

Simulated clinical scenarios: The experiences of Emergency Care Practitioner students

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ABSTRACT

Background: Simulation education as a strategy is used extensively in Emergency Medical Care Departments in South Africa. The literature in this field strongly suggests positive effects on patient safety and student-readiness. Simulation education strategies often fail to address the student experiences in the classroom. The aim of this study was to explore how Emergency Care Practitioner (ECP) students experience simulated clinical scenarios.

Methods: This study was conducted at a South African University in the Gauteng province. Data was collected through semi-structured interviews. Convenience sampling was used to recruit participants. Data saturation occurred after six interviews. Open coding was used to code the transcripts after which codes and categories were merged to produce themes.

Results: ECP students experienced simulated clinical scenarios to be a highly beneficial teaching and learning experience, but experienced simulation as a nerve-racking assessment tool that requires excellent debriefing and feedback to improve its effectiveness. High-fidelity simulation scenarios, that are built on real-life context, are received most favourably by students.

Conclusion: ECP students find simulated clinical scenarios to be valuable in their education. To achieve a favourable simulation experience for ECP students, excellent debriefing and feedback protocols need to be implemented. Availability of time to practise in the simulation laboratory is limited and students feel limited by this.

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BACKGROUND

Simulation is used to train professionals in the realms of aviation and healthcare. Simulation provides the opportunity for the individual to master their skillset in a safe environment where risk of injury or death due to error is removed.¹ The participants in this study were exposed to simulation in the form of OSCEs (clinical assessment of a single skill) and simulated clinical scenarios. As an educational strategy, a high-quality well-structured simulated scenario, has been found to compare favourably with those of traditional learning tech-

niques in the realm of clinical skill performance.¹ Despite its value, simulation is often experienced as stressful.² When teaching the skills that are needed in any Emergency Medical Care (EMC) course, such as critical thinking, clinical reasoning and patient management, simulation has been found to be an effective educational approach.³ It should be noted that simulated clinical scenarios are critical in the developmental process of a student's treatment plans and clinical thinking² and play an important role in bridging the gap between theory and clinical practice.⁴

The use of simulation in paramedic, nursing and medical doctor training has proven to have a positive effect on patient safety.⁵ Once a student has mastered a technique in a simulated environment, they can confidently endeavour to attain the same skill in a clinical environment more safely than if they had never had the opportunity to learn through simulation first.¹ Literature suggests that the greatest advantage of simulation is that it provides a learning opportunity where the risk of patient harm is eliminated.⁶

Since Emergency Care Practitioners (ECP) often require immediate action for patient benefit, performing a skill correctly becomes imperative.⁷ Simulation leads to skill acquisition⁸ and improves student confidence;⁹ it is therefore considered to be valuable as an educational strategy, specifically within the field of EMC. Although it has been reported that simulation as an educational strategy improves confidence, it has also been found to cause anxiety,^{8,10} especially when used for assessment purposes.¹¹ There is extensive use of simulation for assessment in South African EMC programmes, where students are required to treat medium- to high-fidelity simulated patients in a clinical scenario. This is used to assess their clinical skills, clinical reasoning, and critical thinking. Paramedics and ECPs in South Africa have agreed that clinical simulation is an appropriate teaching, learning and assessment tool.¹²

The EMC Department where the participants study, makes use of simulation teaching methods that the staff primarily developed through trial and error, without having explored the students' perceptions or experiences of the teaching styles used. Ascertaining what the lived experiences of students were during simulated clinical scenarios when used as a teaching, learning and assessment strategy provided valuable insight into how the students experienced simulation. Previous South African studies have explored the perceptions of simulation learning amongst medical students¹³ and nursing students,¹⁴ but none of the research was focused on the experiences of ECP students. The data obtained during this study has the potential to better equip the facilitator to manage the simulated teaching processes. This study aimed to explore how ECP students experience simulated clinical scenarios.

DESIGN AND METHODS

Study Design

This baseline study utilised a phenomenological research design in order to explore how ECP students experience simulated clinical scenarios.¹⁵

This design was chosen because the lived experiences of students who had participated in simulated clinical scenarios at a South African university had not been previously explored. A phenomenological method allowed the research team to explore and describe the lived experience of the ECP students in detail.

Research Setting

This study was conducted in South Africa, at the University of Johannesburg, Department of Emergency Medical Care (EMC) in the Faculty of Health Sciences. The interviews took place in a venue on the Doornfontein campus. To ensure that no disruptions occurred during the interview, the venue was private, with low noise levels.

Population and Sample

All fourth-year ECP students were included in this study. It is believed that as senior students, they are information-rich participants, as they have been exposed to a significant number of simulated clinical scenarios in teaching, learning and assessment opportunities during their four years of training. To recruit participants in the study, all 25 registered fourth-year ECP students were sent an information letter via email. Individual interviews were conducted with consenting ECP students to explore their lived experiences of simulated clinical scenarios as a teaching, learning and assessment strategy. The sample size was determined by data saturation,¹⁵ which occurred after six interviews. All interviews were audio recorded and then transcribed.

Data Collection

Data were collected through individual semi-structured interviews conducted during November 2019. After recruitment, a time and date convenient to the participants who agreed to participate, was diarised. On the day of the individual interview, participants were asked to sign participation and audio-recording consent forms before the commencement of the interview. The interviews and the identity of the participants remained confidential. Once recruited, participants were asked "How have you experienced simulated clinical scenarios during your training at university?" Additional probing questions were used to ensure that a rich description of the participants' experiences was obtained. Each interview took an average of 30 minutes, during which the interviewer took descriptive and reflective field notes.¹⁵

Data Analysis

Once transcribed, the six interviews were analysed through open coding.¹⁶ This was done by a member of the research team and by an independent coder. The research team and the independent coder met for a consensus discussion where the identified themes and sub-themes from the collected data were discussed and agreed upon.

Ethical Considerations

Ethical clearance was obtained from the Faculty of Health Sciences Research Ethics Committee of the University of Johannesburg (Ref: REC-01-65-2019). One of the researchers was a clinical facilitator in the Department of EMC at the time of the study. The participants were kept unaware of the researcher’s involvement in the study to ensure that they would not feel obliged to participate as she was a clinical facilitator in the department at the time. KH interviewed the participants and invited students to participate as she was unknown to them. The participants were free to withdraw at any time. All interview data were kept confidential, and transcripts were anonymised before HS saw the data.

Measures of Trustworthiness

Trustworthiness was maintained by using the Lincoln and Guba model¹⁷ of criteria. Credibility was ensured by spending ample time conducting the interviews and using verbatim transcriptions of them for data analysis. The research team’s interpretations and conclusions were validated and confirmed in two ways: a) member checking; b) using field notes taken during the interviews for triangulation. To ensure reflexivity, the research team used their field notes to reflect on their own feelings, values and judgements that might affect the data analysis. Transferability was ensured by the inclusion of comprehensive descriptions of the research context, the transactions and process as observed during the study. Additionally, information-rich participants were sampled. A research study can be dependable only if all the details of data gathering, analysis and interpretation are described by using a code and recode procedure, and by making use of an independent coder

with experience in open coding. This study was made confirmable by ensuring that a chain of evidence would be available upon reasonable request.

RESULTS

Our analysis of the transcripts identified two main themes (Table 1). Simulated clinical scenarios are highly beneficial as a teaching and learning tool, but they are lacking in certain ways as an assessment tool - although adjustments can be made.

The participants in this study experienced simulated clinical scenarios as a highly beneficial teaching and learning strategy, although they identified some shortcomings. They also experienced simulation as a nerve-racking assessment tool that requires debriefing and detailed feedback to make it more effective. These will now be discussed in more detail.

Teaching and learning tool

From trends in the literature, it was anticipated that participants in this study would experience simulated clinical scenarios as highly beneficial during teaching and learning.¹⁸ In addition, the literature also identified some shortcomings and provided recommendations to address these.⁷ Participants complimented the University on having state-of-the-art facilities. They also alluded to the fact that faculty staff added to their appreciation of having an overall “good experience”. One participant noted:

“... [the lecturers] figured out a system and it works, and they are qualifying very good ECPs; I mean we are wanted across the globe.” (Participant 5, male)

Benefits for teaching and learning

The benefits of simulated clinical scenarios and their importance within the ECP curriculum was discussed by all participants. One participant felt that “it made me a much better practitioner”. Although the students were asked about simulated clinical scenarios, they often spoke about the value of Objective Structured Clinical Examinations (OSCEs).

Table 1: Themes and Sub-themes: ECP Student’s Lived Experiences of Simulated Clinical Scenarios

Themes	Sub-themes
1. Teaching and learning tool	1.1. Benefits with regards to teaching and learning 1.2. Teaching and learning shortcomings
2. Assessment tool	2.1. Nerve-racking assessments 2.2. Lack of debriefing

OSCEs are not used for formal assessment at this university, but they are used to teach single skills on mannequins, such as placement of an intravenous catheter or intubation.

A common trend in the transcripts was that OSCEs in particular are seen to be highly beneficial because the students can practise invasive techniques on a manikin without fear of patient harm. Participants mentioned that they can practise these skills during their own free time and in groups as they prepare for examinations. For example:

"I think [OSCEs] is the best surrogate for actually practising on a live person and some of the fairly invasive things we do, we can't just practise on people..." (Participant 2, male)

Participants noted how important it is for them to develop competency without putting real patients at risk of clinical errors because of possible mistakes. These practise sessions add to their confidence when treating real patients, as seen in this quote:

"The practise sessions, I think that is the place where simulations have probably had the biggest positive impact on my willingness to treat patients, because you did it previously..." (Participant 2, male)

Participants in this study noted that they appreciated the opportunity to ask questions during their simulated clinical scenario sessions used for teaching and learning. These questions ranged from concepts they were addressing in class, to treatment modalities they might have come across during their time working shifts with other qualified practitioners that differed from what the lecturer had taught them. This is illustrated by this response:

"So, maybe they say for instance you saw something on the road, maybe another qualified practitioner did something on the road and then maybe you have questions about that. During simulations, that's the time we can ask..." (Participant 1, male)

Teaching and learning shortcomings

Apart from the perceived benefits of using simulated clinical scenarios as a teaching and learning strategy, participants in this study identified areas that they see as shortcomings in the current use of simulated clinical scenarios. Participants often commented on the lack of fidelity when referring to simulated clinical scenarios. As one participant noted:

"It doesn't feel real..." (Participant 6, female)

In contrast to this, other participants commented

positively on the fidelity of clinical simulation scenarios. For example:

"... it looks real, it feels real, the patients are the correct height, the tables are correct, the charts are there, the information that you need to gain..." (Participant 5, male)

This discrepancy in experiences might be attributed to varying levels of fidelity implemented in the various simulated scenarios presented to the students. It is therefore vital to plan and execute high-fidelity simulated clinical scenarios that are based on real-life situations. Participants indicated that they prefer the real world. If the simulation is not set up accordingly, the student might miss the objective of the simulated activity. One participant said:

"I like to deal with the real-world environment... So, for me, it... that has always been a problem..." (Participant 6, female)

It was particularly interesting to note that participants who found the simulated clinical scenarios lacking in "realness" referred to the manikins as "dolls". Other participants, who seemed not to struggle with the fidelity of the simulations, used the appropriate terminology for the simulation space and the manikins. This can be seen in the reflective notes of the interviewer:

"[Participant 6] had a strong negative emotion towards the realness of simulations versus treating real-life patients and their ability to check vital signs and natural responses such as sweat. I noticed that participants who showed similar emotions towards simulations spoke about 'dolls' and that you cannot learn certain things while playing with 'dolls'..." (Researcher reflective notes)

Participants expressed difficulty immersing themselves in the simulated event. This might also have had an effect on their feelings of realness. Participants further alluded to the fact that the simulation and reality often differ in terms of environmental factors that cannot be simulated, such as sounds and smoke, as seen in the following quote:

"... and like the whole experience of sound, smoke, it's something that you don't really see in simulations..." (Participant 1, male)

Another frequent comment on the shortcomings of simulated clinical scenarios was a lack of time. Participants felt that they needed more time in the laboratories to practise. The simulation laboratory used in this study services a faculty with nine departments who also use the space, thus limiting laboratory availability. One participant com-

mented:

"... with nurses and everyone in health, make use of [the lab], ... if we can have more time in simulation labs." (Participant 3, Male)

Practising is vital to the participants of this study. It allows them time to familiarise themselves not only with the clinical skills, but also with the technical aspects of the manikin and the environment that is created in the simulation space. This is illustrated by this participant:

"... the more time you spend with the doll, you know exactly where to feel for pulse, etc. [...] if you're not familiar with the equipment... that's actually time consuming and you'll be trying to hear if that's not the working parts moving or it's really crackles." (Participant 1, male)

Assessment tool

Apart from discussing simulated clinical scenarios and their use as a teaching tool, participants in the study described their experiences of this approach when used as an assessment tool. All of them mentioned that they experienced these simulated clinical scenarios as "nerve-racking", and that they would require in-depth debriefing and detailed feedback to be more effective. For example:

"... a pretty common response is that it's extremely stressful and very nerve-racking..." (Participant 2, male)

Nerve-racking assessments

Current literature on simulated clinical scenarios led to an anticipation that the participants would experience simulation as stressful.¹¹ Simulated clinical scenarios during assessment were experienced by participants as being nerve-racking, and sometimes unrealistic reflection of their abilities, as seen in the following comments:

"... they're just all nerve-racking." (Participant 4, male) *"... unrealistic reflection of your ability ..."* (Participant 2, male)

This "unrealistic reflection of [their] ability" seems to originate from the fact that much of the clinical data is given by a prompter, which means that if the student does not ask the right questions, they will not get the information they need. Students feel that they perform more poorly in a simulated clinical scenario than they would if they were met by a real patient with the same pathology. Participants noted that they would normally be able to deduce some of the information from the environment: the clinical presentation of the patient,

or clinical data such as capillary refill time, or the absence or presence of certain clinical signs such as hepatomegaly for instance. This is expressed in the following quote:

"We had to ask questions to our prompter... who will tell you what you see. So, you literally have to ask okay, is my patient sweating..." (Participant 6, female)

Participants also found that the use of external examiners added to the stress they experienced. Because an external examiner's own practice could differ slightly from what these students had been taught in class, the students were concerned about a mismatch between what they had learned and how they thought the examiner might assess them. See this quote, for example:

"when you are being assessed, you're being assessed most of the time by external people, where ... they also have different ways." (Participant 1, male)

Because the simulated clinical scenarios are mainly perceived as being stressful, participants commented that they often started to doubt themselves and their own competencies. These feelings seem to originate from the student having a sense of being judged and scrutinised by the examiners during these assessment opportunities. Here is an example:

"... you've got people literally looking at you... and sometimes you can see the facial expressions about, whether you do something right or wrong, you start overthinking it." (Participant 6, female)

During the interviews, some participants mentioned that being filmed and having the assessors in a different room watching them perform the simulation on video helped to reduce their stress levels. For example:

"[...] just for stress levels, having assessors in another room, which we have done before. It worked out so much more relaxed. There's one person, it's the lecturer that has taught you" (Participant 4, male)

Participants in this study described a 'holding cell' [verbatim] and how that added to their stress levels. This is a room where students wait until it is their turn to be assessed. Participants shared how this builds up a great deal of stress, which they felt contributed to poor performance. It seems that the main cause of this stress is the fact that the students speak with each other here and speculate about what the clinical case might entail. This is seen in the following quote:

"It does get quite stressful, especially when we're waiting in the... holding cell... everybody's freaking out"

about it, throwing ideas in trying to guess what it is ... [chuckle], which makes it a lot worse." (Participant 3, male)

It was encouraging to note that the participants in this study realised that, although simulated clinical scenarios are extremely stressful, some form of stress is needed when being assessed in an emergency care environment. This stress may be similar to their working environment once they have graduated. Students understand that paramedics and ECPs often work under stressful conditions, as seen from this participant:

"I mean, it is supposed to be a stressful situation because it's testing how we work on the street." (Participant 5, male)

Lastly, a participant mentioned that the briefing pack containing information related to the patient, that they received before a specific clinical simulated scenario confused them due to some missing information. They also said that it was misleading to be given only written instructions without corresponding visual and auditory factors and strongly recommended that these aspects should be considered. This contributes to the fidelity of a simulation, as described in the following extract:

"So, you've got a paper that says your ventilation settings are this and this, then you get into the room where there's a ventilator that's got different [settings] on it and then an alarm keeps going off because the doll is not suitable to work on that machine. So, they say ignore the alarm, but it's ... [sigh]..." (Participant 6, female)

Lack of debriefing

Participants in this study mentioned that the lack of extensive debriefing after an assessment is a significant oversight that leads to lost learning opportunities. They felt frustrated at losing a learning opportunity due to the lack of a debriefing, especially after assessments.

"Debriefing in actual assessments lack" (Participant 4, male)

Participants used the term feedback and debriefing interchangeably. The interviewer assumed in her reflective notes that they are referring to the same thing. Participants not only felt that debriefing was insufficient, but general feedback was also inadequate and poor. This is illustrated in the following two quotes:

"The only feedback ... is comments sheets ..." (Participant 2, Male)

"I think that's terribly done, because the feedback we got [...] was a disaster" (Participant 1, male)

During simulated clinical scenarios for teaching and learning, participants revealed that good debriefing practices were employed by the facilitator. This was not the case when students finished a clinical simulated scenario designed for assessment purposes. Participants felt that they needed to see the examiner's comments, which might show them where they were lacking and explain the marks they were awarded. As this quote shows, they wanted to understand what was expected in the simulation:

"We do have some little feedback when it comes to sims [assessments], I thought that it's inadequate, I think we can definitely go more in depth." (Participant 4, male)

In addition, participants indicated that they wanted the feedback to be given in an encouraging manner. As seen in the following quote, the lecturers in this particular department seem to do this well:

"The lecturers do really well, they don't only look at the negatives, they look at the positives. So, they talk about the simulation, it helps a lot, but there needs to be more body to it." (Participant 4, male)

The last point worth noting is that the participants were very positive about the use of the Simulation Assessment Tool Limiting Assessor Bias (SATLAB) process. This is an assessment scoring method used by many Emergency Medical Care lecturers in South Africa,¹⁹ and, as seen below, students value this robust assessment rubric:

"It really does remove personal bias ... that's forward thinking." (Participant 5, Male)

"It's a very good rubric, it looks at all aspects of the sim..." (Participant 2, Male)

DISCUSSION

One of the concepts that emerged in the findings of this study, and that has been repeated continuously throughout simulation learning research, is that students appreciate a learning opportunity that poses no risk to human life.² Students feel that simulation learning prepares them for the work they will be doing after graduation, and it enables them to practise rare skills that they would not easily have been able to do in a real clinical setting.²⁰ Our findings also echo previous research which found that simulation learning improves student confidence.^{3,21}

Fidelity plays a crucial role in the ECP students' satisfaction with simulation. Higher fidelity simulation is associated with higher levels of student satisfaction.²² Participants in this study held varying opinions about the fidelity of their simulation

experiences, which is probably because time constraints during simulation for assessment allow for less fidelity than is the case with simulation for teaching and learning. Some participants appreciated the fidelity that was provided by aspects such as actually breaking ampoules and using equipment such as defibrillators and mechanical ventilators, whereas other participants in our study were frustrated by situations like needing to ventilate a test lung since the mannequin cannot be connected to the ventilator. Further comments regarding limitations on fidelity such as the lack of “smoke or sounds” are valid, yet these elements of fidelity would be almost impossible to include because of the logistics involved. Facilitators should employ techniques to increase the fidelity as much as possible to ensure that the learning experience is maximised, even though this may take extra time.²²

A concern raised by participants was the fact that time in the simulation laboratory was limited. This problem has been described by South African educators in the past.²¹ Simulation facilities and mannequins are expensive. Although some universities in South Africa have excellent simulation learning facilities, these facilities are often shared with other Health Science departments, which naturally limits the amount of laboratory time available to students in any one department.²¹ The time that is spent in the laboratory does however improve the students’ familiarity with the equipment, and therefore their confidence in using that equipment.³

Despite the confidence they gain from simulated cases, the students still find simulation assessments to be stressful. This phenomenon is well described in the literature.^{11,23} Muldoon *et al.* detail the use of OSCEs for assessment purposes, and the stress that this induced in nursing students.³ Our participants experienced OSCEs differently because OSCEs are generally not used for assessment purposes at this University, instead simulated clinical scenarios are used for assessment. The findings were similar, though, in that students experienced the simulation assessments as stressful. This stress response has been measured objectively and subjectively in the same cohort of South African ECP students using heart-rate variability and a self-reported validated state anxiety instrument.²³ The self-reported anxiety was found to be higher both before and immediately after the simulation assessment, and the student’s heart rate was found to increase during the simulation assessment.²³

Feedback and debriefing are crucial parts of the learning process when simulation is used.¹⁸ The literature describes techniques of oral- and video-

assisted debriefing,²⁴ but neither of these is used as a standard process after a simulated clinical scenario for assessment. The students described how they received the assessment rubric, as well as their SATLAB results per section, but indicated that they felt that this was insufficient. All simulation learning assessments are video recorded which makes it theoretically possible to use these recordings to provide video-assisted debriefing to the student. Ostavar *et al.* found this to be as effective as oral debriefing.²⁴ The students did however mention that they felt that the debriefing following simulated scenarios used for teaching and learning was excellent, and that often lengthy clinical conversations were held after a simulated scenario. These clinical conversations also created an opportunity for the students to discuss any questions they had regarding clinical practices they had witnessed during work-integrated learning shifts. Excellent debriefing leads to improved learning in students,²⁵ and it should therefore be the aim of the lecturer to ensure that optimal debriefing takes place every time that a student experiences a simulated clinical scenario, even those done for purposes of assessment.

One mechanism for providing feedback is the SATLAB feedback rubric (part of the SATLAB method developed by Makkink).¹⁹ The students are made aware of the outcomes of the simulated clinical scenario and provided with descriptors of what was considered to be the best practice, competent practice, not yet competent practice, omitted practice, slightly harmful practice and significantly harmful practice for each outcome of the scenario. This tool provides a marking rubric to guide assessors during their marking of simulation assessments in order to limit their personal bias. The students mentioned that they felt that the tool successfully limited the assessor’s personal bias, and that they believed it to be a good tool. The use of this tool replaced previous styles of assessment which were more susceptible to assessor bias.

Limitations

This qualitative study used convenient sampling to select participants at one university. Other ECP students might have other experiences of simulated clinical scenarios. The results of this study cannot be generalised to other universities, which makes this only a base-line study.

Implications for practice and research

Although ECP students valued simulated clinical scenarios as a teaching, learning and assessment strategy, it is vital for the facilitator to adequately prepare for simulation experiences. Ensuring that

the simulated experience makes use of an appropriate fidelity level to achieve the set outcomes is important for students to be able to immerse themselves appropriately. Care should be taken to allow students ample time to practise their skills in the simulation laboratory. Finally, feedback and debriefing should form part of all simulated clinical scenarios (whether for teaching or assessment) to facilitate the learning of the students.

Future studies on this topic should be conducted at multiple universities and include quantitative methods in order to fully understand the impact and effects of simulated clinical scenarios. By doing so, facilitators will be able to improve their own simulation pedagogy and enhance the teaching, learning and assessment experiences of the students.

CONCLUSION

The students were mostly impressed with the professionalism with which the high-fidelity simulation was implemented. It proved to be a very useful teaching and learning tool; however, some participants doubted whether simulation is effective when used as an assessment tool. They expressed the need for detailed debriefing and discussions after assessments so that they could learn from their mistakes, which would promote effective learning. The lack of discussion and debriefing after simulation assessments left them frustrated because they did not know which areas in their clinical practice needed improvement. To achieve a favourable simulation experience for ECP students, all clinical data should be made available prior to the simulation and excellent debriefing and feedback protocols need to be implemented when using a simulated clinical scenario as a teaching, learning and assessment strategy. They also had limited time to practise in the simulation lab, because it was shared with students from other departments. Simulated clinical scenarios have both benefits and shortcomings that need critical reflection from the facilitator who implements this strategy for teaching, learning and assessment.

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CONFLICTS OF INTEREST

The authors report no conflicts of interest.

AUTHOR CONTRIBUTIONS

HS conceptualised the research project. KH performed the interviews. HS coded the data, and KH and HS performed thematic analysis together with the independent coder. KH and HS drafted the final manuscript.

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