

ORIGINAL ARTICLES

Are Medical Students Adequately Trained to Prescribe at the Point of Graduation? Views of First Year Foundation Doctors.

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ABSTRACT

Background

Drugs are the major therapeutic intervention provided by most doctors throughout their careers. The General Medical Council expects all medical students to be competent to prescribe at the point of graduation.

Aims

The aim of this study was to assess the views of Foundation Year 1 (FY1) doctors who had recently graduated from the University of Edinburgh about their training and competence in relation to the use of drugs based on their early clinical experience.

Method

A questionnaire was constructed based on *Tomorrow's Doctors 2002* and distributed to FY1 doctors who graduated in August 2005.

Results

Responses were received from 100 (39.8%) of the doctors who graduated in 2005. Only 32% respondents considered themselves 'competent to prescribe' at the point of graduation. Less than 50% of respondents felt comfortable in providing information about possible treatments to allow patients to make informed decisions about their care. The majority of respondents complained about a lack of formal teaching and practice at basic clinical skills relating to drug therapy.

Conclusion

Many graduates feel under-prepared to take on prescribing responsibilities after graduation. These findings emphasise the need to ensure that all medical curricula are able to provide sufficient learning opportunities and robust assessment in this important area of clinical practice.

Introduction

Prescribing is a key activity of a doctor. Approximately 7,000 individual drug doses are administered each day in a 'typical' NHS hospital, 70% of which are prescribed by first year graduates and senior house officers even though they have little experience of undertaking these tasks prior to graduating.¹ Currently, drugs make up approximately

15% of the NHS annual expenditure, which is predicted to grow progressively.² Furthermore, medication errors cost the NHS around £200-400 million per year.³ For these reasons, junior doctors must be adequately trained to meet the increasing demands of prescribing.

Previous studies have identified uncertainties in various aspects of medical practice among fresh medical graduates, including clinical pharmacology,^{4,5} suggesting that undergraduate training may be insufficient to meet subsequent work demands. *Tomorrow's Doctors 2002* gave clear guidance on the expected outcomes in relation to drug therapy such as an understanding of side-effects, harmful interactions, antibiotic resistance etc.⁶ However, the guidance arrived at a time when there was already widespread concern about the lack of pharmacology teaching after a progressive move towards integrated non-discipline based curricula, including concerns expressed by medical students themselves.⁷ Postgraduate training is also in transition following the introduction of 'Foundation' training programmes in August 2005.⁸

In accordance with the recommendations of *Tomorrow's Doctors*, the University of Edinburgh revised its undergraduate curriculum in recent years. Teaching about medicines and their use in clinical practice was devolved to the various horizontal modules of the curriculum as part of a 'vertical theme' known as 'Pharmacology & Therapeutics'. The aim of this study was to investigate the perceptions of recent graduates (FY1 doctors) on their preparation and competency to prescribe shortly after graduation in order to inform the vertical theme coordinators of any improvements that might be made.

Table I Analysis of questionnaires

Section 1: Your Undergraduate Training Experience

In relation to the following kinds of undergraduate learning about drugs there was

	Far too little	Too little	About right	Too much	Far too much
	(%)	(%)	(%)	(%)	(%)
Lectures on the basic pharmacology of drugs	16.0	53.0	29.0	2.0	0.0
Lectures on the use of drugs in clinical practice	33.0	54.0	13.0	0.0	0.0
Small group tutorials about drugs and prescribing	54.0	41.0	5.0	0.0	0.0
Problem-based learning about drugs	40.0	48.0	10.0	1.0	1.0
Workshops on prescribing issues	36.0	52.0	12.0	0.0	0.0
Electronic learning opportunities	12.0	47.0	36.0	4.0	1.0

How many times did you undertake the following clinical skills (with supervision or feedback) during your undergraduate training?

	Never	1-5	6-10	11-15	>15
	(%)	(%)	(%)	(%)	(%)
Write up a hospital drug kardex	11.0	62.0	19.0	6.0	2.0
A teaching session on calculating drug doses	9.0	87.0	4.0	0.0	0.0
Set up a drug infusion pump	66.0	34.0	0.0	0.0	0.0
Prepare and give a parenteral drug injection	45.0	51.0	3.0	0.0	1.0
Set up and give a bag of intravenous fluid	11.0	72.0	12.0	4.0	1.0

How often did you use the following resources to aid your learning about drugs in your final year?

	Never	Yearly	Monthly	Weekly	Daily
	(%)	(%)	(%)	(%)	(%)
Web-based resources (PubMed/BNF/google etc)	9.0	17.0	39.0	32.0	3.0
Online medical school resources (lecture notes/CALs etc)	12.0	21.0	36.0	26.0	5.0
Your own textbook	2.0	7.0	25.0	41.0	25.0
Your own BNF	0.0	1.0	13.0	48.0	38.0
Library resources	14.0	14.0	38.0	31.0	3.0

Section 2: Your Training in Relation to Your Current Work

In relation to my prescribing as a junior doctor I have adequate knowledge of

	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
	(%)	(%)	(%)	(%)	(%)
Common adverse effects of the drugs I use regularly	0.0	50.0	29.0	16.0	5.0
Harmful interactions of the drugs I use regularly	0.0	41.0	30.0	24.0	5.0
Prescribing drugs to manage acute illness	4.0	64.0	23.0	7.0	2.0
Prescribing drugs to relieve pain and distress	10.0	62.0	19.0	8.0	1.0
Providing enough information about conditions and possible treatments to allow patients to make informed decisions about their care	2.0	28.0	41.0	28.0	1.0

In relation to my prescribing as a junior doctor I have had adequate training to be proficient at

	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
	(%)	(%)	(%)	(%)	(%)
Writing safe prescriptions for different types of drugs	1.0	65.0	19.0	13.0	2.0
Calculating a drug dosage	0.0	42.0	30.0	28.0	0.0
Giving intravenous, intramuscular and subcutaneous injections	0.0	28.0	29.0	35.0	8.0
Administering oxygen therapy	16.0	67.0	14.0	3.00	0.0
Using a nebuliser correctly	6.0	20.0	41.0	26.0	7.0

In relation to my prescribing as a junior doctor I have adequate understanding of

	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
	(%)	(%)	(%)	(%)	(%)
How errors can happen in practice	11.0	78.0	10.0	1.0	0.0
The principles of managing risks	7.0	62.0	23.0	8.0	0.0
How to evaluate effectiveness of drugs based on published evidence	6.0	56.0	25.0	13.0	0.0
The principles of effective and safe use of medicines as a basis for prescribing	5.0	70.0	19.0	6.0	0.0

In relation to my prescribing as a junior doctor

	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
	(%)	(%)	(%)	(%)	(%)
I was adequately trained to prescribe at the point of graduation	2.0	30.0	24.0	29.0	15.0
Litigation over drugs is a concern for me	15.0	48.0	29.0	8.0	0.0

Table I Analysis of questionnaires (continued)

Section 3: Continuing Medical Education (CME) on Drugs Usage					
In relation to maintaining good medical practice,					
	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
	(%)	(%)	(%)	(%)	(%)
I try to update myself regularly with drugs development	1.0	47.0	35.0	17.0	0.0
I tend to ask colleagues, if possible, for advice (eg. drug dose) before looking up primary references (BNF etc)	12.0	52.0	12.0	21.0	3.0
My working environment generally encourages CME	4.0	62.0	20.0	12.0	2.0
I have enough opportunities to attend workshops to update my knowledge about drugs	0.0	19.0	30.0	45.0	6.0
During work, how often do you use the following resources to upgrade your knowledge about drugs?					
	Never	Yearly	Monthly	Weekly	Daily
	(%)	(%)	(%)	(%)	(%)
BNF	0.0	1.0	4.0	11.0	84.0
Journals	19.0	9.0	57.0	15.0	0.0
Web-based resources (PubMed/bnf/google etc)	11.0	10.0	46.0	24.0	9.0
Newspapers	48.0	4.0	26.0	18.0	4.0
Drugs representatives	20.0	11.0	44.0	24.0	1.0
Teaching resources by Royal Colleges	45.2	13.0	19.0	3.0	0.0

Methodology

A structured questionnaire was designed, based on the learning outcomes in *Tomorrow's Doctors 2002*, specifically items 4, 16, 19, 26, 30, 43 and 52 (Table I). This was divided into three main sections:

- (i) undergraduate training experience,
- (ii) training in relation to current work activities, and
- (iii) continuing medical education.

For most questions, respondents were required to rate their perceptions based on a 5-point Likert scale, ranging from 'strongly agree' to 'strongly disagree'. Other questions assessed FYI doctors' perceptions on how often they had performed certain clinical skills in their undergraduate years or used particular resources to update their knowledge.

Questionnaires were delivered, either by post or hand, to FYI doctors who graduated from the University of Edinburgh in July 2005. These were distributed in the first month after the graduates started their first

placement in order to capture graduates' initial perception on their prescribing competency in relation to the demands placed upon them within their working environment.

All responses were analysed and compared using Microsoft Excel 2002.

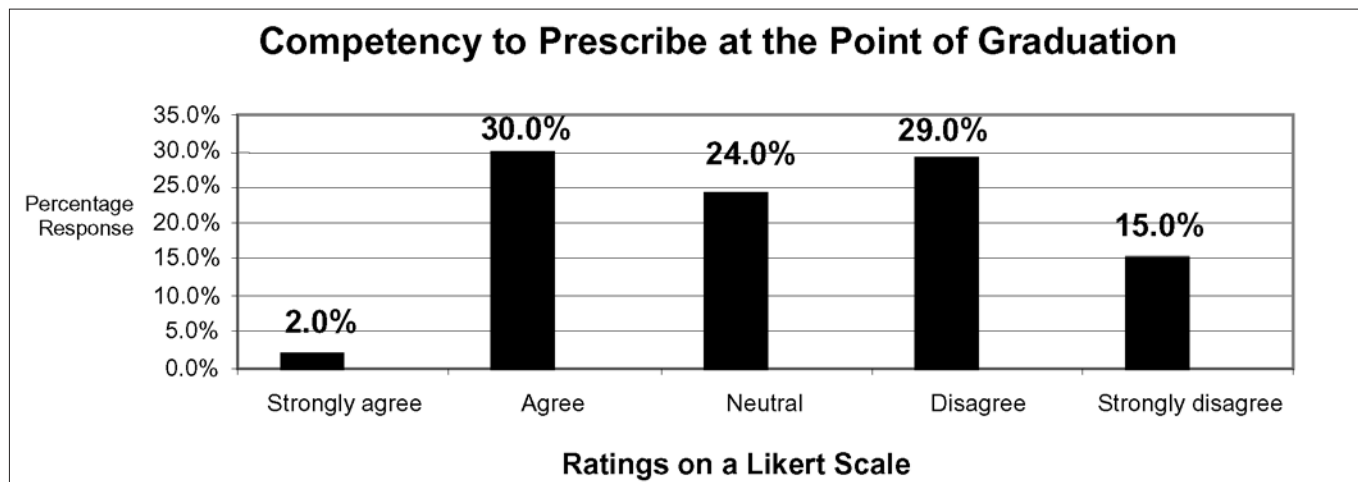
Results

A total of 200 questionnaires were returned from which 100 were FYI doctors who graduated from University of Edinburgh (39.8% of those who graduated in 2005). The remaining questionnaires were either incomplete or completed by doctors who graduated in other years or from other medical schools.

Section 1: 'Your Undergraduate Training Experience'

Most respondents considered that they had too little provision of teaching about drugs across all learning styles including lectures on basic pharmacology, clinical pharmacology and therapeutics, small group tutorials,

Figure 1 Self-rated competency of graduates to prescribe at the point of graduation.



problem-based learning, prescribing workshops and e-learning (Table I). Undergraduate experience of relevant clinical skills was varied but the majority of respondents had written up 5 or less drug prescription sheets and a significant number had never set up a drug infusion pump or prepared and given a parenteral drug injection.

Section 2: 'Your Training in Relation to Your Current Work'

Respondents considered that their knowledge was adequate in relation to current work in the areas of common adverse effects, harmful interactions, prescribing to manage acute illness, and prescribing to relieve pain and distress (Table I). However, there was much less agreement that they could provide enough information about conditions and possible treatments to allow patients to make informed decisions about their care (30%). When asked about their proficiency to undertake clinical skills the majority of respondents agreed that they were proficient at writing safe prescriptions for different types of drugs (66%) and administering oxygen therapy (83%). However, there was less agreement about other areas, e.g. using a nebuliser (26%) and giving intravenous, intramuscular and subcutaneous injections (28%). When asked about overall training to prescribe at the point of graduation only 32% of respondents agreed that this had been adequate (Figure 1). 63% agreed that litigation in relation to the use of drugs was a concern.

Section 3: 'Continuing Medical Education (CME) on Drugs Usage'

About half of respondents agreed that they try to keep up-to-date with the latest drug developments while nearly two-thirds suggested that they would initially ask their colleagues for prescribing advice before looking up primary references such as the British National Formulary (BNF). While most respondents (66%) thought their working environment generally encouraged continuing

medical education (CME) only 19% agreed that they had enough opportunities to attend workshops to update knowledge about drugs.

An overwhelming majority (84%) suggested that they used the BNF on a daily basis, making it by far the most commonly used resource for drug information. Perhaps surprisingly, a quarter of respondents used drug representatives for this purpose on a weekly basis.

Discussion

Tomorrow's Doctors radically altered the structure of UK undergraduate medical education.⁶ There was a move away from factual learning and traditional scientific disciplines to a more integrated and problem-based style of learning. However, this left some concerns that the teaching of pharmacology and therapeutics had been a casualty of the process. This brief study provided a number of important findings:

- (i) less than a third of recent graduates thought that they felt adequately prepared to prescribe at the point of graduation,
- (ii) many felt uncertain that they could provide enough information about possible treatments to allow patients to make informed decisions about their care,
- (iii) many students felt poorly prepared to undertake basic clinical skills at the point of graduation.

These findings are in accord with previous concerns about preparation for practice and do not seem to be specific to our own medical school.^{7,9,10}

Our findings reflect a gap between the workplace demands placed upon FY1 doctors to prescribe and administer drugs and the quantity of available learning opportunities

during undergraduate training. The respondents to this survey all had a series of lectures in basic pharmacology in their first two years of training integrated within biomedical sciences and four sessions of clinical pharmacology at the beginning of year three. Thereafter, learning within the 'vertical theme' took place within the various clinical modules in years three to five, which regularly included aspects of drug therapy. Assessment of competence in this area formed part of an integrated assessment that included all aspects of clinical practice.

The responses seem to indicate that in spite of this training, including the fact that 'Pharmacology and Therapeutics' was supposed to be a continuous theme within the curriculum, FY1 doctors did not feel confident about knowledge and skills in this area of practice. This could be the consequence of a number of problems. First, as suggested by the respondents, the teaching time devoted to drugs may not have been sufficient to cover a very complex and demanding learning objective. Second, there may have been a failure to emphasise the relevance of that teaching to clinical practice or sufficient re-enforcement of that message through assessment structures.

Finally, although the students had access to clinical skills facilities, there may be a need to scrutinise more closely how often specific skills practice is undertaken. Given the limited resource required it was concerning that most students had written up a medication record such as a drug 'kardex' on only a few occasions at the time of graduation, a skill that they might be expected to exhibit many times every day during their first job. Not only are such skills important in maximising the effectiveness of drug therapy but also in reducing the toll of adverse drug reactions and medication errors.^{11,12}

There are two important caveats. First, these observations reflect the views of only 100 FY1 doctors who graduated from a single medical school and may not necessarily be indicative of the wider body of graduates in Scotland. This awaits confirmation by other studies. Potential sources of bias were the fact that the respondents had the motivation to complete the questionnaire and that most were working in hospitals in the region of graduation. Second, the self-rated competency and adequacy of training expressed in the response to this study may not reflect the true capabilities of those individuals in clinical practice.

Conclusion

The results of this study confirm that many students feel under-prepared to take on prescribing responsibilities in the early weeks after graduation. These concerns require a reappraisal of how learning about drugs occurs and should prompt a re-examination of where in the curriculum experience of important practical skills can be gained*. This process should be undertaken with some urgency given the increasing pressures faced by junior prescribers.

* Since the graduation of the 2005 cohort the curriculum in Edinburgh has been substantially strengthened with the inclusion of a final year course of problem-based learning 'Therapeutics Case Discussions' focusing on practical prescribing problems encountered in early clinical practice.

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