



Brief communication

A debriefing tool to acquire non-technical skills in trauma courses

Fabio Botelho^{a,b,*}, Natalie Yanchar^c, Simone Abib^d, Ilana Bank^e,
Jason M. Harley^{b,f,g,h}, Dan Poenaru^{a,b,g,h}

^a Harvey E. Beardmore Division of Pediatric Surgery - Montreal Children's Hospital, 1001 Decarie Boulevard, Montreal, QC H4A 3J1, Canada

^b Research Institute of the McGill University Health Centre, Montreal, Canada

^c Pediatric General Surgery, University of Calgary, Alberta Children's Hospital, 28 Oki Drive NW, Calgary, AB T3B 6A8, Canada

^d Departamento de Cirurgia Pediátrica, Universidade Federal de São Paulo, R. Botucatu, 862 - Vila Clementino, São Paulo, - SP 04023-062, Brazil

^e Pediatric Emergency Medicine, McGill University, Decarie Boulevard, Montreal, QC H4A 3J1, Canada

^f Department of Surgery, McGill University, Montreal General Hospital, 1650 Cedar Ave, R1.112, Montreal, QC H3G 1A4, Canada

^g Steinberg Centre for Simulation and Interactive Learning, McGill University, Canada

^h Institute for Health Sciences and Education, McGill University, Canada



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ABSTRACT

Objective: The study reports the use of a nominal group technique (NGT) to evaluate the PEARLS Healthcare debriefing tool as a tool to foster non-technical skills in trauma simulation courses. Additionally, it introduces a debriefing card to be used in trauma courses.

Design: A nominal group technique was used to evaluate the main strategies for PEARLS. The experts had the opportunity to share their opinions in an online survey and online meeting.

Results: Seven participants participated in the nominal group. Based on the online survey results, the self-assessment debriefing strategy (from PEARLS) was rated 4.83/5 in relevance, the focused facilitation 5/5, and the provision of information 4.5/5. Participants felt that PEARLS was appropriate and useful for fostering non-technical skills: all the debriefing strategies contained in PEARLS were felt to be valid and worth using; and cue cards for the instructors were suggested to assist them in conducting structured formal debriefings. A specific debriefing tool for trauma scenarios was designed based on these suggestions, which is presented in this article.

Conclusion: A nominal group of experts in education, simulation, and trauma support PEARLS strategies for non-technical skills training in trauma courses.

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Introduction

Educational programs in trauma require hybrid educational approaches, including formal classroom techniques and simulation in immersive and realistic environments [1]. Moreover, training is required in both technical and non-technical skills [2], followed by a “hot debriefing” for knowledge and skills integration [1].

Surgical training programs have tended to overlook non-technical skills such as communication and team collaboration, perhaps because the ideal way to teach them is yet to be determined [3]. Even though debriefing has been considered a promising instrument to foster non-technical skills [4], its use among educators remains variable [2], and

strategies to utilize it are limited, restricting the efficacy of this promising tool [2]. We hypothesize that in complex trauma simulated scenarios teams who receive structured non-technical skills debriefing perform better than those who only receive technical skills debriefing. The first step to testing this hypothesis was to choose the right educational tool to promote non-technical skills.

The PEARLS (Promoting Excellence and Reflective Learning in Simulation) Healthcare Debriefing Tool [5] has become accepted as a framework with the potential to promote non-technical skills. PEARLS integrates and structures various debriefing strategies such as learner self-assessment, focused facilitation, and provision of information into one tool [5]. Therefore, it mitigates the limitations of using a single debriefing strategy and decreases the variance in debriefing styles within the same course [6]. PEARLS has been used widely in different specialties but not primarily for non-technical skills in surgical sciences [3,7]. We report here on using a nominal group technique (NGT) to evaluate PEARLS as a tool to foster non-technical skills in trauma simulation courses.

* Corresponding author at: Harvey E. Beardmore Division of Pediatric Surgery, Montreal Children's Hospital, 1001 Decarie Boulevard, Montreal, QC H4A 3J1, Canada.

E-mail addresses: fabio.botelho@mail.mcgill.ca (F. Botelho), natalie.yanchar@ahs.ca (N. Yanchar), ilana.bank@mcgill.ca (I. Bank), jason.harley@mcgill.ca (J.M. Harley), dan.poenaru@mcgill.ca (D. Poenaru).

Material and methods

The NGT employs a panel of specialists structured to reach a consensus on a specific topic. NGT has some advantages in comparison to the Delphi technique. It is faster and more suitable for reaching a consensus on an instrument already developed instead of designing a new one [8]. In a recent scoping review of NGT, Harb et al. defined five broad stages for reaching a group consensus: establishing research objectives, identifying an expert group, eliciting survey items, refining survey items, and evaluating and selecting final items [8]. Therefore, after choosing our objectives, we selected our group of experts. As the average number of participants in an NGT is between six and eight, eight specialists were invited to compose the nominal group for this work, while the study principal investigator (FB) moderated the panel.

To initiate the discussion, an online survey was first sent to the participants. They were asked to rate (using a Likert scale) the relevance of the different strategies used in PEARLS, considering their use for non-technical skills. Additionally, experts were invited to write their comments regarding other strategies and select delivery modalities of the instrument for instructors (e.g., cards, posters, or mobile apps). Two weeks after the survey, the experts participated in an online meeting, where they had the opportunity to share their comments and vote on which PEARLS strategies should be included or excluded in a debriefing session aimed at promoting non-technical skills. After the meeting, a debriefing tool card was drafted and shared by email for the second round of experts' considerations, which informed the final adjustments to the card.

A descriptive analysis of the participants' answers to the survey and during the meeting is reported in this manuscript. The resulting debriefing tool to foster non-technical skills in trauma scenarios is also presented.

Results

Seven participants participated in the nominal group. Participants' profiles are shown in Table 1.

Based on the online survey results, the self-assessment debriefing strategy was rated 4.83/5 in relevance. The focused facilitation was rated 5/5, and the provision of information was 4.5/5. None of the panelists suggested other strategies, and two participants suggested cue cards as the best way to equip instructors with the debriefing tool, with no other alternatives mentioned: "The instructors should use cards, as they can be easily followed." One participant also suggested that the structured debriefing could be useful to evaluate the entire team, and not only a specific team member: "I think that evaluating the team in this format would also be interesting."

All survey questions were reviewed during the online meeting, and various debriefing strategies were discussed. At the end of the session, participants concluded that:

the PEARLS Healthcare Debriefing Tool seemed appropriate and useful for fostering non-technical skills

- all the debriefing strategies contained in PEARLS are valid and should be used

- cards should be given to the instructors to help them conduct structured formal debriefings
- other resources such as videos, apps, or websites are not necessary

Following the meeting, a debriefing tool for promoting non-technical skills in trauma scenarios was designed (Fig. 1). The instrument was sent to the NGT participants, and additional suggestions were made, such as using checkboxes for every strategy as a critical alert to remind instructors that tasks should be accomplished. The NGT participants also suggested including the essential steps of a primary trauma survey to better balance technical and non-technical skills in the debriefing time. Finally, the lead investigators (FB, JH, DP) decided to use examples of questions in the debriefing card instead of only citing the debriefing strategies. This approach aimed to increase the homogeneity of the debriefing among different instructors.

Discussion

The proposed debriefing card is different from other initiatives in surgical education as it primarily focuses on non-technical skills. The debriefing tool can fill the current gap: the absence of structured tools designed for non-technical surgical skills [3]. As most errors in clinical activities, including trauma assessment, are due to ineffective communication and leadership, we believe that the proposed debriefing card could help change this reality and ultimately improve patient care [9].

In trauma simulation courses, the words "priority" and "structured assessment" are commonly used for technical skills. Trainees need to standardize their management of case scenarios in order to treat all life-threatening conditions without missing an injury [9]. Introducing a structured debriefing process to trauma simulation courses would be a natural step with several benefits. A standardized tool enables instructors to use different debriefing strategies, increasing debriefing efficiency and promoting equitable training, with all trainees receiving the same training regardless of the instructor [2]. Without guidance, most instructors tend to focus their debriefing on technical skills and to use more directive feedback, limiting the learning process. Additionally, learners rarely engage in adequate self-assessment of their non-technical skills, and they receive external feedback from a trained instructor [6]. This situation significantly differs from the teaching of exclusive technical skills, where learners can properly self-assess and utilize other tools, such as educational videos and reading material. The proposed debriefing card could therefore unlock trainees' full potential, working on different skills such as decision-making, leadership, communication, situation-awareness, and teamwork.

The debriefing tool proposed was generated by a diverse panel of experts with solid experience in surgical education, non-technical skills, simulation, and trauma care—essential domains contributing to the tool. As debriefing can be influenced by instructors' profiles, including gender, academic background, and experience, we believe that our purposive selection of experts was essential to developing this tool.

Future directions for this work include evaluating the debriefing card in a randomized control trial. We intend to compare it to the standard debriefing method used in trauma courses, which focuses on

Table 1
Nominal group technique - participants' profile.

| | Gender | Country | Title | Position | Affiliation | Areas of expertise |
|---|--------|----------|---------|---|-----------------------------------|---|
| 1 | F | Scotland | PhD, | Emeritus Professor | University of Aberdeen | Non-technical skills, psychology, surgical education. |
| 2 | F | Canada | MD | Clinical Professor, Pediatric Surgeon | University of Calgary | Pediatric surgery and trauma, trauma education, simulation. |
| 3 | F | Brazil | MD, PhD | Full Professor, Pediatric Surgeon | Universidade Federal de São Paulo | Trauma surgery, pediatric surgery, simulation. |
| 4 | F | Canada | MD | Associate Professor, Emergency Medicine | McGill University | Pediatric emergency, pediatric trauma, simulation. |
| 5 | M | Scotland | MD | Emeritus Professor | University of Aberdeen | Non-technical skills, pediatric surgery, surgical education. |
| 6 | NB | Canada | PhD | Associate Professor | McGill University | Psychology, surgical and medical education, simulation. |
| 7 | M | Canada | MD PhD | Full Professor Pediatric Surgeon | McGill University | Pediatric surgery and trauma, surgical education, simulation. |

F: female; M: male; NB: non-binary.

technical skills (such as the provision of information on procedures to protect the airway or manage shock). We believe that the teams who receive non-technical skills debriefing will perform better than those who only receive debriefing on technical skills. Non-technical skills require simulation and debriefing to be efficiently taught, differently from technical skills, which can be learned using other educational tools such as videos and hands-on models [10]. We, therefore, advocate for better sharing of the debriefing time between technical and non-technical skills in

existing trauma simulation courses like the Advanced Trauma Life Support or Trauma Resuscitation in Kids (TRIK). If the results of our trial are positive, we believe that the debriefing card could also be used for debriefing in clinical settings after the management of injured patients.

In conclusion, this nominal group study supports PEARLS strategies for non-technical skills training in trauma courses. The process resulted in a debriefing card to promote better debriefing in simulation courses, including different specialties.

CASE [X] DEBRIEFING CARD

Scenario: [Y]-year-old [sex] with [type of trauma - blunt/penetrating] injury on the [location - frontal, right left] [body segment]. The patient is [awake/unconscious] on presentation, [stable/unstable] and complains of [symptoms, if any].

1. SETTING THE SCENE

"Let's spend **10 minutes** debriefing this case". The goal is to **improve your performance**"

2. EXPLORE EMOTIONS

Ask TTL: "How are you feeling? Any **initial reactions**?"

3. DESCRIPTION

Ask TTL: "What were the critical **interventions** in this case?"

4. ANALYSIS | SELF-ASSESSMENT

Ask TTL: "considering your and your team's **performance**, what did go well, and what were the **challenges you faced**?"

4. ANALYSIS | FOCUSED FACILITATION

What were your thoughts about **communication and collaboration** during [X moment]?

Debriefing card based on PEARLS Healthcare Debriefing Tool

4. ANALYSIS | PROVISION OF INFORMATION

If not discussed yet. Explain:

 Non-technical skills (NTS): communication, teamwork, decision-making, situation-awareness, and leadership.
 TTL's actions that reflect good NTS

- Task assignment
- Event **anticipation**
- Clear **communication**
- Ability to make **good decisions** under pressure
- **Acknowledgment** of options
- **Respectful** behavior

Team **members'** NTS:

- Closed-loop communication
- Options suggestion
- Engagement and respectful behavior

If there is time: (highlight the critical interventions of this case).

 ABCDE priorities

- A - airway and c-collar
- B - life-threatening injuries
- C - shock management
- D- neurological assessment
- E - exposure and hypothermia

5. APPLICATION AND SUMMARY

Ask the group: "what are some **take-home messages** from this case?"






Fig. 1. Debriefing card to promote non-technical skills in trauma courses. TTL: Trauma Team Leader
 Debriefing card front and back pages. First "X": should be substituted by the number of the scenario. "Y" should be replaced by the patient's age. Brackets: the part that should be edited to reflect the case scenario.

CRediT authorship contribution statement

Fabio Botelho: conceptualization, data curation, methodology, formal analysis, writing - original draft. Jason Harley: conceptualization, methodology, supervision, writing - review and editing. Natalie Yanchar: methodology, writing - review and editing. Simone Abib: methodology, writing - review and editing. Ilana Bank: methodology, writing - review and editing. Dan Poenaru: conceptualization, methodology, supervision, writing - review and editing.

Declaration of competing interest

All the authors report no biomedical financial interests or potential conflicts of interest.

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