Medical Students’ Recognition and Response to Clinical Deterioration in Simulated Patient Scenarios

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Abstract

Introduction

The recognition and initial response of clinical teams to patients who suffer a deterioration in their condition is an essential capability of healthcare institutions. Simulation can provide some of this training, but creating appropriate ‘cues’ for recognising unwell patients can be challenging. We aimed to investigate how medical students recognise whether a patient is ‘sick’, and what they do in response to that recognition, using scenarios of clinically deteriorating simulated patients.

Methods

Senior medical students at Bond University participating in simulation scenarios were invited to participate in this study. Scenarios were delivered with simulated patients (SPs). During the post simulation debrief and in subsequent interviews, students were asked questions related to their recognition of, and response to, sick ‘patients’ in their scenarios. Debriefing sessions involving the students were audio recorded and transcribed. Thematic analysis of responses was conducted.

Results

Results suggest that verbal and non-verbal cues from SPs were the most significant influence on student’s recognition of clinical deterioration. Responses to that recognition were varied, but calling for help was perceived by the students to be an effective response.

Conclusion

Effective simulation training for medical students to recognise and respond to clinical deterioration requires scenarios that offer strong cues in patient appearance, speech and behaviour, and suggests that human simulated patients are effective educators for this purpose.
Keywords: simulation, clinical skills, medical education

Introduction

Simulation is often used for training providers to recognize and respond to patient deterioration, but creating appropriate 'cues' for recognising unwell patients can be challenging for simulation educators. We aimed to investigate how medical students recognise whether a patient is 'sick' or suffering clinical deterioration, and what they do in response to that recognition.

Background

Recognising and Responding to Acute Deterioration (RRAD) in Health Care is Standard 8 of the National Safety and Quality Standards (NSQHS) (Australian Commission on Safety and Quality in Health Care, 2018) (Recently changed from standard 9 to standard 8 in the second updated edition in Nov 2017). Multiple strategies have been employed nationally to better identify and manage acute deterioration in patients' physical, mental or cognitive condition. Simulation training has been used for both undergraduate and postgraduate learners to improve RRAD capabilities, as there are fewer opportunities to independently manage real patients, due to shorter work hours and better supervision of junior doctors and medical students.

Despite enthusiasm to incorporate RRAD into medical student training and curricula, little attention has been paid to the cues that novice participants perceive in determining whether a patient is sick or not.

An integrative review of the literature (Massey, Chaboyer, & Anderson, 2016) considered factors that influence ward nurses' recognition of and response to patient deterioration and found these were multifactorial - patient assessment, prior knowledge of the patient and their clinical baseline education, and environmental factors. Respondents were strongly focused on changes in vital signs as one of the significant cues and there was no mention of other factors such as (appearance, body language or interaction). The ward nurses also mentioned that prior knowledge of the patient and the associated underlying medical history influenced their recognition of clinical deterioration. However, "gut feeling" and "sixth sense" was one of the factors that affected their recognition of the deteriorating patient, without elaboration on that concept.

Recognising the unwell patient is a core skill for medical students, and simulation is often employed in their training for this learning objective. Using human patient mannequins for this training has limitations - as many cues such as posture, breathing patterns, interactions, facial expressions (Ragsdale, Van Deusen, Rubio, & Spagnoletti, 2016) and other signs of being unwell are difficult to simulate using these devices.

Simulated patients (SPs) offer an alternative for this purpose, as this approach has intuitive appeal for offering stronger cues in body language and non-verbal signs of clinical deterioration.

A recent meta-analysis by Orique and Philips (2017) "The Effectiveness of Simulation on Recognizing and Managing Clinical Deterioration" described how RRCD was taught in those studies through Low Fidelity Simulation (LFS) that included role play, task trainers and noncomputerized mannequins, while Medium Fidelity Simulation (MFS) was conducted through SPs, computer programs, video games and finally High-Fidelity Simulation (HFS) was carried out with computerized mannequins. Only one study from the face to face simulation worked with SPs in their simulation while the rest of the studies were conducted through the use of MFS and HFS mannequins. (Orique & Phillips, 2017)
Hogg et al highlighted the use of SP methodology in giving students greater confidence in recognising and responding to clinical deterioration (Hogg & Miller, 2016) but didn’t explore the factors or cues that influenced the participants in perceiving if a patient is sick or not.

A comprehensive scoping review by Williams et al examined the effectiveness of working with (SPs) for healthcare students to facilitate the development of students’ clinical competence, including their technical and non-technical skills, and found that the use of simulated patients for RRAD training appears less common than mannequin based approaches (Williams & Song, 2016).

We aimed to investigate the cues that medical students perceive to recognise a patient is sick or not, and what they do in response to that recognition. Answering this question will inform optimal scenario design for RRAD, and support preparation of simulated patients for roles involving deteriorating patient portrayal.

**Methods**

**Study setting**

The Bond University medical program prepares senior medical students for Recognising and Responding to Acute Deterioration (RRAD) through working with ‘hybrid’ simulated patients (SPs), trained to recreate a realistic portrayal of the ‘sick’ patient. The elements of the student training include the scenario patient assessment, communication, teamwork, handovers, and management decisions and the subsequent debrief/reflection on performance.

The sessions are conducted in a simulated clinical environment - either emergency, acute medical or critical care ward depending on the students’ clinical rotations. Scenarios include a number of common deteriorating patient situations, including dyspnoea, chest pain, hypotension, and decreased level of consciousness.

Simulated patient actors working in ‘sick’ roles are given briefings by clinicians, opportunities to practice roles with peer and clinician feedback, and watch YouTube clips and other resources to learn how various ‘sick’ patients look and behave (Nestel, Bearman, & Fleishman, 2014). Adjuncts were used to support the ‘sick’ appearance of the patient actors. These include iSimulate monitor emulators (allowing abnormal vital signs, arrhythmias etc), simulated intravenous access, water and glycerine spray to mimic diaphoresis, and use of part task trainers for diagnostics and for treatment.

**Study participants**

Senior medical students at Bond University participating in simulation scenarios were invited to participate in this study. All students in the relevant years of the program participated in the simulation sessions, but only those who consented to study participation were interviewed or had debriefings recorded for the study.

**Data collection**

During the post simulation debrief students were asked the following questions at appropriate intervals during the debriefing. (Figure 1.)
"Was your patient sick?" and "why did you think that?"
"In general - not only in your simulation case-  what are the useful signs a patient is sick or not?"
"What prompted you to call for help?"
"How did things change when help arrived?"

**Figure 1. Questions asked in the debriefing**

Debriefing sessions were audio recorded.

A smaller subset of students participated in a semi-structured interview straight after the Simulation session. They were interviewed individually and the same questions were discussed in more depth about their specific simulation case.

**Data analysis**

Audio recordings of the debriefing sessions and interviews was transcribed by a transcription service. Thematic analysis of responses during debriefings and interviews was conducted (Richards, 2009).

The authors independently analysed and interpreted the reflective responses to identify key themes and sub-themes. The approach to the thematic analysis was informed by Titchen & McIntyre where first order constructs were those provided by the research participant, and second order constructs were those defined by the researchers. The association between themes and interpretation of findings was compared and contrasted by both authors to finalise the interpretative analysis presented (Titchen A & McIntyre D, 1993).

Bond University Research Ethics Committee granted approval for this research (application ID number 000015768).

**Results**

92 final year medical students consented to participate in this study. Participating students were engaged in simulation as part of their critical care or emergency medicine rotations. 28 participants underwent the subsequent semi structured interview.

The results of both the debriefing sessions and the semi structured interview are presented together.

"What made you think your patient was sick?"

The most common answers were the SPs general appearance and body language, followed by their interaction and communication with the students. Some students also mentioned the presence of abnormal vital signs and the premorbid conditions were important. Some cited concerns from other team members who prompted them to consider it. While others responded that similarity to a previous real experience during their clinical rotations has helped them to make that conclusion. What was interesting is that some attributed that to intuition but could not
expand on that concept.

"She looked sweaty and she, you know, wasn't engaged as much in our conversation"

"she couldn't sit still. She was constantly standing up, crouching down and couldn't really have good conversation."

'part of it was just gestal"

"In general - not only in this simulation scenario - what are the useful signs that a patient is sick or not"

Similar responses were received. Overall appearance and body langue was dominant in responses, but gestalt also was identified as an influence, despite being an ill-defined concept.

'I guess it's a bit hard to put my finger on it"

'I don't know how to explain it, but like, once you see the patient, you know"

"What prompted you to call for help?"

This question received mixed responses, including failure of their own initial management and not knowing what to do next, lack of specific skills such as airway skills, and the students becoming more worried about their patients.

"Basically, I felt I've done what I think I know, then for someone to come and guide further management."

'I would rather get a more senior doctor to come in and give the patient the best care that they can receive."

'Okay we need to go get someone to help us, because we don't really know where to go from here."

‘How did things change when help arrived?’

Students described feeling calmer and more relaxed, reducing their cognitive load and improving their clinical performance. They reported that this enhanced their learning and communication skills by observing leadership behaviours and senior clinician role modelling.

'kind of, direct me and also calm me down"

'You automatically feel a bit more relaxed"

'my internal panic decreased"

'When you feel calm yourself, it's easier to do things collectively"

'How you interacted with the patient gave me an indication of what sort of, how I need to interact with the patient"

'she sort of got all of the pieces together very quickly"
Discussion

Our study findings support the use of simulation based training for the acquisition of skills in recognition of the deteriorating patient, and align with other evidence for this approach (Aggarwal et al., 2010; McGaghie, Issenberg, Petrusa, & Scalese, 2010; Moral & Maestre, 2013; Rudolph, Simon, Rivard, Dufresne, & Raemer, 2007).

Although many programs use SPs to teach RRAD, few have examined the cues that influenced the students to perceive why the SP was sick ((Hogg, Ker, & Miller, 2013). The breadth of our student responses indicate depth in their understanding of the concept and often illustrated connections between objective (eg vitals signs) data with more qualitative perceptions.

Our study findings suggest that cues for recognising patient deterioration are multifactorial, but heavily influenced by voice and body language of patients. This supports our current approach to working with SPs for these scenarios, and suggests that efforts to enhance physical realism and use of authentic cues such as investigations are well placed. These findings will also inform appropriate selection and preparation for SPs role portrayal of the sick patient.

Given the apparent dominance of mannequin based approaches for this type of training (Orique & Phillips, 2017; Williams & Song, 2016) we further suggest educators in these programs should re-consider their approach, including the possibility of negative training and over-reliance on vital signs engendered by mannequin based simulation where more subtle non-verbal cues cannot be manifested.

Study limitations

The study was performed in a single centre and all our simulations were conducted working with SPs. There was no comparison group undertaking simulation training with mannequins.

We currently have no objective follow-up data as to whether these students actually are better at recognising sick patients in practice or not.

Conclusion

Effective simulation training for medical students to recognise and respond to clinical deterioration requires scenarios that offer strong cues in patient appearance, speech and behaviour. These can be achieved by simulated patients adequately prepared for the sick patient role, together with abnormal vital signs and bedside investigations. While not surprising, our findings suggest that mannequin based simulation does not offer sufficient functional task alignment for learning to recognise clinical deterioration.

Take Home Messages

Medical students recognise a range of cues in assessing a simulated patient as 'sick' - with appearance and body language predominating.

Human simulated patients can manifest those cues, and offer close alignment with the learning objective of
recognising a sick patient.

Notes On Contributors

Nemat Alsaba and Victoria Brazil jointly conceived of the study plan, developed the ethical submission, collected and analysed data and prepared the manuscript.

Acknowledgements

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Appendices

Declaration of Interest

The author has declared that there are no conflicts of interest.