

THE JOURNEY – SIM@UKM BASIC SIMULATION LAB FACULTY OF MEDICINE UNIVERSITI KEBANGSAAN MALAYSIA

Dr. MohdHafidzulJasman

Department of Medical Education, Faculty of Medicine, UniversitiKebangsaan Malaysia, Kuala Lumpur, Malaysia

Corresponding Email: mohdhafidzuljasman@ukm.edu.my

ABSTRACT

The Setting up a Simulation Lab is a laborious undertaking that involves proper planning with multiple constructional steps, manpower and significant costs. As one of the leading medical university in the country, we decided to set up a simulation lab for the use of undergraduates as well as postgraduates in health-related courses. This is in-line with the current trend of Education 4.0 to ensure that our institution continue to be a leading clinical teaching hub in the country. The article provides a guideline for other institutions in creating simulation lab and it highlights our endeavor during the setting up of SIM@UKM Basic Simulation Lab. Our journey included creation of simulator inventory for the Faculty of Medicine, listing down the simulation procedures needed, procurement of the simulators together with adjunctive equipment, development of learning packages, administrative work and development of health and safety protocols. Following this, we conducted a pilot study and gathered the feedback. We briefly describe our initial experience and the adaptation during the Covid-19 pandemic. The simulation-based learning at SIM@UKM Basic Simulation Lab is one of the clinical teaching and learning tools that highlight the credibility of our institution as a leading clinical teaching hub in the country.

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1. INTRODUCTION

Medical education worldwide has improved dramatically over the last few decades by implementation of integrated undergraduate medical curriculum in which the students are no longer following the traditional pre-clinical and subsequent clinical years. They are exposed to the clinical world right from the beginning by encountering real patients in hospitals and primary care centres. However, this has caused substantial anxiety among certain students who feel less competent at encountering real patients. Simulation centres were developed in a lot of medical institutions to bridge the gap. The SIM@UKM committee was set up in Faculty of Medicine Universiti Kebangsaan Malaysia to facilitate medical simulation activities in our institution. The committee comprised of a team of lecturers with sound knowledge in medical education and medical simulation in particular. Other committee members include supporting staff that were directly involved in the implementation and the running of the lab. Several meetings were conducted to initially brainstorm the idea and subsequently to check on the progress of specified given tasks. SIM@UKM Basic Simulation Lab (BSL) was implemented with the aim of introducing the undergraduates to the clinical skills in a simulated technique. The primary objective of effective clinical skills simulation centre is to bridge the gap between didactic academic tutorials and lectures and the implementation of the clinical skills on real patients. It supports the move from teacher-centred to student-centred learning that will enhance self-directed independent learning. BSL provides conducive learning environment to promote active learning. It is also to boost the confidence of the medical students and allows individualisation in learning process to be practiced.

2. METHODOLOGY

The initial task was to come out with the learning objectives and the intended learning outcomes for the undergraduate students in general. The committee then collectively compiled all the procedural skills listed in the medical undergraduate logbook. Only the procedural skills that were deemed essential and compulsory for the teaching and learning were selected and listed. During this laborious task, the heads of undergraduate modules, medical educationist and some expert panels were invited to a special workshop to brainstorm and discuss the methodology.

2.1 Creation of simulator inventory for the Faculty of Medicine

The SIM@UKM committee managed to identify all the manikins and task trainers bought earlier by the faculty placed under respective clinical departments. This was done to make sure that the committee could assist the faculty in the proper inventory of assets. We intended to centralize the simulation under one roof if necessary. Inventory was also made to identify simulators and task trainers that were defective and needed replacement. It is also to ensure that the new simulators that we were going to purchase had never been brought earlier to avoid redundancy. Conclusion made from this task was to maintain the assets at their original places in their respective departments and these assets would continue to be under the jurisdiction of the respective departments. Subsequently, we created a list of simulator that need to be procured for BSL based on the learning objectives and the inventory lists.).

2.2 What do we offer?

Various simulation procedures are introduced incorporating basic life support, airway management (e.g. endotracheal intubation, laryngeal mask airway insertion) as well as resuscitations (e.g. neonatal, paediatric, adult). Procedures involving needles and cannulation are offered including central venous catheterization, lumbar puncture, spinal anaesthesia, epidural anaesthesia, knee aspiration, thoracic cannulation, venepuncture, arterial puncture, aseptic blood culture technique, insulin injection, intravenous cannulation, intraosseous cannulation, urinary bladder catheterization, and nasogastric insertion. Wound suturing and episiotomy repair are offered as well as immobilization technique including head immobilization, collar neck application, scoop stretcher application, limb splinting and traction. Basic clinical skills procedures such as blood pressure measurement, inhaler technique, peak flowmetry, heart and lung auscultation, otoscopy, ophthalmoscopy as well as intimate examinations including breast, rectal, female pelvic examination, pap smear and high vaginal swabs are also included.

2.3 Procurement

The selection of venue for the simulation skills lab was the next task that involve negotiation with respective faculties. We managed to get 14 simulation skills lab rooms in the faculty pre-clinical building. All rooms are situated within the same floor level to ensure smooth running of the programme and to provide good facilitation to the students. This is also to ensure monitoring and management of each room can be conducted satisfactorily. The first group of committee members had the task to list all the simulators needed. Following this, vendors from various simulation companies were approached by the second group of committee members and were asked to make demonstration of their products. The demonstrations were attended by content expert from the SIM@UKM committee. The Committee then collected all the quotations from the respective companies and decided on the best product and best price given for purchasing the manikins and task trainers. We had to consider company's criteria including the price, after-sales maintenance, demonstration of technical issues, and additional items provided such as guidebooks and online support system prior to the procurement of the items. A final purchasing task force committee would review the overall process before proceeding with procurement of the intended items. We also have various existing manikins in our institution under the responsibility of the examination unit, clinical skills unit, and Department of Physiology.

The pre-existing manikins were mobilised from the storage room in our clinical building exam hall to be placed under the care of Department of Medical Education. This has substantially reduced the initial cost to set up BSL. All the manikins have been tested and certified for their use in BSL with asset and serial number attached. The new inventory of assets includes all the simulators in BSL. Letters were also issued to the Hospital Central Storage Unit to acquire disposable items and equipment that are used alongside each procedure. Disposable items are also needed to supplement the procedures offered and they include those that were given to the hospital as samples and items that had gone beyond the expiry date for hospital patient clinical use. The hospital was very much co-operative in our principle of recycling these items which would have otherwise been disposed. With the agreement, the Hospital Central Storage Unit continues to supply BSL with any disposable items needed. On the other hand, sutures that have passed their expiry dates were supplied by the Hospital Operating Theatre Unit again based on the principle of recycling. The Central Sterile Services Department (CSSD) unit had also agreed to supply some unused equipment and instruments. This further reduce the cost of setting up BSL as these did not require new purchasing. The Hospital Phlebotomy Unit supplied expired blood test tubes. Therefore, this will further reduce the cost of running and maintaining the BSL. The cooperation from various parties in the setting up of BSL had shown dedication and inter-departmental collaboration.

2.4 Learning package

Learning modules were also created for each of the intended procedures in the form of hard copy in files. They consist of the learning objectives, list of equipment and items available, procedural scenario and step-by-step guide on how to perform the procedures supplemented by relevant figures and photos. The modules are also displayed on the computer screen of each BSL room together with example videos of the procedures. The learning modules were vetted at various levels by academicians. These modules were created with the hope that BSL would become a centre where students could learn independently without direct teaching from academicians using the concept of self-directed independent learning.

Although we encourage the students to learn independently, support is always provided should they need further clarification on certain procedures. Two video-creating workshops were conducted by a certified simulation facilitator, attended by head of curricular modules from various medical specialties and clinical skills learning head of module. The aim of the first workshop was to give guidance on how to create a video and tasks were distributed among the participants to create intended videos with collaboration from the technical supporting staffs. Subsequently, a second workshop was conducted to review and to edit the videos produced. All the verified videos were then uploaded into the desktop to be used for teaching and learning in the simulation lab.

2.5 Administration and safety

The map and signage of the floor plan as well as the signage for each room are properly displayed. All the rooms are air-conditioned and equipped with and closed-circuit television (CCTV) cameras to monitor the movement of students and to ensure that there are no misuse and mishaps happening in the rooms. The corridors leading to the rooms are also monitored with CCTV to ensure optimum security. The CCTV control room is located within our dedicated SIM@UKM office with the views of each room and the corridors projected on the liquid-crystal display television (LCD TV) screen. The SIM@UKM administrative office is located at the entrance of BSL comprising of a dedicated desktop computer for the use of student registration (log in and log out). The office is also occupied by three medical lab technologists who have specific job scope and responsibility in the running of BSL. A single room is dedicated for recruiting and teaching simulated patients, well equipped with LCD projector, a desktop computer and an examining couch along with normal office furniture. The BSL is opened daily during office hours. Students are required to book and subsequently register electronically using QR code or Google Spreadsheet® their intended procedures. Lockers are provided for them to store their personal belongings before entering the labs. They are also required to read the general guideline provided and are aware of the rules and regulations of the BSL. Health and safety precautions and actions that have been defined including information on fire evacuation plans and exits together with first-aid box are made available. Waste disposal protocols are also provided for sharp objects, and other materials.

2.6 Pilot and initial feedback

Before the launching of the SIM@UKM BSL, several trial runs were conducted among the academicians and also selected group of students to ensure that the lab achieved a certain standard. Undergraduates were provided online feedback form acquired through a specially created QR code. The form captured basic demographic information and the procedures of choice as well as a mixture of closed- and open-ended questions. Based on the first trial run with the undergraduate medical students, our statistics showed satisfactory participation from the pre-clinical students who were eager at learning various clinical procedures offered. The clinical year students grabbed the opportunity to enhance their skills while the final years get to equip themselves with procedures and skills required to work as a junior doctor. Good feedbacks were gathered from most of the students. Fifty-two undergraduate students attended the first trial run of BSL. Forty-eight percent were those from year 3 followed by 30 percent from year 1. We found that overall, for all the 5-academic year, venepuncture procedure had the highest participation followed by wound suturing and adult resuscitation.

Venepuncture was the most popular procedure among year 1 whilst adult resuscitation was the first choice for year 3 students. We also found that no students attempted several procedures including central venous line insertion, nasogastric tube insertion, limb splinting and traction. Several clinical skills procedures such as otoscopy, breast examination and rectal examination were also not popular. The online feedbacks that were gathered from the undergraduates highlighted a few issues. More than 90 percent claimed that the written modules and instruction were organised and easy to follow. The videos were easy to follow according to more than 70 percent of feedbacks that were gathered. More than 90 percent also claimed that the procedures offered were helpful and relevant with similar number agreed that the manikins and equipment provided were sufficient. Almost 90 percent agreed that the health and safety measures were good. Eighty-five percent agreed that administrating staff were approachable and able to answer any questions. Open answer feedback question revealed that they were satisfied with the videos and manikins. They also gave good comments on the written instruction and procedures offered. On the other hand, some did point out that the videos provided were not as simple as they thought and prefer to have on-site facilitators instead of self-learning through the written modules and videos. The feedbacks are invaluable suggestions for us to improve the quality of simulation-learning service provided and a more conducive learning environment.

Remediation steps were taken to improve the learning environment. Apart from the pre-existing videos provided in the learning package, we also included link to simulation videos from Youtube to provide more options for the students in understanding the skills. Anatomical diagrams of the organs and structures pertaining to the task given are also provided for reference. We are also proposing for paid tutorprogramme for the graduate students to become facilitators to help the undergraduates in teaching and learning. The information on SIM@UKM project was also delivered to faculty members to ensure that the academicians are fully aware of the new facilities provided for teaching and learning.

2.7 Initial Experience and Covid-19 experience

BSL was also used by the graduate students waiting for their internship postings. They have held a programme to equip themselves with good clinical skills prior to working as interns. BSL therefore become a bridge from undergraduate to the working life. This also perhaps would alleviate anxiety among certain graduates to practice as medical doctors in hospitals and dealing with real patients. BSL have also received visits from international medical undergraduates from Taiwanese, Indonesian, and Korean universities. Various workshops were also conducted in the simulation lab by the departments in the medical faculty. The Covid-19 pandemic posed a big impact on medical education especially clinical skills. Our simulation lab usage has increased dramatically because the students need to equip themselves with adequate skills despite having limited time in normal clinical settings such as wards and clinics. In line with the global pandemic our BSL is providing extra precaution for the visitors and users with extra QR registration, signage, and guidelines. We also ensure proper social distancing is being practiced at the premise including the maximum number of users per room. Sanitisation and cleaning is done regularly after each training session with proper personal protective equipment.

3. CONCLUSION

The BSL will be the main undergraduate simulation centre. We hope that BSL would be a significant learning tool to equip the undergraduate students with adequate clinical competencies. It is hoped that this initiative will be a paradigm shift to move the educational strategies towards student-centred active learning. We do hope that in the future the centre would be not only act as an adjunct to the learning process but the main tool of assessing the student clinical competencies in the form of direct observation of practical skills (DOPS), as part of their pre-requisite of graduating from the medical school. Some departments have used the BSL in which the students undergoing their clinical postings are required to practice and subsequently vide-record their skills to be assessed by their supervisors. This has reduced the workload of the lecturers for not having to be present during the session at all times. Supervisors could then give feedback and comment on the students. It is hoped that BSL would also be useful for the postgraduates to polish their skills. It could definitely provide a new platform for research and subsequent publications. Income generation perhaps can be gained by opening up the centre to the public either from governmental or private agencies. The simulation-based learning at SIM@UKM Basic Simulation Lab is one of the clinical teaching and learning tools that will highlight the credibility of our institution as a leading clinical teaching hub in the country.

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