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WEB PAPER

The South-east Scotland Foundation Doctor Teaching Programme — Is "near-peer" teaching feasible, efficacious and sustainable on a regional scale?

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Abstract

Background: Peer-assisted learning has advantages for students and tutors.

Aims: We aimed to establish a novel 'near-peer' teaching scheme delivered by junior doctors for final-year medical students in Southeast Scotland. We report feedback from students regarding the perceived utility of this scheme, the results of a randomized controlled trial (RCT) of its impact, and mechanisms for quality assurance and sustainability.

Methods: The scheme was devised by newly qualified doctors. Following open recruitment and tutor training, junior doctor-led sessions were provided on clinical examination and practical prescribing in 2006–2008. Feedback was sought using anonymized questionnaires. An RCT was performed to assess the effect of attendance at a prescribing tutorial on performance in a mock assessment.

Results: Of 271 students in 2006–2007, 234 (86%) completed voluntary feedback and 233 (99%) expressed interest in attending more tutorials. In the RCT, students who received a tutorial made fewer dosing errors (9 *vs.* 22, $p = 0.049$). The majority of tutors attending the training symposium felt the experience was useful and helped prepare them for teaching.

Conclusion: 'Near-peer' teaching is a popular adjunct to the undergraduate programme and may promote junior doctors' professional development. Such schemes can be devised and delivered by juniors in conjunction with university staff.

Introduction

Teaching is an integral part of a doctor's role, and has been identified as a desirable skill in medicine (General Medical Council's 'Good Medical Practice', 2006). Traditionally, the education of medical students has been led by experienced doctors, but recent expansions in medical student numbers and constraints on doctors' teaching time have encouraged the development of alternative methods such as peer-assisted learning (PAL), where a trainee is taught by an individual at the same or similar level of medical education. We describe the development of a 'near-peer', junior doctor-led teaching scheme aimed at tutoring medical students: a programme that harnesses the ethos and methodology of PAL and applies it to a new niche.

Peer-assisted learning has been well described and planning and implementation frameworks have been published to aid the initiation and development of such programmes (Ross & Cameron 2007; Durning 2008; Nikendei et al. 2008; Topping 2008; Weyrich et al. 2008). PAL is seen by students as a helpful adjunct to traditional teaching: a recent study at the University of Edinburgh showed that third-year medical students found peer-led tutoring in cardiology examination as acceptable as that provided by senior cardiologists (Sengupta et al. 2007).

Practice points

- Near-peer teaching is a popular adjunct to core teaching.
- Such schemes can be easily established in all hospitals involved with teaching undergraduates.
- Liaison with the local medical school teaching staff is critical to ensure that teaching is appropriate and relevant.
- Standardization of teaching materials, with fixed learning outcomes and formal tutor preparation can provide reassurance about quality of teaching provided.

A similar finding has been reported in the context of wider clinical skills training: students described peer-assisted programmes as providing a 'comfortable environment' in which to learn (Nicky Hudson et al. 2008).

Peer-assisted learning also appears to be related to improved outcomes in both subjective and objective measures. For example, students taught by peers have reported increased confidence in skills such as examination of the musculoskeletal system (Field et al. 2004; Graham et al. 2008). Furthermore, peer-led students have been found to perform as well in clinical skills assessments as those receiving training

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from a qualified professional (Lake 1999; Perkins et al. 2002; Hudson et al. 2008).

Advantages for peer tutors have also been demonstrated: Krych et al. (2005) showed that student tutors in an anatomy teaching programme felt their knowledge, understanding and communication skills had developed as a result of their involvement in the scheme. Similarly, peer tutors in patient-centred interviewing felt that their own consultation skills had improved (Nestel et al. 2005). Field et al. (2007) reported further evidence that this method of teaching is seen as useful for prospective tutors: 89% of students in this PAL programme were keen to train as tutors themselves in the future.

The concept of 'near-peer' teaching has been described previously and used interchangeably with the term 'peer-assisted learning'. Bulte et al. (2007) define a 'near-peer' tutor as one at the same level of education (for example, medical school, junior doctor, specialist trainee) as the tutee, but one to two years their senior within the same broad grade. Most reports of 'near-peer' teaching have described schemes of a similar nature to those described as 'peer-assisted learning' by others, i.e. senior medical students teaching junior medical students (Colaco et al. 2006; Bulte et al. 2007).

Our aim was to establish a teaching programme delivered by doctors in their first year after qualification (Foundation Year 1 in the United Kingdom; FY1) and designed to improve the preparation of final-year students for the final undergraduate assessment and clinical practice. Among FY1 doctors, there is a cohort that is particularly motivated to teach for personal satisfaction, altruism, the desire to develop skills in preparation for future clinical and teaching roles, and to improve career prospects. We believe that, as near-contemporaries, junior doctors are seen by students as more approachable than senior clinicians, and their experience as junior doctors together with their knowledge of the final-year examination provides informed insight. We believe that this may confer advantages over peer-teachers, who are at a similar level to that of the tutee, thus making our definition of 'near-peer' teaching a novel concept. We report the development and introduction of a region-wide, 'near-peer', junior doctor-led teaching scheme over a 2-year period.

Methods

Pilot year study of feasibility (2006–2007)

Edinburgh medical graduates who had expressed an interest in teaching were approached and invited to participate as tutors in the pilot scheme. A preparatory session was organized by a senior lecturer in clinical pharmacology (SM) and attendance was recommended for tutors. Tutorials for final-year medical students were then undertaken by the tutors at five hospitals across the Southeast Scotland region. Tutors identified convenient 1-hour time slots at flexible times, in order to ensure that the timing of tutorials was convenient for students. The aim was for each tutor to provide an average of one tutorial per month for the duration of the scheme. Tutors selected their own topics for the sessions, including clinical examination technique (general surgical, orthopaedic, vascular, endocrine, neurological and cardiovascular) and practical prescribing of drugs and fluids. Tutors were encouraged to maintain as interactive a tutoring style as possible, incorporating the use of audiovisual aids and/or sample drug and fluid prescribing charts. Formal screening of tutorial content was not carried out in the pilot year. Tutorial attendance was limited to four students per session, in order to maximize the potential for interactive involvement. Teaching sessions were coordinated centrally by two of the tutors (AS & JR). Details were advertised on an academic forum within the medical school's virtual learning environment – the Edinburgh Electronic Medical Curriculum (EEMeC). Students signed up on the electronic discussion board on a first-come, first-served basis. No limit was placed on the number of sessions that an individual student could attend. At the close of the sessions, students were encouraged to complete anonymized paper feedback forms comprising five-point Likert scales, which were then collected by the tutor; data were collated and analysed centrally, with the aim of adjusting tutorial content and delivery as the year progressed.

RCT trial of efficacy

Following the pilot year, before launching the second year of the scheme, validation of the effectiveness of near-peer teaching was undertaken by conducting an RCT of its efficacy. Twenty final-year medical students volunteered to participate in response to an open advertisement on the online student forum (EEMeC). Ten were randomized to receive a 30-min small-group tutorial (three to four students), led by a tutor from the pilot scheme. Each tutor used a standardized clinical scenario to teach students about prescribing for a patient with severe left ventricular failure, focussing on specific areas of management and also on generic principles of safe prescription writing. The other 10 students did not receive any tuition. All students then completed a 10-min mock assessment, using a different scenario: infective exacerbation of chronic obstructive pulmonary disease. The students were given a clinical scenario and asked to prescribe medications or fluids appropriate for the patient, under examination conditions and with a copy of the British National Formulary. Two junior doctors marked each anonymized drug and fluid chart against set criteria approved by a University staff member involved in teaching and assessing undergraduate clinical pharmacology (SM). Average total scores, as well as the total number of dosing errors, were ascertained for each student, and the findings in the tutorial and non-tutorial groups were compared using unpaired *t*-tests.

Development and preparation of the second year (2007–2008)

Based on pilot data and liaison with the University of Edinburgh, the scheme was improved prior to commencing the second year. Practical prescribing was chosen as the core theme of the tutorials and tutors from the pilot year designed clinical vignettes for prescribing scenarios to be used to structure tutorials in 2007–2008. These were designed in the style of final undergraduate examination stations. Along with

model answers, the clinical vignettes were approved by a University staff member involved in teaching and assessing undergraduate clinical pharmacology (SM).

A tutor training symposium was devised, aiming to prepare a new cohort of 'near-peer' tutors to teach in the scheme, including tutors who had attended other medical schools, and thus were not familiar with the University of Edinburgh's final examinations. The symposium also aimed to provide new tutors with other applicable teaching skills, by incorporating sessions covering large group teaching and teaching practical skills, as well as the small group teaching involved in this scheme. The clinical vignettes to be used for the 2007–2008 scheme were reviewed in the symposium. Sessions were led by members of the University of Edinburgh teaching staff and funded by the Medical Teaching Organisation of the University of Edinburgh.

A new group of tutors was recruited from the new year group of FY1 doctors, by an e-mail advert sent to all FY1 doctors listed by The National Health Service Doctors Online Training Scheme working in Southeast Scotland. Attendance at the tutor training symposium was compulsory to be able to participate as a tutor in the second year of the scheme. Feedback was obtained from FY1 attendees of the symposium using a five-point Likert scale feedback form.

Following the tutor training symposium, tutors were issued with copies of the clinical vignettes and with sample prescription charts for both drugs and fluids. Throughout the symposium, tutors were asked to use an interactive tutoring style, incorporating the use of audiovisual aids.

Results

Pilot year study of feasibility (2006–2007)

Eighteen FY1 doctors who had graduated from the University of Edinburgh in 2006 were recruited as tutors. Tutorials were delivered throughout a period of 16 weeks (January–May 2007) immediately prior to the final-year MB ChB examination. Of 73 tutorials provided at five sites within Southeast Scotland, 53 (73%) were delivered in two of the main teaching hospitals and the remainder, in peripheral hospitals. Tutorials were attended by 271 students with a mean 4.6 tutorials per week and 3.7 attendees per session.

The content of the teaching programme evolved during the course in response to student feedback; by the end of the year, the majority of sessions had addressed practical prescribing in response to feedback, but others included examination skills in neurology, cardiovascular medicine, surgery and orthopaedics; see Figure 1.

Of the 271 attendees, 234 (86%) completed anonymous feedback questionnaires (Figure 2). Nearly all of the responses were positive about the scheme; 233 of 234 (99%) agreed or strongly agreed that the tutor was approachable and 233 of 234 (99%) of responses agreed or strongly agreed that they would be keen to attend more tutorials. Space had been provided on the form for 'free text' feedback, but no responders elaborated on the reasons for their dissatisfaction with various elements of the programme.

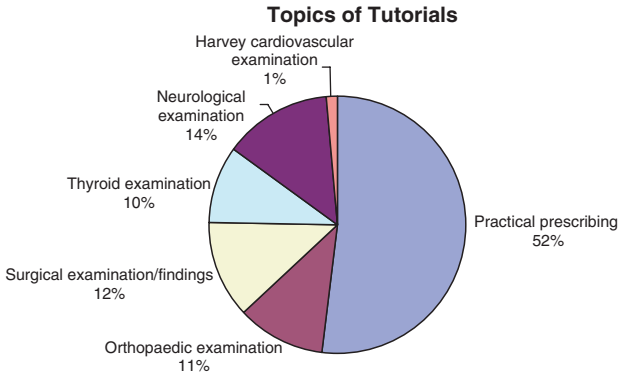

Figure 1. Topics of tutorials provided during the pilot year, 2006–2007 ($n=73$).

RCT trial of efficacy

Total scores in the mock examination were not significantly different between the tutorial and no-tutorial groups (13.9 *vs.* 12.15 out of a maximum of 30 points, $p=0.242$). However, students in the tutorial arm made significantly fewer dosing errors than those in the no-tutorial group (mean 9 *vs.* 22, $p=0.049$).

Development of the second year (2007–2008)

The training symposium was attended by 29 FY1 doctors, with feedback obtained from 25 of them (86%) (Figure 3); 100% of responses agreed or strongly agreed that the sessions were interactive enough, that they felt more prepared to be tutors in the scheme as a result of the symposium, and that they would recommend the symposium to future tutors. A 96% agreed or strongly agreed that the small group workshops were helpful, 92% agreed or strongly agreed that sessions covering teaching technique and prescribing were useful.

Discussion

The volume and scope of the undergraduate medical curriculum creates many unmet educational needs for final-year students preparing for clinical practice. As a result, there is an ever-increasing need for all clinicians to teach medical students and abundant opportunities to develop the teaching skills of junior doctors. One practical way for junior doctors to develop their teaching skills is to participate in near-peer teaching schemes. Junior doctors can benefit in several ways; they receive prior training and guidance in the principles and techniques of teaching, they learn by preparing the educational content of their teaching and hopefully, they receive the approval and recognition of their senior colleagues for their commitment to teaching. Given formal training in teaching skills and opportunities to hone these skills in near-peer teaching programmes, junior doctors can help to secure and maintain a consistent and high standard of teaching within a medical undergraduate teaching programme, as has been demonstrated for similar traditional PAL schemes (Sengupta et al. 2007). We believe that 'near-peer' teaching may have advantages beyond traditional PAL. Junior doctors have

Questionnaire statement	Strongly disagree (1 point)	Disagree (2 points)	Neutral (3 points)	Agree (4 points)	Strongly agree (5 points)	Score (mean ± Sd)
The tutorial was at a convenient time	0.85%	2.14%	0.85%	44.81%	54.27%	4.46 ± 0.71
The tutorial was long enough	0.85%	0.85%	1.71%	36.32%	60.43%	4.55 ± 0.66
The tutor was approachable	0.85%	0%	0%	10.68%	88.46%	4.86 ± 0.47
The group size was small enough	0.85%	0%	1.28%	17.95%	79.91%	4.76 ± 0.56
The material covered was relevant	0.85%	0%	0%	11.97%	87.18%	4.85 ± 0.48
The tutorial advanced my clinical skills	0.85%	0%	3.42%	23.50%	72.22%	4.66 ± 0.63
The tutorial advanced my knowledge	0.85%	0%	0.43%	20.51%	78.21%	4.75 ± 0.55
The tutorial provided useful revision	0.85%	0%	0.43%	17.09%	81.62%	4.79 ± 0.53
I now feel more confident about this finals station	0.86%	0.43%	2.99%	24.36%	71.37%	4.65 ± 0.65
I am interested in attending more of these tutorials	0.85%	0%	0%	9.83%	89.32%	4.87 ± 0.47

SD = Standard Deviation

Figure 2. Tutorial attendee feedback received for pilot year tutorials ($n = 234$).

recently passed final undergraduate examinations and started working. As such, they can aid undergraduate students with their up to date experience, in a manner that we believe is distinct from either undergraduate peer tutors, or more senior tutors. As a result, we believe that near-peer teaching is different from both peer-assisted learning and traditional senior clinician-led teaching.

Developing and launching a scheme successfully requires considerable planning and preparation. We identified and targeted specific areas of the undergraduate teaching programme that we believed would represent popular additional tuition at the start of the pilot year. We then adjusted the sessions based on feedback from the attendees, which led to an increase in the number of sessions covering practical prescribing. The content of teaching sessions was further realigned following helpful, formal feedback from the students. Group sizes were limited to four students per session to maximize student involvement. This had the additional benefit that relatively inexperienced tutors were not overwhelmed by the task, enabling them to achieve a higher standard of teaching.

Anonymized feedback obtained from the majority of students in the pilot year was exceptionally positive with only a small minority dissatisfied with any aspect of the programme or its delivery. The majority approved the content and delivery of teaching sessions and felt that the tutorials provided useful preparation for clinical practice and the final-year examination; nearly all students were keen to attend more teaching sessions. We have received such enthusiastic support from postgraduate tutors in neighbouring hospitals that we plan to extend the near-peer teaching scheme to more district general hospitals.

Further planning was required to ensure that the initiative was sustainable in the long term. A commitment to 'teaching the teachers' was recognized as being vital to the success of the scheme. The tutor training symposium was designed in conjunction with members of the Medical Teaching

Questionnair estatement	Strongly disagree (1 point)	Disagree (2 points)	Neutral (3 points)	Agree (4 points)	Strongly agree (5 points)	Score (mean ± Sd)
The introduction session was satisfactory	0%	0%	0%	52%	48%	4.48 ± 0.51
The lectures on teaching technique were useful	0%	0%	8%	40%	52%	4.44 ± 0.65
The small group workshops were helpful	0%	0%	4%	48%	48%	4.44 ± 0.58
The talk on 'final' examinations was useful	0%	0%	4%	52%	44%	4.4 ± 0.57
The prescribing sessions were helpful	0%	0%	8%	44%	48%	4.4 ± 0.65
The symposium was interactive enough	0%	0%	4%	24%	72%	4.68 ± 0.56
The venue was conducive to the teaching events	0%	0%	0%	24%	76%	4.76 ± 0.44
I now feel more prepared for teaching	0%	0%	0%	32%	68%	4.68 ± 0.48
The catering arrangements were satisfactory	0%	4%	8%	36%	52%	4.36 ± 0.81
I would recommend this to future tutors	0%	0%	0%	20%	80%	4.8 ± 0.41
I had to re-arrange commitments to attend	8%	32%	20%	24%	16%	3.08 ± 1.26

SD = Standard deviation

Figure 3. Feedback received from attendees of tutor training symposium, 2007 ($n = 25$).

Organisation of the University of Edinburgh. The objectives were to provide new near-peer tutors with applicable and transferable skills that they are likely to use throughout their careers as doctors and educators, as well as to introduce them to the specific requirements of this teaching scheme. As a result, sessions covering teaching large groups in a lecture format, as well as teaching clinical skills, were incorporated into the programme. The feedback received demonstrates that the near-peer tutors perceived the symposium to be beneficial.

Although we had demonstrated that near-peer teaching is valued by students, there is little published evidence that near-peer teaching improves the clinical performance of undergraduates. We went on to assess the short-term benefits of near-peer teaching on medical student performance of routine drug and fluid prescribing. We aimed to evaluate whether near-peer teaching had a transferable impact on prescribing skills in particular, as this was identified as the topic to be covered in future years of the scheme. To achieve this, our study used a tutorial that closely resembled the near-peer teaching to be carried out that year, followed by an assessment based around a completely different clinical scenario, to ensure that any change in performance following the trial was the result of transferable skills and knowledge gained from the tutorial, rather than simply reinforcement of the clinical case through the tutorial. By basing the assessment on Edinburgh University's undergraduate finals, the volunteers were assessed in a realistic style, and using an approach that has been validated and approved for the assessment of final-year undergraduates. The overall scores were not significantly different between the tutorial group and no tutorial group, and this may be a reflection of the substantial weighting of marks awarded for specific knowledge of the condition being treated.

However, the tutorial group made significantly fewer technical prescribing errors. This is consistent with the impact that we would aim for the scheme. Core teaching for undergraduates is already developed, and near-peer teaching aims to familiarize students with the use of prescription and fluid charts in keeping with the daily requirements of work as a junior doctor. Thus, we believe that the result of the trial is consistent with a beneficial effect of near-peer teaching on undergraduate performance.

The modifications made to the scheme in preparation for the 2007–2008 year aimed to increase access to sessions for students and to provide greater assurance of quality control of teaching sessions. By focussing solely on prescribing rather than examination and other clinical skills, clinical vignettes could be prepared and approved by a clinician involved in undergraduate prescribing (SM), could be reviewed with the new near-peer tutors at the training symposium and would provide a standardized cohort of tutorials for the year.

We acknowledge that there are potential limitations to our work. It is important to appreciate that students were allowed to attend more than one session each. This was felt to be an important aspect of the scheme, as different sessions covered different topics, and hence an individual may have benefited from attending various sessions run by different near-peer tutors. Furthermore, not all members of the undergraduate year group may have been interested in attending sessions. As a result, feedback obtained from attendees is likely to include feedback from the same individuals for different sessions. Furthermore, feedback from both tutorial attendees and symposium attendees may represent a convenience sample, and this may limit generalizability of the data. Future work would include an assessment of the longer term impact of tutorial attendance on undergraduate performance in final MB ChB examinations. It would also be useful to establish student focus groups in order to ascertain more qualitative data on the perceived advantages and disadvantages of the scheme. Furthermore, any quantitative gain in either prescribing skills or teaching technique for near-peer tutors could be investigated.

In summary, we have demonstrated that a 'near-peer' teaching scheme can be devised, developed and delivered by junior doctors to provide an adjunct to the medical undergraduate teaching programme that is popular with both undergraduate attendees and junior doctor near-peer tutors, and that may improve undergraduate performance. We believe that this novel form of teaching could readily be incorporated into medical school curricula elsewhere and provide a valuable component of junior doctor training programmes.

Notes on contributors

JEREMY RODRIGUES is a Foundation doctor based in Southeast Scotland deanery. Dr Rodrigues has been involved from initial concept to launch. He was one of the 18 tutors to provide pilot sessions and coordinated sessions. He coordinated the trial, analysed data and co-authored this article.

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