Received: 22 March 2018 | Revised: 11 April 2019 | Accepted: 29 April 2019

DOI: 10.1002/nop2.318

RESEARCH ARTICLE

WILEY NursingOpen Open Access

Design, delivery and evaluation of a simulation-based workshop for health professional students on falls prevention in acute care settings

Debra Kiegaldie[1,2,3] | Debra Nestel[4] | Elizabeth Pryor[1] | Cylie Williams[5] | Kelly-Ann Bowles[6] | Stephen Maloney[6] | Terry Haines[6]

[1]Faculty of Health Science, Youth & Community Studies, Holmesglen Institute, Holmesglen, Victoria, Australia

[2]Healthscope Hospitals Australia, Melbourne, Victoria, Australia

[3]Faculty of Medicine, Nursing & Health Sciences, Monash University, Clayton, Victoria, Australia

[4]Monash Institute for Health and Clinical Education, Monash University, Melbourne, Victoria, Australia

[5]Department of Allied Health, Peninsula Health, Frankston, Victoria, Australia

[6]School of Primary and Allied Health Care, Monash University, Melbourne, Victoria, Australia

Correspondence
Debra Kiegaldie, Faculty of Health Science, Youth & Community Studies, Holmesglen Institute, Holmesglen, VIC, Australia.
Email: Debra.kiegaldie@holmesglen.edu.au

Funding information
Funding for this trial was received from a "Simulation Patient Safety Research" project grant from the Department of Health and Human Services, Victoria, Australia (ID3108). No restrictions have been placed on dissemination of findings.

Abstract

Aims and objectives: To describe the design, delivery and evaluation outcomes of a simulation-based educational workshop to teach a patient-centred falls prevention strategy to health professional students tasked with implementing the strategy during clinical placement.

Background: Falls are among the most common and costly threat to patient safety. The Safe Recovery Programme (SRP) is an evidence-based, one-to-one communication approach with demonstrated efficacy at preventing falls in the postgraduate context. Simulation-based education (SBE) is commonly used to address issues of patient safety but has not been widely incorporated into falls prevention.

Methods: This study was a Pre–Post-test intervention design. Health professional students were taught how to deliver the SRP in an SBE workshop. The workshop incorporated content delivery, role-play simulations and interactions with a simulated patient. Students completed surveys immediately before and after the workshop and after clinical placement. Linear and logistic regression analysis was undertaken to identify differences within each pairwise comparison at the three time points. Qualitative free text responses underwent content analysis.

Results: There were 178 students trained. The educational design of the programme described in this paper was highly valued by students. Following the workshop, students' falls knowledge increased and they correctly identified evidence-based strategies except bedrail use and patient sitters. Following clinical placement, fewer SBE students correctly identified evidence surrounding bed alarm use. Students became more confident about falls communication post-SBE; however, this confidence decreased postclinical placement. Motivation to implement the SRP decreased between postworkshop and postclinical placement time points.

Conclusions: Falls research often includes educational components but previous studies have failed to adequately describe educational methods. Students learnt about best evidence falls prevention strategies using interactive educational

methodologies with a workshop viewed by students as being well-designed and assisting their learning from theory to practice.
While students valued the delivery of the SRP using SBE, confidence and motivation to implement falls strategies were not sustained following clinical placement. A programme of education including SBE can be used to support the delivery of falls-based education, but further research is needed to identify what factors may influence student's motivation and confidence to implement falls prevention strategies during clinical placement.

KEYWORDS
education design, falls prevention, falls prevention education, health professional education research, simulated patients, simulation

1 | INTRODUCTION

Falls are a global issue and among the most common and costly threat to patient safety in health care today. Rates as high as 20 falls per 1,000 patient-days have been documented in a range of patient diagnostic groups, with higher proportions among those with cognitive impairment (Haines, Bennell, Osborne, & Hill, 2004; Haines et al., 2011; Healey, Monro, Cockram, Adams, & Heseltine, 2004; Nyberg & Gustafson, 1996; Stenvall et al., 2007). There has been no shortage of falls prevention strategies reported in the literature although few have demonstrated efficacy. The Safe Recovery Programme (SRP) is one intervention that has been demonstrated to reduce falls when provided in isolation or as part of a broader multi-factorial intervention programme (Haines et al., 2004, 2011; Hill et al., 2015). Simulation is increasingly being used in healthcare education but there is limited reporting on the use of simulation as an educational method for teaching about falls prevention. The aim of this paper was to describe the design, delivery and educational outcomes of a simulation-based educational workshop to teach the SRP to a range of health professional students tasked with implementing the programme during clinical placement.

1.1 | BACKGROUND

Clinical interventions and education on falls prevention and management strategies are now mandated across many health professional groups working in hospitalized settings as part of a National Standards Quality and Safety reform led by the Australian Commission on Safety and Quality in Health Care (ACSQHC, 2012). Falls prevention has also become embedded in pre-registration higher education curricula.

The SRP (Hill et al., 2015) is a patient-centred, one-to-one communication approach that works to:

- improve patients' knowledge and understanding of the problem of falls;
- build therapeutic partnerships between patients and health professionals;
- enhance patients' abilities to manage their emotions which might lead to risk-taking behaviours; and
- empower patients by making them the central decision-makers to improve their safety.

There are four stages and 12 steps identified in the SRP (Appendix 1).

Originally developed to be delivered by physiotherapists and occupational therapists who had completed their graduate level training, the SRP focuses on improving interpersonal communication between patients and health professionals and makes the patient the central decision-maker (Haines et al., 2004). The use of the SRP curriculum in a pre-registration student context has not been investigated. One other face-to-face patient education programme that has been trialled has also been found to help reduce falls in an acute hospital setting (Ang, Zubadaiah Mordiffi, & Bee-Wong, 2011) but there is little description about the programme.

There is strong evidence that the use of simulation-based education (SBE) in healthcare curricula improves learning outcomes and can improve clinician's communication, teamwork and leadership skills (Capella et al., 2010; McGaghie, Issenberg, Cohen, Barsuk, & Wayne, 2011; Shearer, 2012). SBE strategies associated with falls prevention, however, have not been widely reported. In a systematic review focusing on the effect of simulated patients in improving person-centred communication skills (Kaplonyi et al., 2017), only one SBE study was identified to teach falls prevention strategies to students. The study focused on nursing student's development of effective team skills and their ability to plan, implement and evaluate care for patients at high-risk of falls (DeBourgh & Prion, 2011). Results of this Pre–Post-test study found that SBE improved student's knowledge and skills and provided experiential learning that was memorable and challenging. Whether gains in knowledge and skills were sustained over time was not tested nor was an evaluation of the programme's ability to influence student's subsequent implementation of interventions during clinical placement.

2 | METHODS

2.1 | Education design

This paper will describe the development and delivery of the SRP workshop using SBE. The educational design of the workshop is reported according to published guidelines for simulation research (Cheng et al., 2016). Appendix 2 contains a detailed description of the workshop.

Students who were on clinical placement to an outer metropolitan hospital in Melbourne, Australia, attended a 4-hr workshop that was part of their orientation. The learning objectives were knowledge and skills-based and were focused on teaching patients what they need to do for falls prevention. A range of educational methods were used including written materials, videos, small group discussions, role-play (an acted out simulated event where the learners took on their role and that of the patient) and immersive simulations where three learners interacted with a simulated patient (a trained actor) in three scenarios and debriefing. The role-play simulations and immersive simulations contributed over 50% of the course delivery and gave students the opportunity to practice or observe patient-centred communication skills designed to mitigate patient risk-taking behaviours that lead to falls. Students were oriented to the content of the workshop and various facets of the simulation including the environment.

The simulations were conducted in the simulation facilities at either a university or hospital. Students from medicine, nursing and allied health, who were all undertaking clinical placement at the hospital, participated in the workshop if they were placed on an intervention ward. Students worked in groups of up to 12. Two faculties facilitated each workshop. The same two faculties conducted all but one workshop.

2.2 | Research design

The aims of the evaluation were to measure the impact of the delivery of the SRP using SBE on student's knowledge of evidence-based falls prevention strategies and their confidence and motivation to implement the SRP during their placement. A further aim was to explore the students' perceptions of their learning experiences.

This study used a Pre–Post-test intervention design. It was nested within a broader cluster cross-over randomized trial (Williams et al., 2016). This paper is reporting the outcomes from the educational approach used to teach the SRP to those students who were randomized into the intervention group of the trial.

2.2.1 | Participant selection and recruitment

All students entering clinical placement on an intervention ward were trained in the SRP. Students were invited to participate in the study comprised of the workshop and three points of data collection:

1. Pre-test (before workshop)
2. Post-test 1 (immediately after workshop)
3. Post-test 2 (postclinical placement).

Most students completed the pre-test survey at the start of the workshop; a small minority had completed the survey online one to three days prior to the workshop. All students completed post-test 1 immediately after the workshop. Post-test 2 data were collected on the final day of clinical placement during a debriefing session with students. For students who did not have a debriefing session, an electronic survey was emailed on their last placement day. Post-test 2 data were collected 2–6 weeks after post-test 1. The timeframe depended on the clinical placement length associated with the year level and was unable to be controlled for. During collection of data, students were requested to self-generate a code to allow analysis of paired data.

2.3 | Research instruments

Six research instruments were used across the three points of data collection.

2.3.1 | Instrument 1: Knowledge questions on Falls Prevention Evidence and "Falls Facts"

Students were asked to consider different commonly employed falls prevention strategies and were asked: "Do you believe the best available research evidence supports this strategy as a means for prevention falls in hospitals?" Students were able to choose the options of Yes, No or Unsure. The strategies in question were bed/chair alarms, bed rails, patient sitters, face-to-face patient falls prevention education, written falls prevention material without face-to-face education, low–low beds and risk alerts. Students were asked to choose where they believed the most common area was for a patient to fall (with options of from bathroom or toilet, patient bedside, ward passageways or somewhere else). They were also asked to choose which four-hour period of the day they thought had the most patient falls in hospitals starting from 6 a.m.

2.3.2 | Instrument 2: Confidence questions

Students' self-reported confidence in being able to implement three major aspects of the SRP was measured using an 11-point numerical rating scale where 0 – not confident, 5 – somewhat confident and 10 – extremely confident. Students were also asked to rate their confidence in being responsible for reducing patient falls on hospital wards as a student.

2.3.3 | Instrument 3: Motivation questions

An additional question was asked on their motivation to use the SRP that used a similar rating scale (0 – not motivated, 5 – somewhat motivated and 10 – highly motivated).

2.3.4 | Instrument 4: Questions on the learning objectives

Students were asked to report on the degree to which they thought they met each of the workshop learning objectives using a 5-point rating scale (1 – not met, 3 – partially met and 5 – completely met).

TABLE 1 Outline of SBE evaluation instruments

Pre-test	Post-test 1 (Postworkshop)	Post-test 2 (Postclinical placement)
Demographics and prior education Instrument 1: Knowledge Instrument 2: Confidence	Instrument 1: Knowledge Instrument 2: Confidence Instrument 3: Motivation Instrument 4: Learning objectives Instrument 5: Learning activities Instrument 6: Views on the learning experiences	Instrument 1: Knowledge Instrument 2: Confidence Instrument 3: Motivation

2.3.5 | Instrument 5: Questions on the helpfulness of the learning activities

A 5-point rating scale was used to measure students' views on the helpfulness of components of the workshop (1 –not helpful at all, 2 – slightly helpful, 3 – moderately helpful, 4 – very helpful and 5 – completely helpful).

2.3.6 | Instrument 6: Open-ended questions on the learning experience

Open-ended questions were asked in the immediate postworkshop survey to determine students' perceptions about what was learnt in the workshop, what was new or different compared with prior education on falls prevention and/or delirium, what worked well and why and what needed improvement. Table 1 outlines the research protocol.

2.4 | Measures of programme impact

Kirkpatrick developed a 4-level model to evaluate vocational/training programmes (Kirkpatrick, 1994). The different levels explore trainees' reactions, learning, behavioural change and any resulting change in organizational practice. Kirkpatrick's original model implied that all levels are recommended for full and meaningful evaluation of learning. Barr, Freeth, Hammick, Koppel, and Reeves (2000) adapted the original model to provide greater contextualization to health care. This adaptation was used to measure programme impact (Table 2). Retention of learning, often omitted from education evaluations, was also sought by measuring changes when applied to the clinical placement setting.

2.5 | Data analysis

Data were analysed with Stata 13 (StataCorp, 2013). Student demographics were expressed as means (*SD*), medians (IQR) and frequencies (%). Student knowledge was coded into binary data of correct and incorrect responses. Confidence and motivation remained as a linear scale. Logistic regression analyses using paired data were used to determine the change in knowledge pre-test, post-test 1 and post-test 2. Data were clustered within participant, and robust variance estimates were employed. Linear regression analysis was used to determine any differences in confidence and motivation. Results were deemed statistically significant when $p < 0.05$.

Qualitative responses underwent conventional content analysis by one of the researchers. Data were coded and grouped into higher order thematic categories and sub-categories (Vaismoradi, Turunen, & Bondas, 2013). These categories were then checked for reliability by another qualitative researcher. Disagreements were resolved by negotiation. Frequencies on the responses according to each thematic category were measured, tabulated and graphed.

3 | RESULTS

The SBE workshops ran between August 2015–July 2016. There were twenty 4-hr workshops conducted with 8–12 students

TABLE 2 Alignment of evaluation instruments to modified Kirkpatrick levels of evaluation (after Barr et al.,2000)

Level	Evaluation type	Evaluation description and characteristics	Our SBE evaluation instruments
1	Participant reaction	Reaction evaluation is how the participants felt about the training or learning experience	5, 6
2	Learning	Learning evaluation is the measurement of the increase in knowledge or confidence of applying knowledge before and after the intervention	1, 2, 3, 4
3	Behaviour	Behaviour evaluation is the extent of applied learning back in the clinical setting – implementation	1, 2, 3
4	Results	Result evaluation is the effect on the environment by the trainee	Not measured
5	Benefits to patients/clients	Any improvement in the health and well-being of patients as a direct result of an educational programme	Not measured

attending each time. All students were in the final 2 years of their undergraduate education. Results are presented according to Kirkpatrick's hierarchy.

3.1 | Demographic information and prior education

Of 178 students who were trained, 171 (96%) students completed the pre-test and post-test 1 and 70 (39%) students completed post-test 1 and post-test 2 in a manner allowing matched responses. One hundred and forty-five (85%) students were nurses and 141 (82%) were female. Most students reported prior falls education (104, 61%) with lectures identified as the most common teaching method (83, 49%) (Table 3).

3.2 | Views ON the learning experiences (Kirkpatrick level 1)

3.2.1 | What was new or different?

A total of 165 comments from 130 participants were received to the question "If you have received prior education on falls prevention and/or delirium, what was new or different about what you have learned today?" Most comments (52, 31%) indicated that this workshop was more patient-centred in its approach to falls teaching than what they had experienced in previous education:

> ...It was different; most education has been about physical techniques and aids to prevent injury and reduce risk, not so much about empowering/educating the patient... (nursing student no. 77)

> ...It was about letting patients make their own decisions rather than advising them on what is safe and educating them on how to prevent falls... (physiotherapy student no. 6)

Other comments focused on this workshop providing a much greater awareness of the evidence for falls prevention strategies and exposing the ones that do not ("Learning how many strategies don't work - according to recent research"; "It was obvious that the safe recovery programme is based on research").

Most other comments noted differences in the nature of the workshop's content and delivery format such as being more "focused," "structured," "in-depth" and using interactive methods such as role-play and simulation:

> ...It was more detailed and more evidence-based. Also, simulation was helpful to get everyone thinking and practicing how to actually do it. It was more practical... (nursing student no. 30)

See Figure 1 for frequency of themes.

3.2.2 | What worked well and why?

For the question "what worked well in this workshop and why," most comments (182, 57.2%) focused on the benefits of the learning activities – video, role-play, discussion, simulation and the additional resources and handouts. Of most value was the simulation (96, 30% of comments):

> ...I think having the simulations worked well as it linked theory with practice and was helpful to have the discussion after the simulation... (nursing student no. 62)

> ...Simulation and role-play. It gave us time to practice and really understand... (nursing student no. 75)

There were frequent comments about the impact of simulation on student learning, particularly its support of consolidating the theory, reinforcing the steps, allowing for practice and reflection, identifying areas for improvement and its realism:

> ...Having a chance to practice with a trained actor in the simulation made it feel more realistic. The most helpful thing in the session... (nursing student no. 44)

Another theme associated with the learning activities was the appreciation of the process of the learning in particular the sequenced delivery of the information using a combination of learning activities:

> ...I liked how there was a mixture of learning resources that catered for everyone's learning. There was group work, sim lab and the classic classroom approach... (nursing student no. 70)

> ...Just the combination of discussing each area, then watching a video prior to simulation and the debrief afterwards... (nursing student no. 18)

TABLE 3 Participant demographics

	N = 171
Student disciplines	
Nursing	145 (85%)
Allied Health	18 (11%)
Medicine	8 (5%)
Gender (female)	141 (82%)
Previous education on falls prevention	104 (61%)
Lecture	83 (49%)
Tutorial	24 (14%)
Workshop	14 (8%)
In-service	4 (2%)
Ward-based education session	9(5%)
Simulation/practical session	16 (9%)

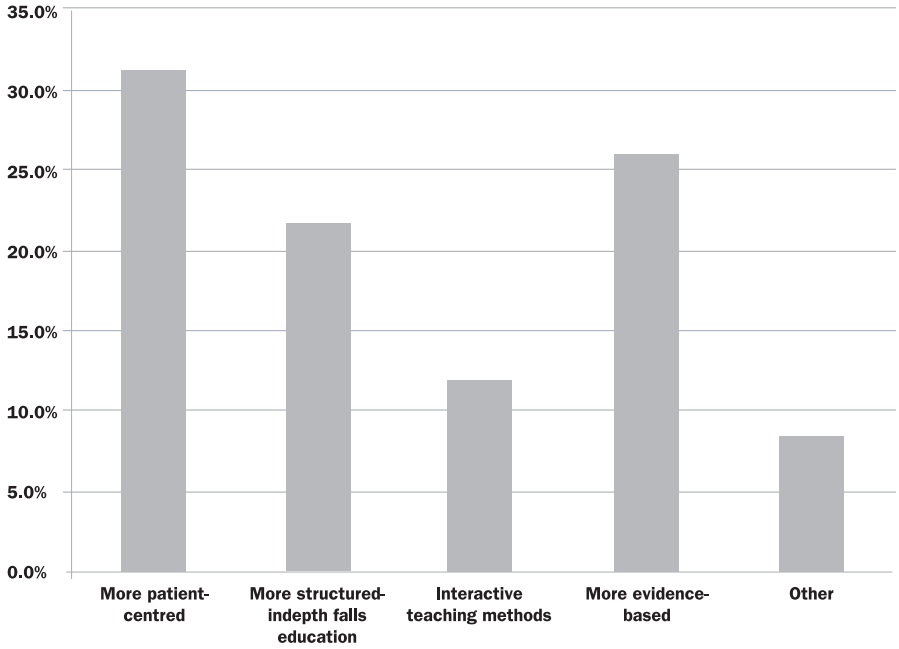

FIGURE 1 What was new or different about the workshop (% of total responses, *N* = 521)

Other themes to emerge included the value of the facilitator's knowledge of the topic and teaching qualities, specific content areas and the opportunity to learn with other health professional students.

3.2.3 | What needs improvement?

Five themes were identified from responses to the question asking for areas needing improvement. Most comments related to the workshop's overall structure, the need to simplify and condense the content (in particular the "steps"), create more interactive learning activities that engage learners, the need for more simulation and providing more opportunities for student participation in the simulation:

> ...Maybe making the steps more concise and simplified.... (nursing student no.12)

> ...more hands-on approach. Getting more than a couple of sim activities in... (medical student no. 138)

The workshop was also considered to be too long by many students (27, 20% of comments).

Students frequently commented on the need to improve the videos. Issues included the videos' length and frequency, technical problems, poor visual quality, lack of realism/authenticity of the interaction between the clinician and SP in the scenario and its inability to engage the student.

Improvements were also suggested for some of the workshop's content (e.g., patient-owned risk factors, cognitive impairment considerations and more strategies to prevent falls and how to implement the programme in the clinical workplace).

3.3 | Learning activities (Kirkpatrick level 1)

In relation to the learning activities, students also reported that SBE was the most helpful educational method with over 80% of responses rating simulation as "very helpful" or "completely helpful." When students were asked to what extent the combination of all learning activities was helpful, 93% rated the combination of all as "Very helpful" or "Completely helpful" (Table 4).

3.4 | Knowledge gains (Kirkpatrick level 2)

3.4.1 | Were learning objectives met?

When students were asked about the extent to which the workshop had enabled them to meet the learning objectives, over 81% reported that the learning objectives were completely met (Table 5).

When students were asked to provide open-ended responses on the three things they had learnt in the workshop, the most common comment was specific statements on "falls facts" such as the incidence, time, location and impact of falls and prevention measures (e.g., "falls mostly happen in the morning" and "falls more common at bedside than bathroom") (216, 41.5%).

Students frequently commented (108, 20.7%) on the patient-centred nature of the teaching, which included the importance of empowering patients ("empowerment of patients will achieve best results"), assisting patients to achieve attitudinal change about falls, goal setting and patient-focused motivational factors ("patients can be motivated to take part in falls prevention"). Specific aspects about the cognitively impaired patient were also noted:

> ...the session with the mild delirium was really important for identifying adaptive strategies for implementing the program... (medical student no. 32)

TABLE 4 Extent to which learning activities were helpful in meeting learning objective

	Median (IQR)
Video on "Falls In Hospital - the Facts"	4 (1)
Overview of the Safe Recovery Programme model	4 (1)
Watching videos of a clinician implementing the Safe Recovery Programme model	4 (1)
Simulation 1: Steps 1–7	4 (1)
Simulation 2: Steps 8–10	4 (1)
Simulation 3: Adapting the Safe Recovery Programme	4 (1)
The learning activity handouts (1–3)	4 (1)
Debriefing with students and facilitators	4 (1)
The combination of all exercises and activities	4 (1)

TABLE 5 Extent to which learning objectives were met

	Median (IQR)
Describe the patterns of falls occurrences (when, why and where they occur)	5 (1)
Describe the 3 stages and 12 steps of the Safe Recovery Programme for patient-centred falls prevention, applied to the cognitively intact patient	5 (1)
Recognize patient attitudes that increase their risk of falling in hospital	4 (1)
Recognize patient decision-making patterns that increase their risk of falling in hospital	4 (1)
Demonstrate skills for implementing the Safe Recovery Programme	4 (1)

Others listed learning related to the student/practitioner skills and capabilities necessary to communicate the SRP to patients, elements of the SRP itself and a new awareness of the lack of evidence for many falls prevention strategies including learning about the current evidence and research in this field:

> ...Most interventions currently used to prevent falls have no evidence to support it... (medical student no. 134)

3.5 | Specific knowledge gains

At post-test 1, students demonstrated a statistically significant increase in knowledge about the common falls prevention strategies. They correctly identified strategies that were/were not supported by evidence except for bed rail use (p = 0.013) and use of patient sitters (p = 0.004).

From post-test 1 to post-test 2, there were fewer correctly identified strategies across all nine items of common falls prevention strategies. However, this change was only statistically significant for "bed/chair alarms" (OR = 0.47, [95% CI-1.27,-0.26], p = 0.003) (Table 6).

3.6 | Confidence gains (Kirkpatrick levels 2 and 3)

Table 7 displays the self-reported confidence ratings of students being able to implement elements of the SRP. There was a statistically significant increase in student-reported confidence on all four items about falls communication and their role in falls prevention (p < 0.001) post the workshop. What was of interest was the statistically significant decrease in confidence ratings when comparing postworkshop to postclinical placement (<0.001).

3.7 | Motivation (Kirkpatrick levels 2 and 3)

Students self-reported motivation to implement three major elements of the SRP was high following the workshop but this significantly decreased postclinical placement (p < 0.001) (Table 7).

4 | DISCUSSION

Education is an important component of falls prevention but there is limited reporting on the educational design or active learning considerations in published falls prevention research (Kiegaldie & Farlie, 2016). This paper addresses this gap; in that, it provides a comprehensive description of the educational design elements frequently omitted in the interventional literature. In a commentary on reporting guidelines for healthcare simulation research, Salas laments the lack of focus on learning and on the instructional features that matter and make a difference (Salas, 2016). Despite the inclusion of a checklist on key instructional elements in Cheng et al.'s (2016) published guidelines for simulation research, descriptions of education remain a varied landscape. Little has been published describing how health professionals can effectively be taught to deliver falls prevention education to patients, but there are many options available. This paper provides a thorough and explicit description of course content and delivery methods for an SBE-focused programme which

TABLE 6 Paired knowledge results of pre-test versus post-test 1 (*N* = 171) and post-test 1 versus post-test 2 (*N* = 70)

	Pre-test, *N* (%)	Post-test 1, *N* (%)	Odds ratio [95% CI], *p*	Post-test 1, *N* (%)	Post-test 2, *N* (%)	Odds ratio [95% CI], *p*
Bed/chairs alarms (Correct: Evidence of no benefit)						
Incorrect	155 (91%)	40 (23%)	50.91 [3.24, 4.61], <0.001	13 (19%)	23 (33%)	0.47 [−1.27, −0.26], 0.003
Correct	10 (6%)	131 (77%)		57 (81%)	47 (67%)	
Missing	6 (3%)	0 (0%)		0 (0%)	0 (0%)	
Bed rails (Correct: Absence of evidence)						
Incorrect	121 (71%)	144 (84%)	0.52 [−1.19, −0.14], 0.013	60 (86%)	63 (90%)	0.66 [−1.21, 0.39], 0.321
Correct	44 (26%)	27 (16%)		10 (14%)	7 (10%)	
Missing	6 (3%)	0 (0%)		0 (0%)	0 (0%)	
Patient sitters or "specials" (Correct: Absence of evidence)						
Incorrect	94 (55%)	121 (71%)	0.53 [−1.08, −0.20], 0.004	51 (73%)	54 (78%)	0.75 [−0.95, 0.36], 0.379
Correct	70 (41%)	48 (28%)		19 (27%)	15 (22%)	
Missing	7 (4%)	1 (1%)		0 (0%)	1 (<1%)	
Face-to-face falls prevention education (Correct: Evidence of benefit)						
Incorrect	56 (33%)	11 (6%)	7.46 [1.33, 2.69], <0.001	4 (6%)	9 (13%)	0.42 [−1.80, 0.05], 0.065
Correct	108 (63%)	159 (93%)		65 (94%)	61 (87%)	
Missing	7 (4%)	1 (1%)		1 (<1%)	0 (0%)	
Giving falls prevention education material but no having face-to-face education (Correct: Evidence of no benefit)						
Incorrect	82 (48%)	74 (43%)	1.35 [−0.07, 0.66], 0.109	36 (51%)	43 (61%)	0.66 [−0.85, −0.03], 0.068
Correct	80 (47%)	97 (57%)		34 (49%)	27 (39%)	
Missing	9 (5%)	0 (0%)		0 (0%)	0 (0%)	
Low-low beds (Correct: Evidence of no benefit)						
Incorrect	131 (77%)	26 (15%)	20.91 [2.49, 3.59], <0.001	21 (30%)	28 (40%)	0.64 [−0.92, −0.33], 0.068
Correct	35 (20%)	145 (85%)		49 (70%)	42 (60%)	
Missing	5 (3%)	0 (0%)		0 (0%)	0 (0%)	
Having falls risk alert bed signs on beds and charts for high-risk clients (Correct: Evidence of no benefit)						
Incorrect	155 (91%)	84 (49%)	13.20 [1.94, 3.22], <0.001	31 (44%)	27(39%)	1.27 [−0.16, 0.64], 0.248
Correct	12 (7%)	86 (50%)		39 (56%)	43 (61%)	
Missing	4 (2%)	1 (1%)		0 (0%)	0 (0%)	
Where do you believe the most common area for a patient to fall? (Correct answer: Patient bedside)						
Incorrect	129 (75%)	8 (4%)	63.43 [3.40, 4.91], <0.001	5 (7%)	6 (%)	0.79 [−1.25, 0.79], 0.660
Correct	41 (24%)	162 (95%)		65 (93%)	62 (%)	
Missing	1 (1%)	1 (1%)		0 (0%)	2 (%)	
Which four-hour period of the day do you think has the most patient falls in hospitals? (Correct answer: 6 a.m.–10 a.m.)						
Incorrect	111 (65%)	9 (5%)	33.78 [2.79, 4.25], <0.001	5 (7%)	14 (%)	0.31 [−1.12, −0.24], 0.014
Correct	57 (33%)	156 (91%)		64 (93%)	55 (%)	
Missing	3 (2%)	6 (4%)		1 (<1%)	1 (4%)	

can serve as a template for future studies evaluating patient safety training interventions.

This study also provides a unique perspective of the impact of an interactive falls prevention education programme on student learning. Given the dominance of traditional approaches to prior teaching of falls prevention (lectures and tutorials), the nature of the learning activities and the quality of the teaching had the greatest impact. The interactive and varied teaching approaches were not only highly valued by students but appeared to positively impact their learning experiences and achievement of learning objectives immediately after the workshop. Experiential learning is described in the literature as fundamental in preparing health professional students for professional practice (Horntvedt, Nordsteien, Fermann, & Severinsson, 2018; Poore, Cullen, & Schaar, 2014, (May)).

While this study did not compare a simulation integrated workshop with a non-simulation programme, the participant feedback valued the use of simulation and role-playing the most, with several participants requesting greater use. Much of the reported simulation

TABLE 7 Paired confidence results of pre-test versus post-test 1 (*N* = 171), post-test 1 versus post-test 2, (*N* = 70) and paired motivation post-test 1 versus post-test 2 (*N* = 70)

	Pre-test Mean (*SD*)	Post-test 1 Mean (*SD*)	Coef, [95% CI], *p*	Post-test 1 Mean (*SD*)	Post-test 2 Mean (*SD*)	Coef, [95% CI], *p*
How confident are you that you could…						
Explain to a patient what the true nature of falls is in hospital (when, where and why they occur)	4.27 (1.78)	7.74 (1.20)	0.16, [0.15, 0.17], <0.001	7.73 (1.20)	7.30 (1.69)	−0.05, [−0.09, −0.01], <0.001
Find out how a patient feels about their own risk of falling while in hospital	5.68 (1.90)	7.64 (1.11)	0.15, [0.13, 0.16], <0.001	7.54 (1.08)	7.12 (1.50)	−0.06, [−0.11,-0.01], <0.001
Help a patient to set their own goals to reduce their risk of failing while in hospital	5.23 (1.94)	7.61 (1.19)	0.15, [0.13, 0.16], <0.001	7.6 (1.21)	6.69 (1.75)	−0.09, [−0.13, −0.06], <0.001
As a student, be responsible for reducing patient falls on hospital wards?	5.07 (2.18)	(Seaton et al., 2018)	0.12, [0.10, 0.13], <0.001	7.20 (1.45)	6.43 (1.72)	−0.07, [−0.11, −0.03], 0.001
How motivated are you to…						
Explain to a patient what the true nature of falls is in hospital (when, where and why they occur)				7.61 (1.31)	5.37 (1.82)	−0.15, [−0.17,−0.13], <0.001
Find out how a patient feels about their own risk of falling while in hospital				7.70 (1.23)	5.43 (1.75)	−0.16, [−0.19, −0.13], <0.001
Help a patient to set their own goals to reduce their risk of failing while in hospital				7.64 (1.26)	5.45 (1.91)	−0.15, [−0.17, −0.12], <0.001

research focuses on the advantages and efficacy of simulation as positively contributing to increases in learner satisfaction, confidence and knowledge acquisition (Seaton et al., 2018).

The programme also provided an opportunity for students to learn how to adapt the SRP to patients with cognitive impairment with the qualitative responses revealing the continued challenges associated with delivering education to this patient group. This has been acknowledged in previous work (Haines et al., 2011). Clearly, more research is needed to determine an effective modification to the SRP to better meet the needs of these patients. Techniques such as "chunking," repetition, simplification, rephrasing, using concrete examples/stories and frequent positive reinforcement (Eccles, 2013; Primeau & Frith, 2013) may assist when students and clinicians provide education to this specific patient population and should be considered for teaching the SRP in the future.

This study expands on previous iterations of the SRP by including a SBE element and focusing the education to students. It also expands on the only other reported SBE falls prevention programme; in that, it evaluated knowledge development and behaviour (confidence and motivation to implement the SRP in the clinical setting) beyond the immediate workshop period. From the data collected, it was not possible to determine whether factors related to the student's experience on placement or other factors reduced their motivation and confidence to employ the SRP. While on placement, if students perceived SRP was not effective in the placement, as it was not supported by other staff, was poorly implemented or was too difficult to implement due to limited resources or patient factors (e.g., delirium), then these factors may have reduced their motivation. Alternatively, the student's motivation may have fell simply because they had completed the placement and any related assessment and now placed emphasis on new forthcoming placements. The SRP has been successfully applied in the postgraduate health professions context (Haines et al., 2004, 2011; Hill et al., 2015) but students, as novice learners, may not have been equipped or ready to take on this task when confronted with the realities of clinical work. This could have been even more apparent for students with competing learning and assessment priorities. A lack of supervisor preparation about the student requirements to implement the SRP could also have played a role. To underpin a quality clinical placement experience, Levett-Jones, Fahy, Parsons, and Mitchell (2006) recommend improved communication between university and clinical staff, mentorship and more specific preparation for clinical placements such as provision of timely information to supervisors, relevant and clear learning objectives and orientation. Environmental factors such as lack of time or access to appropriate patients or a dominance of other falls intervention strategies being inappropriately used may also have had an effect. This is a common barrier for health professional students adopting EBP as part of their daily practice due to the high demands on providing patient care (Horntvedt et al., 2018; Wong, Etchells, Kuper, Levinson, & Shojania, 2010).

Our experience suggests that students embraced the concept of the SRP. They identified the importance of using an evidence-based and patient-centred approach in practice, and they had a desire to implement the programme. However, much of the gains after the workshop were lost over the course of the clinical placement time, indicating that ongoing reinforcement in this context is required. It

is not enough just to educate students and expect it to "stick," we also need to educate the workforce they deal with. Further analysis of this outcome is needed to explore the true impact of clinical placement.

4.1 | Limitations

There are several limitations to this study. While SBE was highly valued by participants, it is not possible to clearly identify whether SBE assisted in the acquisition of knowledge and skills in falls prevention as the study did not compare SBE with no SBE. An open-ended question seeking participant's specific views on simulation was not asked which may have disclosed negative views on the simulation experience.

Features of the study design may also have created limitations to the interpretation and generalizability of the outcomes. Self-reported data mean there was no ability to directly measure and observe student behaviour and performance in either the simulated or clinical setting. The study did however measure qualitative responses to further expand on student views. The addition of other qualitative approaches such as focus group or individual interviews was also not employed in this study. This may have provided an additional opportunity for students to further elaborate on their perceptions of their overall experiences in the programme and on placement.

The short time frame between the pre-test and post-test 1 may have falsely inflated the measure of knowledge, confidence and motivation scores. In addition, completion rates of post-test 2 were quite low which may have biased the results. This was due to the non-return of surveys and limited contact with students during or following their placement by the research team. Feedback from supervisors on the attrition rate was primarily related to logistics and students moving quickly to their next placement and limited time given during their placement.

The higher levels of Kirkpatrick's hierarchy were not investigated so the impact and organization outcomes were not able to be measured. The challenges associated with the use of the Kirkpatrick model have been previously reported (Bates, 2004).

5 | CONCLUSION

The results of this study demonstrate that a multi-teaching modality SRP course that includes SBE using experiential learning with deliberate application of theory to practice appeared to be highly valued by participants. Such educational interventions require detailed descriptions to provide a template for other falls prevention researchers when delivering this type of education. Future modifications of the SRP workshop may be required to address the duration of the programme and a reduction of the SRP steps. Further investigation regarding reasons for a reduction in confidence and motivation to employ SRP during clinical placement is necessary. It is not enough to merely provide information to students on the facts of falls or a checklist of how to teach a patient about their falls risk, it is essential to provide learning experiences that replicate the reality of practice. How students are supported to apply falls prevention strategies as part of their clinical placement time and into their future work requires further investigation.

CONFLICT OF INTEREST

None.

ETHICAL APPROVAL

This research was approved by the hospital's Health Human Research Ethics Committee (LRR15PH11) and the University (CF15/3523 – 2015001384). The clinical trial was registered with ANZCTR (ACTRN12615000817549).

ORCID


Debra Kiegaldie https://orcid.org/0000-0002-4077-5818

REFERENCES

ACSQHC (2012). *National safety and quality health service standards*. Sydney, NSW: Australian Commission on Safety and Quality in Health Care.

Ang, E., Zubadaiah Mordiffi, S., & Bee-Wong, H. (2011). Evaluating the use of a targeted multiple intervention strategy in reducing patient falls in an acute care hospital: A randomized controlled trial. *Journal of Advanced Nursing*, *67*(9), 1984–1992. https://doi.org/10.1111/j.1365-2648.2011.05646.x

Barr, H., Freeth, D., Hammick, M., Koppel, I., & Reeves, S. (2000). *Evaluation of interprofessional education: A United Kingdom review of health and social care*. London, UK: CAIPE and the British Educational Research Association.

Bates, R. (2004). A critical analysis of evaluation practice: The Kirkpatrick model and the principle of beneficence. *Evaluation and Program Planning*, *27*, 341–347. https://doi.org/10.1016/j.evalprogplan.2004.04.011

Capella, J., Smith, S., Philp, A., Putnam, T., Gilbert, C., Fry, W., … ReMine, S. (2010). Teamwork training improves the clinical care of trauma patients. *Journal of Surgical Education*, *67*(6), 439–443. https://doi.org/10.1016/j.jsurg.2010.06.006

Cheng, A., Kessler, D., Mackinin, R., Chang, T., Nadkarni, V., Hunt, E., … Auerbach, M. (2016). Reporting guidelines for health care simulation research: Extensions to the CONSORT and STROBE statements. *Advances in Simulation*, *1*(25), 1–13.

DeBourgh, G. A., & Prion, S. K. (2011). Using simulation to teach pre-licensure nursing students to minimize patient risk and harm. *Clinical Simulation in Nursing*, *7*(2), e47–e56. https://doi.org/10.1016/j.ecns.2009.12.009

Eccles, D. R. (2013). *Communicating with the cognitively impaired patient*. Tallahassee, FL: Florida Board of Nursing: Advance Nursing Institute INC.

Haines, T. P., Bennell, K. L., Osborne, R. H., & Hill, K. D. (2004). Effectiveness of targeted falls prevention programme in subacute hospital setting: Randomised controlled trial. *British Medical Journal*, *328*(7441), 676. https://doi.org/10.1136/bmj.328.7441.676

Haines, T. P., Hill, A.-M., Hill, K. D., McPhail, S., Oliver, D., Brauer, S., … Beer, C. (2011). Patient education to prevent falls among older hospital

inpatients: A randomized controlled trial. *Archives of Internal Medicine*, *171*(6), 516–524. https://doi.org/10.1001/archinternmed.2010.444

Healey, F., Monro, A., Cockram, A., Adams, V., & Heseltine, D. (2004). Using targeted risk factor reduction to prevent falls in older in-patients: A randomised control trial. *Age and Ageing*, *33*(4), 390–395. https://doi.org/10.1093/ageing/afh130

Hill, A.-M., McPhail, S. M., Waldron, N., Etherton-Beer, C., Ingram, K., Flicker, L., … Haines, T. P. (2015). Fall rates in hospital rehabilitation units after individualised patient and staff education programmes: A pragmatic, stepped-wedge, cluster-randomised controlled trial. *The Lancet*, *385*(9987), 2592–2599. https://doi.org/10.1016/S0140-6736(14)61945-0

Horntvedt, M. E., Nordsteien, A., Fermann, T., & Severinsson, E. (2018). Strategies for teaching evidence-based practice in nursing education: A thematic literature review. *BMC Medical Education*, *18*(172), https://doi.org/10.1186/s12909-018-1278-z

Kaplonyi, J., Bowles, K. A., Nestel, D., Kiegaldie, D. J., Maloney, S., Williams, C., & Haines, T. P. (2017). Understanding the impact of simulated patients on health care learners communication skills: A systematic review. *Medical Education*, *51*(12), 1209–1219, https://doi.org/10.1111/medu.13387

Kiegaldie, D. J., & Farlie, M. (2016). *Using education interventions in falls research: a framework for evidence-based education design*. Paper presented at the 7th Biennial Australia and New Zealand Falls Prevention Conference, Melbourne, Australia.

Kirkpatrick, D. L. (1994). *Evaluating training programmes: The four levels*. San Francisco, CA: Brett-Koehler.

Levett-Jones, T., Fahy, K., Parsons, K., & Mitchell, A. (2006). Enhancing nursing students' clinical placement experiences: A quality improvement project. *Contemporary Nurse*, *23*(1), 58–71. https://doi.org/10.5172/conu.2006.23.1.58

McGaghie, W., Issenberg, S., Cohen, E., Barsuk, J., & Wayne, D. (2011). Does simulation-based medical education with deliberate practice yield better results than traditional clinical education? A meta-analytic comparative review of the evidence. *Academic Medicine*, *86*(6), 706–711. https://doi.org/10.1097/ACM.0b013e318217e119

Poore, J., Cullen, D., & Schaar, G. (2014). Simulation-based Interprofessional Education Guided by Kolb's Experiential Learning Theory. *Clinical Simulation in Nursing*, *10*(5), e241–e247. https://doi.org/10.1016/j.ecns.2014.01.004

Primeau, S., & Frith, K. (2013). Teaching patients with an intellectual disability. *Nursing*, *43*(6), 68–69. https://doi.org/10.1097/01.NURSE.0000429798.26483.2d

Salas, E. (2016). Reporting guidelines for health care simulation research. Where is the learning? *Simulation in Healthcare*, *11*, 249. https://doi.org/10.1136/bmj.328.7441.676

Seaton, P., Levett-Jones, T., Cant, R., Cooper, S., Kelly, M. A., McKenna, L., … Bogossian, F. (2018). Exploring the extent to which simulation-based education addresses contemporary patient safety priorities: A scoping review. *Collegian*, *26*(1), 194–203. https://doi.org/10.1016/j.colegn.2018.04.006

Shearer, J. (2012). High-fidelity simulation and safety: A integrative review. *Journal of Nursing Education*, *52*(1), 39–45.

StataCorp, (2013). *Stata statistical software*. College Station, TX: StataCorp LP.

Stenvall, M., Olofsson, B., Lundström, M., Englund, U., Borssén, B., Svensson, O., … Gustafson, Y. (2007). A multidisciplinary, multifactorial intervention program reduces postoperative falls and injuries after femoral neck fracture. *Osteoporosis International*, *18*, 167–175. https://doi.org/10.1007/s00198-006-0226-7

Vaismoradi, M., Turunen, H., & Bondas, T. (2013). Content analysis and thematic analysis: Implications for conducting a qualitative descriptive study. *Nursing and Health Sciences*, *15*, 398–405. https://doi.org/10.1111/nhs.12048

Williams, C., Bowles, K. A., Kiegaldie, D. J., Maloney, S., Nestel, D., Kaplonyi, J., & Haines, T. P. (2016). Establishing the effectiveness, cost-effectiveness and student experience of a Simulation-based education Training program On the Prevention of Falls (STOP-Falls) among hospitalised inpatients: A protocol for a randomised controlled trial. *British Medical Journal Open*, *6*(6), e010192. https://doi.org/10.1136/bmjopen-2015-010192

Wong, B., Etchells, E., Kuper, A., Levinson, W., & Shojania, K. (2010). Teaching quality improvement and patient safety to trainees: A systematic review. *Academic Medicine*, *85*(9), 1425–1439. https://doi.org/10.1097/ACM.0b013e3181e2d0c6

How to cite this article: Kiegaldie D, Nestel D, Pryor E, et al. Design, delivery and evaluation of a simulation-based workshop for health professional students on falls prevention in acute care settings. *Nursing Open*. 2019;6:1150–1162. https://doi.org/10.1002/nop2.318

APPENDIX 1

STAGES AND STEPS OF THE SAFE RECOVERY PROGRAMME

STAGE 1: INFORMATION GATHERING/ASSESSING RISKS (Meeting 1)
Getting to know your patient
Step 1: Information gathering
Step 2: Building rapport
Step 3: Identifying “leverage point” (patient “buy in”)
Exploring patient perceptions
Step 4: Assessing mobility approach
Step 5: Identifying falls history OR
Step 6: Assessing threat appraisal of falls (the patient’s view of their risks)
Giving patient information
Step 7: Going through the Safe Recovery patient booklet or show video

STAGE 2: PROBLEM-SOLVING AND GOAL SETTING (Meeting 2)
Setting patient goals
Step 8: Reviewing threat appraisal
Step 9: Setting goals
Step 10: Enhancing motivation
STAGE 3: REVIEWING GOALS (Meeting 3)
Reviewing patient goals and outcomes
Step 11: Did the patient fall?
Step 12: Did the patient achieve their goals?
STAGE 4: (OPTIONAL)
"Door stop" conversation
Checking in with the patient about how they are going with their goals

APPENDIX 2

THE SIMULATION-BASED EDUCATION (SBE) WORKSHOP FOR THE SAFE RECOVERY PROGRAMME (SRP)

Each SBE workshop was delivered over 4 hr on the first day of a student orientation to a hospital clinical placement.

The learning objectives were to enable students to:

- describe common patterns of falls in hospitals (when, where and why they occur);
- describe the first 3 stages and 12 steps of the SRP;
- recognize patient attitudes that increase their risk of falling in hospital;
- recognize patient decision-making patterns that increase their risk of falling in hospital; and
- demonstrate skills for implementing the SRP with patients

A blended learning approach was used incorporating:

- written materials – including the *Safe Recovery Booklet* designed for patients;
- videos – as content sharing, triggers for discussion and demonstration;
- small group discussions;
- role-play simulations (peer to peer);
- immersive simulations with a simulated patient (SP)
  - o Scenario 1: Information gathering/assessing the risks
  - o Scenario 2: Problem-solving and goal setting
  - o Scenario 3: Adapting the SRP to challenging clinical situations (cognitive impairment); and
- Postsimulation debriefing

Within the role-play simulations and immersive simulation scenarios, students were given the opportunity to practice or observe patient-centred communication skills designed to mitigate patient risk-taking behaviours that lead to falls.

CONTENT

The workshop was divided into six major sections with corresponding teaching activities and time allocations:

1	Fall in hospitals – The facts	Part 1: Checking prior learning (10 min) Part 2: **Video 1** Fast facts of falls (10 min) Part 3: Facilitated discussion (10 min)
2	Overview of the Safe Recovery Programme	Part 1: Principles of the programme (5 min) Part 2: Steps of the programme (10 min) Part 3: **Video 2** Stage 1 (Steps 1–7) (10) Part 4: Facilitated discussion & role-play simulations (15 min) Part 5: Read through Safe Recovery Programme (10 min)
3	Simulation – I STAGE 1: Information gathering/assessing risks	Part 1: Briefing (10 min) Part 2: Simulation (10 min) Part 3: Debriefing (10 min)
4	Simulation – II STAGE 2: Problem-solving and goal setting	Part 1: **Video 3** Phase 2 (10 min) Part 2: Facilitated discussion & role-play simulations (15 min) Part 3: Briefing (5 min) Part 4: Simulation (10 min) Part 5: Debriefing (10 min)
5	STAGE 3: Reviewing patient goals and outcomes	**Video 5** Phase 3 and key points (10 min) Mini – Break (5 min)
6	Simulation – III Adapting the programme	Part 1: Briefing (5 min) Part 2: Simulation (10 min) Part 3: Debriefing (10 min)

PARTICIPANT ORIENTATION TO THE SIMULATIONS

At the start of the workshop, students were given an overview of the workshop, including duration, teaching methods, the learning objectives as well as the overall purpose and context of the workshop as part of a hospital-wide research programme. Prior to the first simulation, students were briefed about:

- the role of the SP;
- the structure of the simulation activities; and
- the nature and purpose of the feedback;

The simulated clinical environment included a hospital bed with bed rails, a bedside table with a jug/cup of water, a nurses' buzzer (or substitute), an IV pole and chair. The SP wore a hospital gown.

THE ROLE-PLAY SIMULATIONS

Students were given the opportunity to role-play each of the 2 stages of the SRP. Students worked in pairs to practice by either playing the role of the patient or the student delivering steps of the programme. Roles were then reversed.

THE IMMERSIVE SIMULATIONS

The simulation scenarios were conducted with individual students interacting with the SP. The same SP participated in all scenarios and workshops. The first two scenarios involved a cognitively intact patient; the third scenario involved a patient who displayed signs of mild delirium. The first scenario was the most straightforward as the student gathered information from the patient and could use the questions from scripts as support without statistically significant change. The second scenario was more difficult as the student needed to tailor his/her responses to the patient in real time and was less able to rely on the script. The third scenario was the most difficult as the student had to 1) respond to a patient whose presentation changed during the course of the conversation and 2) significantly adapt the SRP to meet the patient's needs. The presence of a facilitator in the simulation room during the scenarios meant that students participating in the scenario could receive individual support as required.

In most workshops, the observer students sat in a separate room and watched the scenario on a screen. In a few cases where there were problems with the technology, all students and the SP were in the same room during the scenario ("fish bowl" technique).

The SP had extensive experience working in health professional education. He received detailed guidance notes including a role description with relevant medical and social information, an overview of the workshop and learning objectives as well as an outline of the students' tasks. The notes contained suggested phrasing for responses to student questions for the ten steps of the SRP to be practiced in the simulations (Stages 1 and 2). The SP portrayed the patient role consistently and realistically.

FEEDBACK AND DEBRIEFING

Approximately 10 min per scenario was allowed for feedback and debriefing (3 × 10 min). Feedback was provided in the presence of the two facilitators: the SP and the group of peer students. The focus of the content of the feedback was on the nature of the communication with the SP and the steps of the SRP.

The method for structuring feedback followed principles of "Pendleton's rules."[22, 23] The session began with the student's self-evaluation of what went well and was followed by feedback from the facilitators, SP and peer group with a focus on what had worked well. The observed student then identified what could have been done differently, followed by feedback from the facilitators and group. During the feedback, the SP came out of role and referred to the patient by name rather than using "I" statements when discussing the patient's perceptions of the scenario. The feedback session was conducted immediately after each scenario.

SETTING OF THE WORKSHOP

The simulations were conducted within the simulation facilities at either a university or hospital. Students from medicine, nursing and allied health, who were all undertaking a clinical placement at Peninsula Health, participated in the education if they were placed onto an intervention ward. Students worked in groups of up to 12, with groups being either uni-or multi-professional. Two members of faculty staff facilitated each workshop. The same two facilitators conducted all but one of the workshops. One facilitator was a nurse educator who had a background in undergraduate clinical teaching and postgraduate studies in health profession education. The other facilitator had a background in allied health (speech pathology), education including postgraduate medical education and healthcare communication.