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An evaluation of the use of a "short moment of intensive training" (SMIT) in delivering trauma-nursing education

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Abstract

Background: *In 2021, Westmead Hospital opened a 13-bed trauma ward, drawing the nursing workforce from various surgical specialties and generating an urgent need for trauma-nursing education. The SMIT (short moment of intensive training) method was developed to deliver targeted, flexible, priority focused and customised education.*

Aim: *The primary aim of the study was to demonstrate that specific education on chest trauma using the SMIT method improved nurses' knowledge and confidence in caring for patients who have experienced trauma.*

Methods: *Nurses who met the recruitment criteria completed a pre-SMIT chest-trauma knowledge assessment and trauma-nursing confidence assessment. The SMITs, comprising five sessions, were conducted by the trained instructors. On completion of each session, the instructor recorded the duration of the session, and the nurses completed the "Participant Feedback of SMIT" tool. Once a nurse had completed all five SMITs, they completed the post-SMIT knowledge and confidence assessments.*

Results: *A sample size of 13 nurses participated in the study; 14 nurses were recruited, and one excluded. A statistically significant difference was found between the post-SMIT and pre-SMIT knowledge tests ($p = 0.003$), and post-SMIT and pre-SMIT confidence tests ($p = 0.000$). No difference was found in the amount of time needed to complete the knowledge test post-SMIT ($p = 0.434$). Instructor feedback included the time-consuming nature of one-to-one teaching, and the need to conduct sessions close together to minimise the need to revise previous content.*

Conclusions: *The SMIT teaching method was beneficial for our novice cohort of trauma nurses to increase their knowledge and confidence in treating patients with chest trauma. Recommendations for future research include additional trauma topics, and application of SMITs to other clinical settings.*

Keywords: Trauma nurse education, nursing confidence, critical thinking, chest trauma, trauma ward education, opportunistic learning, teachable moment.

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INTRODUCTION

BACKGROUND

Westmead Hospital is a tertiary referral and Level 1 trauma centre located in the Western Sydney Local Health District (WSLHD), New South Wales, Australia and admits approximately 3000 patients per year with traumatic injuries. About one-third of these patients are admitted to the trauma service, with around 500 experiencing major trauma (Butcher & Balogh 2009).

Westmead Hospital opened its first trauma-specific unit in 2021, which enabled the grouping of trauma patients into a specific ward area that was equipped with the resources and staff to manage and respond to patients' complex needs. Nurses from orthopaedic, neurosurgical, plastics and general surgical specialties came together to form the nursing workforce for this new unit, with varying levels of understanding of trauma-related concepts. These nursing staff required specific training to equip them with the skills and knowledge to care for these patients (Smith & Lane 2015). The educational risks were assessed prior to the unit opening. The Short Moment of Intense Training (SMIT) program was significant in developing a tailor-made educational plan to address trauma-nursing knowledge deficits in the newly assembled nursing team.

Major trauma, for the purpose of this article, is defined as having an Injury Severity Score (ISS) greater than 12. The complexity of managing patients with major trauma requires an established full-time trauma service (Ursic et al. 2009). The Westmead Trauma Service actively manages and co-ordinates patient care, providing a holistic and multidisciplinary team approach to manage care priorities and demands, from admission through to discharge, and follow-up outpatient care.

During the progress of this study, there were many changes that impacted each nurse's ability to consistently work on the ward. The COVID-19 pandemic saw the ward repurposed into a temporary COVID-dedicated ward, and staff were impacted by sick leave and poor staffing levels. So, while the ward had been open for over one year prior to this study being conducted, the staff had minimal experience in looking after patients admitted under the trauma specialty.

The COVID-19 pandemic impacted the type of education being delivered and the number of people allowed to meet in one room. The purpose of the SMIT was to address the immediate educational needs of the new trauma unit, creating an opportunistic, targeted, flexible, learner-centred (Wolpaw, Wolpaw and Papp 2003) and customised program for the delivery of targeted content, according to the priorities identified and, utilising the newly developed SMIT tool.

There remains a large deficit in educational programs specifically directed at trauma-ward nursing. Most program content is generic, and some of the practical aspects of ongoing management are neglected in published articles and existing courses, for example, the Trauma Nursing Core course, which is largely focused on emergency management of traumatic injury (Ding et al. 2016). There is a need for development and innovation of ward-based trauma-nursing educational programs. In the current climate of post-pandemic nursing workforce fatigue, there is a need to adapt, evaluate, revise, and clearly define learning outcomes (Aul et al. 2021; Reynolds, Attenborough & Halse 2020).

PURPOSE

SMITs were designed to provide key concepts of topics in a concise manner, ensuring nursing staff were provided with education conducive to learning. SMIT addressed the low attendance numbers to in-services and minimised the time away from the provision of clinical care (Smith & Lane 2015). SMITs were designed to provide an alternative to the traditional in-service model of education delivery.

The primary aim of this prospective observational study was to demonstrate that specific ward-based education on chest trauma, using the SMIT method, improved nurses' knowledge and confidence in caring for patients who had experienced chest trauma.

METHODS

All recruitment was sought in-person by the instructors. Inclusion criteria were: registered and endorsed enrolled nurses of age greater than 18 years, employed in a permanent position in the trauma unit, able to provide written consent to participate, and available for education (not on leave). One registered nurse was excluded as she was working on permanent night shift and was not available for the education sessions. Further information pertaining to the SMIT process has been provided in Table 1.

Prior to commencing SMIT, nurses who consented to participate in the study completed the pre-SMIT "Chest Trauma Knowledge Assessment" and the "Trauma Nursing Confidence Assessment" (adapted from Garvey et al. 2016). The confidence assessment sought feedback on the nurse's confidence in the assessment and management of patients with chest trauma, assessing their confidence in areas such as documentation of care, communicating changes in the patient's condition, their clinical skills in completing nursing care, and working within the multidisciplinary team. The assessment used a Likert scale to rate each question 1 to 5, 1 indicating that they strongly disagree and 5 that they strongly agree.

The chest-trauma content was covered over five SMITs: mechanism of injury, rib fractures, pain management, physiology, comparison and management of pneumothorax and haemothorax, and the management of the deteriorating patient with complications (from their traumatic chest injury).

The SMIT was conducted by an instructor (experienced senior trauma nurse) trained to deliver the SMIT lesson plan. This was either the Clinical Nurse Educator (CNE), Nurse Educator (NE) or a senior qualified nurse such as one of the Trauma Clinical Nurse Consultants (CNC's). The SMIT lesson plan was used for each session (see Appendix 1 in the Supplementary Material for an example), with the instructor discussing the topic with the nurse using laminated cue cards. The discussion was guided by objectives and key questions formulated for each session to encourage the learner to engage in the session. SMITs were conducted in the clinical ward environment at a time that was deemed mutually convenient to both the instructor and the nurse. It was not a requirement that the nurse would be able to answer all the key questions; the instructor was able to provide the answers and explain the concepts throughout the SMIT. The SMIT provided time for the nurse to ask questions face-to-face with the instructor and query concepts that they did not understand. The nurse could demonstrate their knowledge and understanding of the subject and the assessor could

further develop the nurse's knowledge and ensure a common standard of knowledge across all the nurses on the trauma ward. The SMIT was found to contribute to the development of rapport between the nurse and the instructor and this provided the nurse with a resource and mentor that could be accessed outside of the SMIT in the clinical area (Evans et al 2020).

On completion of each session, the instructor recorded the time taken to complete the SMIT. As part of the evaluation process, the nurse completed the "Participant Feedback of SMIT" tool and gave this to the instructor. This tool sought feedback on the relevance of the session to the nurse's clinical role, presentation of information, content of the SMIT, time effectiveness of the SMIT, and whether the SMIT was a useful educational method. The tool used a Likert scale, rating the effectiveness on a scale of 1 to 5, with a score of 1 indicating the least agreement with the statement and a score of 5 indicating the most agreement with the statement.

Once the nurse completed all five SMITs, the nurse then completed the post-SMIT chest-trauma knowledge assessment and the trauma-nursing confidence assessment.

Table 1- Methodology

SMIT Process	Description	Duration
Recruitment	Information sessions, discussion of involvement and time expected to complete.	Over a period of 2 weeks
Consent	Consent forms were signed and retained for our records. A participant information sheet was provided. Nurses were informed that they were able to opt-out of the program at any time.	Over a period of 2 weeks
Pre-SMIT knowledge assessment	The assessment was administered by the instructors. It was created by the instructors and based on the SMIT content and objectives. It included 14 questions and was marked out of 40. It consisted of multiple-choice questions and one question on assigning the correct anatomical label to a diagram of the chest.	Over a period of 4 weeks
Pre-SMIT confidence assessment	The assessment was administered after the pre-SMIT knowledge assessment. It was adapted from Garvey et al. (2016) to reflect the content and setting.	Over a period of 4 weeks
Education sessions	Five SMIT sessions were created by the instructors and conducted as one-on-one education sessions. Education sessions were flexible based on the nursing roster and availability of the participant.	Over a period of 12 weeks

SMIT Process	Description	Duration
Post-SMIT knowledge assessment	The assessment was administered by the instructors once the educational sessions were completed.	Over a period of 10 weeks
Post-SMIT confidence assessment	The assessment was administered after the pre-SMIT knowledge assessment once the educational sessions were completed.	Over a period of 10 weeks

DATA COLLECTION

The data were collected throughout the process and de-identified. Each participant was assigned a number. A spreadsheet was created in Excel (saved to a WSLHD secure password-protected hard drive) to collate all the results of the assessments used within the study and track the completion of each of the SMIT topics.

OUTCOMES AND EXPOSURE VARIABLES

Primary Outcome:

- The nurse's performance on the post-SMIT knowledge assessment questionnaire.

Secondary Outcomes:

- Self-reported confidence in trauma nursing, including topics such as care, assessment, documentation, communication, clinical skills, and team skills.
- The incidence of attendance at the trauma SMITs.
- The evaluation of the trauma SMITs.

ETHICAL CONSIDERATIONS

This study was approved in October 2021, as a low negligible risk (LNR) study, by the WSLHD human research ethics subcommittee 2021/PID03062-2021/ETH11823. All paper copies of the consent forms, assessments, questionnaires, and feedback were kept in a locked filing cabinet within a locked office in WSLHD.

ANALYSIS PLAN

This prospective observational study of the effect of the trauma SMIT educational intervention on nursing participants' trauma knowledge and confidence was analysed using IBM SPSS Statistics version 28. Frequencies and percentages (%) were used to summarise the distribution of categorical survey variables both pre- and post-SMIT. The mean and standard deviation (SD), or median and interquartile range (lower quartile (LQ) to upper quartile (UQ)) were used for continuous variables as appropriate. Paired *t* tests were used to test for within-participant change in survey responses from pre- to post-SMIT education intervention. The mean within-participant change in a survey response from pre- to post-SMIT, together with its associated 95% confidence interval (95% CI), were

used to quantify the SMIT effect on this variable. Two-tailed tests with a significance level of 5% were used throughout. No adjustment will be made for multiple comparisons in this observational study.

RESULTS

A total of 14 nurses were recruited to the study, and one was excluded. Therefore, 13 nurses, 11 registered nurses and two endorsed enrolled nurses, participated in the study.

Using the paired *t*-test, there was a statistically significant difference ($p < 0.05$) between the post- and pre-SMIT knowledge tests ($p = 0.003$; $t = 3.785$, mean change 3.0), and post- and pre-SMIT confidence tests ($p < 0.001$) ($p = 0.000$, $t = 5.605$, mean change 4.2). No difference was found between the times taken to complete the knowledge test before and after the SMIT ($p = 0.434$, mean change –1.3). Therefore, in this study it was demonstrated that the SMIT improved both the nurse's knowledge and confidence when caring for patients with chest trauma (Table 2).

Table 2- Paired *t*-test of within-subject range (post-SMIT to pre-SMIT)

Change variable	Mean change	SD	95% CI for mean change Lower	Upper	*P* Value	*t*
Knowledge test	3.0	2.9	1.3	4.7	0.003	3.785
Time to complete	–1.3	5.9	–4.9	2.2	0.434	–0.809
Confidence test	4.2	2.7	2.5	5.8	0.000	5.605

Further informal feedback was provided by participants during the evaluation process and certain themes identified. Our evaluation of the feedback identified the primary themes: challenges in implementation and perceived benefits.

CHALLENGES IN IMPLEMENTATION

Instructors were limited to working during office hours, hence there was no opportunity to recruit participants after hours. Recruitment needed to be planned around rosters and staff leave, increasing instructor workload and time.

Working during COVID-19 was identified as a challenge to implementation. Staff were fatigued and 'burned out', and this was exacerbated by the constant change in the clinical environment, where staff had to adapt their nursing to various patient cohorts. These challenges led to a reluctance to participate in learning opportunities.

PERCEIVED BENEFITS

During COVID-19, staff were working in a VUCA (volatile, uncertain, complex and ambiguous) world (Cernega et al. 2024). The SMIT was appreciated by the nurses as it provided them with opportunities to return to face-to-face learning. The nurses also enjoyed the opportunity to work and create a rapport with the instructors whom they saw as subject matter experts, mentors, and clinical leaders. Staff reported feeling that senior leadership was more approachable after this one-on-one time.

Staff provided feedback on the SMIT model, noting the relevance of the sessions to clinical practice. The structured nature of the session and the flexible program delivery allowed staff to attend a session without it impacting on their workload.

Staff reported that the style of the SMIT helped the flow of the conversation (between the nurse and instructor) and maintained consistency of the information provided. The structure of the SMIT created an environment of psychological safety where staff felt safe to ask questions without being judged by their peers. Participants expressed how the one-on-one format allowed them to engage with the content on their own terms, empowering them to freely ask questions and talk without judgment.

DISCUSSION

In 2021 the opening of the purpose-built trauma unit and employment of a new trauma-nursing workforce created an immediate need for trauma-nursing education. The formation of a trauma-specific ward, the grouping of trauma patients and the establishment of a nursing workforce from various surgical specialties required the consideration of a targeted educational strategy for this newly created nursing team. The SMIT was created as an opportunistic, targeted, flexible, and customisable program to deliver the content and address these educational deficits.

The challenges of implementation included the COVID-19 pandemic, fatigue, burn-out, working around rosters and leave, and access to limited resources. The SMIT was introduced during the uncertainty and ever-changing requirements that the COVID-19 pandemic bestowed on the nursing staff at this time. The residual COVID restrictions (social distancing) impacted the way education was delivered in terms of the number of people allowed to be present at face-to-face sessions. The ward was repurposed to a COVID ward more than once in this time and trauma patients were diverted to other areas. The patient cohort was changed

according to organisational needs, bringing in nurses temporarily from other specialties. The COVID-19 pandemic induced what has been coined a VUCA world and this is becoming the new norm (Cernega et al. 2024).

During this time, nurses were also experiencing a degree of fatigue due to the pandemic, although most felt that receiving one-on-one time with the instructor was a positive experience. The degree of fatigue and uncertainty impacted education throughout this period. Nurses lacked motivation to participate in learning opportunities. The nurses had accrued excess leave during the COVID pandemic and then were required to take this leave after the pandemic. This led to more nurses on leave than usual, which impacted the study timeline.

When planning for implementation of the study, it was foreseen that the completion time would ideally be a period of five weeks with one topic being completed in each week. The study, however, took 12 weeks to complete for the 13 nurses. Contributing factors leading to the increased delivery time included: participant's rosters, instructor availability, unplanned annual leave, university placements and sick leave. To overcome these challenges, instructors co-ordinated their availability with the staff roster to enable a shorter succession between SMITs. These strategies improved the pace in which the final stages of the study were completed.

The perceived benefits of the SMIT were identified through our statistical analysis and through informal feedback provided by participants during the evaluation process. It was demonstrated that the SMIT increased both the nurse's knowledge and confidence when caring for patients with chest trauma. The SMIT also supported staff in overcoming the challenges of the COVID-19 pandemic and its residual effects by providing them with individualised one-on-one time with senior clinicians while providing them with flexibility around patient care needs. The staff were given the opportunity to engage with clinicians, enabling them to further establish mentoring relationships, networking opportunities and rapport, all of which led to team cohesion.

Purposeful sampling of permanent staff members of the trauma unit was used. This targeted approach was used due to nurses from specialties other than trauma temporarily working in the ward, with uncertainty as to how long this group would remain working in the trauma unit.

The one-on-one style of the SMIT was also a chance for the instructor to build rapport with the new nursing workforce, creating a positive influence and developing a positive learning culture in the clinical environment (Evans et al. 2020). The SMIT proved to be dynamic, flexible and robust, despite the ever-changing and uncertain clinical environment. The culture of change that existed due to the COVID-19 pandemic fostered the adoption of the SMIT by nursing staff, but it also created a need to be adaptive, creative and innovative in nursing education delivery.

The content was focused on chest trauma, as this was one of the most common areas of injury admitted to the unit, and this ensured a standard of knowledge across the unit. The SMITs were time-consuming for the instructor; however, the format allowed the instructor to customise the SMIT to the individual learning needs of the nurse and allowed specific discussions, guided by the nurse. The one-on-one format allowed the instructor to get to know the nurse and identify knowledge deficits, gaining rapport with the nurse that was transferable to the clinical setting when working as part of the multidisciplinary team.

Our experience of the SMIT with a small cohort suggests that the SMIT methodology may be difficult to co-ordinate and complete in a satisfactory timeframe with a larger cohort. Further research may be required to assess the feasibility of the SMIT as a learning tool for a larger group of participants. In established trauma centres with senior staff, the SMIT could be implemented for new, junior staff members and this would reduce the implementation workload and ensure that junior staff have targeted education. Another consideration may be that small group sessions could be run; however, this would change the model and may lessen the degree of perceived benefits including one-on-one education, mentorship, and leadership. The implementation of this model to other trauma units would be improved with the development of other SMIT topics.

The increased timeframe was found to impact the participants' retention of knowledge and increased the instructor's time spent with each individual. In one session, the instructor gave the participant an extra 15 minutes to enable revision of previous SMIT topics as it had been more than a month since the previous session. Some nurses reported that they had forgotten what they had discussed during prior SMIT sessions and required a quick summary and revision prior to commencing the next topic. This was reported to require longer sessions; however, it also provided an opportunity to reinforce prior learning. This forgetfulness may also have been attributable to the COVID-19 pandemic, in that the nurses were experiencing a high level of fatigue, burn-out and uncertainty at this time. As previously mentioned, the participants also expressed that the format of the SMIT allowed them to express themselves without fear of judgment from other peers, and this may explain how they were empowered to be honest with the instructors about the material they had forgotten, resulting in the benefit that the participants were supported and gaps in their clinical knowledge were appropriately addressed.

Through the process of formative evaluation, it was identified that during SMIT Topic 4, learners were struggling with the concept of the physiology of pressure changes in the chest under normal conditions compared with those in the presence of a pneumothorax and haemothorax. To assist learners, picture aids were introduced to provide the learner with a visual representation of these key concepts, and to support the instructor in explaining the concept. In the participants' feedback for this topic, the use of diagrams and videos was recommended to reinforce understanding (Mishall, Burton & Risley 2023; Satoh, Fujimura & Miyagawa 2023; Manthra Prathoshni, Vishnu Priya & Gayathri 2018; Zheng et al. 2022).

The use of the SMIT method relies on the active engagement of participants in learning, due to the one-on-one nature of the methodology. This means the content of the SMIT is tailored to meet the individual needs and allows instructors to gauge the level of participant engagement and understanding of the concept. A further reported benefit of the one-on-one teaching style was the ability of the participant to ask questions without concerns of hampering the learning of others, or feelings of embarrassment from not knowing the content. Participants valued the opportunity to engage with the instructor as a role model and mentor and learn from the experiences of the instructor. As a result of this interaction, participants reported being inspired to continue with their learning and career pathway in order to provide exemplary trauma nursing care. This was an unanticipated outcome of the SMIT method.

It is noted that while the results indicated that there was no significant difference in the time taken to complete the pre- and post-SMIT knowledge tests, this may have been due to several variables. For example, at the time of completion, the nurses may have had competing clinical priorities, they may have been more considered in the post-SMIT test, and they may have been trying to recall information learned.

LIMITATIONS AND RECOMMENDATIONS

There were a few limitations of this study. The trauma unit consisted of 13 beds and employed 15 nurses at this time. This restricted the number of nurses that could be taken off the floor at any one time, making the normal in-service model untenable. The sample size was small and was limited to one research site and one discipline, limiting the generalisability of the results to other settings and disciplines. Further research is required to understand the value of implementing this approach in other settings where trauma patients are managed (e.g. emergency departments or intensive care units) and within other clinical specialties and health professions.

In this study the SMIT was evaluated individually. We recommend that SMIT be considered as one tool used within a suite of other educational methodologies that may include in-service training, online learning, self-directed learning, or active learning strategies. This may provide an opportunity for future research.

The benefits of a targeted educational intervention for this cohort were demonstrated using the SMIT tool. Further research is recommended into the value of continued use of the SMIT tool and to assess the reliability of the tool across different staff cohorts and content.

CONCLUSION

People who suffer multiple injuries or major trauma have complex and interdisciplinary care needs. The SMIT was developed to address a knowledge deficit and to be a targeted, flexible, and customisable method of content delivery. The SMIT was positively evaluated by nursing staff who participated in this prospective study as relevant, useful in their work, an enjoyable learning experience, and an effective use of their time, with easy-to-understand information. The study demonstrated that the SMIT increased the nurses' knowledge and confidence when caring for patients with chest trauma. This research has revealed a need for further research into the applicability, usefulness and application of the SMIT to different clinical environments, larger cohorts and disciplines other than nursing, and the use of the SMIT as an adjunct to other educational strategies.

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SUPPLEMENTARY MATERIAL

This supplementary material was part of the submitted manuscript and is presented as supplied by the authors.

APPENDIX 1- SMIT LESSON PLAN EXAMPLE. UNIT/TOPIC: RIB FRACTURES

OUTCOMES:

To improve understanding of rib fracture aetiology, diagnosis, treatment and the prevention of complications.

LESSON OBJECTIVES:

- To understand the different mechanisms and forces that cause rib fractures.
- Analyse the complications that can arise from rib fracture injuries and identify nursing strategies that can be implemented to prevent them.
- Recognise the severity of injury and articulate the escalation process for the deteriorating patient.

KEY QUESTIONS:

Can you identify the basic anatomy of the *thorax*?

(Assessor and staff member to refer to diagram on assessors SMIT card)

Staff member to be able to identity:

- Heart
- Lungs
- Ribs
- Diaphragm
- Oesophagus
- Trachea
- Sternum

Aetiology of rib fractures?

- Common mechanism of injury; blunt injury due to; falls, motor vehicle crash/motor bike crash, assaults.
- Forces involved and how this effects the underlying tissue.
  - Height of fall
  - Simple fractures
  - Flail segment
  - Anatomy of ribs 1+2 versus 3-10 versus floating rib 11+12

What are the complications of rib fractures?

- Pain, clicking of ribs, mal union of ribs, flail segments.
- Associated injuries.
  - Pulmonary contusions and lacerations
  - Pneumothorax
  - Haemothorax
- Clinical manifestations can also include shock, hypotension, tachycardia, decrease oxygen perfusion – requiring massive transfusion protocol.
- Infection- pneumonia, empyema.
- Respiratory Failure, ventilator dependence.
- Special considerations: Previous Medical History asthma, Chronic Obstructive Pulmonary Disease, Obstructive Sleep Apnoea places patient on higher risks.

How can we prevent complications?

- Patient positioning & mobilisation (splinting) e.g. use of teddy
- Breathing exercises (deep breathing & coughing, incentive spirometry)
- Oxygen therapy
- Pain: treatment & effects e.g. consulting acute pain service – Patient Controlled Analgesia, Endone, paracetamol.
- Allied health referral for mobility assessment and encouragement of mobilisation

How do we recognise the patient is deteriorating?

- Increased work of breathing/shortness of breath, oxygen requirements, decreasing oxygen saturations, tachycardia, confusion, pain, fever.

How do we escalate for the deteriorating patient?

- Escalate as per hospital policy
- Between the flags – with consideration to chest trauma injury (as listed above).
- Notify the Trauma team for clinical review. Escalate as per policy.

How can we plan for discharge?

- Early allied health referral in particular; PT to mobilise patient and improve inspiratory effort, OT for functional assessment and equipment, SW complex social history, lives alone, may need services on discharge. Pharmacist