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The effectiveness of peer taught group sessions of physiotherapy students within the clinical setting: A quasi experimental study

Des Scott and Jennifer Jelsma

ABSTRACT

The study aimed to investigate whether learning from peers, learning from a clinical educator, or being the peer teacher during clinical group sessions was more effective at enhancing student learning outcomes for different health conditions. A secondary aim was to determine which method students found more satisfactory. Physiotherapy students at the University of Cape Town were sent to different paediatric sites for clinical experience, including a children's convalescent home, two special schools, a day care centre for children with severe disabilities, and a mainstream school. The research design was quasi-experimental in that different teachers (peer vs. educator) were assigned randomly to each health condition. All 38 third year students were eligible for inclusion in the study. Approximately 10 students attended each weekly group teaching session, which was either peer-led or educator-led. Students were required to complete a test covering content taught by the different teachers. The nature of the person presenting to the small group did not have an impact on test scores. There were no significant differences in students' mean test scores between the peer-led, educator-led, or self-led conditions. However, test scores were significantly higher in the health conditions with severe disability than the other conditions. Students also reported higher satisfaction with clinical educator teaching.

BACKGROUND

Clinical education of physiotherapy students is key to their training (Ernstzen, Bitzer, & Grimmer-Somers, 2009) and several educational methods are used to ensure that students gain appropriate knowledge, skills, and attitudes to practice. The traditional model has been the 1:1 method, whereby a student works closely under the supervision of the physiotherapist at a clinical site and receives 1:1 guidance from a clinical educator from the learning institution (Moore, Morris, Crouch, & Martin, 2003). However, with the increasing number of students in clinical training and the need to give them a broader scope of practice, other teaching and learning methods have needed to be introduced (Morris & Stew, 2007). These include the 2:1 model of supervision and small group teaching, making use of either a faculty educator (Delany & Bragge, 2009) or peer teaching (Steinert, 2004).

Peer learning is described by Boud, Cohen, and Sampson (1999) as "the use of teaching and learning strategies in which students learn with and from each

other without the immediate intervention of a teacher” (pp. 413-414). The authors also refer to “reciprocal peer learning” which usually involves students of the same level having an opportunity to act as both the teacher and the learner within a group. The emphasis is not only on content, but also on the emotional support that students offer each other (Bulte, Betts, Garner, & Durning, 2007). Collaborating within a group of peers promotes students’ ability to learn from each other and to work together (Ten Cate & Durning, 2007a).

The advantages of peer teaching have been well documented by many authors and summarised by Ten Cate and Durning (2007a). Peer teaching motivates peer teachers to engage in greater depth with the topic that they are presenting, thereby improving the quality of their learning process. Improved cognition should therefore be achieved with better retention of knowledge, which builds confidence and self esteem in the peer teacher. This is also a useful method to encourage independent, self directed learning in students, which is a step towards instilling a sense of lifelong learning (Boud et al., 1999).

Peer learners benefit by learning from other students at the same academic level who might be more in tune with each others’ cognitive difficulties and in a better position to address them (Steinert, 2004). Having faced the same challenges, the peer teacher often understands the problems and stresses that other learners encounter and will be able to draw on their own experiences in order to assist peers with their learning (Ten Cate & Durning, 2007b). The peer learners may be more at ease in a small group environment with their peers than with an experienced teacher and therefore feel safer to make mistakes and ask questions freely. Discussion amongst peers may clarify content for the participants in a more meaningful manner (Ten Cate & Durning, 2007a).

Weaknesses of peer teaching include the fact that some peer teachers may be poorly prepared to teach the subject content, may have difficulty motivating the other students, or may be unable to control the teaching session (Bulte et al., 2007). Peer teachers also have less knowledge and clinical experience than experienced clinical educators, which may limit their ability to demonstrate clinical reasoning in a practical context (Bulte et al., 2007).

However, there is generally a lack of literature evaluating different models of clinical education (Lekkas et al., 2007), with a particular gap in quantitative evaluation of peer-led teaching compared to educator teaching in the clinical setting.

Currens (2003) and Lekkas et al. (2007) independently reviewed the literature and identified a few studies using qualitative and descriptive methods to describe different clinical education models, including peer learning. Both reviews concluded that there was insufficient evidence to prove that any one method was superior to another.

The positives and negatives of peer learning and teaching were highlighted in a review performed by Secomb (2008), who concluded that it was a valuable teaching method to maximise student learning so long as strategies were put in place to accommodate students with differing learning styles.

Strohschein, Hagler, and May (2002) discussed the collaborative model used in clinical education whereby students work together in a group and are encouraged to take more responsibility for and become more independent in their own learning, but it was not compared to any other model.

The evaluation of a nursing clinical course using “Peer Active Learning Approach” (PAL) was compared to the evaluation of a non-PAL clinical course, with the outcome being a higher mean score for the rating of the PAL course (Stevens, 2008).

Ernstzen et al. (2009) used a questionnaire to investigate physiotherapy educators’ and students’ perceived value of different teaching and learning opportunities in the clinical setting, including peer teaching. While educators valued group sessions and individual sessions equally, students valued individual sessions with an educator more highly. Students rated learning from peers more highly than educators did.

A randomised control trial investigating the efficacy of peer learning using healthcare students receiving instruction in basic life support from either a student teacher or clinical tutor concluded there was no significant difference in the examination results of the two groups or in the student ratings of the quality of the different educational methods (Perkins, Hulme, & Bion, 2002)

More recently a few quantitative studies have been published. Between 2007–2010 a study with medical students learning spinal manipulation skills from either a professional teacher or student teacher was performed (Knobe et al., 2012). The outcomes of a clinical examination for the two groups were compared, as well as results of a qualitative questionnaire. In this case it was concluded that students learn complex skills better from a professional teacher than from peers. Students also rated learning from professionals higher than from peers.

In 2011, a study to assess the education standard and clinical examination outcome in two groups of otorhinolaryngology students was conducted. One group received peer teaching and the other physician teaching. There was no statistical difference in the examination mark or evaluation of educational quality for either teacher group (Kemper, Linke, Zahnert, & Neudert, 2014).

At the University of Cape Town, group teaching has been incorporated into the clinical learning of physiotherapy students. Due to the limited evidence available on whether clinical group sessions run by peer teachers result in equivalent learning outcomes to sessions taught by clinical educators, the need to investigate this arose.

Objectives

The specific objectives for the study were to:

- Compare student test scores following peer-led teaching and clinical educator-led teaching in a clinical group session.
- Determine whether the peer teacher learns more and therefore scored higher in the test on the sections they prepared and presented compared to their test scores for sections presented by their peers and by the clinical educator.

- Establish whether there was a difference in knowledge gained in the various health conditions by comparing the scores for each placement.
- Establish the degree of student satisfaction with each form of learning used and whether one method was more satisfactory than the others.

The null hypotheses, as applied to the first three objectives, are that there is no difference for the test scores for peer-led and educator-led teaching.

Research setting

Students from the Department of Health and Rehabilitation Sciences at the University of Cape Town are sent to one of four-five different paediatric sites to gain clinical experience during the third year of their four year BSc Physiotherapy training. The paediatric sites each have children with specific health conditions. In 2012 these included:

- A convalescent home for young children not well enough to be sent home after being in an acute care hospital. Most of these children were developmentally delayed.
- A special school catering for children with cerebral palsy.
- Another special school for children with birth defects such as spina bifida and congenital muscle disease.
- A day care centre for children with severe physical and mental limitations.

A fifth site was added in 2013, a mainstream school for typically developing children.

The length of each clinical block was five weeks and two to three students were placed at each site. The students managed patients under the guidance of a clinician. Students also received clinical supervision once a week from one of three clinical educators from the university. This supervision consisted mostly of 1:1 and 2:1 teaching methods. In addition, a group teaching session was held once a week at each of the paediatric sites in turn and was attended by all the students (approximately ten). This was co-ordinated by the same clinical educator each week and made use of either peer-led or clinical educator-led teaching. The health conditions covered during the group teaching sessions are shown in Table 1. Ten questions covering the health condition at each of the four sites were included in a test at the end of the five week block, totalling 40 questions.

Table 1
Health conditions taught at each site by either student peer or clinical educator

		Group teaching site	Health conditions taught	Led by
BLOCK 1 April- May	week 1	Convalescent home for young children	Normal and delayed development of babies and young children.	Clinical educator
	week 2	Special school for children with birth defects	Duchene's Muscular Dystrophy Spinal Muscular Atrophy Spina Bifida Spinal cord lesions	Student peer
	week 3	Special school for children with cerebral palsy	Spastic quadriplegia Spastic diplegia Spastic hemiplegia Ataxic cerebral palsy	Student peer
	week 4	Day care centre for children with profound mental and physical limitations	Spastic cerebral palsy with severe intellectual deficit. Hypotonia with severe intellectual deficit. Athetoid cerebral palsy	Student peer
	week 5	Day care centre for children with profound mental and physical limitations	Test and feedback session	Clinical educator
BLOCK 2 July- August	week 1	Convalescent home for young children	Normal and delayed development of babies and young children.	Student peer
	week 2	Special school for children with birth defects	Duchene's Muscular Dystrophy Spinal Muscular Atrophy Spina Bifida Spinal cord lesions	Clinical educator
	week 3	Special school for children with cerebral palsy	Spastic quadriplegia Spastic diplegia Spastic hemiplegia Ataxic cerebral palsy	Student peer
	week 4	Day care centre for children with profound mental and physical limitations	Spastic cerebral palsy with severe intellectual deficit. Hypotonia with severe intellectual deficit. Athetoid cerebral palsy	Student peer
	week 5	Day care centre for children with profound mental and physical limitations	Test and feedback session	Clinical educator

BLOCK 3 September-October	week 1	Convalescent home for young children	Normal and delayed development of babies and young children.	Student peer
	week 2	Special school for children with birth defects	Duchene's Muscular Dystrophy Spinal Muscular Atrophy Spina Bifida Spinal cord lesions	Student peer
	week 3	Special school for children with cerebral palsy	Spastic quadriplegia Spastic diplegia Spastic hemiplegia Ataxic cerebral palsy	Clinical educator
	week 4	Day care centre for children with profound mental and physical limitations	Spastic cerebral palsy with severe intellectual deficit. Hypotonia with severe intellectual deficit. Athetoid cerebral palsy	Student peer
	week 5	Day care centre for children with profound mental and physical limitations	Test and feedback session	Clinical educator
BLOCK 4 February-March	week 1	Convalescent home for young children	Normal and delayed development of babies and young children.	Student peer
	week 2	Special school for children with birth defects	Duchene's Muscular Dystrophy Spinal Muscular Atrophy Spina Bifida Spinal cord lesions	Student peer
	week 3	Special school for children with cerebral palsy	Spastic quadriplegia Spastic diplegia Spastic hemiplegia Ataxic cerebral palsy	Student peer
	week 4	Day care centre for children with profound mental and physical limitations	Spastic cerebral palsy with severe intellectual deficit. Hypotonia with severe intellectual deficit. Athetoid cerebral palsy	Clinical educator
	week 5	Day care centre for children with profound mental and physical limitations	Test and feedback session	Clinical educator

METHOD

Design

The research design was quasi-experimental in that different teaching methods (peer vs. educator) were assigned randomly to each health condition for each clinical placement block. The order in which the different conditions were taught within each block was also randomised. However the group of students in each block was pre-existing. The primary dependent variable was the end of block test scores for peer vs. clinical educator teaching during the group sessions.

Ethical considerations

Ethical clearance was obtained from the Ethics and Research Committee of the Faculty of Health Sciences, University of Cape Town prior to the commencement of the study (HREC REF: 157/2012). Informed written consent was obtained from the students to use their test scores and the results of the satisfaction questionnaire. Students were able to refuse permission for the use of their test score, in which case it was removed from the study with no negative consequences for the student. The test was compulsory as it formed part of the students' formative assessment, but no names were included; only the clinical site of the placement was recorded. To aid data analysis the test and satisfaction questionnaire were linked by a number, but the researcher did not know which number corresponded to which student. The results of the test were made available to the students for self-evaluation of competence. There was no risk to the students participating.

Any relevant and important content that was not covered by the students during their peer presentation was covered by the clinical educator after completion of the test so as not to compromise student learning.

Participants

Third year students based at a paediatric clinical placement between April 2012 and March 2013 were eligible to participate in the study. Students' test scores were excluded if they were repeating third year in 2013, if they missed more than one group teaching session, or if they were absent on the day of the test. Of the 38 eligible students, 36 students were included in the analysis (two were excluded because they had an examination on the day of the test). The test results of the students placed at the mainstream school in 2013 were included in the study, as they attended all group teaching sessions. They were included in the group of students who did not present.

Group teaching sessions

Students were required to participate in four weekly group teaching sessions during their five week clinical placement block (Table 1). Each session was held at a different clinical site and addressed different health conditions but was managed by the same clinical educator. There were between 9 and 11 students in each group teaching session. The number of students placed at each clinical site is shown in Table 2. More students were placed at the facility for severely disabled children than elsewhere.

A clinical educator led one of the four group teaching sessions in each block. The remaining three sessions were peer led, enabling a comparison between peer-taught material and educator-taught material in each block (Table 1). The clinical educator also taught at a clinical different site during each block, ensuring that there was no bias in the content taught by clinical educator teaching during the research study period.

Individual students were randomly assigned to a health condition to research and present to their peers during a group teaching session. However, some students did not present during their block, either because the clinical educator was assigned to lead the group teaching session at their clinical site or because they had a placement at the mainstream school (not shown in Table 1). The number of students presenting each health condition is shown in Table 3.

Students were briefed on the need to include theoretical background to each health condition as well as aetiology, typical presentation, and any precautions necessary in the management of that condition. They were expected to use their own patients to demonstrate the physiotherapy assessment and management of each patient, ensuring that the presentation was contextually relevant. This was in line with the required outcomes for each block, as given in the students' clinical guidelines booklet. The presenting students were all encouraged to make use of teaching material such as posters, diagrams, and/or journal articles to supplement their teaching. .

Table 2
Total number of students at each placement during the research study period

Clinical placement site	No. students	%
Convalescent home	7	19.4
Special school for birth defects	6	16.7
Special school for cerebral palsy	9	25.0
Day care centre for severe disability	12	33.3
Mainstream school	2	5.6
Total students	36	100.0

Table 3
Total number of students presenting each health condition

Content	No. students	%
Normal development	5	13.9
Birth defects	6	16.7
Cerebral palsy	7	19.4
Severe disability	9	25.0
Did not present	9	25.0
Total	36	100.0

Instrumentation

A test with 40 true or false questions was devised by the clinical educator who managed the group teaching sessions. The test was composed of ten questions for each of the four health conditions covered during the placement: normal development, birth defects, cerebral palsy, and severe disability (see Table 3). The test was designed to assess the knowledge the students gained during the group sessions, focussing on the students' ability to apply basic theoretical knowledge, clinical reasoning within the clinical context, and management of the health conditions presented. The test was sent to three paediatric lecturers within the physiotherapy division for expert review to assess its content and validity for third year level of learning. A pilot study was conducted on an earlier third year group prior to commencement of the study. The instrument was judged to have face and

content validity by the expert panel. The tests were marked by a third party, guided by an answer sheet who was blinded as to who had taught the content.

A questionnaire asking the students to rate their satisfaction for both peer-led and clinical educator-led sessions was drawn up and administered with the test. The students were also asked to state their preference for either peer-led or clinical educator-led teaching in the small group sessions. See Figure A1.

Data analysis

The mean scores obtained by students for the sections taught by peers were compared with the mean scores obtained for the sections taught by the clinical educator using a dependent *t*-test (for each group of students the scores were from different sections of the test as each group had different health conditions taught by peers and by the clinical educator). A repeated measures ANOVA was used to establish whether there was a significant difference between the mean scores of the test sections taught by the student, by their peers, and by the clinical educator.

The Kolmogorov Smirnov test was used to demonstrate whether scores for the different health conditions were normally distributed. A repeated measures ANOVA was used to determine whether there was a significant difference between the scores obtained for the different health conditions and a post-hoc Tukey test indicated where differences lay.

Descriptive statistics were used to present the results of the Satisfaction Questionnaire. The Sign Test was used to indicate the proportion of students reporting higher satisfaction with one teaching method.

RESULTS

The scores obtained for each section of the test and the overall test are given in Table 4. The scores were normally distributed. There was a significant difference between the scores obtained for the different health conditions, $F(3, 105) = 13.93, p < .001$. The differences lay between the severe disability and the other three areas ($p < .001$ in each case).

Table 4

Mean scores obtained for each health condition of the test and the test overall (N = 36)

	Maximum Score	Mean	Minimum	Maximum	Std. Dev.
Normal development	10	5.9	3	9	1.6
Birth defects	10	6.0	3	8	1.3
Cerebral Palsy	10	6.6	3	10	1.7
Severe disability	10	8.1	5	10	1.4
Total score for test	40	26.6	22	33	2.7

There was no significant difference between the scores of the sections taught by the clinical educator and those taught by peers ($p = .29$). There was also no significant difference between the mean scores of the test sections taught by the student, by their peers or by the clinical educator, $F(2,52) = 1.99, p = .15$.

However the mean score on the section presented and taught by the student was slightly higher than that of the sections taught by peers or by the clinical educator (see Table 5).

Table 5
Mean scores obtained on the sections for self taught, peer taught and clinical educator taught content

	Valid N	Mean	Min.	Max.	Std. Dev.
Score for own section taught	27	7.3	3.0	10	1.8
Score for peer taught content	38	6.4	4.5	8	1.1
Score for clinical educator taught content	36	6.9	3.0	10	1.6

When asked to rate their satisfaction with peer teaching (median 4, range 3-5) and with the teaching of the clinical educator (median 5, range 4-5), a significantly greater proportion of students reported higher satisfaction with the teaching of the clinical educator (100% of non-tied scores, $Z = 4.130$, $p < .001$).

DISCUSSION

The results indicate that all 36 students participating in the study passed the test overall and there were no significant differences in student test scores when comparing scores for peer taught content to scores for educator taught content ($p = .15$). It would seem that provided the content is well structured and that teaching is contextually relevant, as it was in this study, the nature of the person presenting the information does not appear to be important. This is similar to the findings of other studies mentioned in the background section who also found there was no significant difference in outcome scores for peer-led or educator-led teaching sessions (Kemper et al, 2014; Perkins et al, 2002).

Although not statistically significant, the health condition taught by the student him/herself scored slightly higher than those taught by peers or clinical educator. Being the peer teacher should encourage the student to develop a deeper understanding of the content in order to convey this knowledge to their peers in a meaningful manner and to be able respond appropriately to questions from the group (Macauley & Billings, 2011), so the student should score higher in their own area. The students also spent more time during the block managing these conditions, so they should score higher in more familiar sections. This however was not significant. Further study is needed to explore whether the impact on learning of teaching peers is in fact greater than the impact of being taught by peers within a group setting.

The mean test scores were significantly higher ($p < .001$) for the severe disability section, which covered health conditions similar to those at the cerebral palsy special school. Although the content was slightly different and the conditions were more severe with intellectual disability, there might have been some carry-over of information from the content taught at the cerebral palsy school. The health conditions were closely linked and the patients presented had similar functional limitations. The content taught in normal development seemed to be the most difficult to retain, with the lowest mean

score. This could be because this section required factual recall with regard to developmental milestones.

Despite the equivalence in outcome scores, students reported higher satisfaction with clinical educator teaching than peer teaching ($p < .001$). This seems to imply that the students do not appear to have the same confidence in their peer teachers' abilities compared to the experienced clinical educator's abilities. A study by Bulte et al. (2007) reported a similar finding, but their study emphasised that the benefits of peer teaching and learning outweighed the lack of experience in the student teacher.

As one of the goals of clinical experience is to maximise student learning, it is pertinent to determine whether peer teaching is equivalent to educator teaching in a group setting and whether it can be used to increase students' clinical experience. The number of students needing clinical experience is increasing but key resources, such as clinical sites, educators, and finances, are limited. As discussed by Rodger et al. (2008), peer-led small group teaching could be a useful adjunct to clinical teaching. Previously, third year students at the University of Cape Town were only exposed to health conditions at one paediatric clinical site. This limited their experience of other paediatric health conditions. By introducing small group teaching at all four sites, clinical learning was expanded to include more health conditions. Because clinical learning was mostly peer-led, this method did not increase the work load of clinical educators

CONCLUSION

The choice of instructor, whether peer or clinical educator, did not have an impact on the outcome scores of students being taught in a small group in the clinical setting. There was a slight trend towards better outcome scores when the student was the peer teacher and it is suggested that the opportunities for peer teaching should be maximised, as the benefits have been well documented in the literature. The test scores were higher for the section on health conditions with severe physical and mental disabilities. It is possible that there was carryover of knowledge from other similar health conditions covered. Further studies need to be conducted to determine why students' preference was for clinical educator teaching, despite no significant differences in outcome scores.

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APPENDIX

Figure A1. Satisfaction questionnaire

NUMBER.....

Using the rating scale

1=none; 2=poor; 3=moderate; 4= good; 5=excellent

Please rate the two comments below, by circling the number that best matches your opinion.

During the group sessions:

1. I would rate my satisfaction with the peer taught sessions, as: 1 2 3 4 5

2. I would rate my satisfaction with clinical educator taught sessions as: 1 2 3 4 5

3. My teacher of preference in the group sessions is:

1. Peer teacher

2. Clinical Educator