Simulation in Medical Education: Perceptions of Medical Students' Learning Experience in a History-Taking Module

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Abstract — **Effective communication skills are a core competency required of all doctors; an important tool that facilitates proper history-taking during the doctor-patient interaction. The teaching of this skill is now an integral part of undergraduate medical education and is largely taught using simulation techniques. The current study aimed to explore medical students' perceptions of their learning experience in a history-taking module which was done via simulated learning. Qualitative descriptive methodology was used in this study. Data was collected through focus group discussions from a total of 17 participants. These were purposefully sampled from the target population of second-year medical students who had recently completed the history-taking module. during the 2017 academic year. All data was analyzed thematically, using an inductive approach to identify the emerging themes. Three major themes emerged from the thematic analysis of the qualitative data with sub-themes under each of them. The three major themes were: the 'portals of learning', challenges to learning and reflections on learning. The research shown that the simulated approach is particularly useful in the teaching and learning of communication skills in history-taking. The findings suggested three main areas the students' perceptions focused on which shed light on possible reasons for not achieving proficiency in history-taking. These relate to the ways in which learning opportunities were offered, the challenges encountered in the learning process and reflections on the learning experience.**

Index Terms — **history-taking; medical students; simulation; perceptions; communication skills**

I. INTRODUCTION

The importance of communication between doctors and patients has been well established in the medical literature [1], making history-taking a core competency for all physicians. Good generic communication skills facilitate different aspects of clinical practice, finding important expression in empathic listening, clarifying, and summarizing, and planning and discussing treatment options [2]. In recognition of this, teaching communication skills has increasingly formed an important component of the medical curriculum for undergraduate medical students [3]. However, teaching communication skills within the medical curriculum is not an easy task; students often show negative attitudes towards communication skills as they do not see it as an important aspect of medical education [4], [5]. There is an erroneous belief amongst students that communication is a skill that cannot be specifically taught yet is somehow acquired while training and during medical practice [5]. There are faculty members who share the same position as these students and also demonstrate resistance to novel learning-teaching techniques. It is necessary to indicate that these doctors have never undergone any formal training in communication skills themselves [5], [6]. The considerable. and increasing pressure from national and international professional bodies to improve training and evaluation of doctors in communication skills is reflected globally, making communication skills in medicine, once considered a minor subject, now ranked a core clinical skill [7], [8], [9].

The contemporary medical curriculum now implemented in most medical schools globally, has moved away from the traditional model of extended clinical placement of students, to that of blended learning. Classroom simulation education is now employed in teaching medical student skills in a controlled environment that replicates real-life situations [10]. The latter has made the use of simulated patients (SPs), a particularly important aspect of communication skills training in medical education, spanning several clinical contexts and with proven benefits [10]. Simulation is a highly recommended method for teaching communication skills in the undergraduate medical curriculum. Despite this, substantial difficulties still exist in establishing comprehensive communications skills courses within the medical curriculum and anecdotal evidence revealed that students faced certain challenges when learning how to perform history-taking via simulation. Appropriate interventions to improve and optimize the students' learning experience are needed that require a good understanding of their perceptions about their experience of learning history-taking by simulation, through an empirical study.

Simulation is an educational tool widely used in the undergraduate medical programme and acknowledged as useful in both the teaching and evaluation of students [1], [11], [13]. Deeply rooted in adult learning theory, it is often designed around the constructivist learning theory [12], [14] which assumes that knowledge is only constructed when a person attaches meaning to an experience. It also postulates that constructivism either occurs personally or socially [11], [12], [14]. To constructivists, learning occurs within an individual based on prior knowledge and as such the person

attaches meaning to their previous experiences. Constructivist educators therefore perceive learning in the context of learners' social and experiential activities that are built upon their past knowledge, to create new knowledge [11], [12], [14]. According to constructivism theory, exposure to a new learning activity or experience results in a disorienting dilemma for students, challenging their existing beliefs and assumptions. To resolve this cognitive dissonance, new experiences must be grounded within previous knowledge [11], [12], [15]. There is bound to be conflict between new knowledge and what is already known, forcing students to review their views and perspectives (knowing that you don't know) by reflecting on the simulation experience to create new knowledge [15]. This process involves the critical re-examination of long held presuppositions by the learners as they connect the new knowledge to a present or future situation with patients [12], [14].

The three domains of activity that medical education seeks to enhance during the learning process are (i) cognitive or the mental skills (knowledge), (ii) affective skills (attitude or feelings) and (iii) psychomotor skills i.e. manual or physical (clinical skills) [12]. Although there is a dearth of studies reporting from the perspective of medical students on their experience of learning skills through simulation, previous literature revealed that their attitudes influenced the effectiveness of simulated learning in medical education [10], [12]. This research focused on the affective domain of the learning theory i.e. the attitudes of the medical students towards learning history-taking module by simulation and their perceptions of simulation and its techniques. The overarching purpose of the current research was therefore to explore the attitudes and opinions of 2nd year medical students, regarding learning history-taking using simulated patients, on completion of the module.

II. CONTEXT OF THE STUDY

In keeping with global trends, communication skills training (CST) using simulation to enhance history-taking was introduced into the undergraduate medical curriculum at the Sefako Makgatho Health Sciences University (previously the University of Limpopo) in Pretoria, South Africa, in 2008 [16]. Second year medical students at the University attend a five-week module on History-taking, facilitated by a family physician and a psychologist. The initial session provides a theoretical context, knowledge base and overview of the module through didactic lectures and interactive workshops. Over the remaining four weeks, each student has two interactions with a simulated patient who they engage in a brief history-taking encounter. One encounter is videotaped while the other takes place and is observed in real time. The former is replayed to a group of peers comprising half of the students and is facilitated by the psychologist. The student whose encounter is featured has first opportunity to critique their performance and then gets feedback from the facilitator, with contributions from her/his peers. The focus in this group discussion is self-critique and reflection. The other half of the class observes one another in turn as they each conduct a brief history-taking with a simulated patient (SP). This group is facilitated by the family physician. After each student-SP encounter peer feedback is invited. The facilitator fills in the gaps to wrap up feedback to each student on their performance. The focus in this group discussion is on peer feedback. Central to the teaching methods employed in CST within this module are thus the use of simulation and feedback. Although this mode of learning history-taking has been well received, less than 20% of the second-year medical students at the University learning through this modality achieved marks reflecting proficiency. The aim of the study was to explore how second year medical students experienced learning about history-taking through simulation in the 2015 academic year. It was with a view to make appropriate changes to the History-taking module that would enable students to achieve proficiency in the skill.

III. METHODS

A. Study setting and design

The study was conducted at Sefako Makgatho Health Sciences University (previously the University of Limpopo) in Pretoria, South Africa. The research design was qualitative within an interpretivist-constructivist paradigm that utilized focus group discussions to explore students' experiences and opinions of learning history-taking by simulation.

B. Study participants and sampling

Participants included second year medical students who took the history-taking module in the 2015 academic year. A purposive sample was drawn from students who had completed the module, to select participants most likely to offer the greatest insight into the objectives being explored [17]. The participants were selected by determining the average mark obtained for two separate encounters with a simulated patient. Four scores reflecting the top, middle and bottom range of all the marks for each of the first three blocks of the 2015 academic year were selected. The sample obtained by this method aimed to be representative of the study population, by eliciting the perspectives of students who performed poorly, moderately, and well at history-taking. The focus group discussions were scheduled for termination at the point of data saturation where responses had become repetitive and no new information emerged from data collection.

C. Data collection and management

Data collection was done through three Focus Group discussions (FGD) among a total of 17 participants. The 1st FGD had 7 participants, the 2nd had 6 and the 3rd had 4 participants. To ensure credibility and trustworthiness of the research process, an independent observer with vast experience in qualitative research data collection facilitated the focus group discussions. She was provided with the research protocol prior to accepting the role of facilitator and attended one morning of the block to familiarize herself with the teaching and learning process of history-taking via simulation. The principal investigator was however present at all three focus groups as an observer, taking notes to reflect observations not possible to capture by digital recording such as: the ease with which contributions were made, the mood of the interaction, the depth/intensity of engagement and the dynamic between the more and less assertive participants. The interview schedule consisted of 16 questions. In the first instance the questions aimed to invite their perceptions on key areas of interest for learning. These areas were opportunities to learn, content of learning, what facilitated their learning,

what stood in the way of learning, the growth that occurred through learning and the overall way the students experienced their learning. A total number of 17 medical students participated in this study with ages ranging between 19 and 32 years. Their test marks in the History-taking module ranged from 44 - 76.5% as shown in Table 3 below.

TABLE 1: PARTICIPANTS' DISTRIBUTION (N=17)

AGE(YRS.)	FREQ	%
32	1	6%
22	3	18%
21	7	41%
20	5	30%
19	1	5%
TOTAL	17	100%

TABLE 2: GENDER DISTRIBUTION AT FOCUS GROUP DISCUSSIONS

FGD	MALE	FEMALE	TOTAL	%
Group 1	2	5	7	41%
Group 2	1	5	6	35%
Group 3	2	2	4	24%
TOTAL	5	12	17	100%

TABLE 3: STUDENTS' TEST SCORES IN HISTORY-TAKING MODULE (N=17)

PARTICIPANT ID	MARK (%)
A	69
B	69
C	55
D	76.5
E	44
F	70
G	48
H	52
I	52
J	45
K	50
L	52
M	69.5
N	46
O	61.5
P	71
Q	47

D. Data analysis

Data analysis was done using thematic analysis. This involves an on-going iterative process where data collection, processing, analysis, and reporting are intertwined, allowing the qualitative data to focus on generating themes or concepts or building theory that would make meaning of the aggregate data. One of the researchers and the FGD facilitator independently analyzed the data from the focus group interviews. Transcription of the recordings was followed by coding to extract themes and enable analysis of the data generated. The steps included immersion and familiarization with the data, followed by coding where similar answers were grouped together. Further coding was done in which the main thought for each group of ideas was refined to reduce the categories into which the emergent ideas fit. Perceptions of the students were clearly articulated and focused on the opportunities for, obstacles to and reflections on learning history-taking through simulation. The students recognized various opportunities to learn the skill through simulation. They identified internal and external factors that hindered their learning. They appreciated the nature, value and relevance of history-taking by reflecting on the experience. Students overall found learning history-taking by simulation effective and rewarding but were hindered from benefiting

maximally by factors both within and beyond their control.

E. Ethical considerations

All the participants provided written informed consent before their participation in the study. None of the participants was identified through their name or personal identity and their responses were kept strictly confidential. Ethical clearance was obtained from the Research and Ethics Committees of both the Universities of Stellenbosch and SMU. Furthermore, approval was given by the management of SMU prior to commencement of the study.

F. Rigour

To ensure scientific rigour, the respondents were contacted to clarify and validate themes as they emerged. This was done to confirm if the themes were a true representation or reflection of their responses.

IV. RESULTS

This study sought to explore medical students' perceptions on their learning history-taking through simulation. It was with a view to make appropriate changes to the History-taking module that would enable students to achieve proficiency in the skill. Three main categories emerged from analysis of the qualitative data broadly classified as: *the portals of learning*, *challenges to learning* and *reflections on learning*. These key themes and focus areas under them have been summarized below.

A. Theme 1: The 'Portals of Learning'

From the students' responses it was clear that a number of different factors enabled or positively influenced their learning. These could be referred to as the 'portals of learning' and further divided into sub-themes of the way the module was organised (addressing placement, experiential learning, and formative assessment), the opportunities for role-modelling, a community of learning, learning by reflection and individual motivation..

A. 1. Placement in the curriculum

There is considerable discussion in the literature about the timing of medical students' exposure to CST during their training [7], [18]. According to the participants, an earlier exposure to the CST was preferred.

'I think I would have studied this module last year because we do cases in the first year so that we are actually prepared' (FG3).

A. 2. Experiential learning

Examples of experiential methods and their benefits were given by the study participants [19]. The students also appeared to agree that teaching communication skills by experiential methods was far more successful than by didactic means.

'With the video, you can see yourself what you are doing wrong and you can criticize yourself' (FG2).

'With the video critique, I think the fact that we got to see ourselves from the external perspective really helped the history-taking process' (FG1).

A. 3. Formative assessment

The feedback from an initial attempt at history-taking enabled a better-informed performance for the subsequent assessment. Good feedback practice strengthens students' capacity to self-regulate their own performance [20]. Opportunities for this existed within the teaching sequence described, thereby promoting the goals of formative assessment.

'The feedback given by both the classmates and the lecturers, you actually learn to identify where you went wrong, your mistakes' (FG1).

'And criticizing us it's like making sure we understand the task ahead of us' (FG2).

'Also getting assessed twice helped us to improve yourself the second time' (FG2).

A. 4. Opportunities for role-modelling

The interaction between the study participants and simulated patients provided the opportunity for them to interrogate and model desirable communication skills. By varying the scenarios depicted by the simulated patients, the students were constrained to practice, acquire, and adapt the generic or specific skills appropriate or relevant to the context of the patient.

'We were given different scenarios, not only given a physical thing like headache, pain or flu' (FG1)

Modelling occurred on another level as reflected by the following quote:

'Dr XXX actually did an example of how she would have conducted her history-taking session and I think that gave us a head start' (FG1).

A. 5. A community of learning

A strong thread that emerged from the respondents was that of involvement of others beside the individual learner, in a partnership which mediated the learning in one way or another. The notion that learning does not take place independently of others but benefits from contribution to a collective, is central to the theory of collaborative/social learning. The following quotes convey the perceived contribution of others to the study participants' learning:

'When the classmates have to critique you, not the facilitators, you understand more because they are also students and they do the very same thing that you do. And if they understand how to do something in a different way, in a better manner, then will be easier for you to do the same' (FG3).

'Honestly, I think it's really hard to stand up to your fellow classmates, especially when one has set the bar really high. When you stand up there you thinking ok if this person has went this far and I have to try by all means to catch up' (FG1).

A. 6. Learning by reflection

The participants convey that their learning of history-taking is derived from looking back on a prior aspect of their learning sequence. Identifying one's mistake through self-critique provokes a reflection that results in correcting the approach or question. This process of reflecting back is contained in the following quotes as well as how the potential for change followed:

'Also with self-critique, it's indication that you are actually learning something because if you can identify what you said is wrong, surely you would know the right approach or you know the right question' (FG1).

'But after you've practiced you are able to build a communication. You are able to manage the conversation with your patient and not turn it into an interview' (FG1).

'I learnt to listen to a person and make something and my questions would really come from out of what they are telling me rather having to come with a map and asking them from the fixed map have in my head' (FG2).

A. 7. Individual motivation (approaches to learning)

It was evident from the students' responses that they differed in the way they engaged with learning in the module. They had expectations of what would make it easier for them to obtain better marks without achieving the depth of engagement and learning that the lecturers hoped they would experience from the module. Elements of these approaches emerged in the responses study participants offered, regarding challenges they encountered in learning the skill of history-taking.

'The guideline was very helpful; it was there to guide us. We were told that we need not exactly stick to it. But we felt the pressure to stick to it because it was as if the marks were coming from the guide' (FG1).

'I wanted to say the map is just a guideline. It's not exactly what you need to do precisely. It's like getting a scope but the lecturer will never tell you this is exactly what to ask' (FG3).

'I think when we get the guideline; they should also include other scenarios like a person wanting to lose weight because what we prepare for its pain only, or maybe a cough and a headache. That's what we prepare for' (FG3).

B. Theme 2: Challenges to Learning

To understand the students' learning experience, their opinion about the factors that stood in the way of their learning was paramount. The students attributed this to a range of issues within and without their control which are presented below.

B. 1. Organization

Students have no control of the structure/set up within which their learning takes place. But hindrances to their learning history-taking were attributed to it which are conveyed in the following quotes:

'Cos them being operating at the same time, there's a difference between what you learn in all of them' (FG3).

'Cos I spent 4 weeks on the video and then one week in which I had to do my real time interview with the SP' (FG3).

Both quotes relate to the desire of students to have uniform exposure to all learning opportunities within the module.

'On one side there were some questions that were not really relevant but on the other side they will pinpoint everything that you missed even though you thought maybe this is not really necessary for me to ask. It's different and it impairs learning because now it's about scoring marks' (FG1).

Students objected to assessments based on subjective evaluations of history in the absence of a standardized rating form.

'I just felt that one who has backache gets more information or ok asking the questions is going to be easier than compared to the one who had like psychological problems' (FG1).

B. 2. Emotions

Participants documented negative reactions to one or other aspects of CST in their perceptions. The emphasis seems to be on the negative emotion (panic) arising from having the audience of peers and facilitators.

'When you do it in front of your colleagues, one of the things that will show you that you were actually panicking...when you forget who [the patient] she said she was, her name, you know obviously you were under pressure' (FG1).

'The facilitator was there, it's like being in front of a magistrate in court like now they're going to judge you and they're going to like penalize you for every wrong mistake that you do' (FG3)

B. 3. Complexity of the tasks

The awareness of being recorded imposed another dimension to interacting with the SP which the student needed to address though it was not the main activity of the learning. Previous research revealed negative perceptions of the use of videotape in CST, in a study where the presence of the video camera during the interview was often reported as a hindrance to the students' spontaneity and openness [4].

'When I was in the video, what was at the back of my mind was there's a camera. I have to sit straight. I don't have to twiddle my thumbs. Ok there's a video, there's a camera watching me, I have to be presentable' (FG1).

'It's difficult seeing the patient, seeing the body language, listening to what is said, hearing what is said' (FG3).

B. 4. Simulated patients

Limitations in their usefulness were brought to the fore in several quotes by the study participants presented below. The study participants clearly expressed ways in which SPs did not function optimally in their role that impacted their learning of history-taking negatively. Their observations were in keeping with findings in literature.

'The simulated patients, they sometimes try to be reluctant and make it difficult for one' (FG2).

'I think Esther, the only thing she wanted to do was just swallow him up. I think that was the whole motive, like do you know what? I can see he's sinking, let him sink even more' (FG1).

'What I didn't like about that patient as well, it's like they tried to correct you themselves' (FG3).

C. Theme 3: Reflections on Learning

There is an expectation that learning results in change. Change occurred in different dimensions for the students and was accompanied by growth. The following text relates the quotes to the process of reflection which mediates both the change and growth. The quotes respective to this code are drawn from the behavioural and symbolic environments as illustrated by the following examples.

'Mine it was an interview – I just came to conduct an interview. Yes, no, I ask you answer, we part ways '(FG1).

'At first I didn't understand why people said the block was tricky because what I heard was that you were given a paper with the questions-how you should formulate the questions; what you should find out and what you should know from the patient' (FG2).

'I have realised that it's not an interview and it's not just communication but it's also a relationship. So, we have to be on the same page in order to deal with problems' (FG1).

'Before I thought it was easy now, I've discovered it's tough and should be mastered very well' (FG3).

C. 1. Growth as a result of the module

The following quotes reflect the growth that resulted in students through their participation in the history-taking module. The growth represents the end of the evolution or transitioning process from experience through reflection to the learning attained.

'I learnt to be sensitive with my questions because some questions can be intruding like the patient would be uncomfortable. So I have learnt to be sensitive, I should understand the patient is not a machine. They are people and they have emotions and you have to take care of that part as well' (FG2).

'Yes, I think it's the foundation of getting a very good diagnosis. So I think history-taking is the foundation of having a very happy patient at the end of day' (FG1).

'I just feel that history-taking is the starting point for

everything. You can't continue as a doctor on the medical program if you don't have proper history (FG2)'

The reflection on the learning experience also resulted in an understanding of how it applied in a broader context of writing assignments. This is beyond the context in which the learning was situated as exemplified in the following quote from a participant.

'But then when I was doing my anaemia assignment which is after this, I realised what an advantage it was. Students who had done the history-taking block were able to ask good questions to the patient and get the information out of the patient and the students who hadn't done the block were totally clueless about how to ask questions to the patient' (FG2).

V. Discussion

Simulation is the main strategy around which the learning in the module is structured [3], [4], [5]. The aim was to explore the students' perceptions of learning history-taking through simulation. A better understanding of how the varied elements contribute to students' learning of the skill of history-taking was made possible by a detailed analysis of the data obtained. The intention was for the findings and recommendations to inform appropriate interventions, to address the issues that emerged and facilitate achievement of better marks by students. This study explored the perceptions of second year medical students about learning history-taking through the medium of simulation. The students recognized and appreciated the various channels which mediated their learning of history-taking through simulation. However, they expressed a desire for earlier exposure to the module as an opportunity to practice and develop the skill starting from the first (previous) year of medical training. There is much evidence in the literature to support this [7], [18], [19]. Students were more preoccupied with obtaining adequate marks with minimal effort than with engaging at a deeper and more meaningful level with the learning opportunity. There was a strong feeling by the students that their learning was hindered mostly by factors outside their control. The playing field was unequal, and it undermined their best efforts or misdirected them [5]. They considered having the same preparation for the task, through equal length of exposure to uniform theoretical underpinnings of the skill to be particularly important. Students protested the variability in assessment between facilitators and the differential in perceived difficulty between scenarios allocated to students. Difficulty experienced by students in carrying out history-taking was attributed to the challenge of managing several critical inputs simultaneously. The sentiments expressed in this regard were an acknowledgement of the totality of what the skill entailed rather than of complaint. The use of simulated patients represented by far the biggest frustration experienced by the students in learning history-taking by simulation. A combination of poor dramatization of the scenarios in role-playing and poorly defined boundaries of their role, threatened to limit the usefulness of simulated patients in facilitating the learning of the students. The experience of learning history-taking by simulation was accompanied by strong emotions. Students were uncomfortable with carrying it out under the scrutiny of their

facilitators and peers. There was also anxiety about how feedback on their performance was delivered. In the students' reflection on the learning experience, growth in appreciation of the nature, value and broader application of history-taking were clear. Learning occurred as students successfully utilized simulation to achieve transformation in their views of history-taking.

Based on the study findings the following recommendations are suggested and aim to address the concerns raised in the study. We recommend an earlier introduction of communication skills training in the curriculum to enable students to develop patient-centred and bio-psychosocial doctor-patient interactions. Secondly, regular consultation between facilitators and the availability of workshops would promote uniformity in content and minimize variability in their assessment and feedback. In addition, periodic training to upskill the simulated patients should be introduced to create awareness of and define their role clearly in promoting students' learning through simulation. This should specifically address students' concerns of victimization and poor acting. The major strength of our study is the research method; qualitative research with focus group discussions that generated rich contextual responses from students. The main limitation of this study was the qualitative study design with a small sample size. Involving other participants such as course facilitators or more students would probably have added more depth and rigour to this study. This observation notwithstanding, key insights were generated by this study which though not generalizable, can be a benchmark for future studies across different settings.

VI. Conclusion

The research has shown that the simulated approach is of significant value in the teaching and learning of communication skills in history-taking. The findings suggest three main areas students' perceptions focused on, some of which shed light on possible reasons for not achieving proficiency in history-taking. These relate to the ways in which learning opportunities were offered, the challenges encountered in the learning process and reflections on the learning experience. Based on the study findings, appropriate recommendations for interventions in the use of simulation in the teaching and learning of CST were made which are feasible and applicable in settings beyond the context of this study.

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