The use of trauma interprofessional simulated education (TIPSE) to enhance role awareness in the emergency department setting

Craig William Brown a, Morag Howardb, and Jerry Morsec

aDivision of Medical and Dental Education, University of Aberdeen, Forsterhill, Aberdeen, UK; bSchool of Health Sciences, Robert Gordon University, Garthdee Campus, Aberdeen, UK; cClinical Skills, University of Aberdeen, Forsterhill, Aberdeen, UK

ABSTRACT

Interprofessional simulation-based education (IPSE) is common in medicine and nursing curricula, however, less evident in diagnostic radiography. Previous work suggests graduate radiographers are unprepared in terms of trauma knowledge and experience. A trauma IPSE programme as a joint venture between two universities was developed. Our aim was to explore the views of radiography, nursing, and medical students regarding preparedness for trauma practice. Second-year radiography (n = 39), nursing (n = 10), and medical (n = 5) students were invited to participate in trauma simulations. Pre- and post-scenario questionnaires were completed and quantitative analysis undertaken. Prior to IPSE, the majority of students were unprepared to manage trauma. Post-scenario felt significantly more prepared to undertake their role in the team and had better understanding of their and other professions’ roles in trauma (P < 0.01). IPSE is an effective means of preparing undergraduate students in understanding both their and other professional’s roles within the trauma team.

Introduction

Interprofessional education is fundamental in healthcare curricula due to the need to train effectual healthcare teams (Gough, Hellaby, Jones, & MacKinnon, 2012). One method of instruction is interprofessional simulation-based education (IPSE).

IPSE occurs when two or more professions engage autonomously in realistic scenarios to learn with, from, and about each other, in a controlled manner (Alinier et al., 2008). Whilst IPSE is common in medicine and nursing curricula, it is less evident in other undergraduate professions including radiographers (Alinier et al., 2008; Gough et al., 2012). A recent study found that even limited simulation exposure provided students with understanding of other health professions (Alinier et al., 2014). Due to the time-sensitive, multifarious nature of the trauma setting, successful patient outcomes are reliant on effective communication and teamwork (Miller, Crandall, Washington, & McLaughlin, 2012). Radiography often plays a crucial part in the early management of trauma patients as X-ray images conducted as an adjunct to the primary survey by radiographers allow rapid identification of life-threatening conditions. Therefore, it is disconcerting that Mackay, Anderson, and Hogg (2008) report that graduate radiographers are ill prepared in terms of trauma team knowledge and experience with implications for the delivery of efficient, quality diagnostic imaging.

Background

To bridge this deficit, faculty from two Scottish universities developed in situ trauma IPSE (TIPSE). Our aim was to explore nursing, medical, and radiography students’ perspectives with regard to their preparedness for dealing with “trauma situations”. The main objectives were to increase IPSE and prepare students for professional practice in trauma.

In pairs or triads, radiography students were given a simulated scenario, using SimMan 3G Trauma (Laerdal), along with nursing and when available medical students. All scenarios involving “trauma radiography” were led by a qualified emergency department physician with specialists in both nursing and trauma radiography over a 3-week period. All sessions were performed in situ within the resuscitation room of the hospital to enhance simulation fidelity.

Methods

This study employed a prospective, cohort intervention comparing pre- and post-scenario knowledge/perspectives.

Data collection

All second-year undergraduate radiographers plus a convenience sample of undergraduate nursing students from a variety of year groups from one Scottish university and penultimate-year medical students from the other university were invited to participate. Participants completed paired pre- and post-scenario questionnaires consisting of five-point Likert rating scale. In total, 54 students were recruited (39 radiography, 10 nursing, 5 medical). No students had participated in in situ simulation previously.
**Data analysis**

Likert-scale data were imputed into SPSS v22 with paired pre- and post-scenario scores compared using Wilcoxon paired tests.

**Ethical considerations**

Ethical approval for this study was granted via the National Research Ethics Service.

**Results**

Analysis indicated that prior to completing the simulation only eight of the students “felt prepared” to deal with trauma (Likert score 4) with a mean Likert score of 2.5 (Table 1). Post-scenario results demonstrated a rise in the mean score to 3.7 with most students feeling “more prepared” to deal with trauma (Likert scores 4 + 5, n = 38, P < 0.01). Just over half of the students (n = 28) believed that they “understood their professions role in the trauma team” prior to the scenario. This number increased post-scenario to 49 with a mean change in Likert score of 0.9 (P < 0.01).

In the pre-questionnaire, the majority (76%) indicated “uncertainty as to others responsibilities within the team (Likert scores 1–3), with the cohort returning a mean Likert score of 2.9. This mean score increased to 4.1 post-scenario, providing a statistically significant rightward shift in students’ understanding of others’ responsibilities within the trauma team (P < 0.01)” (Table 1). Interestingly, 13 students (24%) felt unprepared to act in a multidisciplinary trauma team (Likert scores 1 + 2) prior to the scenario, which dropped to only one student (<2%) post-scenario (P < 0.01). There did not appear to be any major differences when analysing individual professional groups. However, the numbers in the medical and nursing groups are too small to make any meaningful group-wise comparison.

**Discussion**

Our data suggest undergraduate healthcare students feel unprepared to work in a major trauma environment. In relation to radiographic practice, this finding is consistent with Mackay et al. (2008), who found graduate radiographers lacked confidence in major trauma and recommended that trauma simulation be integrated into undergraduate programmes. After participation in TIPSE, undergraduate healthcare students felt markedly more prepared for facing major trauma, with a significant difference seen in student perceptions of their role in relation to the trauma team post-scenario. This suggests an enhanced readiness for practice in trauma, highlighting TIPSE’s positive learning effects.

Alinier et al. (2014) agree that IPSE facilitates knowledge and understanding of other health professions’ roles that is well supported in the literature as a vital element in an effective team. Our post-scenario results found a significant positive shift in students’ perceptions regarding major trauma and the roles of other healthcare professionals in this environment.

Miller et al. (2012) found that whilst teamwork and communication in the trauma setting improved through in situ simulations, this outcome was not sustained and they recommended a continuum of simulations maintaining interprofessional collaboration. This raises logistical and resource issues, for example, high student numbers and increasing service demand can preclude organisation of authentic simulation (Alinier et al., 2014; Buckley et al., 2012). It could be argued, in a patient safety-dominated climate, that sustainability of IPSE is a necessity in providing an effective collaborative workforce receptive to modern healthcare needs.

The authors acknowledge that there were a number of limitations connected to this study. Firstly, the questionnaires were distributed to the students for completion at the beginning and end of each scenario, when knowledge of trauma was still fresh in the students’ minds. Secondly, for the purposes of the study a limited convenience sample of students from two participating universities was used, with the majority being radiography undergraduates, while those from the medical and nursing professions were less represented. Thirdly, though a five-point Likert scale was used for the data collection the questionnaires used within the study were not validated prior to analysis. However, the study’s primary intention was to specifically focus on trauma radiography during an IPSE due to the previously reported lack of radiographer confidence within the trauma setting (MacKay et al., 2008).

**Concluding comments**

This study suggests that TIPSE can impart knowledge of the trauma team and prepare students, particularly radiographers, for clinical practice. Further work planned includes longitudinal

---

**Table 1. Pre- and post-scenario preparedness for practice evaluations marked on a five-point Likert-scale.**

| Pre-scenario evaluation | Likert scale (n) | Mean score |
|-------------------------|----------------|------------|
| Q1. How prepared do you feel to deal with trauma in the clinical setting? | 8 18 20 8 0 | 2.5 |
| Q2. How well do you understand your profession’s role within a trauma team? | 1 4 21 4 2 | 3.5 |
| Q3. How well do you understand other professions roles within a trauma team? | 0 18 23 13 0 | 2.9 |
| Q4. How prepared do you feel to act in a multidisciplinary trauma team? | 1 12 26 14 1 | 3.0 |

| Post-scenario evaluation | Likert scale (n) | Mean score | Negative | Positive | Ties | P |
|--------------------------|----------------|------------|----------|----------|------|---|
| Q1. How prepared do you feel to deal with trauma in the clinical setting? | 0 5 11 3 5 | 3.7 | 0 48 | 6 | <0.001 |
| Q2. How well do you understand your profession’s role within a trauma team? | 0 0 5 25 24 | 4.4 | 2 39 | 13 | <0.001 |
| Q3. How well do you understand other professions roles within a trauma team? | 0 0 8 35 11 | 4.1 | 0 48 | 6 | <0.001 |
| Q4. How prepared do you feel to act in a multidisciplinary trauma team? | 0 1 9 32 12 | 4.0 | 0 43 | 11 | <0.001 |

1, not at all; 5, extremely well.
follow-up to ascertain whether this intervention delivered at this point in their curricula improves graduate radiographers preparedness for practice, and qualitative analysis of challenges participants encountered in trauma team simulations.

ORCID

Craig Brown  http://orcid.org/0000-0003-4780-6485

Declaration of interest

The authors report no conflicts of interest. The authors alone are responsible for the content and writing of this article.

References

Alinier, G., Harwood, C., Harwood, P., Montague, S., Huish, E., & Ruparelia, K. (2008). Development of a programme to facilitate interprofessional simulation-based training for final year undergraduate health care students. The Higher Education Academy Health Sciences and Practice Centre Mini Project. York, UK: Higher Education Academy.

Alinier, G., Harwood, C., Harwood, P., Montague, S., Huish, E., & Ruparelia, K. (2014). Immersive clinical simulation in undergraduate health care interprofessional education: Knowledge and perceptions. Clinical Simulation in Nursing, 10(4), e205–e216.

Buckley, S., Hensman, M., Thomas, S., Dudley, R., Nevin, G., & Coleman, J. (2012). Developing interprofessional simulation in the undergraduate setting: Experience with five different professional groups. Journal of Interprofessional Care, 26, 362–369.

Gough, S., Hellaby, M., Jones, N., & MacKinnon, R. (2012). A review of undergraduate interprofessional simulation-based education (IPSE). Collegian, 19(3), 153–170.

Mackay, S., Anderson, A., & Hogg, P. (2008). Preparedness for clinical practice - perceptions of graduates and their work supervisors. Radiography, 14(3), 226–232.

Miller, D., Crandall, C., Washington III, C., & McLaughlin, S. (2012). Improving teamwork and communication in trauma care through in situ simulations. Academic Emergency Medicine, 19(5), 608–612.