is connected with BST room via IT technology. It wou ld help to show a real patient to students while delivering a lecture to medical students. Other than lecture hall, prop osed teaching would have an OSCE hall composed of three components (Pre OSCE quarantine – OSCE and Post OSCE quarantine). In proposed teaching hospital, we have shown one BST, Seminar rooms along with one ward. Numbers of BST and Seminar could be increased 4-5 times to accommodate students from multiple medical schools in a single teaching hospital.

Figure-1. Teaching Hospital equipped with Bedside teaching, Seminar / Tutorial, Lecture hall and OSCE hall

Figure-2A. Objective Structured Clinical Examination (OSCE) Hall

An OSCE hall is a requisite component of a teaching hospital. Here OSCE rooms are shown which would be used as stations. However, quarantine rooms (Pre OSCE and Post OSCE) would be also part of main OSCE hall which have not been shown here due to space constrained. In quarantine rooms, in order to familiarize the way OSCE would be conducted, instructions are given to the students. After OSCE students are quarantined in Post OSCE room until the next batch is ready in pre OSCE quarantine room.

Figure 2B. An OSCE station room

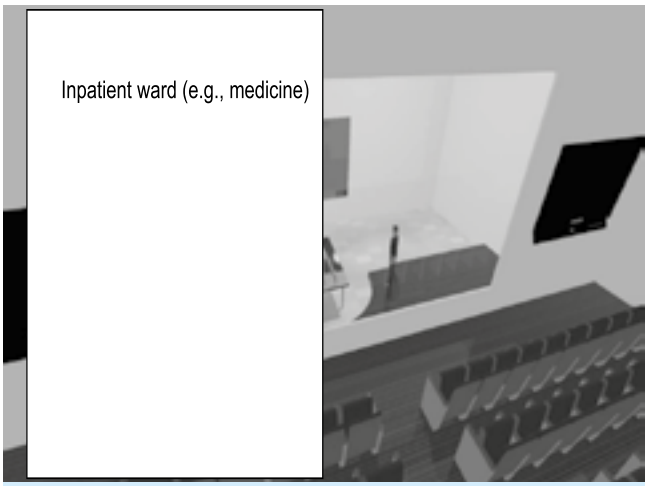


Figure 3. A sketch of Bedside teaching (BST) and Seminar / Tutorial (SRT) rooms.
Ward + Bedside Teaching room + Seminar Room
This is a template for a Bedside teaching (BST) room along with Seminar / Tutorial (SRT) room. This BST and SRT are located adjacent to inpatient ward but outside the ward. Both rooms would be equipped with audio video IT facilities. This would provide isolation for BST, fewer disturbances to inpatient of the ward. It would provide a comfortable clinical teaching environment.

DISCUSSION

Taking consideration of teaching hospital in respect of IT, Rothman[17] suggested a design of teaching hospital. In his teaching structural model, it was explained the interior and exterior spaces of the hospital were conceived as green spaces to reduce the stress. The given spaces were according to Mexico culture on their familiarity, cultural relevant, context of contemporary design.

The use of clinical skills laboratories to solve the inadequacies of the bedside teaching has been employed in many advanced countries. However, it has been suggested also that clinical skill labs should be used as an extra tool and not a replacement for bedside teaching.[18]

Medical schools of developing countries have a great challenge to equip their schools with much expensive skill lab items. However, in the absence of clinical skills laboratories, though there has been a steady decline in the time spent teaching clinical skills at the bedside.[19]

In traditional long and short case, the students 'competence is assessed by two examiners who test their skills on few patients. Thus the luck of the draw plays a dominant role in the procedure and variation in the marking scheme between examiners may be conspicuous.[20]

Long and short case assessment may become a test of the candidate's factual knowledge from a test of skills in eliciting a history, carry out a physical examination and interpreting the results of the investigations.[21] The need to revise the assessment had long been suggested and currently many medical schools use Objective Structured Clinical Examination (OSCE). To conduct a successful and satisfactory OSCE is itself a big challenge. Having been inbuilt OSCE area inside the teaching hospital would make its running smooth with fewer changes in the structure of the hospital. In addition, having an area reserved for OSCE in the hospital, would provide real patients rather than simulated patients. However, selecting real patients could be a challenge.

A lecture hall allows the students to learn through seeing and hearing the teaching material presented to them. It is part of a campus of medical school but it is ignored for teaching hospitals. Some teaching hospitals are far away from medical school campus. Teachers and students have to travel long distance lasting from 1-2 hours which hinders the learning of clinical teaching. Absenteeism from class and delay or

reschedule of teaching are commonly seen when teaching hospital don't have lecture halls. Having a lecture hall inside the teaching hospital would enhance clinical teaching smoothly.

What has been suggested for lecture using BST room connected with lecture hall and using two lecturers (teachers), a question may arise by adopting this method; medical school would need more faculty members in terms of lecture delivering. Mostly lecture is delivered by a single teacher and this is considered its one main advantage. It seems we need two lecturers but 2nd lecturer could be a hospital member if none from teaching faculty is available , a registrar, senior medical officer may help in this process because the purpose is to show physical examination or patients sign and symptoms and this is their routine job. But the impact on learning of students would be greater than expectation.

Another question may arise, what should we do for existing teaching hospitals which do not have such facility. If there is possibility to construct new floors at the top of the hospital, OSCE hall and lecture halls could be constructed at top. However, BST, SRT could be constructed according to the prior ward design.

CONCLUSION

BST room, SRT room are part of indoor ward but they are reserved for teaching. Having a separate teaching area would provide an adequate teaching and assessment opportunity. However, this requires a good system of IT and camera operating system to show 3D video of the bedside teaching.

This network would provide a massive but beneficial teaching opportunity for multiple medical schools within one teaching hospital. In today's era, because of advancement of IT technology, such connections are easy to establish. However, maintaining the connections demand availability of IT assistance at all times. There are more advantages which could be tested once such a hospital is established so we suggest the use of IT technology in existing or newly planned teaching hospitals having BST, SRT, OSCE areas for better clinical teaching should be encouraged.

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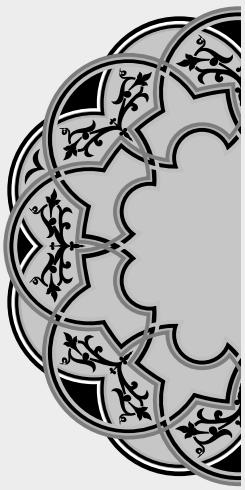

"The first to apologize is the bravest.
The first to forgive is the strongest.
The first to forget is the happiest."

Unknown

AUTHORSHIP AND CONTRIBUTION DECLARATION

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