

Title: Vascular access research knowledge translated for Clinicians

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Abstract

Background

Undergraduate Bachelor's degree programs for Registered Nurses (RNs) in Australia provide only the fundamentals of peripheral intravenous catheter (PIVC) care. Some RNs perform PIVC insertion but only after additional employer provided training. In 2013, a vascular access-focused elective course "Peripheral Intravenous Access and Care (8035NRS)" was commenced for Queensland nurses who were enrolled in any of the Griffith University Master's degree programs. It was developed as a strategy to translate research knowledge into practice by providing students with access to the latest research findings and current best practices in peripheral IV access.

Methods

Topics covered pre-insertion, insertion and post-insertion care over three modules, with each module taking several weeks to complete. The educational course was predominantly developed for the online environment with students able to work through the modules at their own pace. Learning activities included viewing short videos delivered by local and international clinicians and researchers as well as online readings and reflection.

Results

The 12 enrolling students were all female Registered Nurses from four Nursing related Griffith University Master's Degree Programs. General feedback from participants was that the Short Answer Question approach was more difficult than the longer essay format that many had traditionally submitted for assessment in their undergraduate or other postgraduate courses. The reduced word count required different writing skills that demanded succinct and clear conveyance of the intended message. Formal feedback from students was sought after completion of the course and scored better than university average.

Conclusion

This course is the first known university provided, postgraduate academic course in Australia, and possibly one of the few internationally. The course succeeded in its aim of increasing the knowledge and skills about safe, evidence-based PIVC insertion and care to registered nurses. This ultimately will increase patient outcomes and the patient experience of vascular access.

Keywords

Peripheral intravenous catheters, postgraduate education, insertion and management of PIVCs, evidence-based knowledge and skills.

Background

Undergraduate Bachelor's degree programs for Registered Nurses (RNs) in Australia provide only the fundamentals of peripheral intravenous catheter (PIVC) care. A recent review found only a small number of effective courses for undergraduate vascular access training.¹ Models of care also differ between medical and nursing students.² Once registered, some RNs perform PIVC insertion but only after additional employer provided training with practice generally limited to specific departments such as emergency settings. Formal credentialing using either the professional organisation endorsement or annual hospital based assessment systems is possible but rarely undertaken or expected. There are few IV "Teams" in Australia and most cannulation in the general hospital setting is undertaken by junior medical staff. Their workload, as well as delays in patient cannulation could be reduced if larger numbers of appropriately skilled RNs were able to perform this common procedure.

In 2013, a vascular access-focused elective course "Peripheral Intravenous Access and Care (8035NRS)" was commenced for Queensland nurses who were enrolled in any of the Griffith University Master's degree programs.³ This was a 10 credit point course within an 80 credit point (one year full-time) Master's degree program. It was developed as a strategy to translate research knowledge into practice by providing students with access to the latest research findings and current best practices in peripheral IV access. This was to complement and build on the strengths of the Alliance for Vascular Access Teaching and Research (AVATAR) group based at Griffith University (www.avatargroup.org.au). To our knowledge, it is the first Australian university course of its kind to provide students with evidence-based knowledge and skills for safe and effective insertion, and management of PIVCs.

The Course

Topics covered pre-insertion, insertion and post-insertion care over three modules, with each module taking several weeks to complete, and the entire course constituting one semester (13 teaching weeks plus three weeks for revision and assessments). Phlebotomy content was also covered. The first module encompassed the principles and practice of venepuncture and peripheral intravenous cannulation. Students explored the history and purposes of intravenous therapy and then reviewed practices associated with venepuncture and peripheral cannulation including relevant

anatomy and physiology. Principles of infection prevention and safety requirements for these interventions and technology-assisted insertion were also addressed. Module Two was designed to challenge students to present a critique of the principles of PIVC management. They were asked to critically appraise specific elements such as skin disinfection, dressings and securement and approaches to flushing. Consideration of fluid and administration set care as well as assessment for complications of therapy were also posed for appraisal. The final module focussed on evaluating and implementing evidence for vascular access practice. It was constructed to further develop student knowledge and skills to appraise literature and evidence for peripheral venepuncture, PIVC cannulation and care. Challenges and strategies for knowledge translation in the field were explored including avenues to contribute to surveillance, quality and research projects. Table 1 describes the learning outcomes that students were expected to obtain from the course material.

Table 1 Learning outcomes

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| 1 | Describe the current evidence to support effective professional assessment and interventions for people requiring intravenous access and therapy within a multi-disciplinary team environment. |
| 2 | Demonstrate critical thinking skills when assessing, diagnosing, planning, implementing and evaluating professional practice for the care of people requiring intravenous access and therapy. |
| 3 | Use a systematic approach to identify relevant literature to answer clinically meaningful questions related to intravenous access and therapy. |
| 4 | Critically appraise intravenous therapy concepts and relevant safety and ethico-legal requirements in order to practice advanced clinical skills for vascular access and intravenous therapy. |
| 5 | Demonstrate successful venepuncture and/or peripheral venous cannulation in a manner which complies with relevant safety, current evidence, and ethico-legal obligations. |

The educational course was predominantly developed for the online environment with students able to work through the modules at their own pace and flexibly in relation to their own work and personal commitments. Learning activities included viewing short videos delivered by local and international clinicians and researchers as well as online readings and reflection. A one day workshop was the only in-person component, and this was delivered early in the semester to provide students with additional hands demonstration and practice, and in-person assessment of cannulation in a simulated scenario using mannequin arms.⁵

The practicum had two elements: (i) the facilitated workshop where PIVC insertion techniques were practised (ii) short presentations where PIVC topics and questions related to equipment and process were discussed. Both activities involved evidence based justification of materials. A guided instructional approach was used in the face-to-face setting with guest presenters who were nurse educators but also had an affiliation with various organisations in the vascular access industry or were clinical experts such as Clinical Nurse Consultants or Clinical Nurses from Vascular Access Surveillance Teams. The topics were free from active product promotion and interests declared before each presentation. A small trade display was also available. Each educator focussed on the research aspects of various devices and demonstrated the background to how and why they were developed. During the workshop, students could then practice simulated PIVC insertion and an assessment of their preliminary skills was completed at the conclusion of the day. This was necessary as a confirmatory starting point for these students who post-workshop were required to practice insertion skills in their clinical environment and have these signed by a workplace mentor.

Assessment

Assessments ranged from practical items to written tasks. There were five assessment items: (i) Practical demonstration (workshop based assessment of PIVC insertion skills) undertaken in Week 2. This item was only assessed as satisfactory/unsatisfactory and was a mandatory requirement before the practical log for assessment (ii) could be commenced; (ii) Log of learning activities requiring five successful IV cannulations/ venepunctures at the clinical workplace. This was also assessed as satisfactory/unsatisfactory; (iii) Examination weighting 0.3 – selected responses and constructed responses comprising twenty multiple choice questions (MCQs) and two short answer questions (SAQs); (iv) Assignment weighting 0.4 – constructed responses across seven SAQs; (v) Assignment weighting 0.3 – constructed responses from five further SAQs.4 The word count for the SAQs was limited to 300 words.

The pedagogical assumption taken for written assessments (iii) to (v) was that the five levels of Structured Observed Learning Outcomes (SOLO) as described by Biggs were harmonious with the Dreyfus Model of Skill Acquisition that is essentially a Novice to Expert (N-E) model.6, 7 Biggs offers an elegant taxonomy that may be applied to such short response-style questions and has been used by teachers to analyse the level of complexity of responses to short-response assessment items.8 The concepts associated with the Dreyfus N-E model were applied to provide a philosophical underpinning that has been previously used to describe clinical performance.8-10 The model describes how people progress in their knowledge from rule-based problem solving to a different approach based on matching with past clinical experiences. The approach was used by the lecturer to judge the performance of student responses to SAQs and provided a degree of insight to the level of knowledge that translated to practical clinical skills. For example, students that presented SAQ responses that were assessed to be at the SOLO Multi-structural level were considered Competent within the hierarchy of the N-E model, while the more advanced Relational level SAQ answers indicated that a student could be considered Proficient. It must be noted, though, that the assumptions held for this course did not consider that a SOLO Extended Abstract response to an SAQ could be adequately reconciled as defining an Expert. The overall aim of this course was to provide

an educational approach that enabled RNs, having covered the basics of PIVC care, to increase their knowledge and skills towards the specialist level of practice.

Results

Under the results section, it would be great to link this back to the purpose of the program, and the purpose of the paper. It is initially unclear if the results are going to be how many additional nurses are now inserting IVs in Australia, how quality of patient care has been influenced, or program feedback from participants.

Will the other possible program evaluation domains be evaluated in the future?

Is there a plan to continue offering this course? Will the course expand beyond 12 students?

The first course delivery was in 2013. Expressions of interest in the course were received from 58 people within two weeks of formal permission from the university to proceed with the pilot course offering. This was without any formal advertisement and/or marketing efforts and just based on word-of-mouth. The 12 eventual enrolling students were all female Registered Nurses from four Nursing related Griffith University Master's Degree Programs. The course saw all students successfully complete the course and the course continues to be offered. The practical demonstration and log of activities that were the non-graded items of assessment were successfully completed by all.

Formal feedback from students was sought after completion of the course using the university's standard processes and course appraisals from students scored better than university average. Additional general feedback from participants was that the SAQ other assessment items were more difficult to address than the longer essay format. In response to this it is planned to provide students with a brief message at the start of each semester on a web-based discussion board. This will explain the rationale for the SAQ style of assessment and provide more guidance for what is required. Many had traditionally submitted for assessment in their undergraduate or other postgraduate courses. The reduced word count required different writing skills that demanded succinct and clear conveyance of the intended message. Students also felt that the content and readings on the history of PIVC use was disproportionate with other sections of the course. The course has been modified to reflect a better weighting of this content. The course continues to be offered with a view for future course development that may include broadening content to include central venous catheters, and/or offering of individual modules for professional development.

Discussion & Conclusion

Considering that it was offered at a postgraduate level, the demand and interest in the course was high. This is based on feedback to date and personal contacts. The course consisted of weekly delivery of online content that was promoted and structured to correspond with the Infusion Nurses Society Standards of Practice for peripheral vascular access.¹¹ The approach was modelled upon similar recommendations for centrally placed catheter education.^{12, 13} Written assessments were designed to reflect vascular access related clinical activities and students were required to

successfully outline structured decision-making and justification of opinions using contemporary evidence. The course activities aided learners to construct meaning from critical reflection on readings. As a group they were encouraged to reflect on how they had developed certain assumptions about PIVC access and to question whether those assumptions were valid. Students found the concise writing style required for short answer questions challenging, as opposed to traditional long essays that have been typical of undergraduate and postgraduate nurse education in Australia. The assessment approach also required students to give succinct but referenced responses, akin to professional writing required for journal publications.

Overall, the course was a success and students enjoyed access to the latest research as well as practical learning activities. Based upon student feedback, a decision was made to reduce content related to the history of PIVC use. Additional costs were incurred to develop the recorded materials from external clinical research experts, but this was regarded as an investment in engaging students with contemporary research projects. Students viewed this pre-recorded video content several times as well as lectures that were initially presented face-to-face and video archived within the course. Costs associated with running the workshop were supplemented with external participants that enrolled in a concurrently run PIVC skills short course. These students did not complete online materials or undertake written assessments. This was also seen as a strategy to promote the postgraduate course to clinical facilities beyond routine marketing channels and beyond formally enrolled students pursuing an academic degree.

Several enquiries were made from interstate students, suggesting the option of employing a clinical facilitator in other cities of Australia could be possible to increase student numbers. In conclusion, this course is the first known university provided, postgraduate academic course in Australia, and possibly one of the few internationally. The course succeeded in its aim of increasing the knowledge and skills about safe, evidence-based PIVC insertion and care to registered nurses. There is also strong interest to integrate this with undergraduate nursing courses. This could potentially pave the way for new Nursing graduates entering the workforce to be equipped with an additional skill set. This ultimately will increase patient outcomes and the patient experience of vascular access.

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