



Design and evaluation of a post-graduate education in rehabilitation research methods for medical and allied health professionals

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ABSTRACT

Objective: Generic courses in research methods do not adequately prepare the postgraduate clinician for the undertaking of a clinical research project. This paper outlines the design, delivery and evaluation of a research methods topic specifically aimed at postgraduate health professionals. The purpose of the new research methods topic was to create an integrated learning experience for the students in their clinical setting, and to carry their new skill set over in to the follow-on topics of project design and project implementation. **Method:** A topic was developed using adult learning principles and based on the needs of postgraduate clinicians to enhance the knowledge of health professionals in the field of rehabilitation research methods, as part of a Masters in Clinical Rehabilitation qualification. Fifty seven students from both Australian and International backgrounds enrolled in the topic over 3 separate semesters. The topic was delivered as a 3 day intensive to 14 students, as a traditional lecture based topic over a full semester to 10 students, and as an online topic over a full semester to 33 students. Students were asked to evaluate the course via a short feedback form at the end of the topic. **Result:** Twenty students completed the feedback form. There was a positive feedback response of 98% for the 3-day intensive students and 96% for the full semester students. To date 8 students have completed the full Masters course, 6 of whom have developed their clinical research project to papers for submission to peer reviewed journals. The first of these papers has been published. **Conclusion:** Health professionals benefit from a research method topic based on adult learning principles that is grounded in their own clinical practice.

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Introduction

Flinders University of South Australia offers a Master's program in Clinical Rehabilitation. Students who enrol in this course are health professionals and the majority enrol part time to study whilst continuing to work in their clinical setting. Part of the requirements of the Masters

in Clinical Rehabilitation course is that all students must complete a research component related to their clinical work. Medical education in Australia has largely not prepared health practitioners for evidence based practice (EBP). Increased knowledge and skill in evaluating and performing research is crucial if they are to understand research findings on which clinical

practice ought to be based (1). Many health professionals view their position as one of treatment, with research being the job of the academic. However, health professionals increasingly accept that EBP is the best practice basis for their work and decision making. The gap between clinical and research work has resulted in research that should change practice often being ignored for years (2). The list of reasons for enrolling in post-graduate courses includes keeping up to date with current knowledge, career progression, and subject specific interest (3), however concepts and theories presented to health science students in research methods courses are often presented separate to the context of clinical skills, and as a result have been considered by students as “abstract”, “uninteresting”, and “hard” (4).

Many research methods courses are amalgamated across a school or faculty. Often it is run by a statistician, usually resulting in a dry presentation of factual statements on types of studies and statistical tests. Additionally, class sizes are large, and contain students from many disciplines, where the non-math specialist can feel isolated and left behind. There may also be a tendency to learn facts in the style of an undergraduate learning the anatomical textbook ad verbatim. This does not promote a level of understanding within the clinician, as in the andragogy process of adult learning, approaches that are problem-based and collaborative rather than didactic, and that place an emphasis on equality between the teacher and learner are preferred. The educational needs of the health professional in the development of research skills should align to the six principles of adult learning. Adults are internally motivated and self-directed, bring life experiences and knowledge to learning experiences, are goal oriented, are relevancy oriented, are practical, and like to be respected. Preparing a clinician for the world of research is important to ensure that research based evidence is incorporated into clinical practice. Winn (1995)(5) demonstrated the importance of hands on research practice in an undergraduate setting, in that social science students who typically go on to a career as a

practitioner appreciated a ‘learning by doing’ approach.

Many of our postgraduate students are experienced clinicians who are studying to further their knowledge and careers, and potentially have not been exposed to any research activities since their undergraduate days. Many of our students are also studying around their work schedules, and topics need to be delivered either online or as short intensive courses. In addition, learning of research methods should not be done in isolation. In a study by Coomarasamy & Khan (6) they found that standalone teaching of EBP improved knowledge but not skills, attitudes, or behaviour, whereas clinically integrated teaching improved knowledge, skills, attitudes, and behaviour.

Numerous postgraduate courses for health professionals are now available, and incorporate a component of research methodology, including the Masters in Clinical Rehabilitation course we run at Flinders University, South Australia. In previous years, our post graduate students attended a generic research methods topic that was delivered out-with the context of the clinical setting. The purpose of the new research methods topic was to create an integrated learning experience for the students in their clinical setting, and to carry their new skill set over in to the follow-on topics of project design and project implementation. This topic was developed for use in a post-graduate course in clinical rehabilitation. The course attracts health professionals with a least 2 years clinical experience post bachelor graduation.

Description of the topic

The topic is sub-divided into 5 modules, taught in sequence, to develop the clinicians understanding of the importance of research and their position within the field. This was designed to follow the process that the clinician will go through when developing their own research. This should lead to a richer understanding of the process, and a higher quality output that can contribute to the evidence. The 5 modules were developed as: 1. EBP and developing a theory; 2. designing a proposal; 3. literature review skills;

4. ethical considerations; and 5. Statistics. In addition, 7 key learning outcomes were developed, as listed in table 1.

Course Content

The key considerations and resources in the teaching of each module were as follows:

1. EBP and developing a theory

Sources of knowledge and evidence based practice (7,8). The first hurdle that an educator must overcome is the belief amongst clinicians that research is done by academics, and is not related to their work and practice. The source of the research question is the part of their current practice that they feel could benefit from a change, allowing them to make the link between clinical research and patient care. Identifying the need for change and what effect it will have is the beginning stages of a research hypothesis. Focusing this into a specific patient group and/or issue is the beginning of the development of a question.

2. Designing a proposal

At this stage the use of a good handbook will help with the design, for example “Handbook for Allied Health Researchers” (2009) by Perry, Morris and Cotton (9). It is important to emphasise that the project will need to be feasible, as many will begin to plan a question that can only be answered with a large randomised control trial requiring large grants.

3. Literature review skills

The health professional must then place their idea in the context of the current literature. In order to do this, sound literature review skills must be developed. Emphasis should be on the fact that critically analysing a paper is essential, and that any output they produce will be under a similar scrutiny from reviewers and readers of the final paper. Again, good resources are essential, such as “How to read a paper” by Geenhlaugh and Taylor (10).

It is at this stage that most health professionals admit to skimming or skipping the results section, as it is full of statistical analysis that they do not understand. Understanding the

statistical analysis is key to being able to critically evaluate the methods and discussion sections, and taking time to answer specific questions will help alleviate the fear of statistics and allow the student to continue with their critical evaluation. A larger module on statistics is needed later in the topic.

4. Ethical considerations

The need for ethics must be covered, using the Declaration of Helsinki (11). The ethics process must be covered, including who is on committee, the style of writing to ethics, with an emphasis that you cannot deviate in your methodology from what you submit to ethics.

5. Statistics

Statistics is purposely left to the end of the course, as it can put students off the whole research process. By now, they should have a feel for the process, and be beginning to have ideas of the project they would like to do. I would advise against the use of statistics books written by statisticians, as these can be very intense. Instead, a book written by a non-statistician such as “*Discovering statistics using SPSS*” by Andy Field (12) gives the reader the feeling that they are not alone in the fear of statistics, and this particular book is written in a style that makes it much easier to read. Encourage specific questions from papers, explaining the sections that they do not understand. The statistics module concludes with a practical session that is clinically relevant, utilising a set of data with pre-determined answers. This is the final section that allows the students to create and interpret results for themselves.

Method

Participants

The analysis of the topic was reviewed by the Flinders University Social and Behavioural Research Ethics Committee who determined it to be exempt. A total of 57 students completed the topic over 3 semesters. It has been delivered as a three-day intensive with two separate classes of 6 and 8 participants; and as a 12 week course on 3 separate semesters, containing a total of 43

students, 10 face to face (internal) students and 33 distance learning (external) students. All students enrolled in the topic over the 3 semesters were invited to give their feedback on the topic.

Student assessment

Assessment was based on 3 criteria:

1. The ability to critically evaluate a paper (adapted from Guyatt et al, 1993)(13)
2. The development of a theory into a proposal written to the specifications of a template
3. The ability to calculate and interpret a set of data as a statistical analysis, following a specifically developed user guide to SPSS (IBM).

In the three day intensive classes, student interaction and questions were encouraged to maintain engagement, and overnight tasks were set with presentations of findings of the previous day's work on days 2 and 3. In the online class, forums were set up for each module, encouraging online participation, discussions between students, and allowing an open section for any questions related to interpreting papers and statistical analysis. In addition to this, discussions also occurred in the class room for those studying internally.

Student evaluation of the topic

The topic evaluation process and questions were different for the intensive version than the 12 week version. The evaluation questions for the intensive program were produced by the facilitating hospital, whereas the evaluation of the 12 week course was set by the University. For each of the three day intensives, the facilitator collected evaluation forms from the students containing 9 questions answerable on a 4 point scale. For the online topic, an online evaluation form was completed, containing 5 questions on a 5 point scale. On each occasion, the lecturer was blind to the collection process. Table 2 presents the questions and student feedback from the three day intensives with a 100% response rate from the students. The response rate from the 12- week version of the topic was much lower (16%), and these questions and responses are presented in table 3.

Result

Participants

Of the 57 participants, the mean age was 34.4 years (SD 13.4) and 18 were male. 33 were Australian students, and 24 were international students. The majority of students were from a medical, physiotherapy, occupational therapy, or nursing background.

Student evaluation and feedback

For those who completed the topic as part of a 3-day intensive, there was a 100% response rate to the feedback questions. There was a 98.4% response of either 'fully met' or 'exceeded expectations' across all questions and participants (table 2).

From those who completed the topic over the 12 week course, the response rate to evaluation was low, at 16% (6 participants). There was a 96.6% positive response of either 'agree' or 'strongly agree' to each of the statements (table 3).

As of July 2013, 8 of the participants have completed the full Masters course. Of these 8, 6 of the student led projects have been developed for submission to peer-reviewed journals, with the first of these having been accepted and published. The students represent all 3 streams of the topic, with one from the intensive course, four from the internally delivered course, and one from the externally delivered course. The majority of students study part-time around their clinical work load, and are not expected to complete their studies until at least mid-2014. Only the students who attended the internal delivery of the topic were enrolled full time, which is reflected in the higher number of completed papers from this cohort.

Discussion

This paper outlines the design, delivery and evaluation of a research methods topic developed specifically for the post-graduate health professional. Students in this course reported a high satisfaction level, with the intensive delivery method scoring particularly high in meeting or exceeding expectations.

The use of a course with emphasis on clinical relevance has been previously published (14). In their course, the emphasis was placed on the ability of the students to critically appraise research papers and other evidence, with assessment based on a data interpretation exercise and the interpretation and appraisal of extracts of research papers. This is similar to two of the assessment methods in the topic presented here. In our course at Flinders University we further this by embedding the learning into the students' clinical practice by including the development of a research proposal based on their own clinical observations.

Part of the success of the course can be attributed to the andragogy theory of learning, where in this setting the health professionals bring their own ideas to the course and scaffold their learning around their own clinical practice. There is evidence that critical appraisal teaching has positive effects on participants' knowledge (15). A one-off half-day course on teaching appraisal skills was shown to show small improvements in self-selected healthcare professionals' knowledge and understanding of the medical literature and appraisal skills with critical appraisal skills training. No improvement was observed in attitudes towards the use evidence and evidence-seeking behaviour (16). However teaching appraisal skills specific to medicine over a longer time scale has shown to improve skills by 25% (17).

For clinicians to make sense of scientific evidence and follow an evidence-based approach to their practice it has been stated they should be able to: (1) turn problems of their clinical practice into focused questions; (2) comprehensively search for literature to address these questions; (3) critically appraise this literature for its usefulness and scientific validity; and, (4) apply the results of this appraisal to their practice (18). These are essential components if there is to be transference of knowledge and skills from the lecture theatre to clinical practice. In our course, the research methods are taught in relation to each individual student's background, where there are encouraged to appraise journal articles

relevant to their own practice and develop research proposals based on their own clinical experience. This approach scaffolds the new knowledge on to their existing experiences and makes for a smoother transition from the lecture to the clinic.

An intensive 3 day course in EBP has been shown to lead to a significant increase in knowledge and skills of the participants (19). In our course the intensive 3 day version of the topic had a slightly higher positive response rate, and is potentially a more acceptable form of learning for the full time health professional. This has in part led us to consider the development of short intensive courses across all our post-graduate topics in Clinical Rehabilitation.

An important point to consider is the availability of the educator to answer questions throughout the course. One of the major barriers to postgraduate students completing the research component of a Masters is poor communication between student and supervisor (20). For this topic, the lecturer allowed any type of question to be asked either in person, via online forums, or via email. All questions were responded to within 2 working days, on most occasions the same day the question was posted. This is a time-intensive method of teaching, and potentially would not be suitable for larger classes, such as those typically seen in the undergraduate setting. However smaller class sizes have been shown to be an important factor in student satisfaction, and part-time students on postgraduate programmes are a particularly vulnerable group who may need extra support from educators and trainers. For these students, smaller class sizes could be beneficial (21).

Although it is common for Masters by Research students to publish, the change in teaching practice has resulted in Masters by coursework students producing publishable material for the first time in our department.

This study suffers from some limitations. Firstly, the poor response rate for the full semester students has the potential to skew the

results of the feedback. Also, as the feedback was anonymous, further analysis of the data was not possible. As the intensive and 12 week versions had different evaluation questions, they cannot be directly compared. Despite these limitations it has allowed reflection on the best methods to teach research skills in working health professionals.

Conclusion

The results from the development of this course indicate that postgraduate clinicians benefit from a research methods topic tailored to the clinical setting, taking into account the needs of the postgraduate learner, providing relevance to their work place, and in return producing a research output of publishable quality. Future studies should follow up on clinicians educated to postgraduate level to identify any impact these tailored courses have on their practice, and if the skills learnt are long lasting.

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Table 1. Learning outcomes for clinician specific Research Methods topic.

LO1	Critically analyse the role of theory in underpinning rehabilitation research
LO2	Critically evaluate the characteristics of good rehabilitation research
LO3	Critically evaluate the importance of study design issues in rehabilitation research such as validity, reliability, bias and sample size
LO4	Identify different types of study design in rehabilitation research, evaluate their strengths and weaknesses and select appropriate designs in practice
LO5	Develop a preliminary rehabilitation research proposal
LO6	Understand methods for collecting, recording and analysing qualitative data (interview techniques, focus groups, transcripts etc) in rehabilitation research
LO7	Understand methods for collecting and recording quantitative data (questionnaire design, devising and testing measurement tools, designing data collection tools etc) in rehabilitation research

Table 2 student evaluation of topic from 3 day intensives

Variable	Exceeds Expectations	Meets Expectations	Partially meets expectations	Needs Improvement
Topics/ Content	10 (71%)	4 (29%)	0	0
Course Duration	10 (71%)	3 (21%)	1 (8%)	0
Instructor Knowledge of Topic	14 (100%)	0	0	0
Ability to make topics relevant to participants	14 (100%)	0	0	0
Delivery Skills	12 (85%)	2 (15%)	0	0
Interaction with participants	12 (85%)	2 (15%)	0	0
Delivery Method	13 (92%)	1 (8%)	0	0
Use of AV/ training aids	11 (78%)	3 (22%)	0	0
Program Handouts	12 (85%)	1 (8%)	1 (8%)	0

Table 3 student evaluation of topic from full semester class

Variable	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
I had a clear idea what was expected of me	4 (67%)	2 (33%)	0	0	0
I developed my ability to think critically and analytically	5 (84%)	1 (16%)	0	0	0
The feedback I received helped me to learn	5 (84%)	1 (16%)	0	0	0
The learning resources were of a high quality	4 (67%)	1 (16%)	1 (16%)	0	0
overall I had a worthwhile learning experience	4 (67%)	2 (33%)	0	0	0