Exploring medical students' perceptions on the effectiveness of a clinical skills rotation at a clinical skills laboratory

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Declaration

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Muhammad Faisal Rahim

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Abstract

Learning skills and competencies through simulation is a safe way of teaching medical students clinical procedures before exposing real patients to their practice. This is the case at the Ziauddin University (ZU) in Pakistan. The study was done after a Clinical Skills Laboratory (CSL) was established where Clinical Skills Rotation (CSR) was taught. The aim of the study was to determine how students experienced this new form of teaching and how it affected the rotations following the training in the CSL. The focus of the CSR was the transfer of knowledge into a variety of skills such as communication, interpersonal, and psychomotor skills, mostly through simulation-based training on manikins and on standardised patients.

The study adopted an explorative approach by making use of both qualitative and quantitative data. One-to-one interviews were conducted with participants who attended CSR along with other rotations in the third year of their Bachelor of Medicine Bachelor of Surgery (MBBS) class. Quantitative data was also gathered. The design comprised a quantitative component in the form of a Likert scale type questionnaire coupled with a qualitative component comprising unstructured interviews. The sample was selected from the third year MBBS class of 2016. The students were divided into two groups that completed the questionnaires and took part in the interviews, which the researcher conducted. The data gathered from the questionnaires were collated in tables to indicate the trends found in the answers. The interviews were audio recorded, transcribed, and analysed through thematic analysis using a coding process to develop evolving themes.

The quantitative data analysis showed overall positive perceptions and experiences of attending CSR. The majority of respondents perceived that the clinical skills sessions were conducted with clear aims and objectives. There was a clear indication that they thought the educational content was appropriate for a student's level of understanding. Two thirds of students positively responded, describing the CSL sessions as relevant to their clinical contexts. Most of them agreed that these sessions created interest and enthusiasm among students. The qualitative data showed that most of the students

enjoyed learning in a CSL and valued the experiences that would enhance their performance of procedural skills, communication skills, and universal precaution. In addition, skills that students learned at CSR moderately affected their learning in other rotations.

Opsomming

Die aanleer van vaardighede en bevoegdheid deur simulasie is 'n veilige manier om mediese studente kliniese prosedures aan te laat leer voordat werklike pasiënte blootgestel word aan hulle praktiese toepassing daarvan. Dit is die geval by Ziauddin Universiteit in (ZU) Pakistan. Die studie is gedoen nadat die Kliniese Vaardigheidslaboratorium (KVL) gevestig is. 'n Kliniese Vaardigheidsrotasie (KVR) is ingestel in die KVL om die studente te onderrig. Die doel van die studie is om vas te stel hoe studente dié nuwe vorm van onderrig beleef en hoe dit die daaropvolgende rotasies na opleiding in die KVL beïnvloed. Die fokus van die KVR was die oordrag van kennis na verskeie vaardighede soos kommunikasie, interpersoonlike en psigomotoriese vaardighede, meestal deur middel van simulasiegebaseerde opleiding op plastiese modelle en gestandardiseerde pasiënte.

Die studie het 'n verkennende benadering gevolg deur van beide kwalitatiewe en kwantitatiewe data gebruik te maak. Een-tot-een onderhoude is gedoen met deelnemers wat die KVR bygewoon het saam met and rotasies in die derde jaar Baccelarius Geneeskunde en Baccelarius Snykunde klas (MBBS). Kwantitatiewe data is ook ingesamel. Die ontwerp het bestaan uit 'n kwantitatiewe komponent in die vorm van 'n Likert-skaal tipe vraelys tesame met 'n kwalitatiewe komponent wat bestaande uit ongestruktureerde onderhoude. Die studente is in twee groepe ingedeel wat onderskeidelik deelgeneem het aan die voltooiing van die vraelys en deelgeneem het aan die onderhoude wat die navorser gevoer het. Die data wat ingesamel is deur middel van die vraelyste is saamgevat in tabelle om die tendense wat in die antwoorde gevind is aan te dui. Die onderhoude is opgeneem, getranskribeer en geanaliseer deur middel van tematiese analise en 'n koderingsproses om ontluikende temas te ontsluit.

Die kwantitatiewe data analise het oor die algemeen positiewe persepsies en ervarings van die bywoning van die KVR aangedui. Die meeste respondente se persepsie was dat die kliniese vaardigheidsessies aangebied is met duidelike doelstellings en doelwitte. Daar was 'n duidelike aanduiding dat hulle gedink het die opvoedkundige inhoud was

gepas vir 'n student se vlak van begrip. Twee-derdes van die studente het positief gereageer op die vraag oor die relevansie vir hulle kliniese konteks. Die meeste van hulle het saamgestem dat hierdie sessies belangstelling en entoesiasme by studente geskep het. Die kwalitatiewe data het aangedui dat meeste studente die leerervarings in die KVL geniet en waarde geheg het aan die ervarings wat hulle toepassing van die prosedurele vaardighede, komunikasievaardighede en universele voorkoming sou verbeter. Daarbenewens het die vaardighede wat studente in die KVL geleer het, ook die studente se leervermoëns in ander kliniese rotasies tot 'n mate verbeter.

Abbreviations

ACLS   Advanced Cardiac Life Support

BLS   Basic Life Support

CPR   Cardio-Pulmonary Resuscitation

CSL   Clinical Skills Laboratory

CSM   Clinical Skills Module

CSR   Clinical Skills Rotation

DOPS   Direct Observation of Procedural Skills

DRE   Digital rectal examination

EGR   Ethical Guidelines for Research

ERB   Ethical Review Board

HREC   Health Research Ethics Committee

IDH   International Declaration of Helsinki

IMI   Intramuscular injection

IVI   Intravenous injection

MBBS   Bachelor of Medicine Bachelor of Surgery

MiniCEX   Mini Clinical Evaluation Exercise

MRC   Medical Research Council

OSATS   Objectively Structured Assessment of Technical Skills

OSCE   Objectively Structured Clinical Examination

PAL   Peer-assisted learning

PMDC   Pakistan Medical and Dental Council

SBL   Simulation-based learning

SP   Standardised Patient

ZU   Ziauddin University

Tables and Figures

Terminology

- **Reflection**: A thought that allows students to develop a new understanding of the situation that leads to a change in the state of mind and a more informed and improved action (Bringle & Hatcher, 1999).

- **Perception:** The process of using the senses to acquire information about the surrounding environment or situation (Ben-Chaim & Zoller, 2001). For the purpose of the research, perception will also include experience.

- **Simulation-based Learning:** Simulation is a type of educational activity where students imitate real cases in an artificial environment without harming the patients (Cant & Cooper, 2010).

- **Evidence-Based Medicine:** Evidence-Based Medicine is a judicious use of literature that helps in making decisions about patient care (Guyatt, 1991).

- **Debriefing Technology:** Use of technology or simulation to provide the environment or platform for expression of feelings after some educational activity (Cheng, Eppich, Grant, Sherbino, Zendejas, & Cook, 2014).

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CHAPTER 1: INTRODUCTION

1.1   Introduction

Medical students worldwide are introduced to clinical skills laboratories (CSL) where they can learn clinical skills in a simulated environment practicing on plastic manikins and models. The first CSL was established at the Netherlands Limburg University in 1976 in Maastricht (Al-Yousuf, 2004). Since then, many medical colleges around the world have integrated a CSL into their medical curricula. The main objective of a CSL is to provide a safe and protected environment in which the students can learn new clinical skills before they start working with real patients in clinical settings. When the term 'clinical skills' is used in reference to a CSL, it involves a wide scope of learning tasks such as history-taking, physical examination, procedural skills, professionalism, effective communication, and teamwork. The use of a CSL can facilitate learning procedural skills in the medical curriculum by providing students with an opportunity to acquire skills and techniques such as intravenous injection (IVI), intramuscular injection (IMI), cardio-pulmonary resuscitation (CPR), intubation, digital rectal examination (DRE) and catheterisation with standardised learning, just to name a few. A CSL allows the use of multiple educational strategies, including simulation-based learning (SBL) with the use of technology as well as peer-assisted learning (PAL) through experiential and social learning approaches, which provide student-centred, self-directed, and integrated learning. In addition, small group discussions, large group discussions, and role-playing, as well as standardised, simulated, and real patients can be a part of the teaching and learning methods in these programmes. Reviewing video recordings of a case or a procedure can also play a vital role in learning and overcoming mistakes (Ziv, 2010).

There are many reasons for using a CSL in the medical curriculum such as the vital role it can play in providing an alternative venue for practicing clinical skills for medical students. It can also provide an artificial learning environment for medical students where students can have ample time to practice their skills until they perfected their skills (Vankipuram, Kahol, McLaren & Panchanathan, 2010). Other advantages of a CSL are that it reduces the gap between the classroom and the clinical setting and subsequently

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bridging the gap between theory and practice. For example, the use of simulators enable students to learn, practice, and make mistakes without risking real patients or themselves. In addition, simulators have a foreseeable behaviour outcome; experiences are reproducible, which allow standardised experiences for the students. For most students, the CSL provides a learning environment where they may feel less stressed and can repeat their task at their own pace. (Ahmed, Amer, Challacombe, Jaye, Dasgupta, & Khan, 2011). According to Al-Elg (2007) the "single most important determinant of skills and knowledge retention is repeated practice" (Al-Elq, 2007, 59). In the CSL, students can repeat procedures several times in order to improve their skills and competency levels. Students can practice skills such as genital, vaginal, rectal, and breast examinations that are often difficult to practice on real patients during their early clinical years. One of the most important features of using a CSL for the acquisition of clinical skills is that students can get direct feedback on their progress (Shuid, Yaman, Kadir, Hussain, Othman, Nawi, *et al*, 2015), which may come from peer feedback, through their own reflection or from their teachers' assessment using Objectively Structured Clinical Examinations (OSCEs) (Alinier, 2003).

In the contemporary world, where medical costs are escalating with a higher demand on available medical services, there is a growing number of patients who come to the hospital for a shorter hospitalisation and, therefore, there is less time available for students' learning. The other problem is the growing number of medical students, which leads to an increased burden on hospital administration in terms of space and resource availability to accommodate students (Weissman, 2005). Hence a CSL can be utilised as a place where students can learn clinical skills in a simulated environment (Bradley & Postlethwaite, 2003).

In addition to the above, there is an increasing concern about patients' safety, which includes students performing a physical examination that makes the patient uncomfortable (Ochsmann, Drexler, Schmid, & Zier, 2011). According to one report, the estimated time allotted to bedside teaching has dramatically declined from 75% to 16% from the 1960s to 1978 and is currently perhaps even lower. This may also be due to the

shift of health care services from in-patient settings to ambulatory care settings (Ziv, Wolpe, Small, & Glick, 2006). Since a CSL is a place where students' learning of clinical skills can take place, it would seem as if it could provide a solution to some of the above-mentioned problems. The aim of this study was to look at the experiences and perceptions of students on various components of their clinical skills rotation (CSR). Another aim was to explore its effectiveness on their other major rotations in the third-year clinical clerkship programme. The background of the study unpacks the context in which the study took place.

1.2   Background

In 2010, the Pakistan Medical and Dental Council (PMDC), the only regulatory body for medical colleges in Pakistan, issued a notification to all its colleges for the establishment of a CSL. The notification was aimed at starting to offer courses such as Basic Life Support (BLS) and Advanced Cardiac Life Support (ACLS) as a mandatory requirement for all graduating students. In addition, the PMDC required that the Bachelor of Medicine and Bachelor of Surgery (MBBS) programme must include the learning of procedural skills in the CSL in the pre-clinical years, but mainly in the third year. In response to this request, the Ziauddin University (ZU) established a Clinical Skills and Health Informatics Laboratory in 2011. The aims and objectives of this CSL were firstly, to improve students' procedural, examination, interpersonal, and communication skills and secondly, to incorporate an additional Health Informatics and Evidence Based Medicine component (Quadri, Rahim, Alam, Jaffery, Zaidi, & Iqbal, 2008).

Later in the same year, a new CSR was added in the third year of the MBBS programme along with other clinical rotations such as surgery, medicine, paediatrics, gynaecology and obstetrics, family medicine, clinical pathology, and radiology. The total duration of the CSR is four weeks. In each week different competencies related to procedural, clinical, communication, and interpersonal skills are taught. The purpose of the rotation is to provide students with opportunities to learn various clinical skills and to develop other inter-professional skills that are often difficult to teach in clinical settings. The components taught during the third year of CSR are summarised in Appendix A. Each teaching session

in the CSR is presented in a similar manner with an introductory lecture followed by a video session. After that, a demonstration is given by an instructor, followed by a simulation-based practice session on manikins and models. The final assessment of skills takes place at the end of the rotation. The assessment method used is an OSCE, with six to seven stations to evaluate students' competencies gained during this rotation.

1.3   Motivation for the study

The motivation for this study started when I reflected on the time when I was a medical student. I can remember that we went to various wards in the hospital, yet the only clinical exposure that we had at the time was taking histories from the patients. Since the facility where I was trained was private, we as students were not allowed to do physical examinations or procedures on the patients. The main reason for this was that in private tertiary hospitals, patients prefer that their consultants see them instead of a junior staff member or a medical student. These experiences made a lasting impression on me. When I joined a medical college as a medical educationist, I realised that students needed some kind of advanced clinical preparation besides just taking histories in their clinical rotations during their early clinical years. As the CSL was a new venture at the university where I teach, I was curious whether the CSR in a CSL was effective and whether it really contributed to the better preparation of medical students for clinical practice. Since the efficacy of the CSL at the institution was not explored before, nor the benefits taken into account, I decided to take on the study as part of my Master's Degree.

1.4   Problem statement

At ZU, medical students have less chance to practice clinical skills, especially some of the procedural skills, such as gynaecology and obstetrics examinations skills, which male students normally find difficult to perform on real female patients. In addition to this, the management of a private hospital puts a high premium on the safety and privacy of patients. The newly instituted CSR in the CSL was a good opportunity to provide medical students with the practice of these procedural skills in a safe and artificial environment before they are confronted with real patients at ZU, which is a privately owned university hospital. The CSR is a part of the clinical clerkship program of the third year MBBS

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undergraduate program. A total of 10-12 students were rotated in each of the rotations of the clerkship program. Before the end of the rotation examination, the CSL is opened for all the third year MBBS students to practice whatever skills they want to learn in a CSL. It was also expected that the CSR would have an impact on the rotations following the CSR. Hence, it was firstly important to determine what students' perceptions were of the quality and pertinence of their learning experience and the applicability of the skills and knowledge they gained after attending the CSR in the CSL. Secondly, it was also important to determine what students' perceptions were about the transferability of their knowledge and skills to the other major rotations like surgery, medicine, family medicine, and gynaecology and obstetrics in such a way that it enhanced the learning in those rotations.

1.5   Layout of the assignment

The assignment consists of five chapters starting with this chapter as a brief introduction to CSLs and providing some background and context to the study. The second chapter gives a brief overview of relevant literature in order to position the study in existing knowledge about the topic. This culminates into a problem statement, the research questions, and the aims and objectives of the study. The third chapter sets out the research design and methodology such as the sampling, data collection, data analysis, anticipated benefits, and ethical considerations. In the fourth chapter, the data is presented followed by the fifth chapter where the results are discussed. The chapter ends with the conclusion, the contribution of the study, and recommendations for further studies.

1.6   Summary

In this chapter, the concept of CSLs and their main functionalities were introduced. The background and context highlighted the context of medical schools being urged by government to establish CSLs to enhance the learning of clinical skills and how ZU responded to this call. The rationale for the study unfolded as being a mix of the researcher's own reflection and the need for the institution to determine the efficacy of the CSR on students' clinical skills acquisition and the degree of enhancing other clinical

rotations following the CSR. In the next chapter, a brief literature review positions the study in the field of clinical skills training in a medical curriculum.

CHAPTER 2: LITERATURE REVIEW

2.1 Introduction of a Clinical Skills Laboratory in the medical curriculum

In the background of the study, reference was made to the inception of the Clinical Skills Laboratory (CSL) at Ziauddin University (ZU) that created a context for the study. In the literature overview, the focus is on the inclusion of CSLs in the medical curriculum and specifically discussing the learning theories that are used to explain learning in a simulation environment. Teaching methods is another area that links to the learning theory and indicate how learning is best facilitated in a CSL in order to assist students to develop the competencies that would enhance their learning in other rotations. Finally, the overview concludes with the assessment of learning while the chapter concludes with a discussion of the problem statement, the research questions, and the objectives of the study.

2.2 Inclusion of CSLs in medical education

The system of delivering education is rapidly changing in medical professions education. The traditional method of classroom teaching is no longer the sole teaching and learning method. There are many other spaces where learning can take place including in a CSL where students learn various clinical skills in a standardised and artificial environment before attending to real patients.

According to Kneebone (2003), learning clinical skills in a simulated environment without encountering real patients is sensible and wise. It can, for example, allow medical students to prepare themselves in dealing with emergency situations before dealing with the real case scenario in a non-threatening environment. A CSL has the potential to recreate some real patient scenarios for various challenging situations (Gaba, 2004). Simulation is a technology that can prepare students for real patient-like experiences in an interactive manner. As an educational strategy for teaching and learning, simulation

provides the opportunity for the students to be both pragmatic as well as experimental (Barsuk, Cohen, Feinglass, McGaghie & Wayne, 2009).

With simulation and the help of interactive manikins, screen-based computer simulations, task trainers, and low to medium fidelity simulators one can create opportunities for students to improve their skills in order to deliver better and safer care to patients when they get to the clinical areas. It is a powerful teaching and learning space that can help today's health care professionals to achieve higher levels of competence and safer patient care (Aggarwal, Mytton, Derbrew, Hananel, Heydenburg, Issenberg *et al*, 2010). Medical students' performance and confidence levels significantly improved after being trained on psychomotor skills in simulation (Laschinger, Medves, Pulling, McGraw, Waytuck, Harrison *et al,* 2008).

At the same time, there are certain issues that may emerge as a hurdle in establishing a CSL and such as cost and training. The cost of equipment acquired for a CSL is very high and for some institutions, especially in developing countries, it might be difficult to produce a valid justification for the money spent on a CSL. In addition, expert training is also required to handle these high fidelity simulators.

Researchers highlighted some of the problems that medical students have when communicating with patients during history taking and physical examination (Leblanc, Tabak, Kneebone, Nestel, Macrae, & Moulton, 2009). These problems may be due to a language barrier or due to the uncooperative behaviour of patients such as dealing with angry or irritated patients. In some situations, students need to deal with difficult and pressured situations such as where they need to handle uncooperative patients or they may have to break bad news to a patient's family. The CSL can provide opportunities for students to practice communication skills prior to entering the wards with real patients. It can decrease student anxiety and promote effective therapeutic communication skills (Sleeper & Thompson, 2008). In a CSL, an enabling environment may be created where students can learn communication skills as they can be provided with guidance and feedback on how to deal with such situations. Feedback is most important aspect of

learning and improving skills in a CSL, which also allowed students to reflect back on their performance in order to improve it for the next time.

As the study explores students' perceptions and experiences during a Clinical Skills Rotation (CSR) in a CSL, the inclusion of such a rotation in a medical curriculum is discussed in the section below.

2.3   Clinical Skills Rotations in a programme such as the Clinical Clerkship

Any clinical skills programme needs to be structured and organised in terms of its educational contents so that students should know what they are expected to learn. A planned programme would help them to take maximum advantage of learning skills and competencies in a CSL. For these programmes to be successful, all students need to show their maximum participation and interest in these simulation-based learning (SBL) sessions and in CSR (Jamelske, 2009).

Learning skills should not be the sole objective for coming to the CSL. It is more important for medical students to know in what context they are learning these skills and the holistic picture is in their clinical context. For example, when a student learn the insertion of a nasogastric tube in a standardised patients (SP) or in a manikin, the student should also know for which medical conditions or emergencies this clinical procedure is required, or what the complications and contraindications for this procedure are. It is equally important to understand the appropriateness of the skill *and* to acquire the skill. Practical learning within the clinical context leads both to longer retention of the learning as well as the integration of their knowledge and skills at the same time (Avargil, Herscovitz & Dori, 2012). The instructors should also know how effectively the various learning and teaching strategies are utilised in a CSL in order to implement and gain outcomes for these teaching and learning strategies. Regular and repeated visits of medical students to the CSL can help track their improvement in skills for what they have learned in the CSL. Of critical importance is adequate feedback provided by their facilitators in order for students to improve their competence level (Branch & Paranjape, 2002).

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The following section explains how students learn in a CSL and which learning theories may be applied in simulation learning spaces.

2.4   Learning theories and teaching methods in a CSL

Learning theories are efforts to explain how students learn. In a CSL, a number of learning theories can be applied for teaching clinical skills. For example, according to behaviourism, the learning occurs when there are changes in students' behaviour and the correction, techniques, and skills can be observed (Skinner, 1975). An effective reinforcement agenda requires repetition of task sequences and constant positive reinforcement. Without positive feedback, learned repetitions will quickly become extinct. It is in a learner's instincts that s/he will continue to modify their behaviour if the positive reinforcement is absent (Skinner, 1975). This type of learning also takes place in the clinical training programmes, where students are encouraged to practice their skills under the supervision of trained instructors. The instructors provide feedback for improvement of students' performance in a CSL. This allows students to keenly observe each step of a clinical procedure that they then try to emulate in order to improve their performance. One important factor in behaviour-based learning is that it would be unsuccessful if students do not pay attention while this learning approach is utilised. It could also be to the detriment of students if they just do what others do and do not develop the cognitive ability to discern when to use which procedure.

Another important theory pertaining to performing clinical procedures in the CSL, is social constructivism, based on the philosophy that students construct meanings as they learn from each other and as a result of their own cognitions to build new knowledge (Schunk, 2004). Team work and creativity in problem solving skills are the essential ingredients of practice when applying this theory and is well demonstrated during clinical practice and performing clinical procedures.

Using learning theories as a lens, various teaching methods may be utilised to enhance effective learning. Medical students are exposed to various teaching and learning methods from their first to their final year of training in a medical school. Traditionally,

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basic sciences teaching involved didactic lectures and practical sessions, while for the learning of clinical skills, students mostly relied on bedside teaching and teaching in out-patient clinics. Eventually, new methods of teaching clinical skills were introduced such as Simulation-based Learning (SBL), peer-assisted learning (PAL), and role-playing (Sutkin, Burley, Zhang & Arora, 2008).

The following section takes a closer look into these teaching approaches and methods.

2.4.1 Simulation-based learning

Clinical skills programmes offer opportunities for innovative teaching and learning methods that provide medical students with effective feedback and assessment strategies through low- to high-fidelity simulators and scenario-based simulation. SBL in skills training is a noble effort to substitute the real patient encounters with the standardised patients, task trainer or virtual-reality patients (McGaghie, Issenberg, Cohen, Barsuk & Wayne, 2011). The purpose of SBL is to duplicate patient-care scenarios in a realistic environment in order to provide productive feedback and assessment (O'Connor & McGraw, 1997). SBL offers the opportunity to practice real-time experience in a controlled fashion, on which can be reflected at leisure. SBL is used in multiple areas of medical education to provide opportunities for deliberate and safe practice in shaping the development of clinical skills (Many, 2005). The shift to SBL and assessment contributed to a significant change from the traditional approach of learning and the customary reliance on real patients for clinical teaching (Scalese, Obeso, & Issenberg, 2008).

SBL can play a vital role in the development of health care professionals' knowledge, skills, and attitudes, while protecting patients and ensuring their safety. SBL provides a valuable tool in teaching and learning to mitigate ethical tensions and can resolve long standing practical dilemmas in the clinical practice (Fanning & Gaba, 2007). An increasing number of hospitals and medical colleges are now turning to SBL through establishment of simulation centres. Simulation training centres, with their innovative techniques and state of the art equipment, offer unparalleled opportunities for the learners with dynamic,

complex, and unanticipated medical situations to be practiced and managed in a simulated environment.

SBL tools, strategies, and techniques can be applied in designing structured learning experiences for the medical students. It can also be used as a measurement tool to assess the targeted teamwork competencies and learning objectives. In teamwork training students work together on tasks assigned to them and can be conducted in the simulated environment. Different case scenarios may offer a protective benefit in terms of providing patient safety as students can commit errors in a simulated environment. It also offers collaborative learning, where students learn from each other and share ideas, which actually enhance performance and the competency level of medical students (Lateef, 2010).

A properly conducted SBL session can help a learning activity to be designed in a predictable, consistent, standardised, safe, and reproducible manner. With SBL, students can improve their attitudes, knowledge, and skills while protecting patients from unnecessary risks (Anderson & Fincham, 1994). SBL provides acquisition of skills from basics to complex level using virtual reality and high-fidelity simulators. SBL also provides opportunities for the kind of assessment and feedback that moves the learner from novice to expert (Berragan, 2011).The availability of high-fidelity simulators can incorporate many aspects of assessment through a debriefing session, which can provide constructive feedback for skills improvement. The use of standardised patients (SPs) in the CSL is an essential component used in giving feedback to medical students and evaluate their performance uniformly especially in teaching and assessing clinical/physical and communication skills in medicine. All SPs can simulate 'real' patients by mimicking in giving history or explaining a symptoms.

SBL focuses mainly on skills acquisition that can be technical or non-technical. It is important here to understand that learning activities should be planned in such a way that learning objectives are clear and achievable. The absence of assessment or feedback is the greatest single factor for an ineffective simulation-based session. Therefore, a SBL

session should be adapted as a holistic approach to achieve learning outcomes and not just for the learning of technical skills. Feedback and debriefing or follow-up assessment methods are key elements in building SBL into learners' progression (Reese, Jeffries, & Engum, 2010). Therefore, learners can achieve a higher level of technical and clinical proficiency before they see real patients, which obviously reduces the risk to real patients (Burchard, Ziv, Coyle, Gomez, Tang, Karter *et al*, 2003).

SBL applications are utilised in the Clinical Skills Rotation (CSR) at ZU when faculty test patient care aspects of trainees, for example, using a cardiology patient simulator. On the simulator, a task can be given to the students to demonstrate their ability to perform CPR and to identify heart sounds or a murmur correctly. Furthermore, medical knowledge can be tested using a full-body simulator during a simulated cardiac arrest and verbalise the correct steps in the algorithm for treatment of pulseless ventricular tachycardia. During this encounter, the trainer can also evaluate the students' interpersonal skills, professionalism, and communication skills while performing procedures on the manikin.

With all its advantages, it is assumed that evidence-based outcomes of these technologies can be used as an effective instrument for teaching and assessment of the CSR in a CSL. Medical educators must be willing to make some effective changes in medical education to ensure the appropriate use of these technologies in a facility.

The previous section provided the importance and advantages of CSL followed by the details regarding what and how students may be taught in a CSL through this teaching method. The next section explores the use of PAL.

2.4.2 Peer-assisted learning

Field, Burke, McAllister and Lloyd (2007) has observed that PAL is an effective methodology used in teaching and learning in a clinical context. In this type of learning, a person observes their senior peer and try to imitate them in performing the procedural skills (Fuchs, Fuchs, Mathes & Simmons, 1997). Peers will also help each other to

perform the same procedure and they will be ready to give tips and advice to each other for further improvement. It limits the role of the instructor and places more emphasis on team-based learning. The most important advantage of PAL is that a peer is more approachable than an instructor. Hence, senior students or peers can communicate better with their equals than their facilitators (Maheady, 1998). Some research findings show that this type of learning promotes interest, confidence, and enthusiasm among students toward learning clinical skills, which may be absent in other forms of teaching and learning methods (Weidner & Popp, 2007). This is significant because a peer can also contribute in the feedback sessions where they can highlight the shortcomings of fellow trainees and can give suggestions for improvement.

PAL may also be to the detriment of learning when the environment in which leaning takes place is too friendly and relaxed as it might dim the seriousness of the learning process. PAL will be a promising learning strategy in future, as students are often overburdened by educational contents and less time devoted for practical experiences in their medical curriculum, especially the clinical curriculum. It is expected that the utilisation of PAL in CSLs will increase in the future due to the higher value placed on simulation in learning processes. In addition, Peer Physical Examination (PPE) is a technique which was introduced some years ago in the clinical clerkship programs. PPE is the teaching and learning activity in which fellow students examine each other in order to improve their physical examination techniques in clinical skills. A number of recent studies suggest that PPE is more acceptable and preferred method for students` learning physical examination techniques than with older patients or SPs (Pazo, Frankl, Ramani, & Katz, 2017).

2.4.3 Role-playing

Role-playing is defined as acting as a pre-defined character in a mock situation. It may be taking on the role of a patient or taking on the role of the physician, which helps students to learn history taking and physical examination skills. Role-play is widely used as a learning strategy that teaches communication skills and physical examination skills

to the students in medical education. It is widely used in a CSL to teach clinical skills and incorporated with various other learning strategies. The teaching and learning communication skills, coupled with the use of role-playing and standardised patients, have now become a common practice in the acquisition of clinical skills like learning in clinical skills training programmes (Wagner, Lentz, & Heslop, 2002). Training of technical or clinical skills with communicational aspects is now becoming an essential component of CSL training. Communication skills can be easily learned through role-playing. This role-playing approach is a type of low-technical simulation technique that can be used in different settings and can address larger audiences. Role playing can also adopted to teach physical examination skills and also to discuss various clinical cases to the medical students. Using role playing as an innovative teaching and learning methodology has a great potential in health professions education.

The learning approaches and methods discussed here enhances the teaching and learning in a CSL, which creates opportunities for students to explore knowledge and skills at new levels. It allows creativity and experimentation in students' minds and helps facilitators to achieve their teaching objectives.

2.5   Assessment and evaluation of clinical skills

2.5.1   Assessing clinical competence

A CSL and its programmes in pre-clinical and clinical years of a medical curriculum can play a vital role in the acquisition of non-technical and procedural skills. Moreover, it can also play an important role in clinical skills assessment (Issenberg, McGaghie, Hart, Mayer, Felner, Petrusa *et al*, 1999).

Miller's pyramid (see figure 2.1) provides a framework for assessing clinical competence in medical education (Miller, 1990). This model is very popular in clinical education for assessing declarative knowledge and procedural knowledge. Miller's Pyramid of Clinical Competence provides a basis for determining the level of clinical skills acquisition and how students move from one level to the next in the pyramid (Wass, Van der Vleuten,

Shatzer & Jones, 2001). The first level of Miller's pyramid is 'knows', which assesses the student's cognition of the content. For the assessment of knowledge, written examinations can be used. The application of knowledge ('knows how') is a higher order of cognition and is tested by assessing clinical problem-solving abilities through multiple-choice questions or problem-based questions. The third level ('shows how') refers to being able to articulate and demonstrate the application to others. In addition, this level assesses specific clinical skills, usually through objectively structured clinical examination (OSCE). The fourth level ('does') assesses students' performance which means performing what they have learned and typically practiced in clinical setting. However they can perform these clinical skills in the laboratories for example in the CSLs. Miller emphasises that the fourth level is the most important and most relevant to a physician's actual performance. At this level a student is expected to demonstrate the integration of knowledge and skills into successful performance.
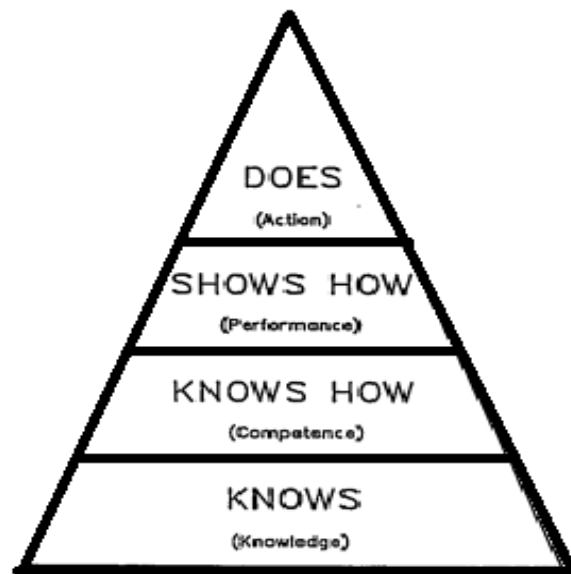
Figure 2.1: Pyramid of Clinical Competence (Miller, 1990).

A number of assessment methods like Mini Clinical Examinations (MiniCEX), Direct Observations of Procedural Skills (DOPS), and Objectively Structured Assessment of

Technical Skills (OSATS) is available to check physicians' competencies of clinical skills, which is the most difficult level to assess.

The OSCE is usually used in clinical skills programmes for the assessment of clinical skills competence. Wilkinson and Frampton (2004) found that a clinically based OSCE was a stronger predictor of subsequent clinical performance than traditional essay and multiple-choice questions. A goal of competency-based teaching and assessment of clinical skills always comprised of how students should be given an opportunity to achieve and demonstrate pre-defined performance standards. In addition to the OSCE and log books, students' feedback and recommendations are extremely important since it may contribute to the curricula reforms (Wass et al., 2001).

2.5.2 Importance of feedback and Debriefing technology

The most important feature of using CSL for the learning of clinical skills is that students can get direct feedback on their performance. This feedback may be from their peers, through their own reflections or from their teachers' assessments. According to Hattie and Timperley (2007), feedback is defined as information or a message given to the learner after some learning activity in order to improve its future activity shape. From an educational point of view, feedback can be described as written or verbal communication given to student about the activity that he conducted usually given after performance an activity (Sales, 1993). However, more recent literature defines feedback as information in narrative format about the learner's performance in a given educational activity, intended to guide future performance of the related or same activity (Ludvigsen, Krumsvik, & Furnes, 2015).

Feedback is a very important component of the teaching and learning process and it plays an important role in the assessment of skills learned in a CSL. Through feedback, students can reach their maximum potential in learning. Immediate and detailed feedback on students' performance also facilitates the achievement of the desired learning outcomes. Constructive feedback increases the student's skills and internal motivation to

improve his/her level of competence. At the same time, it raises the level of students' awareness about their performance.

Simulation based learning and training should always be linked to debriefing and feedback. Debriefing technology is an important component which provides a forms of the feedback process. Debriefing technology gathers user input from various sources during students' performance in SBL sessions and is particularly used as feedback mechanism in the CSL. Debriefing is a reflective, collaborative process which is done in a form of discussion after a simulation based learning activity. Debriefing encourage participants' reflective thinking and provide feedback on their performance that sometimes requires minimal interruption by the facilitator (Cheng, Grant, Dieckmann, Arora, Robinson, & Eppich, 2015).

2.6   Evaluation of medical programmes

One of the frameworks used for the evaluation of programmes in Pakistan is (Kirkpatrick's (1996) Four Levels of Evaluation. The first level explores the level of satisfaction and happiness through students' opinions, perceptions, and experiences used to evaluate a training programme. The second level makes sure that knowledge and skills are acquired after the experience, whereas the third level evaluates the transfer of knowledge and skills to the workplace and measure the practical aspect of knowledge and skills at the workplace. The fourth level deals with the societal impact of the assessment criteria (Naugle, Naugle & Naugle, 2000).
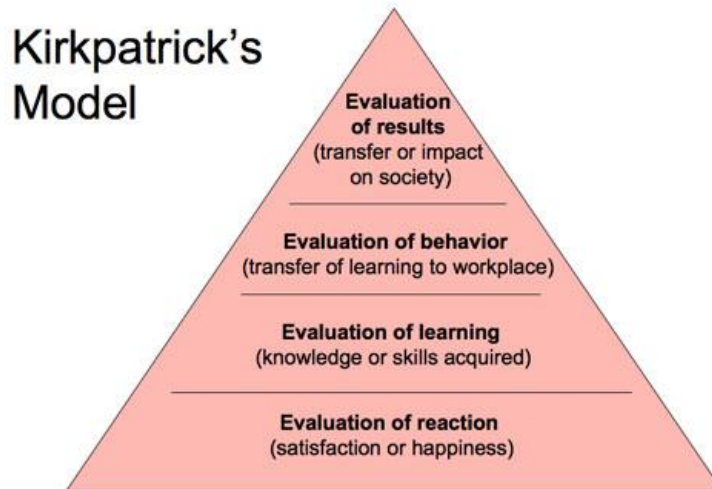
Figure 2.2: Kirkpatrick's Model for Evaluation (1996)

In this study, the students' opinions, perceptions, and experiences are used to evaluate the training programme mirrored against Kirkpatrick's model (1996). In the qualitative part of the research, the first level of Kirkpatrick's model (1996) is used as a lens to view and analyse the verbal feedback received from the respondents. Applying the model in the analysis, perceptions and value of the CSR is determined in order to arrive at possible improvements and changes that will enhance the programme. Students' self-perceived competency is operationally defined as the self-reported ability to perform clinical practical skills. This measurement involves subjectivity as self-reporting can produce error in judgement when compared to objectively measured competencies as seen in OSCE.

2.7   Problem statement

The major problem faced by ZU in their private hospital facility, is the tremendous workload clinical faculty members already have. It comprises seeing different patients for treatment and, at the same time, teaching a large number of students in their clinics. The main aim of the hospital's clinical setting is to provide a fair chance to all medical students to see a variety of patients and expose them to a large number of cases for their clinical experience. However, the number of patients places too much pressure on the available

doctors, which hampers the exposure of students to patients in the training hospital. In this regard, the CSL was instituted to provide an alternative and safe place for the students to practice their skills before they encounter the real patients, especially in pre- and early clinical years such as in the third-year MBBS programme.

The other problem in a private clinical setting such as this is the small variety of patients, since the private hospitals only serve a small fraction of people in the neighbouring community. Compared to the public sector's training hospitals, students see a greater variety of patients and cases as patients travel from distant areas of the country to public hospitals. Therefore, the CSL at ZU is playing a vital role in presenting different case scenarios through simulation-based training to the students that undergo their practical training in private hospitals. Furthermore, at ZU medical students have fewer chances to practice clinical skills, especially specific procedural skills, such as gynaecology and obstetrics examinations skills. Male students especially find difficult to perform procedures on real female patients. In addition, the management of private hospitals are more concerned with patients' safety and privacy.

As ZU has not had the opportunity to determine the efficacy of the CSR in the CSL, the study was undertaken. The objective of the study is to investigate what students' perceptions and their experiences are after attending the CSR for the last few years in a CSL. It is also important to determine what students' perceptions are of the effectiveness of the CSR in their knowledge and skills improvement on other major rotations like surgery, medicine, gynaecology and obstetrics, and family medicine during their third-year clinical clerkship programme. The results will provide a fair idea of the students' perceptions on the CSR and the utility of the CSL in the early years of its inception in the medical curriculum. Additionally, this study will also shed some light on whether the teaching and learning in the clinical skills programme is going in the right direction. The rationale, aims and objectives as well as the research questions follow in the next sections.

2.8   Rationale, aims and objectives

The rationale of the study is to assist ZU in determining whether the changes in the MBBS curriculum, using a CSL, have heightened the efficacy of the CSR and to see the spin-off effect on the other major rotations in a clinical clerkship programme. The overall aim is to explore the students' perceptions and experiences of the CSR in the CSL, as well as evaluating students' perceptions of self-perceived competence of the CSR on other major rotations such as medicine, surgery, paediatrics, and gynaecology and obstetrics in the third-year clinical clerkship programme.

The objectives to achieve the aim is to:
> explore the overall trends of how the students feel about the CSR and the CSL;
> determine what were the positive experiences of students;
> probe what they disliked and why;
> inquire if there is anything students would want to be different in the CSR; and
> explore their experience and perceptions of students` self-perceived competence which becomes the basis of evaluating the impact of the CSR on other major rotations in the clinical clerkship program.

2.9   Research questions

The research questions that guided the above aims and objectives are:
What are students' perceptions of their learning in a CSL and how does their self-perceived competency gained during the CSR impact on the learning in their other main clinical rotations?

2.10 Summary

In this chapter, the literature overview positions the study within the existing body of knowledge on the topic. Reference is made to other studies that are closely related to the current study as well as ongoing dialogue in the literature about the topic, filling in gaps and extending prior studies. The overview moves from the inclusion of CSLs in medical training to the inclusion into programmes such as the one under study. Insight into how students learn in such a CSL is covered by looking at theories and teaching methods that are conducive to CSL learning. This is followed by assessment and evaluation framework

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that are helpful in determining the level of learning that took place and the success of a programme. Finally, the chapter briefly covers the problem statement that necessitates the study, while outlining the rationale, aims and objectives. The chapter concludes with the research question to guide the study and specifically the next chapter that covers the research design and methodology.

CHAPTER 3: RESEARCH METHODOLOGY

3.1   Introduction

Following on the literature overview and outlining the rationale, aims and objectives, this chapter focuses on the research design and the methodology that was followed to answer the research questions and fulfil the objectives of the study. This chapter starts with a study design that comprises the research approach, the research context at Ziauddin University (ZU), the respondent population, sampling – with its inclusion and exclusion criteria – and the subsequent research process. This is followed by the methodology covering the data collection methods with the qualitative and quantitative instruments, the data analysis process, and the role of the researcher in the process. The chapter ends with the ethical considerations, the reliability, and transferability of the study.

3.2   Study design and approach

A research design is a plan to obtain data in order to answer the questions being asked in the study and for handling difficulties encountered during the research process (Lewis, 2015). In this study design, a mixed methods approach, focusing on the specific case of ZU in Pakistan, was followed. The design included a quantitative and a qualitative component. For the quantitative component, a questionnaire was used to explore the trends of student perceptions of their learning in a CSR and students' self-perceived competency evaluation of learning in other rotations following the CSR. Quantitative data is an applicable way to determine trends in answers from different respondents. Although there may be some major differences between qualitative research and quantitative research, there are some important similarities between them of which the important one is that it advocates the integrated use of different methodologies which increases the understanding about the phenomenon under investigation. This mixed methodology also promotes the way of bringing in different perspectives on one topic. In this case students` perceptions were gathered through both methods.

For the qualitative component, individual interviews were conducted to further explore in more depth the students' perceptions and experiences during the CSR. This approach was chosen because it provided richer, valuable information, and unforeseen insights from the participants and describes the views of the respondents with regard to the nature of their exposure to the educational experience (Thomas, 2006).The researcher considered this design because it is non-experimental, univariate, and could provide a high degree of representativeness of participants' opinions (Polit & Beck 2004).

A research approach would normally make a choice to follow either of the two research paradigms, but the mixed methods approach has developed as a third paradigm in research. Denscombe (2008) defines a mixed methods approach as

- quantitative and qualitative methods within the same research project;
- a research design that clearly specifies the sequencing and priority that is given to the quantitative and the qualitative;
- qualitative elements of data collection and analysis;
- an explicit account of the manner in which the quantitative and qualitative aspects of the research relate to each other;
- heightened emphasis on the manner in which triangulation is used; and
- pragmatism as the philosophical underpinning for the research.

In this study, most of these components were included and applied.

3.3   Population and sampling

The study population was third-year medical students. The total class size was 115 (n=115) students attending a clinical skills rotation (CSR) along with other rotations in the third-year clinical clerkship programme at ZU. The population that was used for this study were the entire third-year MBBS class attending the clinical clerkship programme. Out of 115 students, a total of 58 students participated in this study and they were divided into two groups. In group one, 18 students were interviewed and in group two 40 students completed the quantitative questionnaire. Both groups were selected on pre-determined attributes that is described as exclusion and inclusion criteria in section 3.4. Purposive

sampling was applied by ensuring that all participants had attended the clinical skills programme as well as the other clinical rotations during the third academic year of the programme.

3.4   Inclusion and exclusion criteria

Eligibility criteria, as described by Polit and Beck (2004), are the criteria that specify the characteristics that individuals must possess in a population to be considered for inclusion in a study. The inclusion criteria for the participants in group one was that only students were included who had attended the four weeks long CSR in their third-year clinical rotation programme. For group two, the inclusion criteria were students who have attended both CSR and completed the questionnaire as well as attended all major clinical rotations including surgery, medicine, gynaecology and obstetrics, and paediatrics. The exclusion criteria were students who had not attended the CSR, or had low attendance percentages in the CSR or in other major rotations.

3.5   Data collection and instrumentation

Two methods were used to generate data in the study. Firstly, one- to-one interviews were conducted and audio recorded. Secondly, a paper-based quantitative questionnaire were given to the students to complete in the presence of the researcher.

3.5.1   Qualitative data: one-to-one interview

For the qualitative data collection, one-to-one semi-structured interviews (see Appendix C) were conducted. The semi-structured guideline assists in defining the areas to be explored, but allows the interviewee and interviewer to diverge from the structure in order to further pursue an idea with specific and more detail. These interviews were conducted in the clinical skills faculty room, where the researcher himself conducted all the interviews. Each interview was about 15-20 minutes long. Before conducting the interviews, the researcher explained the process of the interview by briefly discussing the objectives of the study and the questions that were to follow. Interviews were held in a calm and quiet environment where there were no disturbances. The students were invited

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by email to participate prior to the interview date. In addition, participants gave written consent by signing a consent form (see Appendix D). The interviews were conducted through open-ended prompts. All the interviews were audio recorded.

The researcher converted the audio narration into a transcript (see Appendix E) after which the recorded material were stored on a personal laptop that is protected by a password. The laptop is stored in a locked steel office cupboard to ensure that the data is protected. Data collection through interviews was continued until saturation was reached (Farrokhi & Mahmoudi-Hamidabad, 2012). Walker, (2012) explains that the number of interviews that are required for a qualitative study to reach data saturation cannot be projected. It is therefore not relevant what the number of respondents were, but rather the fact that one question is posed to multiple respondents in order to reach saturation. In this study, eighteen (18) interviews were conducted.

3.5.2 Quantitative data questionnaire

In order to explore the trends of student perceptions and experiences of the CSR, a quantitative research questionnaire was distributed. A quantitative questionnaire generates quantifiable, observable data (McCusker & Gunaydin, 2015). It is mostly concerned with measurable phenomena involving events or things, people, and establishing the relationship between variables. For the collection of the quantitative data, a questionnaire was developed that consisted of two parts (See Appendix B).

The first part of the quantitative questionnaire consisted of Likert scale questions and the second component comprised some open-ended questions. The Likert scale is often used for nominal data and when one wants to know respondents' feelings or attitudes about something (Allen & Seaman, 2007). The questionnaire in this research used a five point Likert scale. The advantage of using a five point Likert scale over a seven point Likert scale was that it consumes less time to complete, is easier to select options, and has a high return rate. Most of the questions asked in this portion of questionnaire was about how the sessions in the Clinical Skills Laboratories (CSL) were conducted, whether

the students were satisfied with the clinical content, and whether the sessions were according to their understanding and requirements. The second portion of same questionnaire consisted of questions that investigated how many times the students performed specific clinical procedures that they have practiced in the CSL or in other clinical rotations (See Appendix B).

3.6   Data analysis

3.6.1   Qualitative data analysis

An inductive interpretive approach was used to do the qualitative data analysis. This approach interprets the meaning of the respondents' responses in the interview. In this study, a mixture of content and thematic analysis of the transcribed data were used (Vaismoradi, Turunen, & Bondas, 2013). Codes encapsulate the meaning of what is being said by a respondent. Codes are then clustered into categories of meanings that relate to the study. Related categories then forms a theme. Themes were interpreted to provide information about students' perceptions or expressions of their feelings about their experiences regarding the CSR. To ensure credibility, the researcher asked the supervisor to check the codes and themes as well (Fereday & Muir-Cochrane, 2006). The codebook consisted of codes, categories, themes, descriptions, and examples of codes in the transcript (see Appendix F).

3.6.2   Quantitative data analysis

The preferences that students chose in the questionnaire was an indication of how they perceived their learning in the CSL. Each statement in the questionnaire presupposed a possible impact of the learning process. The number of students supporting a particular stance would be interpreted as a trend. Data analysis was done by using a data analysis software programme (SPSS Version 15) in which frequency charts and tables were developed. The tables show percentages and frequency of answers. The tables further depicts the results in terms of the frequency of skills practices used in various clinical rotations and the number of times it was repeated. The quantitative data indicated the

positive or negative experience of an activity as presented through a statement in the questionnaire.

3.7   The role of the researcher

Before, during, and after the interviews, the researcher took field notes as a supplement to the recordings. This was important because these notes formed part of the data material, which complemented and filled the gaps of missing data. These notes were handwritten and maintained in a diary. Both for analysis of the data and for coding, the researcher utilised his personal knowledge and experiences as tools (McCracken, 1988). Therefore, some of these tools are the researcher's own unique impressions, which might remain intangible and undocumented (Strauss & Corbin, 1990).

3.8   Ethical considerations

Ethical approval was obtained from the Ethical Review Board (ERB) of the Dean's Office of ZU (see Appendix G) and from the Health Research Ethics Committee (HREC) at Stellenbosch University in South Africa. The research was conducted according to the ethical guidelines and principles of the International Declaration of Helsinki (IDH), the Medical Research Council (MRC), and the Ethical Guidelines for Research (EGR) (Guba & Lincoln, 1994). All participants were assured of the confidentiality and preservation of the anonymity by the concealment of their identities. A consent form was signed by each participant for his/her agreement on the terms and participation in the research project (see Appendix D). They were allowed to skip or provide no answer to any of the questions if they wished to do so. Initial briefings, which included the brief description on the process of the interview, study objectives, and research outcomes, were discussed with all participants before conducting the interviews to ensure their maximum participation.

3.9   Measures to insure reliability and transferability

Trustworthiness accompanies reliability and validity in qualitative research. It incorporates truth, value, neutrality, credibility, transferability, consistency, applicability, reliability, dependability, and conformability, which is required to be implemented in all the steps and processes of the educational research (Strudwick, Booth, Bjarnadottir, Collins, &

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Srivastava, 2017). Reflexivity by the researcher is also used to enhance the credibility and the quality of the research (Nilson, 2017). Strict adherence to the research methodology, transparency, and originality will further ensure trustworthiness. Furthermore, member-checking techniques in research methodology ensures credibility to the research process (Creswell & Miller, 2000).

3.10 Summary

In this chapter, the design and details of the research process were discussed as well as the motivations for why certain methods were chosen. The various data collection methods, data analysis methods, ethical considerations, and the validity of the study were also discussed. The next chapter systematically presents the results through tables, figures, and quotes from respondents.

CHAPTER 4: RESULTS

4.1 Introduction

In the previous chapter, an account was given how the research was conducted through a mixed methods approach to answer the research questions. In chapter four, the results from the interviews and the questionnaires are presented by means of themes and categories. These themes and categories emerged after data analysis was done and highlight the main issues that influenced the learning of the students at the Clinical Skills Laboratory (CSL). Quotations from the students are included to indicate how their perceptions relate to the research questions.

4.2 One-to-one interviews

The analysis of the interview data revealed several codes as explained in chapter 3, which were first clustered as categories and ultimately as themes. Five themes were identified: i) students learning skills at the CSL; ii) students' perceptions and experiences during the process of learning; iii) preparation for other rotations; iv) professional development; and v) the areas of improvement in the clinical skills rotation (CSR) programme and laboratory. Table 4.1 is a summary of the various themes and categories.

Table 4.1: Themes and categories

Themes	Categories
Theme 1: Students' learning skills in the CSL	Category 1: Learning procedural skills Category 2: Communication skills Category 3: Universal precautions
Theme 2: Students' perceptions and experiences about the process of learning in the CSL	Category 1: The learning process Category 2: Learning through technology Category 3: Peer-assisted learning Category 4: Role-playing
Theme 3: The effect of clinical skills learned in the CSL on the other rotations	Category 1: Confidence Category 2: Motivation Category 3: Removal of fear
Theme 4: Students` recommendations for improvement	Category 1: Equipment Category 2: Training and skills taught in the clinical skills module

Learning Procedural Skills

Communication Skills

The Learning Process

Learning through technology

Student learning skills at Clinical Skills Laboratory (CSL)

Universal Precautions

Students perceptions and experiences about the process of learning in the CSL

Peer assisted Learning

Medical Student at CSL

Role playing

The effect that the clinical skills learned in the CSL had on the other rotations

Motivation

Students' recommendations for improvement

Equipment

Confidence

Removal of Fear

Training and skills taught in the clinical skills module

Themes

Categories

Legends:

Figure 4.1: Layout of themes and categories

4.2.1   Theme 1: Students' learning skills in the Clinical Skills Laboratory

Participants overwhelmingly perceived the CSL as a facility where they can effectively learn practical skills with the help of simulators in a simulated environment without

potentially harming real patients. The skills that students learned in the CSL were described as follows during the one-to-one interviews.

Category 1: Learning procedural skills

Most of the skills the students said they learned were related to procedural skills. The students appreciated that they learned important skills that include intravenous injection technique, intra-muscular injection technique, digital rectal examination, cardio-pulmonary resuscitation (CPR), endo-tracheal intubation, etc.

With regards to the learning of procedural skills the students gave the following opinions:

> **Respondent 1:** *"We learnt many basic skills in the CSL, like intra-venous drips, intra-muscular, taking blood pressure, universal precautions and all that stuff…"*

> **Respondent 10:** *"…intravenous and intra-muscular injections, catheterisation. and also CPR at CSL. I think it really helps me..."*

> **Respondent 3:** *"We are taught about how to take [do] procedures, the exact steps to follow..."*

Surgical skills, such as sterility and the use of surgical materials, were taught in the CSL to the medical students so they can learn skills up to a certain level before they had to perform actual surgeries on the patients. Several students enjoyed these skills and they in fact requested for more surgical material so that these skills could be taught on a regular basis in the CSL.

> **Respondent 4** *"…some small adjustments can always be done like, for example, inclusion of surgical materials to practice suturing skills so that students can learn hands-on."*

While the major component of the learning process in the CSL were procedural, the students also learned other skills such as communication skills and universal precautions.

Category 2: Communication skills

The CSL provided students with a good training platform to learn about effective communication with patients, especially using the local language. Students felt that they learnt to communicate effectively with their patients so that they can obtain the correct clinical information for history taking and physical examination. Several participants acknowledged that the CSL provided them with the perfect environment to learn communication skills.

> **Respondent 4:** "*Effective communication skills are very [more] important than a lot of medicine. It is more about counselling than anything.*"

> **Respondent 10:** "*…medicine is all about procedures [procedural] skills and communication skills, so obviously learning about them will give you a chance as how to apply that directly to your clinical practice...*"

Category 3: Universal precautions

Most of the students expressed opinions that the CSL is an excellent training opportunity to learn about universal precautions and patient safety. The students appreciated and explained how they had learned to perform hand washing, scrubbing, gloving, gowning, and several other techniques, which helped them in protecting patients as well as themselves.

> **Respondent 4:** "*…you can use the same skill you have learnt here and you can use it in a real life in the clinical setting. In the same way you can apply the universal precautions…*"

Respondent 3: *"…universal precautions like, you know, how to wear gloves and what rules, you know, to follow; that all these things will definitely benefit us…"*

Respondent 4: *"You do not want to get introduced the infection to your patient if you have learnt the universal precautions here and apply it in your other clinics. For example, you learn every precaution when you take blood from a hepatitis patient you apply all safety measures, which provide safety to yourself and to your patient."*

In the next theme, the students' perceptions of how they experienced the learning will be explored.

4.2.2   Theme 2: Students' perceptions and experiences about the process of learning in the CSL

It has been mentioned earlier in the literature review that learning in the CSL is underpinned by several types of learning theories and learning strategies to facilitate students' engagement in the CSL. The students in this study also expressed their opinion reflecting these processes.

Category 1: The learning process

Most of the learning seem to take place through a behaviourist learning approach, social learning, and simulation-based learning. Students expressed positive perceptions and expressed their satisfaction with the simulation-based learning. It evoked their interest in learning clinical skills as it provided a safe learning environment where they could make mistakes without harming real patients.

Respondent 1: *"…simulation is where you deal with patients or creating the artificial scenario".*

Respondent 2: *"…Simulation is about manikins and it is about artificial-based learning, which helps in learning in a sound manner".*

Practicing on manikins promoted their competency level, which ultimately improved students' skills. Different kinds of clinical scenarios could be created using state of the art simulators and manikins, which also provided a sense of realism in learning.

> **Respondent 6:** *"[M]anikins are most resourceful in the rotation. In this way you feel that you have done something practically."*

What the students liked the most in the CSL were the simulators, manikins, and simulation-based learning.

Category 2: Learning through technology

Apart from the simulation, many students also appreciated the use of multimedia contents as a part of the learning in the CSL. Multimedia videos and animations facilitated learning in the CSL, as one student's opinion indicated that:

> **Respondent 4:** *"When you see multimedia videos and then you practice it by yourself, I think the use of multimedia always facilitates you in learning [more] than the boring lectures given verbally."*

It would thus seem as if the use of the videos in combination with the clinical skills teaching was conducive to students' learning.

Category 3: Role-playing

In a CSL, the instructors often make use of role-playing to replicate the skills for the students, especially when it relates to the learning of history taking skills. Students had the opportunity to learn these skills at the CSL and expressed satisfaction over this learning method.

Respondent 5: *"…we practice doing examination after we see our instructor performing the same examination of patients, which gave us a fair idea how we should be performing skills on real patient."*

Respondent 10: *"Once performing clinical skill it motivates me and gives me the confidence that I need and it gives me the opportunity to revise again and again imitating my instructor and doing the same practice on a dummy without harming the real patients."*

4.2.3 Theme 3: The effect that the clinical skills learned in the CSL had on the other rotations

Clinical skills learned at the CSL seemed to have an influence on the knowledge, skills, and competencies in the other major rotations like surgery, medicine, family medicine, gynaecology and obstetrics, etc.

<u>Category 1: Confidence</u>

Confidence created self-believe among students. It might be due to their internal motivation or self-believe state. Another factor for confidence building in the CSL was their training, which involved repetition of skills and identification of their own strengths and weaknesses. Confidence boosting through learning in the CSL was a recurrent theme expressed by most of the students.

Respondent 1:0 *"…before performing on actual patients, you perform on dummy. It gives you more confidence before encountering the real experience."*

Respondent 7: *"…think I feel 90% confident when I will be doing these procedures..."*

Respondent 6: *"All the skills will be helpful e.g. heart sounds, breath[ing] sounds will be helpful in the clinics and all the procedures done in [the] CSL will help us in [a] hospital. So once we practice here we can perform them in other rotations…"*

Respondent 2: *"…most of skills we learned here is applied in our other rotations Ummm. Like I/V, CPR, catheterisation."*

The emergency skills that were taught in the CSL seem to be very valuable for the students. Students highlighted the importance of learning emergency skills that they were able to utilise in an emergency situation.

Respondent 10: *"...skills that we did about inter I/V and I/M injections, catheterisation and also CPR in the CSL, I think it really helps me in emergency..."*

Category 2: Motivation

Personal development included self-analysis and reflection skills among students, which helps them to be motivated and also build their confidence about becoming competent physicians. After attending the CSR, many students felt confident about applying their skills in a professional manner. Nearly all the students thought that they were motivated for learning in a simulated environment, which also evoked their interest by using this innovative method of teaching and learning.

Respondent 9: *"…we are just having bookish knowledge and now, with hands-on experience, it helps you to understand more and motivates us more."*

Respondent 5: *"…when patient comes in the emergency room you can perform CPR…"*

Category 3: Removal of fear

Students practiced their skills in a safe and simulated environment, which allowed them to gain competence and remove their fears. Furthermore, clinical skills were often repeated to make sure students got enough practice so that, when they face real patients, they pose no threat to them. Several students shared their experiences about how they gained competencies by removing their fear of working with real patients.

> **Respondent 2:** "…*it helps me to get over the fear of patients. I think that it is very beneficial that we go to simulations first then we move on to the clinical settings…*"

> **Respondent 3** "*...to repeat the procedures again and again without harming the patients. It is actually better than performing the same procedures on the real patients.*"

4.2.4   Theme 4: Student recommendations for improvement

Despite the mostly positive perceptions and experiences of students on CSR at CSL, there were some negative feelings expressed by some of the students with some recommendations.

Category 1: Equipment

Students expressed their frustration about resources constraints at CSL, which includes lack of stock items like gloves and suture materials.

> **Respondent 9:** "*…I guess surgical models like suturing should be included...*"

> **Respondent 4:** "*…some small adjustments can always be done like, for example, inclusion of surgical materials to practice suturing skills so that students can learn hands-on*".

Some students complained about the lack of hi-fidelity simulators at the CSL.

> **Respondent 2:** "…*new manikins can be bought to introduce the new technology. For example, I have seen the manikins Gyn. and Obs. conference at Vancouver in which a pregnant women [manikin] would cry during the delivery process, which creates a very realistic image…*"

Category 2: Timing and skills taught in the clinical skills module

New and divergent opinions were expressed by quite a number of students with a very strong recommendation that CSR should be introduced during the early stages of their medical training, in other words, in their first- or second-year MBBS programme. As one student said:

> **Respondent 1:** "*The Clinical Skill Programme should start with first-year medical students.... In this way the new students have a small clinical exposure in the beginning of their career.*"

Furthermore, a few students felt that some skills were missing in the programme. They suggested more skills to be added for the preparation of their elective programme.

> **Respondent 4:** *"...now we see more students are going for electives so it may benefit them as they are going through those programmes before applying to the elective programmes…"*

The interviews suggested that the students benefitted from their CSL sessions. However, to quantify some of the learning they encountered they were also asked to complete a questionnaire. In the section below, these results will be presented.

4.3   Quantitative Questionnaire

The total number of students who participated in the quantitative questionnaire survey were 48. The gender distribution was as follows: 18 were male while 30 were female students. There were eight questionnaires which were returned partially incomplete by the students. Thus they were excluded from the total count (n=40), leaving a response rate of 83%.

4.3.1 Part A of the questionnaire

The first section of questionnaire consisted of questions related to how the clinical skills sessions were conducted. It also captured what the students' feedback on these sessions in terms of delivery and academic content were. Table 4.2 shows the results of part A of the quantitative questionnaire.

Table 4.2: Results of part A of the questionnaire

S.N	Questions	Total no.of Students	Strongly Agree		Agree		Neutral		Disagree		Strongly disagree		Cumulative
		N	N	%	N	%	N	%	N	%	N	%	%
1.	Clinical skills session done with clear in its aims and outcomes.	40	15	37	21	52	4	10	0	0	0	0	100
2.	Content in these sessions were appropriate for my level of understanding.	40	22	55	17	43	1	2	0	0	0	0	100
3.	CSL teaching relevant to my clinical context and needs.	40	17	43	14	35	7	17	2	5	0	0	100
4.	I had been given plenty of opportunity to practice and repeat clinical skills at CSL.	40	14	35	17	43	8	20	1	2	0	0	100
5.	I had been given good & valuable feedback on my performance.	40	11	28	19	48	8	20	2	5	0	0	100
6.	Does simulation create interest enthusiasm among students?	40	18	45	14	35	5	13	3	7	0	0	100
7.	CSL provide better Learning in History taking Skills.	40	4	10	8	20	12	30	13	33	2	4	100

4.3.2 Part B of the questionnaire

The second part of the questionnaire related to the influence the CSL sessions had on the other rotations (see table 4.3). From the results it was clear that surgery and medicine were the main rotations that maximally utilised skills taught at the CSL in their rotations; 79% of all the competencies were being utilised. In the paediatrics as well as gynaecology and obstetrics rotations, the skills were moderately utilised with a rating of 21%. The family medicine and clinical pathology rotations were the rotations where clinical skills were least utilised with only an incidence of 5%. Table 4.3a summarises the percentages.

From the results, it was evident that the majority of students, 89% (percentages are calculated by adding the percentages of strongly agree and agrees responses) of the respondents felt that the clinical skills sessions were conducted with clear aims and objectives; 97% percent of respondents thought that the educational content were appropriate for the students' level of understanding. Furthermore, 78% of students positively responded regarding the relevance of that session to their clinical context and needs. In addition, 76% felt that appropriate feedback was given on their performance. Lastly, 80% percent of participants agreed or strongly agreed that these sessions have created interest and enthusiasm among the students.

The highest number of disagreements were seen where participants thought that communication skills and physical examinations were not taught at an optimal level with 18-34% disagreement. Similar results were seen for learning universal precautions where there was only 41% agreement.

Table 4.3a: Frequencies of competencies in various clinical rotations

S.No		I/V	NG	Cath	ETT	DRE	CPR	BS	HS	S.I	S.M	Hand	CS	ST	EBM
1.	Surgery	2	3	2	4	3	2	4	3	15	8	10	3	3	4
2.	Medicine	6	16	19	7	9	9	13	13	2	3	3	5	3	11
3.	Pediatrics	1	--	--	--	--	1	9	9	7	-	1	3	--	5
4.	Family Medicine	3	--	1	--	1	--	3	1	--	--	--	2	--	1
5.	Primary Health Care	5	--	--	--	--	--	1	--	--	--	--	1	--	1
6.	Gynecology & Obstetrics	2	1	12	--	1	1	--	--	--	--	--	3	1	2
7.	Clinical Pathology Laboratory	7	--	--	--	--	--	--	--	--	--	--	--	--	--

Table 4.3b: Abbreviations used in table 4.3a

I/V- Intravenous injection.	EBM-Evidence based Medicine.
I/M- Intramuscular injection.	CS-Communication skills.
NG- Naso-gastric injection.	Hand- Hand Washing.
Cath- Catheterisation.	ST-Suturing.
ETT- Endo-tracheal Intubation.	S.I- Surgical Instruments.
CPR-Cardio-pulmonary resuscitation	S.M- Surgical Material

Table 4.4 shows that breathing sounds, heart sounds, I/V, I/M, and catheterisation were the competencies most frequently used or repeated in other clinical rotations.

In summary, clinical skills learnt at CSL were used in many other clinical rotations, For example, male catheterisation, breathing sounds, and heart sounds were maximally utilised. Most of these clinical skills were utilised in rotations like surgery, medicine, and paediatrics compared to other rotations. In this way it can be inferred that medical students had extended learning in the CSL for these clinical skills. The skills can be repeated again in different rotations, including during future years of medical college and beyond in their professional life.

Table 4.4: Frequencies of various skills and competencies taught at CSL and repeater in other clinical rotations in 3rd-year clerkship programme

S. No.	Name of competencies repeated in other rotations after learned at the Clinical Skills Laboratory	Frequency of competencies repeated in other rotations learned at Clinical Skills Rotation
1	Intravenous & intra-muscular injection technique	25
2	Nasogastric injection	20
3	Catheterisation	25
4	Endo-tracheal intubation	11
5	Digital rectal examination	14
6	Cardio-pulmonary resuscitation	13
7	Breathing sounds	30
8	Heart sounds	26
9	Surgical instruments	24
10	Surgical material	11
11	Hand washing, scrubbing, gloving	14
12	Communication skills	17
13	Suturing	7
14	Evidence-based medicine	24

CHAPTER 5: DISCUSSION AND CONCLUSION

5.1   Introduction

This chapter will interpret the results in detail, followed by a discussion of the contributions of this study and its scientific significance. The following section is divided according to the students' perceptions and experiences of where, what, and how students learn. This is followed by the impact of the clinical skills rotation (CSR) on the other rotations and how this has helped the students to develop personally and professionally. In the last portion of this chapter, recommendations and suggestions from students for the improvement of clinical skills programme at the Clinical Skills Laboratory (CSL) are also discussed.

5.2   Discussion of students' learning in the simulation laboratory

Before discussing the effects or impact of the CSR on their major rotations, it was important to find out what the overall trends of students' perceptions and experiences of learning in the CSL and the influence on the learning of various other skills were. The most crucial aspect of this type of learning involved simulators. The students expressed a positive view in their interviews about the role of simulation in their learning. This is in line with the research that simulation usually leads to improvement in skills and, overall, learners experience high levels of satisfaction through this teaching methodology (Nestel, Groom, Eikeland-Husebø, & O'Donnell, 2011).

5.2.1   Perceptions of what students learned

The main skills students learned at the CSL were procedural skills, surgical skills, universal precautions, communication skills, and evidence-based practice. Most of the students expressed their satisfaction and gave positive feedback on the learning of procedural skills such as intra-muscular and intravenous injection techniques, nasogastric intubation, catheterisation, digital rectal examination, and cardio-pulmonary resuscitation (CPR) as part of the clinical skills programme. These skills, according to

most of the participants, were the important skills that would help them to become a competent physician. Previous research explained that learning procedural skills in a CSL provided students with lifelong learning competence that would help them to become competent physicians (Grantcharov & Reznick, 2008).

While it is acknowledged that it would be best to learn surgical skills in surgical wards, operation theatres or in surgery out-patient clinics, a CSL can play an important role in building the competence and a foundation for students to learn and perform surgical skills (Kneebone & Nestel, 2005). These skills can be learned in a CSL where they can repeat exercises to gain practice (Issenberg & McGaghie, 2002). Students learned gloving, hand washing, scrubbing, gowning, masking, no touch, and antiseptics techniques, amongst others in the CSL.

In the context under study, the prevalence of infectious diseases is very high. Thus, the students as well as the faculty need to understand the importance of these skills. This could be one of the reasons why the students really appreciated that these were taught in the CSL. Students felt that clinical skills should be taught more extensively and that the clinical skills curriculum was too short to manage everything. In addition, the unavailability of surgical materials created some negative feelings among students. This negativity was expressed because students were eager to learn these skills, yet there was no budget to offer the proper training. A research study (Janjua, Razaq, Chandir, Rozi & Mahmood, 2007) explained that the learning of surgical skills and universal precautions in low cost training programmes resulted in a decrease of needle prick injuries and provides effective infection control.

A very important, often hidden, portion of a clinical skills programme is the learning of communication skills. These skills are often neglected in a clinical curriculum (Humphris & Kaney, 2001).   Whenever a physician interacts with patients, s/he needs to be able to effectively communicate in order to be able elicit the relevant clinical data from patients (Kaplonyi, Bowles, Nestel, Kiegaldi, Maloney, Haines *et al*, 2017). The students of ZU were assisted in learning and communicating with patients using various local languages

and with a sense of empathy as part of the CSR. This practice is supported by research at various medical institutions where it has been shown that the inclusion of communication skills in undergraduate medical programmes should start from the early years and then continue to run longitudinally into the senior years (Ende, 1983).

5.2.2 Perceptions of how students learn

One of the most prevalent learning theories applied in the CSL teaching was behaviourism where students learn by imitating behaviours of their role models (Abaza & Nelson, 2017). Simulation-based learning (SBL), where manikins and models are used instead of real patients, is widely acknowledged as the way to teach and learn many clinical skills (Smith, 2006). When students were asked how they experienced learning at the CSL using simulation, most of them were excited with these innovative learning strategies and expressed that SBL had provided them with a safe learning environment. Students took maximum advantage of the simulated environment and they could practice their skills several times in order to help them to become competent in the respective skills (Hart, Bond, Siegelman, Miller, Cassara, Barker *et al*, 2017). Performing procedures under supervision, along with feedback from a tutor, has huge benefits for the students' skills improvements (Issenberg & Scalese, 2007).

Literature indicates that peer-assisted learning (PAL) is an effective teaching strategy for clinical skills training and that students seem to show an interest and enthusiasm towards it (Aba Alkhail, 2015). Peer-assisted learning (PAL) is one of the teaching strategies utilised in the CSL since instructions received from peers are seen as useful because peers seem to know more accurately what the level of students' knowledge and understanding is. What was interesting in this study however was that PAL was not explicitly mentioned by any of the students during the interviews. The reason for this could probably be that they didn't realize that senior students involvement were meant to help them and facilitate them in learning, despite the fact that they were getting benefits from peer inputs.

The use of multimedia as a learning method for teaching breathing sounds, heart sounds as well as videos of clinical procedures and physical examinations are currently used by most skills centres. The students using the CSL appreciated the use of multimedia and advised that this would be a way forward to future learning. Another study supported this finding and explained that using new media and other formats in technology helped students to engage in meaningful learning (Babiker, 2015).

The quantitative results showed that clinical skills learned during CSR were beneficial to other major rotations. The qualitative data explored the detail of how the students benefited from attending the CSR. The fact that the students learnt clinical skills in the CSR and then used those same skills in the following clinical rotations, was very useful as it helped them to gain confidence. Furthermore, this process of learning provided students with lifelong learning competencies that will contribute to their becoming competent physicians. In addition to this, it was evident from the findings that the students were also gaining confidence in crucial skills that will help them in emergency situations (Gul & Guneri, 2015). Simple emergency skills, for example CPR and endotracheal intubation, are amongst the skills students enjoyed learning most and often had to use it in emergency situations.

Personal development has more recently gained importance in medical students' careers. Currently medical students face various challenges in the progression of their medical careers. Personal development is important because it provides opportunities for reflection and self-analysis (Schwerdtle, Morphet, & Hall, 2017). The CSL provides students with opportunities to enhance their skills and knowledge in the area of personal and professional development. The findings suggest that the CSL provides an opportunity for professional growth and development in the form of vertical and horizontal progression of knowledge skills and attitudes (Clarke, Horeczko, Carlisle, Barton, Ng, Al-Somali, & Bair, 2014). The students acknowledged their overall grooming for professional and personal development, which has improved their standards of medical practice through motivation, increase in confidence, and techniques that remove fear.

Many of the suggestions to improve the CSL and its programme related to resource constraints. The unavailability of high-fidelity simulators and the lack of stock items were the students' main concerns. These concerns can create negative feelings among students. Some students suggested that the clinical skills programme should be introduced at an early stage of the programme in order to better prepare them for their elective programme. The details of the concerns expressed by students could be used for improving the logistics as well as programme structure in future. In addition, CSR or the clinical skills programme should be introduced in the early years of their medical careers. If a training institution is not able to introduce this early, it could have negative implications on the teaching and learning at the CSL. This model of early exposure of clinical skills in medical curricula has also been advocated for by other authors (Gaba, 2004).

5.3   Conclusion and recommendations

This study showed that third-year medical students have positive perceptions about SBL in clinical skills programmes. This simulated environment of the CSL has the potential to offer various learning opportunities for the students. Most of the students enjoyed learning in the CSL and valued their experiences. They felt that the learning of procedural skills, communication skills, and universal precautions in a simulated environment, without potentially harming real patients, was of much help. In addition, skills that students learned in the CSR were fairly well utilised in other rotations. The only negative feedback was that there was not adequate recourses (suturing material and gloves) to make their learning more authentic.

This study focused on the Karachi medical students' teaching and learning experiences in a CSL at one of the private medical universities. Feedback and the results from this research will assist the Ziauddin University (ZU) to improve standards of our clinical skills programme; to further improve the quality of teaching and learning; and to configure the educational contents of the programme at the CSL. Moreover, the request for additional resources and simulators that may further enhance the facility for education need to be considered seriously. Clinical skills should start early in medical students' career,

preferably in the first and second years of the MBBS programme as part of an early clinical exposure plan.

5.4 Future research and limitations

5.4.1 Future research

- ❖ Competencies learned at the CSL and in other rotations were only evaluated in the third year of the MBBS programme. To further explore the impact of these skills on society or on a physician's practice, a separate study or evaluation report should be done.
- ❖ A similar study in the same institution should be conducted to discover what the perceptions of students are about high-fidelity simulators, instead of using low- to medium-fidelity simulators.
- ❖ Studies should examine the impact of clinical skills teaching on professional and national levels, especially when these medical students become doctors and enters clinical practice.

5.4.2 Limitations

This was a study at a single institution, which make the findings contextual. A multi-centre study should be conducted as a follow-up of this project to see the impact of the CSR and its effectiveness on a larger scale with a bigger sample size.

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Appendix A

Table shows some of the skills and competencies taught during clinical skills rotation.

Table 1: Clinical Skills Rotation contents	
	Week One and Two:
1.	Intravenous and Intramuscular injection technique
2.	Nasogastric Tube insertion technique.
3.	Male and female catheterisation.
4.	Endotracheal Intubation.
5.	Digital rectal examination skills.
6.	Cardio-pulmonary resuscitation skills.
7.	Breath sounds
8.	Heart sounds simulation session etc.
9.	Physical examination videos and practice sessions on SP.
	Week Three & Four:
10.	Identification of surgical instruments.
11.	Suturing material.
12.	Hand washing, scrubbing, gloving and gowning.
13.	Case scenarios for communication skills.
14.	Suturing technique.
15.	Evidence Based Medicine Module

Appendix B

QUANTITATIVE QUESTIONNAIRE

Section 1:

Section 1: Instructions to Participants: Please circle the most appropriate number of each statement which corresponds most closely to your desired response according to this Likert Scale. Likert scale is from 1 to 5, 1 = strongly disagree.2= Disagree, 3= Neutral, 4= Agree, 5= strongly agree. There is an additional Open ended question in the end.

Section 1:						
Sr.No	Questions	Scale: 1= Strongly disagree. 2= Disagree. 3=Neutral4= Agree. 5= Strongly agree				
		1	2	3	4	5
1.	Clinical skills session done with clear in its aims and outcomes					
2.	Content in these sessions were appropriate for my level of understanding.					
3.	CSL teaching relevant to my clinical context and needs.					
4.	I had been given plenty of opportunity to practice and repeat clinical skills at CSL.					
5.	I had been given good & valuable feedback on my performance.					
6.	Does simulation create interest enthusiasm among students?					
7.	CSL provides better learning in History taking Skills.					
8.	CSL provides better learning in Physical Examination Skills.					
9.	CSL provides better learning in Procedural Skills.					
10.	CSL provides better learning in communication skills.					
11.	CSL provides better learning in Universal Precautions. Provide list of competencies gained in above categories discussed?					

QUANTITATIVE QUESTIONNAIRE Section 2

Section 2: Instructions to Participants: Please tick the appropriate box with the skills attended in CSL which was repeated again in other clinical rotations e.g. Medicine, Surgery, Pediatrics, Family Medicine, Gynecology and Obstetrics. **In the second column** please state how many times you have repeated these skills (given in numbers):

Sr.no	Competencies or Skills of CSR in CSL.	Please tick (√) Skills learned during CSR which was repeated in other rotations e.g. Medicine, Surgery Peadrictrics, Family Medicine, Gyn and Obs.	Number of times skills repeated (Please put numbers).
	Example: Female Catheterisation	✓	3
1.	Intravenous & Intramuscular injection technique		
2.	Naso-gastric insertion technique.		
3.	Male and female catheterisation.		
4.	Endotracheal Intubation.		
5.	Digital rectal examination skills.		
6.	Cardio-pulmonary Skills.		
7.	Breath Sounds.		
8.	Heart sounds.		
9.	Physical Examination Videos and Practice sessions on Standardised Patients.		
10.	Identification of Surgical instruments.		
11.	Suturing Material.		
12.	Hand washing, Scrubbing, gloving and gowning.		
13.	Case scenarios for communication skills.		
14.	Suturing technique.		
15.	Evidence based medicine		

Appendix C

ONE ON ONE INTERVIEW QUESTIONS:

1. Have you ever heard the term of "Clinical skills lab or clinical skills rotation" before starting of this programme? Prompt: You can elaborate if you want to.

2. Do you have any prior experience of Simulation-based learning?
Prompt: If yes, tell me more about it. If not, what comes first in your mind with this term SBL?

3. What would you say about clinical skills programme, how much benefit you got in term of skills while attending this rotation in your Third year clinical clerkship programme?

4. In what way has the CSR motivate or demotivate you in learning clinical skills? Does this type of teaching involving simulation, stimulate your interest in learning clinical skills? Prompt: How?

5. What resources in the clinical skills lab did you find the most helpful and why?
Prompt: Is there anything that you may want to change or require in future?

6. What benefit would you say did you receive through attending this CSL rotation in Third year clinical clerkship programme?

7. Any additional comments do you want to make or anything else you would like to say at the end?

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Appendix D

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CONSENT FORM:

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CONSENT TO PARTICIPATE IN RESEARCH

</div>

Title: Exploring medical students' perceptions on the effectiveness of clinical skills rotation in a clinical skills laboratory at Ziauddin University.

You are asked to participate in a research study conducted by M.Faisal Rahim having a degree of MBBS, Adv.Diploma in HPE , from the Faculty of Medicine, Ziauddin Medical College, Ziauddin University. You are being invited to take part in a research project of M.phil in HSE. You were selected as a possible participant in this study because of eligibility in this regard to activities conducted at clinical skills lab.

1.   **PURPOSE OF THE STUDY**

This research study hopes to gain information about student's perceptions about clinical skill rotation and its impact on other clinical rotations in 3rd Year MBBS Programme in order to improve the programme and facility.

2.   **PROCEDURES**

If you volunteer to participate in this study, we would ask you to do the following things:

You will be asked about your perception and experiences in one to one interview format with an audio recording device

The interview should take a maximum of 20 minutes. It will be one time interview.

Total 16-20 students will interviewed in one to one interviews.

 It will be recorded with your permission and written out afterwards.

and this content form also implies for

This consent form is also for Quantitative Questionnaires that you are going to fill, filling this form and signing means you giving full consent for these quantitative questionnaires, in addition to qualitative interview.

3.   **POTENTIAL RISKS AND DISCOMFORTS**

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A report will be written by the researcher about the information gained. Your interview will be kept anonymous.

As such no risk or harm involved in this research but your participation is **entirely voluntary** and you dislike or decline to answer any question which may not suits you or will affect you negatively in any way whatsoever. You are free to decline to answer that question or leave from the study at any point, even if you do agree to take part.

4.   POTENTIAL BENEFITS TO SUBJECTS AND/OR TO SOCIETY

Your answers will help to improve clinical skills programme and help us to find out the impact of this rotation on other major clinical rotations like Surgery, Medicine, Gynecology and Obstetrics and Pediatrics in 3rd year clinical clerkship programme. Ultimately will improves the quality of education and health care delivery

5.   PAYMENT FOR PARTICIPATION

No payments for the participants but refreshments will offered as a part of these interviews

6.   CONFIDENTIALITY

Any information that is obtained in connection with this study and that can be identified with you will remain confidential and will be disclosed only with your permission or as required by law. Confidentiality will be maintained by means of lock and key system by the investigator and all data will be kept in one place means no copy and replication will be done in any case.

No information will be released to any other party for any reason.
Interviews will be audio taped and if the participant wish to delete of edit any answer to the question he will give right to do so at the end of interview.

Right now there is plan to publish safeguard of data has already being discussed in above paragraph.

7. PARTICIPATION AND WITHDRAWAL

You can choose whether to be in this study or not. If you volunteer to be in this study, you may withdraw at any time without consequences of any kind. You may also refuse to answer any questions you don't want to answer and still remain in the study. The investigator may withdraw you from this research if circumstances arise which warrant doing so, You can decide to take part or not at your own will and at any point of time during interview or after the interview. There are no negative consequences for you if you decide not to take part. Your decision will not have any influence on your academic outcomes.

8. IDENTIFICATION OF INVESTIGATORS

If you have any questions or concerns about the research, please feel free to contact Muhammad Faisal Rahim, email address: mfaisalrahim @gmail.com, cell number 03445325730, home address : House no; 16 Block 13 Gulshan –e-Iqbal, Karachi, Pakistan

9. RIGHTS OF RESEARCH SUBJECTS

You may withdraw your consent at any time and discontinue participation without penalty. You are not waiving any legal claims, rights or remedies because of your participation in this research study. If you have questions regarding your rights as a research subject, contact Ms MaléneFouché [mfouche@sun.ac.za; 021 808 4622] at the Division for Research Development.

SIGNATURE OF RESEARCH SUBJECT OR LEGAL REPRESENTATIVE

The information above was described to [me/the subject/the participant] by [name of relevant person] in [English] and [I am/the subject is/the participant is] in command of this [I/the participant/the subject] was given the opportunity to ask questions and these questions were answered to [my/his/her] satisfaction.

[I hereby consent voluntarily to participate in this study/I hereby consent that the subject/participant may participate in this study.] I have been given a copy of this form.

_____

Name of Subject/Participant

_____

Name of Legal Representative (if applicable)

_____   _____

Signature of Subject   Date

SIGNATURE OF INVESTIGATOR

I declare that I explained the information given in this document to _____ [name of the subject/participant] and/or [his/her] representative _____ [name of the representative]. [He/she] was encouraged and given ample time to ask me any questions. This conversation was conducted in (English) and no translator was used.

_____   _____

Signature of Investigator   Date

Appendix E
Transcription

Respondent No: 1-

Interviewer: Have you ever heard the term of 'Clinical Skill Laboratory' or 'Clinical Skill Rotation' before starting of this programme? If answer is NO what is your perception the term CSL or CSR?

A:Oh..Okay….Yes,I have. Clinical Skill basically is a basic requirement that every medical student must attend. It teaches that how you have to take blood pressure, inter vines drips and all basic things.

Interviewer: Do you have any prior experience of Simulation-based learning?

A: I think simulation is like an acting (pause) like in a real life, simulation is where you deal with patients or creating the artificial scenario.

Interviewer: What would you say about clinical skills programme, how much it benefits you in other rotations, in terms of skills while attending this rotation in your 3rd year clinical clerkship programme?

A: We learnt many basic skills in CSL like inter vines drips, inter muscular, taking blood pressure, universal precautions and all that stuff which can facilitate in other rotations in 3rd year clerkship programmes.

Interviewer: In what way has the CSR motivate or demotivate you in learning clinical skills? Does this type of teaching involving simulation, stimulate your interest in learning clinical skills? Prompt: How

A: .Yeah…., Yes, Yes its motivates me a lot

Interviewer: What resources in the clinical skills lab did you find the most helpful and why? Prompt: Is there anything that you may want to change or require in future?

A:Naaa…To some extend I am not satisfied as multimedia was not that clear, projector was not showing the crisp videos and besides that the models are pretty old. All these things need to be upgraded.

Interviewer: What benefit would you say did you receive through attending this CSL rotation in 3rd year clinical clerkship programme?

A: It did benefit me a lot because I have learnt basic procedures i.e. IV drips, inter muscular and taking blood pressure, universal precaution and all that stuff.

Interviewer: Any additional Comments

A: The Clinical Skill programme should start with 1st year medical students. They should attend one class in a month. Later on in 3rd year they can have proper clinical skills rotations. In this way the new students have a small clinical exposure in the beginning of their career.

Respondent No: 2

Interviewer: Have you ever heard the term of 'Clinical Skill Laboratory' or 'Clinical Skill Rotation' before starting of this programme? If answer is NO what is your perception the term CSL or CSR?

F: Yes I have heard this term when I started 1st year and I know what it entails. We use simulation over here to learn clinical skills which will be useful to us when we go to hospital settings.

Interviewer: Do you have any prior experience of Simulation-based learning?

Prompt: If so tell me about it? If not what is your perception of SBL?

F: Yes, I have attended quite a few conferences in which simulation and Simulation-based Learning were promoted abroad. Simulation is about manikins and it is about artificial based learning which helps in learning in a sound manner.

Interviewer: What would you say about clinical skills programme, how much it benefits you in other rotations, in terms of skills while attending this rotation in your 3rd year clinical clerkship programme?

F:A lot, Hmm...most of skills we learned here is applied in our other rotations Ummm.. Like i/v, CPR, Catheterisation, yes benefits are there.

Interviewer: In what way has the CSR motivate or demotivate you in learning clinical skills? Does this type of teaching involving simulation, stimulate your interest in learning clinical skills? Prompt: How

F: Yes, it motivates me when we go to manikins we learn about anatomy and learn more about even single details of how to go about different procedures and once we get hands on procedures it would evoke interest to move on to procedures skill.

Interviewer: What resources in the clinical skills lab did you find the most helpful and why?

Prompt: Is there anything that you may want to change or require in future?

F: Manikins are good for the present time but new manikins can be bought to introduce the new technology, for example I have seen the manikins Gyn.&Obs conference at Vancouver in which a pregnant women (manikin) would cry during the delivery process which creates a very realistic image and environment of a hospital.

Interviewer: What benefit would you say did you receive through attending this CSL rotation in 3rd year clinical clerkship programme?

F: The benefits are unparalleled because it helps me to get over the fear of patients. I think that it is very beneficial that we go to simulations first then we move on to the clinical settings in real life. It helps remove the fear and we were taught every single instruction in detail which would not be possible otherwise.

Interviewer: Any additional comments

F: It was very good and I think it was a very good learning experience.

Respondent No: 3

Interviewer: Have you ever heard the term of 'Clinical Skill Laboratory' or 'Clinical Skill Rotation' before starting of this programme? If answer is NO what is your perception the term CSL or CSR?

K: Yes, I actually have heard the term CSR and CSL back in 1st year MBBS. I took a workshop with you BLS in which you have told me the CSR and how to handle an unconscious patient in a road traffic accident, so yes.

Interviewer: Do you have any prior experience of Simulation-based learning?

Prompt: If so tell me about it? If not what is your perception of SBL?

K:Hmm..Yes, I actually have. Simulation is when you provide artificial environment, manikins and you know when you teach how to do procedures and how to repeat the procedures again and again without harming the patients. It is actually better than performing the same procedures on the real patients.

Interviewer: What would you say about clinical skills programme, how much it benefits you in other rotations, in terms of skills while attending this rotation in your 3rd year clinical clerkship programme?

K: We are taught about how to take procedures, the exact steps to follow which we might forget, how to communicate with a patient, how to take consent and also the universal precautions like you know how to wear gloves and what rules you know to follow that all these things will definitely benefit us in other rotations.

Interviewer: In what way has the CSR motivate or demotivate you in learning clinical skills? Does this type of teaching involving simulation, stimulate your interest in learning clinical skills?

Prompt: How

K: Yes, It did

Interviewer: What resources in the clinical skills lab did you find the most helpful and why?

Prompt: Is there anything that you may want to change or require in future?

K: Yes I am very satisfied with the learning resources provided by himI here. Manikins are of great use which I like the most. All the models are very helpful and the multimedia contents that Dr. Faisal showed here are very helpful for example we did the heart sound here the other day which was very helpful.

Interviewer: What benefit would you say did you receive through attending this CSL rotation in 3rd year clinical clerkship programme?

K: Besides when I attended your clinical skills programme I learned about clinical skills, universal precautions and how to perform procedures, it helps me a lot.

Interviewer: Any additional comments:

 K:No that's it.

Respondent No: 4

Interviewer: Have you ever heard the term of 'Clinical Skill Laboratory' or 'Clinical Skill Rotation' before starting of this programme? If answer is NO what is your perception the term CSL or CSR?

S: Yes, I have. The clinical skills is like skills, regarding what we have to practice in the clinic hands on training, universal precautions, the safety measures and what guidelines, we should follow.

Interviewer: Do you have any prior experience of Simulation-based learning?

Prompt: If so tell me about it? If not what is your perception of SBL?

S: Yes, I have heard about it. Simulation-based Learning is an artificial environment with artificial models or settings. It drives to generate the atmosphere or the situation where we can have an experience before encounter the real patients.

Interviewer: What would you say about clinical skills programme, how much it benefits you in other rotations, in terms of skills while attending this rotation in your 3rd year clinical clerkship programme?

S: Yes, it does, as I said before (Pause), you can use the same skill you have learnt here and you can use it in a real life in the clinical setting. In the same way you can apply the universal precautions that you have learnt here to the other clinics. You do not want to get introduced the infection to your patient if you have learnt the universal precautions here and apply it in your other clinics. For example you learn every precaution when you take blood from hepatitis patient you apply all safety measures which provide safety to yourself and to your patient. Effective

communication skills are very important than lot of medicine. It is more about counseling than anything. If you cannot communicate with your patient then you are lost. If you learn how to communicate for example if you know how to phrase your question while history taking and already practiced it in skill laboratory then you can show a professional attitude in your clinics.

Interviewer: In what way has the CSR motivate or demotivate you in learning clinical skills? Does this type of teaching involving simulation, stimulate your interest in learning clinical skills? Prompt: How

S: Yes, it does motivate me. Once you have learnt the clinical skills in a simulation environment than you are more confident. When you take part and go to clinical settings for example once you practice digital rectal examination on a manikin or model in CSL and after that when you go to the patient to do the procedure it will be done more effectively with a doctor standing there and the patient will not have much discomfort.

Interviewer: What resources in the clinical skills lab did you find the most helpful and why? Prompt: Is there anything that you may want to change or require in future?

S: Yes, I am satisfied with overall resources. When you see multimedia videos and then you practice it by yourself, I think the use of multimedia always facilitates you in learning than the boring lectures given verbally. I think the programme theory and its guideline are very good but some small adjustments can always be done like for example inclusion of surgical materials to practice suturing skills so that students can learn hands on.

Interviewer: What benefit would you say did you receive through attending this CSL rotation in 3rd year clinical clerkship programme?

S: It creates a setting or an atmosphere in which you want to learn.

Interviewer: Any additional comment:

S: No, it is pretty good and I think this programme should bring a bit earlier. May be in 1st year or 2nd year as now we see more students are going for electives so it may be benefit them as they are gone through those programmes before applying to the elective programmes. In this way it will be a big help for them from their University.

Respondent No: 5

Interviewer: Have you ever heard the term of 'Clinical Skill Laboratory' or 'Clinical Skill Rotation' before starting of this programme? If answer is NO what is your perception the term CSL or CSR?

F: Yes, it is where you come and learn on manikins and several techniques before you go to the real world in the real practice in the real clinics.

Interviewer: Do you have any prior experience of Simulation-based learning?

Prompt: If so tell me about it? If not what is your perception of SBL?

F: Yes, before once in a CPR class we did CPR on manikins but our experience was very little. I think it is a good way for students to learn before they go to real practice they learn the basic methods and how to properly handle different situations before it actually happened, we pracice doing examination afer we see our instructor performing the same examiniaion of patients, which gave us a fair idea how we should be performing skills on real patient

Interviewer: What would you say about clinical skills programme, how much it benefits you in other rotations, in terms of skills while attending this rotation in your 3rd year clinical clerkship programme?

F: . Anything you learn right now you can apply it in the OPD e.g. DRE, physical examinations and CPR when patient comes in the emergency room you can perform CPR.

Interviewer: In what way has the CSR motivate or demotivate you in learning clinical skills? Does this type of teaching involving simulation, stimulate your interest in learning clinical skills? Prompt: How

F: I think it motivates, once you have the knowledge and allow you to do thing again and again so that you can do better when you go to the real world or OPD.

Interviewer: What resources in the clinical skills lab did you find the most helpful and why? Prompt: Is there anything that you may want to change or require in future?

F: I think everything is fine. We have all the models, manikins and multimedia contents. Most helpful things I find in CSL are manikins and models because it all hands on work.

Interviewer: What benefit would you say did you receive through attending this CSL rotation in 3rd year clinical clerkship programme?

F:We have learnt all those things here that we can use in 4th year so we have learnt all those techniques that we can apply on real patients. So this is the best thing about this.

Interviewer: Any additional comments:

F: . It was good.

Respondent No: 6

Interviewer: Have you ever heard the term of 'Clinical Skill Laboratory' or 'Clinical Skill Rotation' before starting of this programme? If answer is NO what is your perception the term CSL or CSR?

S: Yes, I think it is an excellent way to learn all the practical aspects of the medicine in an artificial manner that we can apply them in a practical life.

Interviewer: Do you have any prior experience of Simulation-based learning?

Prompt: If so tell me about it? If not what is your perception of SBL?

S: I have done a workshop of BLS that where I have the experience of Simulation-based Learning.

Interviewer: What would you say about clinical skills programme, how much it benefits you in other rotations, in terms of skills while attending this rotation in your 3rd year clinical clerkship programme?

S: All the skills will be helpful e.g. heart sounds, breath sounds will be helpful in the clinics and all the procedures done in CSL will help us in hospital, So once we practice here we can perform them in other rotations in hospital.

Interviewer: In what way has the CSR motivate or demotivate you in learning clinical skills? Does this type of teaching involving simulation, stimulate your interest in learning clinical skills?

Prompt: How

S: It motivates a lot. There are not only videos and lectures but there is also practical application with the help of models and manikins which makes you more practical in your practical aspects.

Interviewer: What resources in the clinical skills lab did you find the most helpful and why?

Prompt: Is there anything that you may want to change or require in future?

S: I think the manikins are most resourceful in the rotation. In this way you feel that you have done something practically.

Yes, I am pretty satisfied with all the resources and no change required in the programme.

Interviewer: What benefit would you say did you receive through attending this CSL rotation in 3rd year clinical clerkship programme?

S: I got an insight into practical clinical medicine and all aspects of it.

Interviewer: Any additional comment:

S:No.No

Respondent No: 7

Interviewer: Have you ever heard the term of 'Clinical Skill Laboratory' or 'Clinical Skill Rotation' before starting of this programme? If answer is NO what is your perception the term CSL or CSR?

K: No, that you would be learning something which can be used later on in our career.

Interviewer: Do you have any prior experience of Simulation-based learning?

Prompt: If so tell me about it? If not what is your perception of SBL?

K: Yes, we have a couple of rotations in which they taught us with simulation. I think it is a very good process. You can practice in an artificial environment that is created which can be rotate or similar to the real environment. So I think it is a good way to learn before you go to the real patients.

Interviewer: What would you say about clinical skills programme, how much it benefits you in other rotations, in terms of skills while attending this rotation in your 3rd year clinical clerkship programme?

K: All most all of them because you eventually ends up performing in family medicine, performing same procedures in the other clinics. So if you get to learn it on simulation-based environment first prior to real patients it always helpful. We did the heart sounds here other day with him (Senior colleague), which was very helpful.

Interviewer: In what way has the CSR motivate or demotivate you in learning clinical skills? Does this type of teaching involving simulation, stimulate your interest in learning clinical skills? Prompt: How

K: I think it is nice because we are not only focusing on manikins and models. It really motivates you because you are learning other things like indications and complications of clinical procedures and what you are need to look out for when you are doing a procedure. So that it gives you very nice over all covering of the procedures.

Interviewer: What resources in the clinical skills lab did you find the most helpful and why? Prompt: Is there anything that you may want to change or require in future?

K: No I think it is pretty decent. Yes I am satisfied with overall resources provided in skill lab. I think there more procedures should be added more generic procedures like respiratory examination.

Interviewer: What benefit would you say did you receive through attending this CSL rotation in 3rd year clinical clerkship programme?

K: . I think I feel 90% confident when I will be doing these procedures on actual patients.

Interviewer: Any additional comments

K: I think that something should be done prior to the other rotation. This something which helps us in all the other rotations so you should do it at the beginning may be it can be done before commencing to 3rd year MBBS programme or may be done at the end of 2nd year of MBBS before the start 3rd year clinical clerkship programme or we can have CSR at the first month of 3rd year MBBS programme and there we should attend another rotation.

Respondent No: 8

Interviewer: Have you ever heard the term of 'Clinical Skill Laboratory' or 'Clinical Skill Rotation' before starting of this programme? If answer is NO what is your perception the term CSL or CSR?

S: No, I have not. Not before attending this programme.

Interviewer: Do you have any prior experience of Simulation-based learning?

Prompt: If so tell me about it? If not what is your perception of SBL?

S: Yes, when I heard about it I feel that it creates a kind of environment where you supposed to learn in an artificial environments.

Interviewer: What would you say about clinical skills programme, how much it benefits you in other rotations, in terms of skills while attending this rotation in your 3rd year clinical clerkship programme?

S: . It does benefit other rotations, because medicine is all about procedures skills and communication skill, so obviously learning about them will give you a chance as how to apply that directly to your clinical practice when you go to that stage.

Interviewer: In what way has the CSR motivate or demotivate you in learning clinical skills? Does this type of teaching involving simulation, stimulate your interest in learning clinical skills? Prompt: How

S: Yes, It motivates me

Interviewer: What resources in the clinical skills lab did you find the most helpful and why? Prompt: Is there anything that you may want to change or require in future?

Ans.5. Yes, I am satisfied all resources but I will be more satisfied if there will be more gloves.

Interviewer: What benefit would you say did you receive through attending this CSL rotation in 3rd year clinical clerkship programme?

S: Benefits are obviously there because there is direct hands on experience and you learn more from directly performing on manikins than learn through videos or lecture.

Interviewer: Any additional comment

S: No, everything is according to the clinical skill laboratory as it should be.

Respondent No: 9

Interviewer: Have you ever heard the term of 'Clinical Skill Laboratory' or 'Clinical Skill Rotation' before starting of this programme? If answer is NO what is your perception the term CSL or CSR?

T: Yes, I have. Basically it is a rotation which teaches you clinical skills on manikins and models which helps you to become a doctor.

Interviewer: Do you have any prior experience of Simulation-based learning?

Prompt: If so tell me about it? If not what is your perception of SBL?

T: Yes, I have, when you have hands on experience on manikins and models you can learn better. Simulation means what you should do in an artificial environment which helps you in the clinical experience in real life.

Interviewer: What would you say about clinical skills programme, how much it benefits you in other rotations, in terms of skills while attending this rotation in your 3rd year clinical clerkship programme?

T:. I think it a very great programme, It helps me out a lot in other rotations because before this we all did theory and having hands on experience helps you grasp the knowledge a lot.

Interviewer: In what way has the CSR motivate or demotivate you in learning clinical skills? Does this type of teaching involving simulation, stimulate your interest in learning clinical skills? Prompt: How

T: Yes, absolutely, because for last three years we are just having bookish knowledge and now with hands on experience it helps you to understand more and motivates us more.

Interviewer: What resources in the clinical skills lab did you find the most helpful and why?

Prompt: Is there anything that you may want to change or require in future?

T: .Obviously, yes. Models are great. Yes everything is up to the mark.

Interviewer: What benefit would you say did you receive through attending this CSL rotation in 3rd year clinical clerkship programme?

T: . Yes, it does, because if you learn these things prior to entering in clinical life you are more experienced and well equipped to handle the real situations

Interviewer: Any additional comments

T: Nothing much everything is good. I guess surgical models like suturing should be included. No additional comments. I think it was a great programme and every 3rd year student should attend.

Respondent No: 10

Interviewer: Have you ever heard the term of 'Clinical Skill Laboratory' or 'Clinical Skill Rotation' before starting of this programme? If answer is NO what is your perception the term CSL or CSR?

F: No, I would think it is all about of practicing skill regarding clinics actual performance of techniques and stuff before going into professional life.

Interviewer: Do you have any prior experience of Simulation-based learning?

Prompt: If so tell me about it? If not what is your perception of SBL?

F: No, I think that before performing on actual patients, you perform on dummy. It gives you more confidence before encountering the real experience.

Interviewer: What would you say about clinical skills programme, how much it benefits you in other rotations, in terms of skills while attending this rotation in your 3rd year clinical clerkship programme?

F: . Especially the skills that we did about inter I/V and I/M injections, catheterisation and also CPR at CSL , I think it really helps me in emergency and other rotations.

Interviewer: In what way has the CSR motivate or demotivate you in learning clinical skills? Does this type of teaching involving simulation, stimulate your interest in learning clinical skills?

Prompt: How

F: Once performing clinical skill it motivates me and gives me the confidence that I need and it gives me the opportunity to revise again and again imitating my instructor and doing the same practice on a dummy without harming the real patients.

Interviewer: What resources in the clinical skills lab did you find the most helpful and why?

Prompt: Is there anything that you may want to change or require in future?

F: I think it is perfect. I do not want to change anything and resources are fine.

Interviewer: What benefit would you say did you receive through attending this CSL rotation in 3rd year clinical clerkship programme?

F: I think I have received amp knowledge about everything that you have taught us and most of the things that we need to know before performing procedures in a real clinical set up.

Interviewer: Any additional Comment

F: No, just keep it.

Appendix F: Code Book

S.no	Theme	Categories	Code	Description
1.	Learning skills in the CSL.	Procedural Skills	I/V.I/M injection techniques, catheterisation, NG tube, DRE, CPR	Clinical competencies including basic practical skill
		Surgical skills	Surgical instruments, suturing skills	Skills used during surgeries
		Universal Precautions	Hand washing, scrubbing, gloving, gowning.	Skills for Patient safety
2.	Students perceptions & experiences about the process of learning at CSL.	Learning process	Simulation-based learning	Learning in an artificial environment
			Learning through technology	Use of technology like Animation and Multimedia in education
			Peer-Assisted Learning	Peer helping junior students to learn
			Role-Playing	Role modeling
			Peer-assisted learning	Learning from class fellows or seniors
3.	Effects competencies learned at clinical skills rotation on other rotations	Preparation for other rotations.	Facilitation to other rotation	Skills learned at CSL utilised in other rotations
			Extended learning skills	More skills which were not part of curriculum
4.	Personal & Professional Development	Personal Development	Motivation	Believing in one's direction to behaviour
			Confidence	State of being certain
			Removal of fear	
		Professional-Interdisciplinary skills	Universal precautions, Patient safety. Difficult and challenging situations	Clinical competence and other skills related to other professions
			Communication skills	Effective communication with patients
5.	Recommendations for Improvement for CSL.	Critique	Lack of new models & manikins	detailed analysis and assessment of something
			Lack of stocks items	
		Recommendations	Early introduction of programme	Recommendation for future for further improvements
			Preparation for elective requirements	Elective requirements such as CPR course, anti-touch, anti-septic techniques

Appendix G: Office of Dean`s Approval Letter

FACULTY OF MEDICINE
ZIAUDDIN UNIVERSITY

28th October 2015

TO WHOM IT MAY CONCERN

I have no objection on Dr. M. Faisal Rahim conducting this educational research on the topic "Exploring medical students' perceptions on effectiveness of clinical skills rotation in clinical skills laboratory" in my institution, as this is an educational research and has no human or animal harm issues involved.

I have allowed Dr. M. Faisal Rahim to conduct this research in his program and in clinical skills and health informatics laboratory.

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ZU
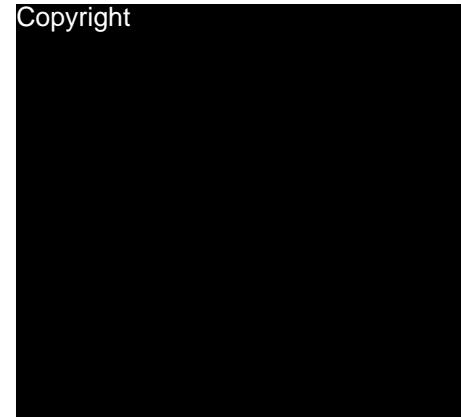
Appendix H: Coding Picture
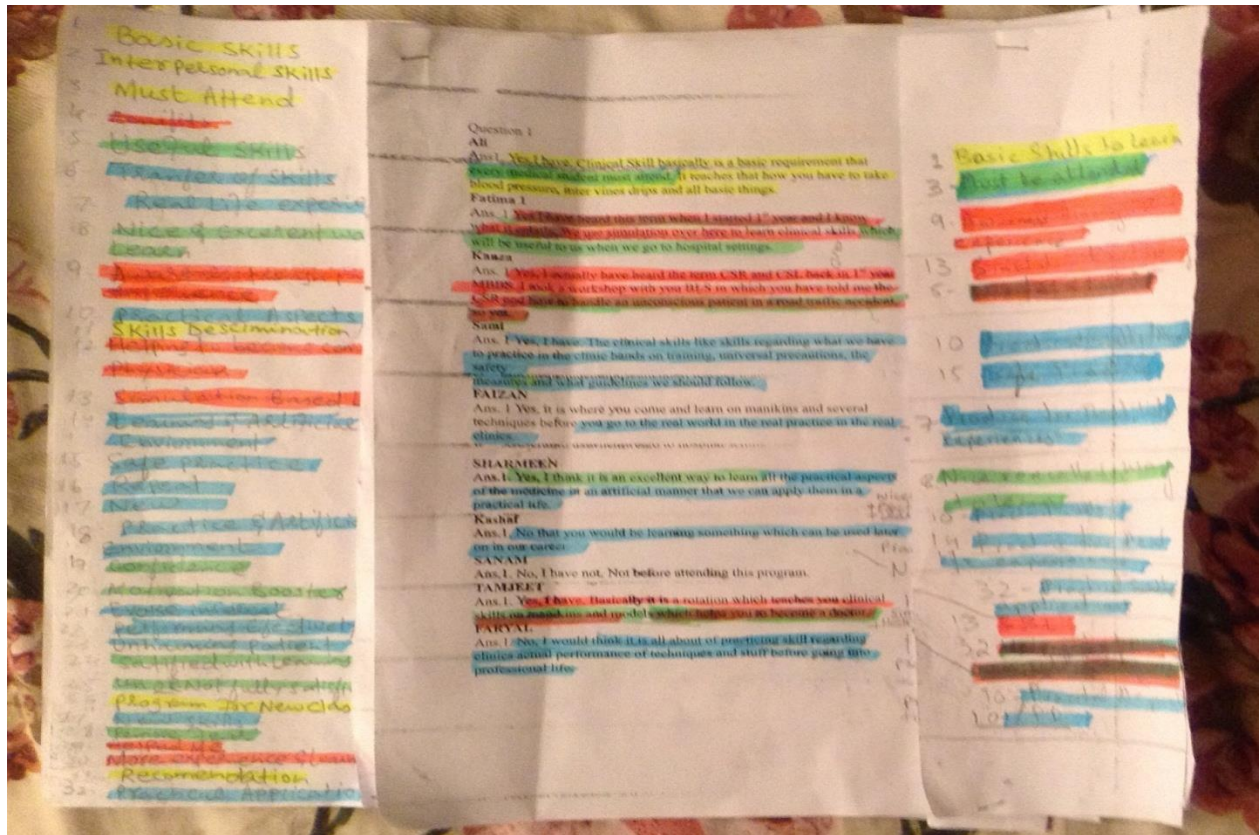
Appendix I

Table:4. shows the results of section 1 of quantitative questionnaire.

S.no	Question	Total No. of Students:	Strongly Agree		Agree		Neutral		Disagree		Strongly Disagree		Cumulative Percent
	Questions	N	N	%	N	%	N	%	N	%	N	%	%
1.	Clinical skills session done with clear in its aims and objective	40	15	37	21	52	4	10	0	0	0	0	100
2.	Content in these sessions were appropriate for my level of understanding	40	22	55	17	43	1	2	0	0	0	0	100
3.	CSL teaching relevant to my clinical context and need	40	17	43	14	35	7	17	2	5	0	0	100
4.	I had been given plenty of opportunity to practice an repeat clinical skills at CSL	40	14	35	17	43	8	20	1	2	0	0	100
5.	I had been given good & valuable feedback on my performance	40	11	28	19	48	8	20	2	5	0	0	100
6.	Does simulation create interest enthusiasm among students	40	18	45	14	35	5	13	3	7	0	0	100
7.	CSL provide better learning in history taking skills	40	4	10	8	20	12	30	13	33	2	4	100
8.	CSL provide better learning in Physical examination skills	40	9	23	19	48	9	22	3	7	0	0	100
9.	CSL provide better learning in Procedural skills	40	12	30	23	57	4	10	1	3	0	0	100
10	CSL provide better learning in communication skills	40	13	32	15	37	5	12	7	18	0	0	100
11	CSL provide better learning in universal precautions -provide list	40	13	33	17	42	8	20	2	5	0	0	100

Table:5. Frequencies of competencies in various Clinical Rotations

S.No		I/V	NG	Cath	ETT	DRE	CPR	BS	HS	S.I	S.M	Hand	CS	ST	EBM
1.	Surgery	2	3	2	4	3	2	4	3	15	8	10	3	3	4
2.	Medicine	6	16	19	7	9	9	13	13	2	3	3	5	3	11
3.	Pediatrics	1	--	--	--	--	1	9	9	7	-	1	3	--	5
4.	Family Medicine	3	--	1	--	1	--	3	1	--	--	--	2	--	1
5.	Primary Health Care	5	--	--	--	--	--	1	--	--	--	--	1	--	1
6.	Gynecology & Obstetrics	2	1	12	--	1	1	--	--	--	--	--	3	1	2
7.	Clinical Pathology Laboratory	7	--	--	--	--	--	--	--	--	--	--	--	--	--

Legends:

I/V- Intravenous injection. Hand- Hand Washing.

I/M- Intramuscular injection.ST-Suturing.

NG- Naso-gastric injections- Surgical Instruments.

Cath- Catheterisation.S.M- Surgical Material.

ETT- Endo-tracheal Intubation.

EBM-Evidence based Medicine

CS- Communication skills

CPR- Cardio-pulmonary resuscitation.

Table 6:Results of Quantitative Questionnaire (Section 2).
Show Frequencies of various skills and competencies which were repeated in other rotations

S.No	Name of competencies repeated in other rotation once learned at Clinical skills Laboratory	Frequency of competencies repeated in other rotations learned at Clinical skills rotation
1.	Intravenous & Intramuscular injection technique	25
2.	Naso-gastric injection	20
3.	Catheterisation	25
4.	Endo-tracheal Intubation	11
5.	Digital Rectal Examination	14
6.	Cardio-pulmonary resuscitation	13
7.	Breath Sounds	30
8.	Heart sounds	26
9.	Surgical Instruments	24
10.	Surgical Material.	11
11.	Hand Washing, Scrubbing, Gloving	14
12.	Communication skills	17
13.	Suturing.	7
14.	Evidence based Medicine	24

Appendix J: Authors Information

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2. Contact information of co-author:
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Appendix K: PROCESS LAYOUT (How sample is obtained and distributed)

Mixed Research Design: Total Sample Size of Study = 58

Qualitative research Design Sample Size in Qualitative Method = 10	Quantitative Research Design Sample Size in Qualitative Method = 48

One to One

Interviews

No: of Participants=
10

Quantitative Questionnaire completed and filled

No: of Participants= 40
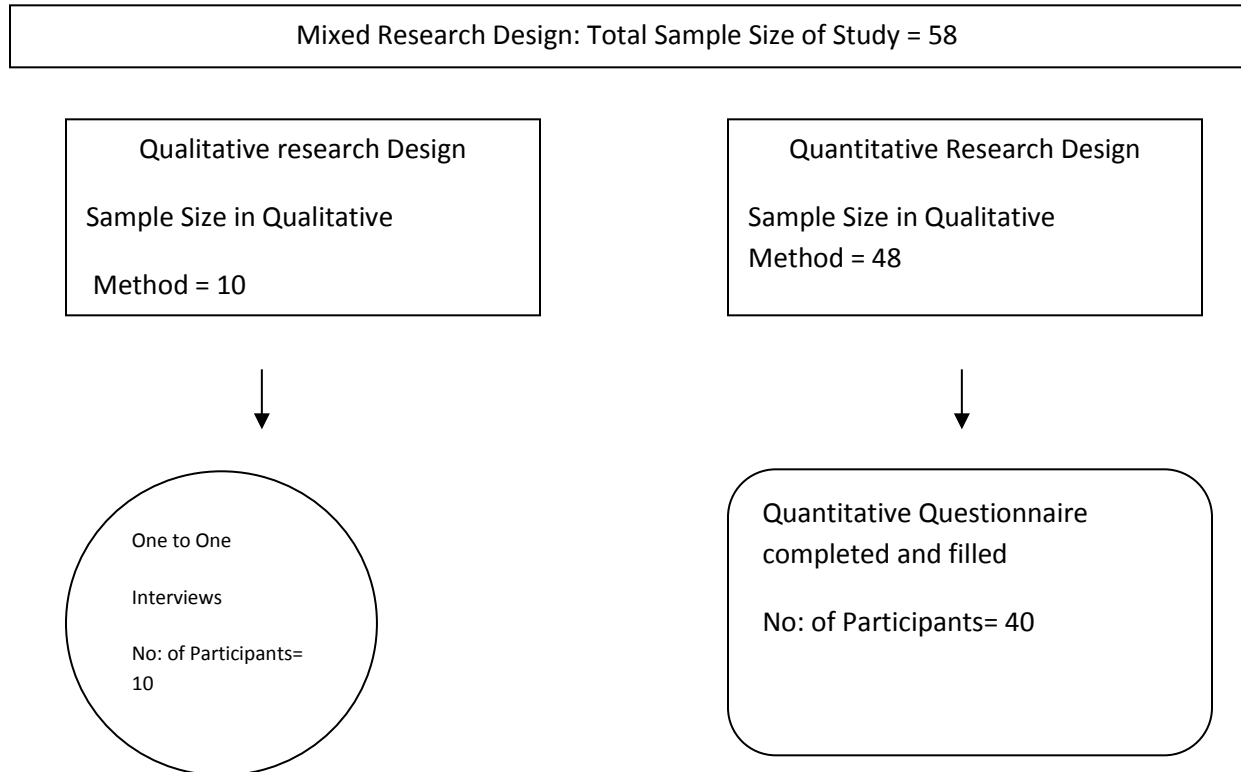
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