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Extemporaneous preparation teaching in UK schools of pharmacy: Anachronism or badge of office?

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Abstract

In this study, we aimed to establish the attitudes and beliefs of pharmacy staff currently teaching extemporaneous preparation in UK schools of pharmacy, regarding their perception of extemporaneous preparation teaching; their perceived significance of its inclusion in current MPharm degree programmes, and their beliefs concerning the subject's future sustainability. Fourteen individuals, each responsible for teaching extemporaneous preparation at a UK school of pharmacy, were interviewed by telephone using an inductive qualitative approach. Interviews were transcribed and the qualitative data was mapped using a framework approach and analysed for underlying themes. Five main themes emerged from the transcriptions of the interviews: Logistical constraints associated with teaching; whether extemporaneous preparation is pharmaceutical science or practice, is in fact an art or not; whether extemporaneous preparation is outdated and irrelevant; the teaching of transferable skills; risk management associated with extemporaneous dispensing.

These themes raise serious questions regarding the long-term sustainability of extemporaneous dispensing both as a professional activity for pharmacists and as a component of the MPharm degree. Yet whilst these teachers readily articulated that there had been a sharp decline in opportunities for practicing pharmacists to engage in small-scale medicines manufacturing, the scientific, practical and transferable skills enshrined in the teaching of extemporaneous preparation were defended as relevant to pharmacists' contemporary professional practice. The responses by the university teachers interviewed indicate that they are fully aware of changes in pharmaceutical service delivery over recent years, and suggest that extemporaneous preparation teaching in UK schools of pharmacy has necessarily adapted to the changing environment in which pharmacy is practiced.

Keywords: *Dispensing, extemporaneous preparation, interview, pharmacy, pharmacy education, pharmacy lecturer*

Introduction

"...this is a professional course and this has to be spot on, got to be right...you know first semester first year, here's a bit of real pharmacy in with your chemistry."

The teaching of extemporaneous preparation in pharmacy undergraduate courses has historically been linked inextricably to pharmacists' historical role as compounders and manufacturers of medicines. Though this topic continues to figure in the pharmacy undergraduate syllabus of all UK schools of pharmacy (Chowdhury, Taylor & Harding, 2003), the content of the pharmacy curriculum has in recent years undergone considerable revision as the pharmacist's role in

healthcare becomes increasingly patient-focussed, rather than solely drug-centred. This shift is reflected in the increasing prominence and space allocated within an already crowded pharmacy curriculum given over to communication skills and a broader consideration of the social and psychological factors influencing health and the uptake of pharmaceutical services.

Manufacturing medicines, particularly within community pharmacies, occupies a very small proportion of most pharmacist's activities, with only 0.05% of all prescriptions written in England being for unlicensed medicines or specials, including those prepared extemporaneously (Department of Health, 2001). Consequently, when considering the activities of future pharmacists, extemporaneous preparation

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teaching could be viewed as outmoded and irrelevant. Yet, it could also be argued that the practice of formulating and manufacturing medicines remains at the very heart of pharmacists' identity (Taylor & Harding, 1999). This is encapsulated by the archetypal symbol of pharmacy—the pestle and mortar—an iconic image, recognised worldwide and still extensively used within the UK in pharmacy fascias, stationery, advertising, and other various items and locations (Taylor, Nettleton & Harding, 2003). In the qualitative study reported here, the appropriate member of staff at all the UK schools of pharmacy was interviewed to explore the pertinent beliefs and expectations of those teachers who are responsible for extemporaneous preparation courses within the MPharm degree.

Method

Selection of method

We used an inductive, qualitative approach to capture university teachers' expectations and beliefs about the role of extemporaneous preparation teaching. To avoid reporting teachers' experiences and beliefs in an overly simplistic fashion, interpretive data analysis was influenced by a social theoretical model of professionalisation and role maintenance (Macdonald, 1995).

Data collection

The individuals responsible for teaching extemporaneous preparation/dispensing at all 17 established UK schools of pharmacy at the time of this research (mid-2004) were invited to participate in this study. Fourteen of the seventeen were successfully contacted and interviewed by telephone; repeated attempts to contact the three remaining individuals via telephone and e-mail were unsuccessful. However, after the 14 interviews, no new substantive themes emerged from the data and "data saturation" was considered to be achieved.

Information was collected on a range of issues, including the teachers' perception of the place extemporaneous preparation teaching held within the contemporary curriculum, and students' receptivity to this topic and their beliefs concerning the subject's future sustainability. An experienced qualitative researcher and sociologist (GH) conducted semi-structured interviews. A topic guide was constructed from free text comments appended to a questionnaire survey administered previously (Chowdhury et al., 2003) and this provided an adaptable structure to the interview. Questions probed respondents' beliefs and expectations about the current and future role of extemporaneous preparation teaching. Interviews lasted as long as 30 min, took place in the participant's

workplace, were tape recorded and then transcribed verbatim and anonymised. All interviews took place between March and October 2004.

Data analysis

The transcripts were initially mapped using a framework approach (Ritchie & Spencer, 1994) to systematically disaggregate the qualitative data. Two researchers worked independently to chart the disaggregated data. An index of pertinent issues was generated and collated to form loosely constructed categories of issues, which we examined to identify emergent themes. On the basis of these analytical interpretations, a consensus of emergent themes was established.

Results and discussion

Five themes were identified as emerging from the transcripts of the interviews: Logistical constraints associated with teaching; whether extemporaneous preparation is pharmaceutical science or practice, or is indeed an art; whether extemporaneous preparation is outdated and irrelevant; the teaching of transferable skills; risk management associated with extemporaneous dispensing.

Theme one: Logistical constraints

The nature of extemporaneous preparation teaching requires considerable resources, both in terms of teaching support and ingredients for manufacturing the products (Chowdhury et al., 2003). This factor, together with debates as to the relevance of extemporaneous dispensing in preparing students for contemporary practice, makes the subject particularly vulnerable to being either pared down or replaced altogether in the curriculum as new material is incorporated.

Student numbers in the UK schools of pharmacy have increased dramatically in recent years (Taylor, Bates & Harding, 2004). The increase in student numbers was reported as an issue of concern by all the teachers interviewed.

"...student numbers have nearly doubled in here in the last six or seven years." (T2)

Moreover, this was combined with concerns about the level of students' academic competence:

"...ability of students to cope with the work...seems to have diminished, gradually" (T10).

Teachers of extemporaneous dispensing were confronted with teaching a resource-intensive subject to an increasing number of students per year. This clearly has implications in terms of both course delivery and development, as they strive to process increasing

numbers of students without the matched resources to do so.

“...more practical groups... means unfortunately we can’t maybe cover everything that we’d like to cover practically with the students” (T5).

“...you’ve a longer period of assessment marking afterwards, so that maybe possibly leaves less time to develop the course.” (T2).

Teachers also reported problems of sourcing raw materials for running conventional practical courses:

“I’ve found even in terms of getting materials in for the products, a lot of materials are no longer made...so the course has had to be scaled down from not even the resource side of staffing levels, but actually materials that we used in the past for students to use in their formulations, we just literally, you can’t get hold of them any more...” (T2).

“...the only problems we do have now of course are availability of raw materials, you know our technician does have to spend quite some time sometimes sourcing, you know, cardamom tincture and all this sort of thing... it’s just difficult to get from the wholesalers... the less people do, the less the wholesaler’s is going to stock it, the less the wholesalers stock it, the less people are able to do because they can’t get the ingredients” (T12).

These logistical developments have, in a sense, forced the issue about the aims and purpose of extemporaneous preparation teaching. Whilst historically it aimed to impart an ability to manufacture a significant number of specific products from a set of ingredients, teachers acknowledged that this was now no longer tenable, nor appropriate given current professional practice.

Theme two: Extemporaneous preparation: Science, practice or art?

The formulation and manufacture of medicines from their constituent ingredients is unquestionably a scientific endeavour, requiring a knowledge and understanding of the physicochemical properties or drugs, excipients and dosage forms. One defining characteristic of a profession, as a privileged occupational group, is the ability of its members to lay claim to an exclusive body of knowledge and skill that is not accessible outside of that profession. Johnson (1989) refers to this as a profession’s ‘mystique’. The activity of compounding medicines has long been a characteristic professional trait of pharmacists, as well as a scientific activity. For example, the apothecary was regarded as a privileged occupation that was able to enjoy a greater social status than doctors of that time.

The beliefs of teachers regarding whether they consider extemporaneous preparation to be an art or

a science is important because it indicates the likely orientation of their teaching with respect to imparting a professional skill or training in scientific technical procedures. As a technical procedure, the objective is to ensure students are capable of producing medicines correctly. However, when extemporaneous preparation is conceptualised as an art, it introduces the concept of imparting to students an acquired but difficult to define skill—one associated with the taking of a profession. It was evident that for some interviewees, extemporaneous preparation teaching was regarded as a technical skill-based exercise, which aimed to impart transferable skills. Thus, it was imperative to not simply compound and manufacture a large range of specific pharmaceutical products, but rather to develop core technical skills in calculation and manufacturing techniques that could be adapted to individual circumstances. The objective then was to enable students to

“...understand the concepts behind [extemporaneous preparation] and [ensure] they can do calculations [and] understand and be able to demonstrate the technique.” (T2)

An emphasis on the scientific principles underpinning extemporaneous preparation of medicines indicated that for some there was an accentuated sense that this was a scientific, technical process, rather than professional activity:

“... We certainly, assessment-wise, put less emphasis on the whole technique part of it, and more behind the understanding of the science behind it...” (T2)

Others believed that extemporaneous preparation spans both science and art in that it requires students to acquire scientific skills, but the way these are applied to the formulation of products was a creative process and as such akin to an art:

“...it has been just treated almost as a skill-based thing, whereas we want to make them more aware of the science base to it. But it’s still learning well, formulation is an art really isn’t it, it’s, so much of it is experience and just feeling, rather than firm science”. (T1)

“... well there certainly is an art to it, I suppose much of it is very similar to cooking, but then people would say cooking is just as much of a science as anything else.” (T11)

However, what distinguishes extemporaneous preparation as more than a simple technical skill is that pharmacists are responsible for ensuring the product is safe and effective for the patient. Having to consider the person for whom the product is intended requires pharmacists to consider the relationship between the medicine they produce and its use by a patient. This requires the exercise of a professional judgement

rather than slavish adherence to standardised scientific procedures. As such, pharmacists are required to develop an ability to perform their professional activities in ways that are exclusive to pharmacists. For one teacher, extemporaneous preparation teaching was instrumental in instilling this aspect of professional practice:

“...they do the dispensing, the extemporaneous work, that’s when they do start to realise that there’s often no right or wrong, but they have to make decisions. I think you should know what goes into the manufacturing of things so you could look on the side of a packet of tablets and see that it contains, and know what each of those things is there for. And if a patient then says, ‘Well, has it got any colouring matter in it or something?’ You look through it and say ‘oh yes [it] has,’ Then if they say ‘well I’m lactose intolerant, does it have any lactose in it’ You look through the ingredients and you say, ‘Yes,’ and the patient says, ‘Well, does it matter?’ and you can say, ‘Yes,’ or ‘No,’ as the case may be, you need to know about these things.” (T8)

Theme three: Extemporaneous preparation as an anachronism?

The feeling among many teachers was that lamentably, extemporaneous preparation was increasingly difficult to justify as a topic in the modern curriculum. The introduction of health and safety regulations combined with economic constraints was evoked in one instance to justify removing the preparation of complex products from courses:

“Over the last five to ten years, we’ve dropped out a lot of the old kind of extemporaneous preparations, you know, the fairly complex ones that we used to do. Partly that’s because, well now we’ve moved, we don’t have, in our new labs we don’t sort of have heating, apparatus for heating that sort of thing, and because of Health and Safety regulations there are things we can’t do.” (T10)

Changes in the nature of pharmacy practice and the introduction of the new pharmacy contract, which places an emphasis on extended roles beyond traditional dispensing, were also used as a justification for courses being pared down.

“...I think with the changing role of pharmacists ... whenever we find out what the new contract’s going to be, all of the extended roles, I don’t think that they feel there’s a lot of place for extemporaneous dispensing (T12).”

Teachers were pragmatic about extemporaneous preparation *per se* becoming increasingly less relevant to contemporary practice

“...most of the things of course are now only done in special manufacturing laboratories, so we don’t feel they’re relevant anymore... We don’t feel there’s any point in teaching them how to make things on an extemporaneous basis that they would never do themselves in practice... We just can’t see the point of wasting their time, and ours, in teaching them something that they’re never going to use (T10).”

However, some teachers were clearly disappointed by this development:

“I’m a bit saddened that it seems to be moving away from community pharmacies and that that pharmacists either can’t, or won’t, or seem unwilling to tackle, or prepared to make products extemporaneously for whatever reason, I don’t know, lack of skill or ... or whatever. I don’t know. I’m saddened, a little bit sad about that. However, that said, I mean, I feel in our job we’ve got to prepare students to work in any aspect of pharmacy, for all I know they could end up as a special manufacturer, so it’s still valid (T5).”

Theme four: Transferable skills

In a largely pragmatic response to increasing student numbers and the diminishing need for compounding skills in practice, teachers are increasingly placing the emphasis on extemporaneous preparation teaching as a vehicle to impart students with a conceptual understanding of the scientific principles underpinning the manufacturing of medicines—offering in effect, a set of transferable skills. In this sense the emphasis was less on developing technical ability and more upon professional traits centring on the science underpinning formulation and manufacture, performing pharmaceutical calculations and the ability to undertake precise, accurate and effective measurements.

“If they’re in community or hospitals they’ll never have to melt down bases or make a suppository, but if they understand the concepts behind it and they can do calculations, hopefully it’ll make them better pharmacists out in the field whenever they deal with all sorts of calculation that they have to do (T2).”

“...this is a professional course and this has to be spot on, got to be right and so I think we’re reasonably strict about it... it [extemporaneous preparation] has been just treated almost as a skill based thing, whereas we want to make them more aware of the science base to it (T14).”

“Pharmacists know about what the ingredients do in a product and it’s by handling some of those ingredients in extemporaneous preparation and knowing about the manufacture, not necessarily actually doing it, but knowing how it’s done, which distinguishes a pharmacist from other chemical scientists, or pharmacologists say (T7).”

Theme five: Risk management

The peppermint water case (Pharmaceutical Journal, 1998), which concerned the death of a three-week-old child following ingestion of extemporaneously prepared peppermint water, raised serious concerns about extemporaneous preparation within community pharmacies and highlighted the need for safety in the manufacturing process. It also raised questions over the competencies of newly qualified pharmacists and the adequacy of their undergraduate training (Pharmaceutical Journal, 2000a). These concerns were raised at a time when the trend in schools of pharmacy was to reduce the amount of student exposure to preparing and dispensing extemporaneous products. At the end of trial, the Royal Pharmaceutical Society of Great Britain's (RPSGB) director of professional standards said that '*The Boots peppermint water case raises questions over whether community pharmacists should dispense extemporaneously*', and subsequently, the Council of the RPSGB published standards of good professional practice for the dispensing of extemporaneous preparations (Pharmaceutical Journal, 2000b), which are now incorporated into '*Medicines, Ethics and Professional Practice: a Guide for Pharmacists*' (Royal Pharmaceutical Society of Great Britain, 2004).

One teacher interviewed interpreted these events as an indication from the RPSGB that such activities were no longer appropriate for pharmacists:

"...almost five years ago with the peppermint water case, they [the RPSGB] more or less said—oh pharmacists shouldn't be involved in extemporaneous dispensing any more (T10)."

This sentiment, coupled with the proliferation of multiple pharmacies advocating "*using specials rather than actually making anything up in the pharmacy*" (T12) and a reduction in the number of independent pharmacies, has led some to perceive extemporaneous preparation as increasingly marginalized within both practice and the curriculum, with an associated concern that such a situation carries certain risks:

"I have been questioning in my own mind whether it's right to dabble with it, in that whether the students do enough to be able to be competent at it, whether you're doing more harm by doing a bit than, you know, nothing at all. Well I can't ever come round to saying that they should do nothing at all, but, you know I do worry whether just doing a bit here and there really equips them to cope with that sort of thing (T12)."

One teacher further articulated that the concept of risk management was inherent in extemporaneous dispensing courses:

"...We use it [extemporaneous dispensing] to teach a sort of degree of discipline in...practice and risk management... (T10)"

Conclusion

Each of the five themes emerging from interviews with representatives from the 14 UK schools of pharmacy raises serious questions about the long-term sustainability of extemporaneous dispensing both as a professional activity for pharmacists, and as a significant component of the MPharm degree. Yet it is evident that despite the sharp decline in opportunities for pharmacists to practice small scale manufacturing of medicinal preparations, especially within community pharmacies, the scientific and practical skills enshrined in the teaching of extemporaneous preparation are robustly defended as relevant to pharmacists' contemporary professional practice. This parallels an issue in general medical practice concerning the impact of the new GP contract, which prevents general medical practitioners working outside of surgery hours. Consequently, this significantly reduces their exposure to managing medical emergencies that most frequently present out of hours. Yet this ability is considered an integral feature of their identity. Moreover, a recent study has also shown that pharmacy undergraduates view extemporaneous dispensing as both relevant to their future practice and part of their future professional identity (Taylor, Harding, Bissenden, Shepherd & Shooter, 2004).

Increased student numbers and the diminishing availability of materials represent physical constraints on course design and delivery. Moreover, whilst there is undoubtedly an "art" in compounding a medicine, in an era of evidence-based medicine, protocols and standard operating procedures within pharmaceutical services, extemporaneous preparation seems to belong to a bygone age of carriage-built cars and bespoke-tailored clothing. Additionally, preparing medicines in a pharmacy out with the requirements of good manufacturing practice, when such medicines can be readily produced by a specials manufacturer (albeit at much higher cost), may be perceived as unnecessarily risky in a society whose individuals are increasingly empowered to challenge the actions of professionals and willing to seek legal redress in the case of errors.

In the UK over recent years, the emphasis in pharmacy has become patient-focussed, rather than as was historically the case, drug-centred. This represents both an opportunity and a threat to the place of extemporaneous preparation in the contemporary pharmacy curriculum. The threat is represented by the move to encourage pharmacists to assume a health promotion/public health role with an emphasis on communication skills, medicines management, supplementary prescribing, and so forth. Within this context, extemporaneous preparation appears anachronistic. Yet if pharmacists are to successfully protect their status as health professionals they need to lay claim to expert knowledge and deliver services

that are exclusive, and hence cannot be offered by other occupational groups. To downplay what has historically represented pharmacists' defining and exclusive capabilities—formulation and compounding—is to accede to a trend towards de-professionalisation and diminished occupational status. However, patient-centred medicines may offer new opportunities for pharmacists, particularly in the area of tailoring medicines for use in specific patient groups, to exploit and demonstrate their unique skills. Likewise, pharmacogenomics and genetic testing may lead to pharmacists being required to tailor medicines to the specific requirements of individual patients in the future. Each patient may have their own specific issues in relation to a particular medicinal product; issues may include: whether a particular product will interact with existing medication, whether an established allergy to particular excipients might preclude the use of a newly prescribed medication, or concern over the efficacy of repeat medication when supplied in a different colour. Pharmacists possess an exclusive ability to assimilate the individual needs and requirements of patients (including their beliefs and expectations of medicines) allied to an understanding of the scientific principles of how medicines are formulated and manufactured. It is the application of scientific knowledge to individual's specific requirements that lies at the heart of pharmacists' identity. The responses by those university teachers who were interviewed have shown that extemporaneous preparation teaching in the UK schools of pharmacy has necessarily adapted to the changing environment in which pharmacy students are taught and pharmacy is practiced. It is apparent that it continues to be robustly defended as a valuable, integral part of the pharmacy curriculum.

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