Preregistration house officer skill and competency assessment through questionnaires

In 1996 the University of Liverpool reformed its medical course from a very traditional lecture-based curriculum to an integrated problem-based learning curriculum. This article summarizes the results of questionnaires sent to both traditional and reformed curricula Liverpool graduates asking them to assess their competencies.

Introduction

Since the General Medical Council (GMC) gave recommendations on the content of medical curricula in the UK in *Tomorrow's Doctors* (General Medical Council, 1993) many universities have reformed their medical curricula. In 1996 the University of Liverpool reformed its medical curriculum from a traditional lecture-based course to an integrated problem-based learning (PBL) curriculum and included many of the recommendations of *Tomorrow's Doctors* (General Medical Council, 1993; Bligh, 1995; Bradley and Bligh, 1999). *Tomorrow's Doctors* highlighted the fact that medical curricula were not adequately preparing graduates to work as preregistration house officers (PRHOs) and part of the rationale for introducing a reformed curriculum in Liverpool was to give graduates greater preparation to work as PRHOs.

The consequences of Liverpool University's reformed curriculum are being closely monitored. This paper follows on from work by Brown et al (2004), who looked at the effects that reform in Liverpool University's curriculum has had on the attitudes of PRHOs to postgraduate training, and papers that looked at the views of educational supervisors on the competencies of Liverpool PRHOs and curriculum reform (Watmough et al, 2006a, 2006b). Questionnaires were also sent to Liverpool PRHOs asking them to assess their own competencies. The focus of this paper is to examine how well prepared PRHOs from both the Liverpool traditional medical curriculum (TMC) and reformed medical curriculum (RMC) felt to work as PRHOs and whether there any differences in the self-perceived competencies of graduates from both types of curricula. This article looks at questionnaire data gathered on the last two cohorts to graduate from the TMC (1999, 2000) and the first two cohorts to graduate from the RMC (2001, 2002).

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The questionnaires

Questionnaires, developed by the University of Manchester (Jones et al, 2001, 2002) containing 31 skills, attitudes and competencies from *The New Doctor* (General Medical Council, 1997) which the GMC expects graduates to perform as PRHOs, were sent to Liverpool PRHOs training in the Mersey Deanery area. The list of graduates and which hospital they were based at was obtained from the Mersey Deanery, the body responsible for postgraduate training in the Liverpool area. The vast majority of Liverpool graduates train as PRHOs in the Mersey Deanery.

The questionnaires were distributed between March and June of 2000, 2001, 2002 and 2003 for the 1999, 2000, 2001 and 2002 cohorts respectively, which meant that the PRHOs had experienced both medical and surgical attachments and were in a position to reflect on their experiences as junior doctors. The questionnaires were originally distributed via the postgraduate centres in Mersey Deanery hospitals during PRHO protected teaching time with the help of postgraduate centre staff. Stamped addressed envelopes were included. Two follow-up letters were posted to non-respondents at their hospital addresses.

The PRHOs were asked in the questionnaires: 'Please rate yourself on your competency in the following…'. The answers were given on a 5-point Likert scale, which ranged from 'generally not at all competent' to 'generally very competent' with 'generally quite competent' as midpoint. The full list of questionnaire variables is included in *Table 1*.

Analysis

The questionnaire data were analysed using the Statistical Package for Social Sciences version 11.0 for windows (SPSS) and non-parametric tests (Mann–Whitney U) were used to test for significant differences between TMC and RMC cohorts of PRHOs. The results shown in this paper are the average results from the two traditionally educated cohorts compared with average results from the two cohorts of PRHOs from the RMC.

For the purpose of this paper and ease of presentation the questionnaire results have been summarized in three points rather than the five points on the Likert scale on the questionnaires. The upper two points on the Likert scale have been banded together and labelled as 'more than generally quite competent', the mid point remains the same as 'generally quite competent' and the lower two points on the Likert scale have been banded together and labelled as 'less than generally quite competent'.

Results

The response rates were 52% (78/150) for the 1999 cohort, 67.5% (112/166) for the 2000 cohort, 57% (92/161) for the 2001 cohort and 57% (94/162) for the 2002 cohort.

The results in *Table 1* show the average of the two cohorts (1999 and 2000) pertaining to the TMC and two cohorts (2001 and 2002) pertaining to the RMC curriculum and the results of the non-parametric tests ($P \geq 0.05$).

All but two of the 31 questionnaire variables had improved on the midpoint scales when comparing TMC with RMC graduates. Sixteen of the variables had shown a significant difference with only one of these variables (understanding disease processes) rated in favour of the TMC graduates.

Discussion

As the high percentage ratings at midpoint and above demonstrates the PRHOs both from the TMC and RMC rated themselves at generally very competent on the skills listed on the questionnaire. These high percentages may in part be because the questionnaires were distributed towards the end of the PRHO year. If they had been delivered earlier in the PRHO year when they had less experience as PRHOs, then that the ratings may have been lower.

These results represent the PRHOs' self-perception of their skills and as such are prone to inevitable bias. It may be, given the overall high percentage results, that

Table 1. PRHO (AQ In full please) ratings on competencies listed in The New Doctor 'Please rate yourselves on your competence in the following'

	% of PRHOs rating themselves as (rounded up to nearest whole number)						
	More than quite competent		Quite competent		Less than quite competent		*P* value
Item in order as it appeared on the questionnaire	TMC	RMC	TMC	RMC	TMC	RMC	(<0.05)
Communicating effectively	80	90	18	9	2	1	ns
Working in a team	79	95	20	4	1	1	0.01
Being aware of limitations	83	91	16	8	1	2	ns
Understanding disease processes	43	33	49	55	8	12	0.018
Managing time effectively	53	63	34	33	13	4	ns
Developing appropriate attitudes towards personal health and wellbeing	50	66	38	32	12	2	0.001
Recognition of social and emotional factors in illness and treatment	58	76	36	22	6	2	0.002
Providing care for people of different cultures	49	50	38	42	13	8	ns
Coping with uncertainty	41	33	34	53	25	14	ns
Making the best use of laboratory and other diagnostic services	44	53	38	40	18	7	ns
Using informatics as a tool in medical practice	36	50	32	38	32	12	0.002
Understanding the purpose and practice of audit, peer review and appraisal	34	59	36	32	30	9	0.001
Understanding the relationship between primary and social care and hospital care	40	70	40	26	20	4	0.001
Using opportunities for disease prevention and health promotion	36	50	36	41	28	9	0.001
Being aware of legal and ethical issues	27	43	45	9	28	8	0.001
Understanding the principles of evidence-based medicine	42	62	42	35	16	3	0.001
Diagnosis, decision making and the provision of treatment including prescribing	48	53	35	35	17	12	ns
Keeping accurate records	61	77	35	18	4	5	ns
Obtaining valid consent	47	47	32	37	21	16	ns
Calculating accurate drug dosages	52	69	31	23	17	8	0.004
Writing a prescription	64	77	22	20	14	3	ns
Venepuncture	69	90	23	8	8	2	0.009
Arterial blood sampling	59	81	21	13	20	6	0.001
Suturing	26	43	26	27	48	30	0.001
Performing an electrocardiogram	32	55	23	31	45	14	0.001
Basic cardiopulmonary resuscitation	71	84	21	13	8	3	ns
Administering oxygen therapy safely	67	77	21	20	12	3	ns
Correctly using a nebulizer	52	58	17	33	31	9	ns
Inserting a nasogastric tube	43	44	14	32	43	24	ns
Urinary catheterization	62	67	13	26	25	7	ns
Control of haemorrhage	46	72	33	22	21	6	0.001

ns = not significant; RMC = reformed medical curriculum; TMC = traditional medical curriculum

both types of PRHO have overestimated their abilities. Other studies have shown that PRHOs tend to overestimate their own clinical skills (Barnsley et al, 2004) and that medical students tend to overestimate their own diagnostic skills in comparison with skills assessment by their supervisors (Mattheos et al, 2004). All PRHOs in the UK have named consultant educational supervisors whose job it is to assess their competencies and both TMC and RMC graduate Liverpool PRHOs rated themselves as much more competent in these skills than their consultant supervisors rated them (Watmough et al, 2006b). However, as the questionnaires were anonymous the PRHOs would not have felt they were being formally assessed on these skills.

Both TMC and RMC have different experiences of having their skills assessed. Students for the final cohorts of the traditional curriculum undertook traditional final exams at the end of the fifth year. Final year student assessment in the RMC is through portfolios which uses similar skills and competencies to those included on the questionnaire, so students from the RMC programme may be more used to the process of self evaluation. The PRHOs from the RMC would have been more used to being assessed on the kind of skills listed in the questionnaire. However, all four cohorts were subject to portfolio assessment during their PRHO year at the Mersey Deanery, which lists similar skills to those included in the questionnaire. The ability of health professionals to assess their own competence is a skill that can be acquired and is crucial for doctors (Mattheos et al, 2004); it is possible that PRHOs are still learning this skill.

The response rates were similar for all the PRHO cohorts and while the study may have been improved if higher response rates had been achieved, as the numbers for TMC and RMC PRHOs were broadly similar all the cohorts were subject to the same bias. The study reported here has similar response rates to other questionnaire surveys of PRHOs (Jones et al, 2001, 2002).

The results and curriculum reform

Despite the generally strong self ratings by both groups of PRHOs and potential for bias in their self ratings, there are clear differences in the self-perceived competencies between TMC and RMC PRHOs. The results indicate that the RMC PRHOs rate themselves as better prepared for the skills and competencies listed in *The New Doctor* (General Medical Council, 1997) than TMC PRHOs and those variables that showed a significant change may be explained by differences between both types of curricula.

The RMC is arguably more geared towards teamwork than the TMC, which could explain the improvement in 'working in a team'. The students work through the first year in PBL groups where group work makes completing the PBL scenarios more efficient. They also have to gain feedback from nurses when completing the final year portfolio and work closely with other health-care professionals in accident and emergency attachments and on GP placements. The improved skills in 'using informatics as a tool in medical practice' could also be down to the greater emphasis in the RMC curriculum for finding evidence when working through PBL cases, but also students who have graduated more recently are more accustomed to using computers whether at home or in school.

The RMC graduates feel more competent at 'understanding the purpose of audit, peer review and appraisal'. Many of the RMC PRHOs will have undertaken audits through their special study modules or on one of the optional final year placements unlike the traditional students who rarely had the opportunity in their course. The actual use of a portfolio in the final year in place of the traditional final exams will have encouraged students to have a greater awareness of peer review and appraisal. The improvement in 'understanding evidence-based medicine' can also be related to the final year portfolio where students are assessed on this. In addition, gathering evidence is an essential element when working through the PBL scenarios.

Students in the RMC spend approximately 30% of their time on clinical placements in the community compared with 4 weeks in the TMC which should explain why RMC graduates feel better at 'understanding the relationship between primary and social care and hospital care'. In general practice undergraduate students learn implicitly about the effects disease has on patients and their family and the increase in community placements may also explain why the RMC graduates rate themselves as better at 'recognition of the social and emotional factors in illness and treatment'. One of the themes that runs through the RMC is 'individuals, groups and society' which may also account for this increase in self perception by RMC graduates.

There is a public health aspect in many of the PBL scenarios offering an explanation of why RMC graduates feel more competent at 'disease prevention and health promotion' and, again, this is also an important component of everyday general practice. Another theme that runs through the curriculum is 'population perspective' and all students in the RMC curriculum are given copies of GMC documents, such as *The New Doctor* (General Medical Council, 1997), which stress the importance of this. For 'developing appropriate attitudes towards personal health and well being' it is possible that the regular contact with a PBL tutor in the early years of the course and teamwork involved in working through PBL scenarios plays a part. Students from the RMC undertake timetabled discussions and are assessed on 'understanding legal and ethical issues', which may explain the increased self perception of ability shown in these results, especially as there was little teaching in these areas in the TMC.

Six of the items show a significant increase relating to practical, clinical skills (venepuncture, control of haemorrhage, performing an electrocardiogram, suturing, arterial blood sampling and calculating accurate drug dosages). Students are introduced to skills training in the clinical skills resource centre (Bradley and Bligh, 1999) during the first semester. They are assessed on these skills in objective structured clinical exams throughout the course and in the final year students have to record how many times they undertook these skills on a clinical skills record sheet within the portfolio. There was no formal practical skills teaching or assessment in the TMC. The clinical exposure in the final year, particularly when students shadow their first PRHO post for 8 weeks and with an 8-week accident and emergency placement, allows students to practice these skills before graduation. Students now get the opportunity for supervised writing of patients' notes while on the shadowing placements, which includes updating drug information, and have to write drug for-

mulae in the final year portfolio. This may explain why they feel more competent at calculating accurate drug dosages.

Given that the improvements already mentioned can be linked to curriculum reform it may be surprising that there is no improvement in 'communicating effectively' given the introduction of structured communication skills classes in the RMC. In fact the ratings for both groups of PRHOs are very high for this. Focus group research has shown that Liverpool PRHOs feel they are good communicators but for different reasons. The traditional graduates intuitively feel this because doctors naturally have that ability and the RMC graduates because they have received training in that area (Watmough et al, 2006c).

It is concerning that there was a significant decrease relating to 'understanding disease processes'. Curriculum reform can often lead to uncertainty about knowledge base in graduates (Kaufman and Mann, 1998; Jones et al, 2002), and elsewhere in the UK PBL graduates (Jones et al, 2002) have rated themselves as lower regarding understanding disease processes. However, over time it is often found that these concerns are unfounded (Albanese, 2000; Blake et al, 2000) and the introduction of PBL in Liverpool for dentistry has not affected basic science knowledge (Last et al, 2001).

Focus groups held with the first RMC cohort (Watmough et al, 2006d) have shown that these graduates are unsure about basic science as a result of the less structured approach of PBL, but do feel they have enough knowledge to work as junior doctors. It is interesting to note that there have been no significant differences and a trend for slight improvements in the other questionnaire variables relating to knowledge on the questionnaire such as 'diagnosis, decision making and the provision of treatment including prescribing'. Owing to the PRHO and student concerns, however, changes (yet to be evaluated) have been introduced to the curriculum to support the students in the acquisition of basic science knowledge within a PBL system through extra plenary sessions and students sharing learning objectives on the university intranet.

With the introduction of the foundation programme, Liverpool graduates can be monitored on the management and understanding of disease processes over a 3-year period from the final year of medical school to the end of the foundation year 2 using the portfolio system (Watmough et al, 2006b), which may lead to further improvements in the acquisition of this knowledge. This may reduce concern over the issue of basic science knowledge. However, further work may be required to look at the impact of some of the changes made to the reformed curriculum and the extra support in place for students to see if this leads to more confidence in knowledge acquisition.

Conclusions

Whether the PRHOs have overestimated their own abilities or not, a picture emerges of PRHOs from the RMC feeling in themselves to be more competent than their predecessors. It has previously been reported that curriculum reform in Liverpool can have a positive impact on how educational supervisors view the competencies of PRHOs (Watmough et al, 2006a, 2006b). In fact the educational supervisors recognized similar improvements in competencies to the PRHOs thus adding to the evidence that curriculum reform can make a difference to PRHO performance. One of the reasons for introducing the RMC was to improve preparedness for the PRHO year and this study shows curriculum reform can also have a positive effect on how PRHOs perceive their own competencies. **BJHM**

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KEY POINTS

- Preregistration house officer (PRHOs) are able to assess their own competencies according to the expectations of the General Medical Council through questionnaires.
- PRHOs rate themselves as more competent than their educational supervisors rate them.
- The results show that PRHOs from a reformed medical curriculum rate themselves as more competent in the skills listed in *The New Doctor* than graduates of a traditional course.
- These improvements can be linked to reform of the curriculum and the innovations contained in the course.
- Curriculum reform can improve graduates' self perceptions of preparedness for the PRHO year.