Evaluation of a simulation teaching programme for medical students: Does effective learning occur despite resource constraints?

Aaron Ooi, Alexandra Wallace

Department of Paediatrics, Waikato Hospital
Department of Paediatrics, University of Auckland
Background

• Increasing use of simulation in the delivery of undergraduate medical education
  – Technical and non-technical skills
  – Application of knowledge without patient harm

• Implementation limited by resource constraints
  – Time, personnel, access to appropriate space and/or equipment
Our context

• 5\textsuperscript{th} and 6\textsuperscript{th} year medical students undertaking their paediatric attachments at Waikato Hospital

• Limited opportunities to:
  – Actively participate in management of acutely unwell children
  – Explicitly practice and receive feedback on communication tools such as ISBARR* and closed loop communication

*Identify, Situation, Background, Assessment, Recommendation, Read back
Our approach

• Registrar led simulation programme

• Four common presentations
  – Bronchiolitis
  – Gastroenteritis
  – Asthma
  – Sepsis

• Equipment:
  – Basic infant/child manikin
  – Identical forms and equipment to ward
  – SimpleSim application

• Participants in teams of 2 or 3

• Facilitator guided debriefing post simulation
Our approach
Learning objectives

• Put the ABCDE approach into practice

• Practice effective communication

• Identify and manage seriously unwell children with common paediatric conditions
To evaluate the utility of our 5th and 6th year medical student simulation programme
Research questions

1) What do our students learn from the workshop?

2) What do students find useful from the workshop?

3) What are suggestions for improving the workshop?
Method

- Anonymised feedback forms completed by all students at the end of each workshop

- Student perceptions:
  - Likert scales
    - Usefulness of the workshop
    - Appropriateness of level of difficulty of scenarios in relation to their level of experience
  - Free-text qualitative responses
    - Learning points encountered
    - What students found useful
    - Suggestions for improvement
Data analysis

• Likert scales
  – Descriptive statistics

• Free text qualitative data
  – Inductive, thematic content analysis
  – Data coded and analysed using nVivo software
Results

• 1\textsuperscript{st} June 2017 to 31\textsuperscript{st} December 2018

• 101 students
  – 100% response rate

Distribution of medical students

- 5\textsuperscript{th} years: 44
- 6\textsuperscript{th} years: 57
Results: Likert scales

I found this exercise useful for my learning

- Strongly agree: 90
- Agree: 10
- Neutral: 0
- Disagree: 0
- Strongly disagree: 0
I found the level of difficulty of the case appropriate for my level of experience
Question 1: What are our students learning from this workshop?
<table>
<thead>
<tr>
<th>Theme 1: Importance of utilising a structure to manage acutely unwell patients</th>
</tr>
</thead>
<tbody>
<tr>
<td>- ABCDE for initial assessment and re-assessment</td>
</tr>
<tr>
<td>“Importance of using an ABCDE structure in panic situations and re-assessment for response/clinical changes.”</td>
</tr>
<tr>
<td>“ABCDE and importance of addressing each individually. Don’t miss anything and don’t forget interventions at each stage.”</td>
</tr>
<tr>
<td>“Go back to ABCDE when unsure what is going on.”</td>
</tr>
</tbody>
</table>
## Theme 2: Importance of effective communication skills in an acute setting

<p>| - Communication with parents, colleagues | “Ways to communicate under pressure – closed communication loops and regular recaps to establish status quo and planning next steps.” |
| - Use of “time-out” and microsummaries | “Slow down, take a breath. Use team time-outs.” |
| - Asking for help | “When to call for help and how to present information. ISBARR. You need to be clear and concise with what you want/requesting over the phone.” |</p>
<table>
<thead>
<tr>
<th>Theme 3: Appreciation of human factors in a clinical context</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Team work and prioritisation skills</td>
</tr>
<tr>
<td>- Recognising limitations</td>
</tr>
<tr>
<td>- Assertiveness skills</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>“The leader doesn’t have to dictate everything, active followers follow in the background.”</td>
</tr>
<tr>
<td>“How to prioritise tasks, allocate roles and splitting so that things are efficiently done.”</td>
</tr>
<tr>
<td>“Understanding limits. Don’t be afraid to escalate and call for senior help and clarify plan if I’m unsure.”</td>
</tr>
</tbody>
</table>
### Theme 4: Application of knowledge and utilisation of resources when managing an unwell child

<table>
<thead>
<tr>
<th>- Identification of an unwell child</th>
<th>“Distinguishing life threatening or acute asthma. Life threatening asthma protocol.”</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Management of common conditions</td>
<td>“Following and finding protocols.”</td>
</tr>
<tr>
<td>- Utilisation of guidelines</td>
<td>“Practicalities of emergency management. How to give resus fluids. Paediatric dosing.”</td>
</tr>
<tr>
<td>- Prescribing skills</td>
<td></td>
</tr>
</tbody>
</table>
Question 2:
What do our students find useful from this workshop?
**Theme 1: The learning climate**

| Practical, safe, non-intimidating learning environment | “Having the hands on experience under supervision and guidance was a safe way to learn and experience these emergency situations.” |
| Peer participation provided sense of comradery and opportunity to learn vicariously | “It was nice having everyone in the same room as those doing the simulation – sense of not being alone in a stressful situation.” |
| | “It was really helpful to be an observer too. Observing how my classmates do things and learning from their successes and failures.” |
### Theme 2: The clinical scenarios

<table>
<thead>
<tr>
<th>The designed scenarios were practical and provided a sense of realism</th>
<th>“It felt real. All the equipment was present.”</th>
</tr>
</thead>
<tbody>
<tr>
<td>Scenarios fostered autonomy and a sense of responsibility not routinely experienced during their training</td>
<td>“Having to make decisions. Thinking on feet. Practicing the level of responsibility/duty expected of us in 1 month’s time.”</td>
</tr>
<tr>
<td></td>
<td>“Really good realistic practice to take up the role as a doctor. Was good to be the person in charge of management rather than being a passive bystander.”</td>
</tr>
</tbody>
</table>
### Theme 3: Applying learned knowledge to a clinical context

| Applying learned knowledge and practicalities of managing of an acutely unwell child | “Doing a scenario is very different from reading about it.”
|                                                                                   | “Learning to recognise when the child is sick and when to escalate. Practicing algorithms/structures. Back to basics ABCDE.”
|                                                                                   | “Getting us to perform things we’re not yet completely comfortable doing - being able to do practical doctor things e.g. filling out forms, charts etc.” |
## Theme 4: Negotiating complex human factors

| Experience of negotiating complex human factors involved in the management of an unwell child | “Useful to try working in a team setting. How to organise a team. Splitting tasks.”  
“Communication skills. How to present relevant information to the team. Practice calling seniors.”  
“Becoming aware of own weaknesses. Realising what you don’t know. Learning to know when to seek help.” |
### Theme 5: The debriefing process

<p>| | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Timing and content of the</td>
<td>“The immediacy of feedback. Being able to ask questions about</td>
<td>“Highlighting what was done well and not just focusing on</td>
<td>“Getting feedback from both students and registrars.”</td>
</tr>
<tr>
<td>debrief</td>
<td>real life applications in these scenarios – putting learning</td>
<td>negatives. Practical aspects discussed point by point.”</td>
<td></td>
</tr>
<tr>
<td>Utilisation of peer</td>
<td>points into context.”</td>
<td></td>
<td></td>
</tr>
<tr>
<td>feedback</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Question 3:
What are suggestions for improving the workshop?
Suggested improvements

• 51 students had no suggestions for improvements

• Increased frequency of workshops
  – Greater breadth of scenarios

• Equipment failure
  – Back up application (SimMon)
Conclusions

• Simulation is an effective learning tool for undergraduate medical students when:
  – Tailored appropriately to their level of experience
  – Undertaken in a safe learning climate

• Simulation acts to:
  – Encourage application of learned knowledge
  – Facilitate the teaching of both technical and non-technical skills

• Feasible in a resource constrained environment
Strengths and limitations

• Strengths:
  – All students who participated were surveyed
  – Surveys simple, cost effective
  – Responses were anonymised, free text responses

• Limitations:
  – Findings based on student perceptions
  – Single coder during data analysis
Where to from here?

• Ensure sustainability of workshop
  – Addressing ongoing learner needs

• Evaluate utilising a three pronged approach
  – Student, peer and self evaluations
  – Longitudinal follow-up of workshop participants
Where to from here?

• Development of a practical “how-to” guide

Developing an undergraduate paediatric simulation workshop in a resource constrained setting: A practical ‘how to’ guide

Aaron Ooi, James Hambidge, Alexandra Wallace

First published: 23 April 2019 | https://doi.org/10.1111/jpc.14477
Acknowledgements

• To all the students who participated in the workshops and provided valuable feedback

• Supervisor: Dr Alexandra Wallace

• Registrars: Dr James Hambidge
  Dr Benjamin McConchie
  Dr Sukhbir Sandhu
  Dr Carolyn Aird
  Dr Wee San Toh
Thank You

Questions?
Our simulation scenarios

Paediatric Simulation: An overview

(5th/6th year medical students)
Orientation to simulation

Welcome to sim!

Ground rules

- What happens in sim stays in sim
- None of what happens is an assessment
- Suspend disbelief:
  - Treat everything in sim as real life including the patient, the carer, the nurses etc
  - Do things how you would normally and ask for what you can’t see
- It’s supposed to be fun! 😊

What to expect: Participants

- You’ll be in a team of two
- There will be an introduction to the scenario for you
- We expect you to go through an A-E assessment, managing issues as you find them
- There is always help to be found
  - Ring and ask for what you think you need
- It isn’t the diagnosis but the getting there that’s important
- You will be working outside of your role to allow the sim to work, this doesn’t mean this is expected of you in real life at the moment!

What to expect: Participants

- Tag teaming vs team leading
  - Student vs clinician behaviour
- As a team leader:
References


