

SOWING THE SEEDS FOR PHARMACEUTICAL CARE: DEVELOPMENTS IN UNDERGRADUATE CLINICAL TEACHING AT LIVERPOOL SCHOOL OF PHARMACY

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Many schools of pharmacy have made efforts to move away from the traditional "lectures and laboratories" teaching approach towards strategies designed to improve both factual recall and professional attitudes and skills. This article describes how this approach is used to teach clinical pharmacy and therapeutics and hospital pharmacy at Liverpool School of Pharmacy and Chemistry

Pharmaceutical care describes a model of practice in which the patient is the primary focus and in which the pharmacist accepts responsibility for ensuring appropriate outcomes from drug therapy.¹ Therapeutic options are rarely "right" or "wrong", but are open to interpretation, particularly since patients are a heterogeneous group. Participation in the delivery of pharmaceutical care requires the pharmacist to have a number of different attributes other than the ability to recall factual knowledge: problem solving skills and a holistic appreciation of the patient are essential. Classroom or workshop-based teaching is an important process in the development of skills and attitudes that undergraduates will require once they enter practice. However, innovative strategies are required to prepare pharmacists for practice in the "real world". Recent research has shown that many preregistration trainees lack essential clinical skills at the start of their training.²

Many universities have taken innovative approaches to undergraduate teaching in the United Kingdom and a number of different methods of teaching pharmacy students have been described.

Some examples include the use of internet-based teaching at Leicester,³ the use of simulated clinical environments at Aberdeen,⁴ multidisciplinary pharmacy and medical student education at King's College London,⁵ and the use of hospital visits at the University of London School of Pharmacy and the school of pharmacy at Bath University.^{6,7}

The purpose of this article is to describe some of the strategies hospital-based practitioners have developed over a number of years, to teach students the importance of patient-focused and pharmaceutical care. Using these strategies, we introduce undergraduate students, in their formative years, to these concepts within the hospital setting.

The practice of pharmacy was revolutionised in the late 20th century with the advent of "pharmaceutical care" as defined

by Hepler and Strand.⁸ In conjunction with developments in the delivery of undergraduate education, the uptake of the principles of pharmaceutical care and their impact on practice has resulted in a need to change the way that our undergraduates are educated. At Liverpool John Moores University, we have developed patient-focused models of teaching within the undergraduate pharmacy curriculum. The concepts of patient-focused care are predominately delivered in a core module, "Clinical pharmacy and therapeutics (CPT)", and the elective module, "Hospital pharmacy". The modules also introduce students to hospital pharmacy practice, which at present is not a mandatory component of the undergraduate pharmacy degree. This exposure has been suggested as a method of raising awareness of hospital pharmacy and perhaps encouraging undergraduates to choose this as their future career.⁹ Delivery of the course is reviewed and evaluated periodically, and reflection on ours and students' perceptions of the course ensures that it is constantly evolving in terms of delivery and content.

EXPERIENTIAL LEARNING

Experiential learning is a growing part of the undergraduate curriculum in UK schools of pharmacy. Other professions have also taken up the challenge of experiential learning: medical teaching employs considerable problem-based learning coupled with patient contact and experiential learning within the undergraduate curriculum.¹⁰ Such teaching places strong emphasis on practice backed up by knowledge, rather than simple factual recall. This has been shown to produce better assimilation and recall of knowledge than passive receipt of facts, as well as developing the skills and attitudes of individual students.¹¹

Experiential learning in the practice base is valuable and our profession must use it fully if practitioners are to graduate from schools of pharmacy with a comprehensive appreciation of their potential role in deliv-

ering pharmaceutical care. Pharmacy undergraduates have traditionally been educated through lectures and workshops designed to impart knowledge, understanding and problem-solving skills. Once they have left the academic environment, preregistration trainees and graduate pharmacists develop skills in pharmaceutical care through interaction with their peers, experiential learning and postgraduate education. Many schools of pharmacy have made efforts to move away from the traditional "lectures and laboratories" approach towards strategies designed to improve both factual recall and professional attitudes and skills.^{4,6,12}

THE "CLINICAL PHARMACY AND THERAPEUTICS" MODULE

Liverpool's CPT module is a core module undertaken by all final-year pharmacy undergraduates. It comprises about 60 hours of contact teaching and is similar to modules in operation at some other schools of pharmacy. The aims of our CPT module are to:

- 1 Improve knowledge of therapeutics and pharmaceutical care
- 1 Further develop problem-solving skills in patient-focused pharmaceutical care

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- 1 Develop oral communication skills
- 1 Develop an ability to find and apply relevant information
- 1 Encourage students to participate in self-directed learning

Tuition in CPT comprises a mixture of lectures, tutorials, clinical visits and self-study. Lectures constitute only a small and declining part of the course, and are delivered by academic staff, teacher-practitioners (hospital- and community-based), and specialist pharmacists from local hospitals.

Tutorials The backbone of the CPT module is a series of 11 tutorials run in parallel classes of about 15 to 20 students who have the same tutor each week. Tutorials are designed to deliver a knowledge base, develop the students' abilities to solve problems and encourage them to establish options and make decisions for which they accept responsibility. The tutorials are supported with essential directed reading and a further background reading list.

Each tutorial, facilitated by teacher-practitioners, lasts about three hours and has a predominant theme, such as rheumatology or congestive cardiac failure. The tutorials begin with a description of a patient, similar to those found in medical notes, including the presenting complaint and history, the patient's drug history, any relevant laboratory results and findings of the doctor's examination. Alternatively, the scenario might begin in a community pharmacy, where a patient reports difficulties with his or her prescribed medication or symptom control. A series of questions follow, in which students are asked to identify the patient's possible pharmaceutical care needs and how they might be addressed. The questions are interspersed with developments in the patient's condition that the students are asked to react to or comment upon. Consideration of all the alternatives and the ability to develop a reasoned pharmaceutical care strategy, informed by patient preference, is one of the key messages we attempt to deliver.

The students' findings are then discussed between groups and consensus reached. Although students are exposed to situations that require the application of problem-solving skills earlier in their university careers, this is often the first stage in their undergraduate education in which the answers are rarely "right" or "wrong", where information cannot be processed using a predetermined equation or formula, and which often results in lively and heated debate between groups.

Hospital visits Hospital visits are organised for groups of six students and have been a part of the overall curriculum at Liverpool school of pharmacy for over 30 years. Each student is allocated three hospital clinical visits and most these are led by senior hospital pharmacists or teacher-practitioners. These visits are not designed to introduce students to the hospital environment; this takes place earlier in the students' course. Instead, the pharmaceutical care planning process is demonstrated by interaction with

TABLE 1: STUDENT OPINION OF CLINICAL CLERKSHIP (N=59) STATEMENT NUMBER WHO 'AGREE' OR 'STRONGLY AGREE'

Statement	Number of students who "agree" or "strongly agree"	Percentage
I thoroughly enjoyed the clerkship	55	93.2
I gained from the clerkship	54	91.5
It was motivating and confidence building	54	91.5
It illustrated the relevance of previous studies	58	98.3
It was relevant to my current academic studies	58	98.3
It showed patients are individuals and their preference's matter	54	91.5
It showed the importance of defining intended therapeutic outcomes for individual patients	57	96.6
It showed the importance of pharmacists accepting responsibility to ensure optimal outcomes	56	94.9
It enhanced my problem solving skills	48	81.3
I would like more of this style of tuition	58	98.3

the patient, as well as identification of the desired outcomes of therapy and the outlining of a strategy by which pharmaceutical care needs can be delivered. Although students are made aware during their studies that patients do not take their medicines "exactly" as the pharmacist or doctor told them, visualisation of this in the practice setting reinforces this fact and some students express surprise at the degree of non-compliance exhibited by certain patients. That the decision to use therapeutic agents is not based on pharmacological actions alone is similarly reinforced.

THE "HOSPITAL PHARMACY" ELECTIVE

Around 30 students undertake the "Hospital pharmacy" elective each year. Tuition in hospital pharmacy comprises a mixture of clinical clerkships, clinical hospital visits, lectures, tutorials, workshops and self-study. Formal classroom teaching and self-study follows a similar pattern to the CPT module. The elective comprises 120 hours of contact teaching and about a third of tuition is delivered in local hospitals by practising pharmacists, mostly teacher-practitioners.

Hospital visits Students visit a number of different hospitals to gain experience in areas such as radiopharmacy, oncology, community services pharmacy, surgical services, nephrology, paediatrics and neurology. Visits are timetabled for three hours each in groups of no more than six students, and before each visit, outline objectives are agreed following discussion between the module leader and the hospital pharmacist. These clinical visits are strongly biased toward student reflection on previously taught material and emphasise the importance of the core modules in pharmacology, dosage form design and pharmaceutical chemistry.

Before each hospital visit, the subject is introduced within the university by lecture and directed reading. When students arrive in the hospital, a short session is held to share experience and knowledge, and discuss potential solutions to problems they may encounter on the ward. Some of the visits are "task-based" and rely heavily on student participation.

An example of this is the visit in which students compile drug histories from patients. The students work in pairs with patients who have previously given permission to be interviewed. The interviews take place on general medical, medicine for the elderly and medical assessment wards. One student compiles a drug history using a variety of data capture forms or a blank page while the other observes. Roles are then reversed and the exercise repeated. A teacher-practitioner, who may intervene if appropriate, supervises the exercise. The students and tutor then move away from the patient and discuss the effectiveness of the exercise. Drug histories, and the successful completion thereof, are discussed in a plenary session where students identify what questions they might ask if doing the exercise again.

Clinical clerkships Each student completes two "clinical clerkships", a format which was pioneered in 1993, and we believe to be unique to Liverpool in the teaching of pharmacy students. Each clerkship lasts seven hours and aims to:

- 1 Enable students to relate previously learned scientific and clinical principles to patient care
- 1 Illustrate the patient as the focal point of all pharmacy practice through experiential and task-based learning
- 1 Encourage students to identify opportunities for pharmacists to contribute to individual patient care
- 1 Develop problem-solving skills by demonstrating the pharmacists' contribution to ensuring optimal patient outcomes

The clinical clerkship model is now a well-established component of the hospital pharmacy elective. The clerkships consist of an intensive full-day session in which two students work with a specialist senior clinical pharmacist in one of the local trust hospitals. The module leader, to ensure uniformity of educational experience, approves learning objectives, and outline timetables, for each clerkship in advance. Tuition relies heavily on interaction between the students, practitioners and patients. An example of the content of a

Clinical clerkship: respiratory objectives

The aim of the study is for you to develop clinical knowledge and skills in respiratory pharmacotherapy. At the end of the clerkship you should feel confident discussing the pharmaceutical care of patients with respiratory disease, including the identification of appropriate therapeutic outcomes and how pharmacists can contribute towards them.

PREPARATION

Before your visit to the hospital you must review previous tuition on respiratory pharmacotherapy, appropriate section(s) in the British National Formulary and British Thoracic Society recommendations in management of asthma, chronic obstructive pulmonary disease and pneumonia.

MORNING SESSION

Interactive discussion on the pathophysiology and drug treatment of asthma, chronic obstructive pulmonary disease and pneumonia. Ward visit: discuss the management and monitoring involved in

patients with respiratory disease. Interactive discussion on methods of drug delivery to respiratory tract including nebulisers and oxygen therapy.

AFTERNOON SESSION

Discussion with cystic fibrosis liaison nurse to include pharmaceutical care needs of patients. Ward visit to compile drug histories, formulate pharmaceutical care plans and counsel patients. Management of pulmonary embolus. Feedback and debriefing.

EXAMPLE CONTENT

Examples of what may be covered: management of acute exacerbation of asthma and chronic obstructive pulmonary disease; respiratory self-help groups; self-monitoring plan; pharmacotherapy of tuberculosis; relative merits of different inhaler devices; domiciliary oxygen therapy; smoking cessation; physiotherapy; empirical therapy of pneumonia, bronchitis and bronchiectasis; management of pneumothorax and pleurodesis.

“Respiratory clerkship” is shown in the panel above.

Student opinion of the perceived usefulness of the clinical clerkship has previously been assessed with an anonymous, structured questionnaire conducted after their clerkship. Students were asked to indicate their views of the module using sliding scales between two opposing statements. The results of one year's students' opinions are shown in Table 1.

ASSESSMENT OF THE MODULES

Students' assessment of the CPT module comprises four components. First, a short multiple-choice test is administered at the end of each tutorial. Students are tested on the tutorial content and background reading; students who fail to read around the subject are clearly disadvantaged. Secondly, students are asked to prepare a report in the style of the *MeReC Bulletin* describing issues such as “Which nicotine replacement therapy?” or “Which ACE inhibitor for a practice formulary?”. Third, assessment of clinical visits in CPT is performed by reviewing the major learning points described by the student using a proforma. Students are asked to outline the objectives of treatment for a patient that they encountered and describe how well the predefined objectives were achieved. In addition, students suggest pharmaceutical care contributions, such as monitoring, stopping treatments, adding treatments or assisting administration. Finally, at the end of the module, students sit an examination. The examination uses a mixture of multiple choice and short structured questions, and longer questions based on case studies similar to those used in the tutorials.

Coursework assessment in hospital pharmacy also comprises a number of methods. To date we have made use of observed clinical visits, completion of a drug utilisation review for inclusion of a drug in the local hospital formulary, tutorial assess-

ments, and a drug information response to a letter from a local general practitioner asking for comment on an editorial from a medical journal. For example, students were asked to comment on the use of short-acting dihydropyridine calcium antagonists for management of hypertension. Finally, students sit an examination, similar to that used in CPT, at the end of the module.

SUMMARY

The ongoing development of “bedside teaching” represents a determined approach by Liverpool school of pharmacy to develop graduates who appreciate that pharmaceutical care is the preferred model of practice and that self-directed strategies of learning are essential. Students are encouraged to

break out of passive learning and accept responsibility for their decisions.

We hope that students graduating from our courses will enter their preregistration year with a better understanding of the patient, both as individuals with their own beliefs and as the ultimate focus of all pharmacotherapy. In addition, we hope students will be aware of the importance of defining the intended outcomes of therapy, and the need for our profession to ensure those outcomes are achieved.

ACKNOWLEDGEMENTS The university is grateful for the continuing and essential support of local NHS trust hospitals and their pharmacists without which the clinical component of its course would be impossible to deliver.

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Correction

Reference 1 was incorrectly attributed to Linda Strand. The author of the article in question was Douglas Simpson, former editor of *The Pharmaceutical Journal*.