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ABSTRACT

Diagnostic ultrasound has expanded into physiotherapy though training in the modality appears to be and is reported by physiotherapists as limited. To address this, a training package was specifically developed for physiotherapists within Australia. The aim of this study was to evaluate the training package for improved educational outcome and to ascertain if there was a difference in outcome between two forms of delivery.

The training package was delivered either during a workshop, where the training package was delivered face to face, or via a self paced DVD, which was mailed to participants. Both participant groups completed a web based assessment prior to and at the completion of the training. The assessment assessed their knowledge in ultrasound physics, scanning technique and anatomy.

Pre and post training assessment scores were available for 84 participants who attended a workshop and 96 participants who received the DVD. Important and statistically significant (p < 0.05) increases in assessment scores from the beginning to the end of the training program were seen in both groups. On average, workshop participant scores improved by 37% and DVD participant scores improved by 27%. No statistical difference in the post assessment scores of the workshop trained or DVD trained participants was evident.

On comparison, no statistically significant difference between the two methods of training; workshop and DVD, was found so both can be seen to be beneficial to the professional development of the physiotherapist in the use of diagnostic ultrasound within their profession.

INTRODUCTION

Diagnostic ultrasound is being used within physiotherapy particularly as a means of providing biofeedback (McKiernan, et al., 2010) A national survey of Australian physiotherapists conducted by the authors (McKiernan, et al., 2011) indicated that physiotherapists are already using diagnostic ultrasound in their practice however training in the modality is reported to be limited. While some training is provided, mostly by the equipment companies selling the machines, further training was considered desirable by survey participants. In response to a variety of training methods, survey participants indicated workshop and DVD formats to be the two favoured methods of training in diagnostic ultrasound. Post graduate university courses require a large time and financial commitment and require participants to attend the university campus, often taking months to complete, rendering them inaccessible to the majority of physiotherapists (The University of Sydney, 2008). While many undergraduate physiotherapy programs currently include basic skills in the modality, this leaves a large gap for qualified professionals (Charles Sturt University, 2008; Curtin University, 2000; Frost & Clarke, 2004; La Trobe University, 2006; Monash University, 2008; The University of Newcastle, 2008; The University of Sydney, 2008).

Continuing Professional Development (CPD) is said to be necessary to the continued improvement of clinical services (Lawton & Wimpenny, 2003). The purpose of CPD has been stated to include maintenance and improvement in clinical performance; it can result in a change in practice by influencing professional practice, facilitate improvement in patient outcomes and help health professionals keep up to date (Cantillon & Jones, 1999; Fox & Bennett, 1998; O'Brien, et al., 2001). Positive CPD prepares participants for change and further learning (Mazmanian & Davis, 2002). Competence is said to be built on clinical skills, knowledge and moral development (Epstein & Hundert, 2002). The education in this study was used to facilitate learning as opposed to being regarded as instruction (Fox & Bennett, 1998).

While no one method has been reported to be the most effective for improving participant performance, the most effective methods of CPD have been stated to be learning linked to clinical practice and interactive workshops encouraging interaction between participants and practice of skills learned; as was used in the workshop component of this study (Cantillon & Jones, 1999; Davis, Thomson, Oxman, & Haynes, 1992; Fox & Bennett, 1998; Mazmanian & Davis, 2002). If participants

accept responsibility for their learning, changes to knowledge and/or skills can result and this can have a significant effect on professional practice and possibly health care outcomes (Davis, et al., 1999; Mazmanian & Davis, 2002).

Participant performance has been shown to improve when learning experiences incorporate knowledge assessment and assessment of clinical practice needs (Mazmanian & Davis, 2002). Multiple choice questions have routinely been used to assess health professionals involved in similar training programs and were used in this study (Davis, et al., 1999; Goldberg, et al., 2001). Excellent reliability has been stated when using multiple choice questions to evaluate factual knowledge, problem solving skills and some aspects of content and clinical reasoning however there are few validated strategies to assess actual clinical practice (Epstein & Hundert, 2002). Due to the difficulties of assessing practical scanning competence, this was not assessed in this study.

"Prior needs assessment is important for informing and directing the educational process (Cantillon & Jones, 1999, p.1277)." A strength of this study is that participant learning needs had been previously assessed via a survey and this information was used to develop focused training; this is stated as a necessary precursor to effective CPD and can result in an increased potential for change (Davis, et al., 1992; Fox, 2000; Mazmanian & Davis, 2002).

One aim of this study was to assess delivery of a training package on the use of diagnostic ultrasound for physiotherapists in face to face workshop and DVD format. A secondary aim was to assess the influence the training package had on participant educational outcome and to see if there was a difference in learning outcomes between physiotherapists trained using workshop or DVD format.

METHOD

Ethics approval for this study was granted by the Hunter New England Human Research Ethics Committee. A training package was developed incorporating lectures and examples of scanning techniques with diagnostic ultrasound. The content of the training package was based on the authors' experience and feedback from the previously conducted questionnaire (McKiernan, et al., 2011). The training package consisted of elements related to the technology as well as technique. The technological content included the basics of ultrasound including physics, transducers and machine buttons. The technique section covered how to scan the abdominal muscles, multifidus and the pelvic floor. Educational outcome was assessed via an assessment completed prior to and at the completion of the training package.

Participants had to choose whether to study via the workshop or DVD approach and thus two separate groups were formed within the study. While the opportunity existed for participants to participate in both approaches, no participant underwent training via both workshop and DVD during the study.

The Workshop

The one day workshop comprised a series of lectures and hands on scanning sessions where participants scanned each other under the supervision of an accredited medical sonographer and two physiotherapists who use ultrasound on a regular basis. The ultrasound machines used during the workshop were portable Mindray units (Mindray Building, Keji 12th Road South, High-tech Industrial Park, Nanshan, Shenzhen 518057, P. R. China) on loan from Ausmedic (PO Box 542, Hornsby NSW 2077) with 3MHz curved and 10MHz linear transducers.

The workshop was run under the auspices of the Australian Physiotherapy Association (APA) as part of their continuing professional development activities for members. The APA has a policy that insists on accreditation of all CPD activities before they can be run. Following its accreditation, the APA advertised the workshop in their professional bulletins, member magazine and journal. Workshop registrants were invited to participate in the study via an e-mail invitation and were requested to complete the pre assessment online using SurveyMonkey (www.surveymonkey.com, California Office: 640 Oak Grove Avenue, Menlo Park, CA 94025, USA) prior to attending the workshop and paper copies of the assessment were also available at registration for those who wanted to participate but had not had time to complete the assessment online. At the completion of the workshop participants were given instructions as to how to access the post assessment online. A follow up reminder email about the post assessment was sent to all participants two weeks after the workshop.

The DVD

The DVD included the same lectures comprised of a PowerPoint presentation and audio, video footage showing scanning of the above mentioned body areas and ultrasound video clips of the resultant images obtained. Physiotherapists who participated in the DVD training came from a list of physiotherapists who had previously indicated interest in taking part in the training. Participants were sent an email inviting them to join the study and complete an online pre assessment using SurveyMonkey. At the end of this pre assessment participants entered a mailing address and were sent a copy of the DVD and instructions on how to access and complete the post assessment. Participants were given two months to use the DVD and were sent a follow up reminder about the study post assessment.

Pre and Post Assessment

Both groups of physiotherapists underwent the same before and after assessment procedures to assess baseline knowledge and changes in knowledge after the workshop or DVD training. The assessments were designed for the study and results were not given to the participants. The pre and post assessment used the same twenty three questions which were a mixture of multiple choice, true/false and open ended questions. These questions were used to give each participant a mark and assess the change in their educational outcome. The assessment questions explored all aspects of the taught material such as physics (the basics, transducers and machine buttons); technique (scanning of the abdominal muscles, multifidus and pelvic floor) and image anatomy (Figure 1). The twenty third question asked participants about their confidence in answering the assessment questions. At the completion of the post assessment, an additional three questions investigated participants' perception of the training received. An area for participants to add in any additional comments was also included.



Figure 1: Breakdown of assessment questions and possible marks.

Each participant had the potential to obtain thirty marks in both the pre and post assessment (Figure 1). For each participant these marks were entered into an excel database. A two tailed paired *t* test was used for statistical analysis of the data within groups and two tailed unpaired *t* test analysis across groups. Changes in educational outcome were assessed by comparing each group's pre and post assessment scores. Statistical analysis was performed to see if this improvement was statistically significant. A p-value of 0.05 was used to assess statistical significance. Statistical analysis was also performed to see if there was any statistically significant difference between the pre and post assessment marks of the workshop group compared to the DVD group to ascertain if one method of training was superior to the other. Finally changes in confidence level were assessed with a chi squared test.

RESULTS

Assessment scores on entry and end of training were available for 84 participants for the workshop and 96 participants for the DVD. Important and statistically significant (p < 0.0001) changes in scores from the beginning to the end of the training program were found in both participant groups as determined with paired *t* tests (Table 1). All participant scores increased in the range from 3 - 77% (Figure 2). For the workshop participants, assessment scores increased by 17 to 63 percentage points with the majority increasing 21-30%. For the DVD participants, assessment scores increased by 3 to 77 percentage points with the majority increasing 31-40%.

	Workshop	Workshop	DVD	DVD
	Pre Assessment	Post Assessment	Pre Assessment	Post Assessment
Minimum Score	6	16	7	16
Median	12 (40%)	23 (77%)	14 (47%)	23 (77%)
Maximum Score	19	28	25	28
Interquartile Range	4	2.5	6	5

Table 1: Breakdown of assessment results for the Workshop and DVD groups.



Figure 2: Percentage increase in participant scores.

To determine if there was a difference between the two methods of training, the scores for the pre assessment and post assessment for both the workshop and DVD were compared. There was a statistically significant difference in the pre assessment scores (p < 0.05) of the workshop and DVD; with the DVD group having higher pre assessment scores. There was found to be no statistically significant difference in the post assessment scores (p > 0.05) of the workshop and DVD. These were determined with unpaired *t* tests.

The results were further broken down into the specific assessment areas of physics, technique and anatomy. It can be seen that for all categories participants demonstrated improvement with a decrease in score range and an elevation in median scores (Figure 3).



Figure 3: Breakdown of assessment results by category.

Confidence Results

In both the pre and post assessment, participants were asked to state how confident they were in answering the questions. They had to select from four responses: very, average, below average and poor (Figure 4). As can be seen in this graph, within the workshop group 81% of the participants reported poor confidence levels prior to the training and 86% average confidence levels after the training. Within the DVD group 59% of the participants reported poor confidence levels prior to the training and 86% average confidence levels after the training. Within the DVD group 59% of the participants reported poor confidence levels prior to the training and 83% average confidence levels after the training. While all participants stated an improvement in their confidence level when completing the assessment, some added in the open comment section that this training made them very aware of how much they did not know and that was still a barrier to their confidence level when using diagnostic ultrasound. The chi squared statistical analysis showed that both the workshop (p < 0.0001) and DVD (p < 0.0001) groups had a statistically significant improvement in confidence.



Figure 4: Participant confidence in completing the assessment.

Perception of Training Results

In the post assessment, the participants were asked some true/false questions in relation to their perception of the training. The first question asked if the content covered in the training was good. All (100%) participants responded true. Participants were then asked if they enjoyed the training. All except one participant (99.4%) responded true to this and this person had been in the DVD group. The next question asked if the speed with which the content was covered was good. All except two participants (98.9%) responded true. The two people who responded false were in the DVD group and in the open comment section stated "a little long winded" and "too wordy in explaining some aspects".

Workshop Results

Finally in the post assessment was an area where participants could add any additional comments. Though it was not compulsory to add a comment, 44% of participants did. From the workshop, comments were largely centred around four main areas. Firstly participants stated that the course was helpful and useful and enabled them to learn and understand; "The lectures were really good, appropriate, easy to understand". Secondly participants commented on the course itself using words such as well organised and presented and easy to understand. Thirdly participants stated that they were now able to and had used their ultrasound machines. Finally the word confidence was used by 31% of participants; "I came away with confidence in being

able to use the ultrasound machine". 5% of participants stated they "Loved the practical nature of the workshop" and that "It was great having a sonographer present". Also 7% expressed interest in now buying a machine "I am going to approach our head of department for purchase of a machine and be able to validate my reasons". Participants also suggested two areas of improvement that could be done to the workshop; they would have liked "More supervision in the practice sessions" and "Need more time spent on identifying anatomical structures on the screen".

DVD Results

From the DVD participants, 21% entered a comment. The most common word used was access (17%); access without having to travel and the ability to access multiple times and as a resource into the future; "A really user friendly way of doing this"; "I think this is a great way to learn". Participants in this group also commented that the content was good (9%) and it allowed them to start using their ultrasound machine (15%). Participants also suggested areas of improvement that could be done to the DVD, "It would be good to have some more examples of scans with arrows to show the different structures in motion. Also some scans are obviously easier than others and that varies from patient to patient so it would be good to see some difficult examples as well." "It would be helpful to place run times for each segment beside the title (would just help with time management). A summary sheet of salient operational points would be useful - I can't get the computer anywhere near to the ultrasound in our practise!"

DISCUSSION

It is acknowledged that competence is an inferred quality and that "performance on a multiple choice test may exceed competence.....Conversely, competence may exceed test performance (Epstein & Hundert, 2002, p.231)." In saying this, the assessments administered at the end of the training program showed marked improvement when compared to the baseline assessment, so the success of the educational material is inferred. Statistically significant improvements in results were obtained with both the workshop and DVD interventions. As no statistically significant difference in the post assessment scores of the workshop and DVD were found it can be said that both methods are useful and valid methods for improving the knowledge base of physiotherapists in diagnostic ultrasound.

A statistically significant difference in the pre assessment scores of the workshop and DVD participants was found. This may be explained by the difference in recruitment of the two groups. The DVD group who had the higher median pre test score of 14 (47%) had indicated their interest in being part of this study from a previously performed questionnaire. It could be surmised that these participants had been exposed to and possibly received training in diagnostic ultrasound prior to participating in this study and as such their initial knowledge base was slightly higher. Also this group did indicate an average confidence level in completing the pre assessment while the workshop group all indicated below average or poor. As their median score was only 47% and the lowest score was 23%, an education intervention was still warranted and proved to be beneficial.

The objectives of the training were to give an understanding of the theory and physics of ultrasound, to improve the participant's ability to operate a standard ultrasound machine and to provide an understanding of the role of ultrasound in the assessment of transversus abdominis, rectus, multifidus and the pelvic floor. What was interesting was that participants indicated an improvement in their confidence level when completing the assessment. Some added in the open comment section that this training made them very aware of how much they didn't know and that was still a barrier to their confidence level when using diagnostic ultrasound. This opens the possibility of further training in the modality for physiotherapists.

All participants indicated the content covered in the training was good, 99.4% enjoyed the training and 98.9% said the pace of delivery of content was good. This is probably largely due to the fact that the content of the training package was determined following responses to the previously administered questionnaire in which physiotherapists had indicated their training needs. Generally it can be concluded that the training package created was relevant, enjoyable and covered topics in enough depth and within a reasonable time frame.

The participant comments about the workshop and DVD show that not only was there an increase in knowledge, but participants felt an improvement in their knowledge and confidence. It is rewarding to have some of them looking to purchase a machine or using a machine and thinking more about what they are doing and applying good technique. It was also encouraging to see that some wanted more training and for

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other body areas to be included. Of great interest is the comment from a rural physiotherapist; with benefits of the DVD format for those physiotherapists who are isolated in remote and rural areas highlighted. It allows them easy access to training without having to travel long distances or rely on internet services which are unreliable. The other notable benefit of the DVD is that it can be accessed on multiple occasions for revision or reinforcement purposes allowing participants to fill gaps in their knowledge and skills at their own pace (Davis, Thomson, Oxman, & Haynes, 1995; Mazmanian & Davis, 2002). The main benefit of the workshop would have to be the supervised practical sessions. Also the interaction between the course presenter and fellow physiotherapists provides not only confidence but more detailed help and answers to participants' specific questions. This is reflected in the increased number of participants in the workshop feedback that commented on improvement in their confidence compared to the DVD group.

Participants in this study had a readiness to learn what they needed to know in order to practice effectively within the clinical situation (Newman & Peile, 2002). In this study it can be said that the participants were self directed learners, they identified they had a need to learn, they came to the decision to participate and applied themselves to learning new skills and then took these new skills back into practice (Fox & Bennett, 1998; Newman & Peile, 2002). Participants in this study were motivated to learn and change and this can largely be attributed to the recruitment process of the study (Fox & Bennett, 1998).

CONCLUSION

A training package was developed for physiotherapists in diagnostic ultrasound. This training package was delivered via two different methods. Both the workshop and DVD resulted in a statistically significant increase in the participant knowledge and confidence of participants. Both methods of educational delivery are considered successful with no statistical advantage of either method. The benefits of the workshop are the supervised practical sessions and participant interaction. The benefits of the DVD are it is easily accessed by rural physiotherapists; it can be accessed again and again and can be stopped and started at any time. Of the physiotherapists who participated in this study 99.4% reported the training to be enjoyable and 100% reported it to have good content.

REFERENCES

- Cantillon, P., & Jones, R. (1999). Does Continuing Medical Education in General Practice Make a Difference? *British Medical Journal*, *318*, 1276-1279.
- Charles Sturt University (2008). *Charles Sturt University*. Retrieved 16th December, 2008, from <u>www.csu.edu.au</u>
- Curtin University (2000). *School of physiotherapy 2000 annual report*. Retrieved 12th December, 2008, from <u>www.physiotherapy.curtin.edu.au</u>
- Davis, D., Thomson O'Brien, M. A., Freemantle, N., Wolf, F. M., Mazmanian, P., & Taylor-Vaisey, A. (1999). Impact of Formal Continuing Medical Education: Do Conferences, Workshops, Rounds and Other Traditional Continuing Education Activities Change Physician Behaviour or Health Care Outcomes? *Journal of the American Medical Association*, 282(9), 867-874.
- Davis, D. A., Thompson-O'Brien, M. A., Freemantle, N., Wolf, F. M., Mazmanian, P., & Taylor-Vaisey, A. (1999). Impact of formal continuing medical education: do conferences, workshops, rounds, and other traditional continuing eduction activities change physician behaviour or health care outcomes? *Journal of the American Medical Association*, 282, 867-874.
- Davis, D. A., Thomson, M. A., Oxman, A. D., & Haynes, R. B. (1992). Evidence for the Effectiveness of CME, A Review of 50 Randomized Controlled Trials. *Journal of the American Medical Association*, 268(9), 1111-1117.
- Davis, D. A., Thomson, M. A., Oxman, A. D., & Haynes, R. B. (1995). Changing Physician Performance: A Systematic Review of the Effect of Continuing Medical Education Strategies. *The Journal of the American Medical Association*, 274(9), 700-705.
- Epstein, R. M., & Hundert, E. M. (2002). Defining and Assessing Professional Competence. *Journal of the American Medical Association*, 287(2), 226-235.
- Fox, R. D. (2000). Using Theory and Research to Shape the Practice of Continuing Professional Development. *The Journal of Continuing Education in the Health Professions*, 20, 238-246.
- Fox, R. D., & Bennett, N. L. (1998). Continuing Medical Education: Learning and Change: Implications for Continuing Medical Education. *British Medical Journal*, 316, 466-468.
- Frost, N., & Clarke, J. (2004). Ultrasound for Biofeedback in Physiotherapy. *Sound Effects*, *4*, 10-13.
- Goldberg, B. B., Schultz, S. M., Baltarowich, O., Waldroup, L., Bogen, J., & Veloski, J. J. (2001). Effectiveness of the "Teaching the Teachers" Diagnostic US Training Program. Academic Radiology, 8(11), 1159-1167.
- La Trobe University (2006). *School of physiotherapy newsletter*. Retrieved 12th December, 2008, from <u>www.latrobe.edu.au</u>

- Lawton, S., & Wimpenny, P. (2003). Continuing Professional Development: A Review. Nursing Standard, 17(24), 41-44.
- Mazmanian, P. E., & Davis, D. A. (2002). Continuing Medical Education and the Physician as a Learner: Guide to the Evidence. *The Journal of the American Medical Association*, 288(9), 1057-1060.
- McKiernan, S., Chiarelli, P., & Warren-Forward, H. (2010). Diagnostic Ultrasound use in Physiotherapy, Emergency Medicine and Anaesthesiology. *Radiography*, 16, 154-159.
- McKiernan, S., Chiarelli, P., & Warren-Forward, H. (2011). A Survey of Diagnostic Ultrasound Within the Physiotherapy Profession for the Design of Future Training Tools *Radiography*, *17*(2), 121-125.
- Monash University (2008). *Monash University*. Retrieved 16th December, 2008, from www.monash.edu.au
- Newman, P., & Peile, E. (2002). Valuing Learners' Experience and Supporting Further Growth: Educational Models to Help Experienced Adult Learners in Medicine. *British Medical Journal*, 325, 200-202.
- O'Brien, M. A., Freemantle, N., Oxman, A. D., Wolf, F., Davis, D. A., & Herrin, J. (2001). Continuing Education Meetings and Workshops: Effects on Professional Practice and Health Care Outcomes. *Cochrane Database of Systematic Reviews*(1), 1-33.
- The University of Newcastle (2008). *Musculoskeletal Physiotherapy*. Retrieved 12th December, 2008, from <u>www.newcastle.edu.au/course</u>
- The University of Sydney (2008). *Ultrasound for Physiotherapists*. Retrieved 12th December, 2008, from <u>www.usyd.edu.au/courses</u>