GPHE 31023—8/7/2003——77015

Pharmacy Education, 2003 Vol. not known (not known), pp. 1–8

A Pilot Study to Evaluate Clinical Competence in Junior Grade Pharmacy Practitioners

G.M. GOLDSMITH[a], I.P. BATES[b], J.G. DAVIES[c,*], D. McROBBIE[d] and D.G. WEBB[e]

[a]*Barts and the London NHS Trust, Whitechapel E1 1BB, UK;* [b]*School of Pharmacy, University of London, London WC1N 1AX, UK;* [c]*School of Pharmacy and Biomolecular Sciences, University of Brighton, Brighton BN2 4GK, UK;* [d]*Pharmacy Department, St Thomas' Hospital, London WE1 7EL, UK;* [e]*London Region Clinical Pharmacy, Northwick Park and St Marks Hospitals, Harrow HA1 3UJ, UK*

(Received ????; In final form ????)

This pilot project investigated pharmacists' performance, using a previously designed and evaluated competency assessment grid, over a 12 week period in eight active and one control sites. At baseline and 12 weeks later, assessors defined the clinical service provision "expected" and then assessed junior pharmacists' service against these specifications. The observed and expected competencies for each task were then compared. A number of assessors from the active sites were interviewed to determine the ease of use, the process adopted and the time taken to carry out the assessment of a student.

Over the 12 week period students in the active group ($n = 24$) showed a significant improvement in their ability to perform key tasks in all but one area whilst there was no significant change in performance in the control group ($n = 4$). Evidence indicated that a variety of approaches were used when carrying out assessments using the grids by the five assessors interviewed. Additionally, the effects of using the grid on the assessment process had a range of organisational benefits across the active sites, highlighting the flexibility of the grids in diverse departments. The results indicate that the competency assessment grids can detect a change in pharmacists' performance and that this might reflect the pharmacists' awareness of the behaviours being assessed.

Keywords: Competence; Competency; Fitness for purpose; Assessment

INTRODUCTION

In July, 2000, the Government published its plan for the National Health Service. The vision was of an NHS that offered fast and convenient care, available when people require it, tailored to their individual needs and delivered in a consistently high standard (NHS Executive, 2000a). The role of pharmacy in delivering the plan was detailed in a supplementary document (NHS Executive, 2000b), in which pharmacists were recognised as highly qualified professionals whose skills were being under-utilised. The document suggested that, in the new NHS, pharmacists would spend more time focussing on the clinical needs of individual patients, helping them stay healthy, deal with minor illnesses and helping patients to get the most from their medicines (NHS Executive, 2000b). The programme outlined key areas where pharmacists could develop new and existing skills to rise to the challenges of the changing healthcare environment.

Assurance of service quality is an overriding concern to government and professional agencies as well as to patients. The key document "Pharmacy in the Future-implementing the NHS Plan" states that "…there will be a high standard of professional regulation… the Royal Pharmaceutical Society of Great Britain disciplinary procedures will be modernised and pharmacists will have to demonstrate competence if they wish to remain on the register" (NHS Executive, 2000b). This ambition is not new and, as members of a professional body, pharmacists have a responsibility to "maintain a high standard of professional competence relevant to his/her sphere of activity" (Royal Pharmaceutical Society of Great Britain, 2000). The message is clear: quality and competence are essential and failure to be "fit to practice" will result in disciplinary proceedings. However, this raises two important questions: what is competence and how can an individual be judged or assessed in an objective way?

Whiddett and Hollyforde define competency as a "quality or characteristic of a person related to

*Corresponding author. E-mail: j.g.davies@bton.ac.uk

ISSN 1560-2214 print/ISSN ????-???? online
DOI: 00000

effective or superior performance" and go on to describe competency frameworks (a structured collection of those competencies essential for effective performance) as a means by which to measure fitness for purpose (Whiddett and Hollyford, 2000), as schematically outlined in Fig. 1.

Traditionally, assessments have focused on what a student "knows" (the straight recall of facts) or "knows how" (the application of knowledge to problem solving and decision-making about issues relating to clinical practice). However, the real challenge lies in the assessment of performance when completing tasks, i.e. competence in practice. Miller's pyramid of competence is a simple conceptual model claiming that the ultimate goal for a valid assessment of clinical competence is to test what the practitioner actually does in the working environment (Miller, 1990).

Davies and others have acknowledged inconsistencies in the practice of clinical pharmacy by junior hospital pharmacists and developed a competency grid using the Whiddett and Hollyford model in order to facilitate the assessment of ward-based activities (McRobbie *et al.*, 2001; Davies *et al.*, 2002). The work produced a tool that lists those behaviours essential to effective performance in a format that could be tailored to individual hospital environments or patient group requirements and served as a set of standards against which the junior pharmacist could be judged.

The aim of this preliminary pilot project was to investigate the potential impact of this competency-based approach on the assessment of junior pharmacists in the hospital setting.

METHOD

This was a controlled, longitudinal and multicentre study to assess the performance of junior pharmacists in eight active and one control hospital sites. The control site was blinded with regard to the content of the assessment grids. The senior pharmacists responsible for training (tutors) were approached to participate in the study and asked to assess the competency, using previously designed and tested grids, of their junior pharmacists (tutees). The development of the competency framework being used for this study (referred to as the competency "grid") has been described elsewhere (McRobbie *et al.*, 2001). Table I shows the delivery of patient care cluster of competencies that were evaluated in this pilot trial.

The inclusion criteria for the study were

1. That pharmacists be classified as "junior" (B grade or below) for the duration of the project (See Fig. 2 for a list of UK hospital pharmacist grades) and
2. That a senior full-time member of pharmacy staff be available at a participating active or control site to serve as a coordinator for the study.

At baseline ($t = 0$) and 12 weeks later, tutors at both the active and control sites used the grids to define the clinical service provision for each of the behavioural indicators that was "expected" (e.g. whether they thought a "drug history" should *always*, *usually*, *sometimes* or *never* be completed) and then assessed the pharmacist on the ward, giving the actual observed competency rating. The observed and expected competency rating was compared to ascertain the adjusted competency rating, where an individual pharmacist was deemed competent in a particular behaviour if their observed rating matched or exceeded the rating defined in the clinical service specification.

Analysis of the adjusted competency ratings was by Mann–Whitney U test to detect any significant difference between the two cohorts at baseline and a repeat measures Wilcoxon signed-rank test to reveal if the active and control groups demonstrated any significant change in competency performance over the 12-week study period.

To determine the reproducibility of tutor assessment, all control sites were judged simultaneously by two independent assessors and the corresponding ratings correlated to evaluate the degree of agreement.

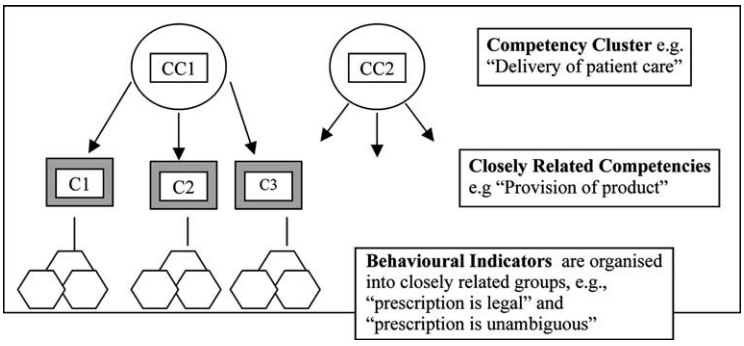

FIGURE 1 A typical competency framework structure.

TABLE I Delivery of patient care competency cluster

Related competencies	Behavioural indicators
Need for the drug	Relevant patient background Drug history
Selection of drug	Drug–drug interactions Drug–drug interactions are identified Drug–drug interactions are appropriately prioritised Appropriate action is taken Drug–patient interactions Drug–patient interactions are identified Drug–patient interactions are appropriately prioritised Appropriate action is taken Drug–disease interactions Drug–disease interactions are identified Drug–disease interactions are appropriately prioritised Appropriate action is taken
Administration of drug	Calculation of appropriate dose Selection of dosing regimen (route and time) Selection of formulation and concentration
Provision of drug product	The prescription is unambiguous The prescription is legal
Monitoring drug therapy	Identification of pharmaceutical problems Prioritisation of pharmaceutical problems Use of guidelines Resolution of pharmaceutical problems
Consultation or referral	Relevant pharmaceutical problems are appropriately referred
Drug information and patient education	Need for information is identified Accurate and reliable drug information is communicated Documentation
Evaluation of outcomes	Assesses outcomes of contributions

Qualitative Method

Post-trial interviews were conducted with a sample of the tutors to ascertain the usability of the grids, how they had impacted on service provision and to identify any issues that would explain any differences in the results reported between sites. It was also an opportunity for the tutors to voice ideas and problems with respect to the use of the grids in practice (see McRobbie *et al.*, 2001 for a full description of the competency grids).

Lead pharmacists involved in the active pilot sites were invited to participate in one-to-one interviews. A semi-structured interview schedule was developed from issues raised at research meetings and through unanswered questions from the quantitative interviews. Interviews were recorded and transcribed by an independent research assistant. Analysis was inductive and grounded in the data and no prespecified coding frame was utilised to analyse these data. Discourse analysis was used as the principal analytical approach. Codes were allocated to text units, not as a summary description of the text but to confer meaning to the text. Codes were then grouped into categories where this was possible.

UK Grade	Typical Job Description
A/B	Junior, post-registration, rotational ("internship")
C	Post-basic
D	Specialism, section leader
E	Principal, specialist
F	Managing services
G	Leadership, higher management

FIGURE 2 A description of job grades in the UK hospital sector.

RESULTS

Forty-three junior grade pharmacists (tutees) were recruited from the active sites in addition to 20 tutors. Five tutees were recruited and assessed at the control site by two independent tutors. At the end of the 12-week study period, assessments had been

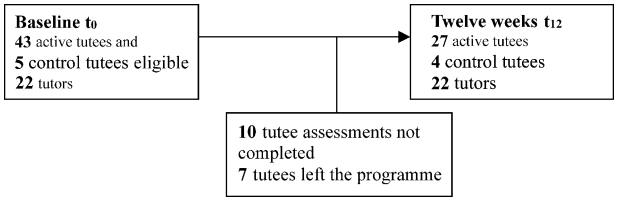

FIGURE 3 Flow chart of recruitment and attrition of pharmacists.

TABLE II Tutor demographics

Characteristic		
Mean age (years ± SD)		33.4 (±5.3 years) (*n*=19)
Sex		14 Female
Time registered with RPSGB (years ± SD)		11.2 (±5.4)
Further qualifications	None	2
	Certificate*	2
	Diploma*	6
	MSc*	11
	Other	1
Grade of job	D	12
	E	3
	F	5
	G	2
Teaching & Learning (T&L) courses attended	None	8
	Train the trainers	7
	T&L as part of postgraduate qualification	2
	Other	4
Usual frequency of contact with tutees	≥Once a week	11
	Once a fortnight	4
	<Once a fortnight	4
	Not applicable	3
Allocated duration with tutee (hours per week ± SD)		1.5 (±0.8)

*In pharmacy practice or clinical pharmacy.

completed for 27 active and 4 control site pharmacists (see Fig. 3 for recruitment flow chart).

Demographic data were received from all 22 tutors (assessors) involved in the study (Table II), half (11) possessing an MSc in clinical pharmacy while eight claiming not to have attended any teaching and learning courses. Half reported that they saw their tutee more than once a week with 15 seeing the tutee fortnightly or less often. Demographic data was submitted for 24 of the 27 tutees in the active group and all 4 in the control group (Table III).

A comparison of active and control groups at baseline ($t = 0$) revealed that for four competencies there was an initial difference between the groups in favour of the active group; "selection of dosing regimen" (U test, $z = -2.026$, $p = 0.043$), "identification of pharmaceutical problems" (U test, $z = -2.871$, $p = 0.004$), "prioritisation of pharmaceutical problems" (U test, $z = -3.107$, $p = 0.002$) and "resolution of pharmaceutical problems" (U test, $z = -2.660$, $p = 0.008$). There were no significant differences between groups for all other competencies.

The active tutees showed a significant improvement in all competencies over a 12 week period while using the grids (Wilcoxon, $p = 0.047$ to $p < 0.001$ for a range of 24 competencies) with the exception of "prescription is legal" ($z = -1.387$, $p = 0.166$). Corresponding control tutee results reveal no significant improvements between baseline and 12 weeks for any of the competencies assessed. Table IV shows the patient focussed competency changes within groups after 12 weeks.

There was a significant correlation in assessor rating indicating reliability in the true assessment of tutees using the competency framework grid (Spearman *r*, range $p = 0.05$ to $p < 0.001$ for a sample of 18 assessed competencies).

Tutor and Hospital Site Qualitative Interviews

Five assessors in five sites were interviewed and the interviews transcribed *verbatim*. Twenty four codes were developed from the five interviews (Table V) from which five categories were developed:

1. Assessment issues
2. Service specification issues
3. Effect of the innovation on the organisation
4. Empowerment issues and
5. Other.

The term "service specification" was used to describe the standard to which the basic grades were expected to achieve during the assessment. Of interest is that the "innovation acceptance" code was volunteered in four out of the five interviews, indicating institutional acceptance of the competency framework grids.

Institutional Effects

The development of the service specification based on the grids stimulated several sites to discuss service development to the wards, an issue which they had not previously addressed:

> "This service specification [grids] helped us. . .compare our ideals with current practice. . .what is best practice and what is realistic."

The implementation of the grid system for measuring competencies has gone beyond its original intention of improving junior pharmacist competency.

TABLE III Tutee demographics

Characteristic		Active group (n=24)	Control group (n=4)
Mean age (years ± SD)		24.8 (±2.9 years, n=24)	24.0 (±1.4 years, n=4)
Sex[ψ]		18 Female	4 Female
Class of degree[ψ]	First	5	–
	2:1	11	2
	2:2	4	2
	3rd	2	–
Time registered with RPSGB[ψ] (years)	<1 year	16	3
	1–3 years	7	1
	>3 years	1	–
Further qualifications[ψ]	None	19	4
	Certificate*	3	–
	Other	1	–
Type of ward on which tutee assessed[ψ]	Elderly	10	5
	Care/medical	12	2
	Surgery	4	–
	Paediatrics	4	–
	Orthopaedics	2	–
	Psychiatric	2	–
	Obs & Gynae	–	1
	Intensive care mixed	6	–
Length of experience on ward (weeks)		10 (range: 1–60)	1
Type of service provided[ψ]	Once daily visit	15	4
	Twice daily visit	7	–
Time on ward (hours ± SD)		1.6 (±0.6)	1.3 (±0.5)
Type of service provided[ψ]	Ward based	3	–
	Medical team based	1	1
	Neither	14	3

*In pharmacy practice.

TABLE IV Within-group changes in adjusted competency rating between baseline and $t = 12$ weeks for active and control groups

	Trial group			Control group		
Competency	n	Z-score	P-value asymp. sig. (2-tailed)	n	Z-score	P-value asymp. sig. (2-tailed)
Relevant patient background	19	−2.979	0.003	4	0.000	1.000
Drug history	12	−1.983	0.047	2	−1.000	0.317
Drug–drug interactions identified	18	−2.265	0.024			
Drug–drug interactions prioritised	19	−2.674	0.008			
Drug–drug interactions action taken	18	−2.374	0.018			
Drug–patient interactions identified	19	−3.582	0.000			
Drug–patient interactions prioritised	25	−3.195	0.001			Ψ
Drug–patient interactions action taken	24	−3.299	0.001			
Drug–disease interactions identified	22	−3.538	0.000			
Drug–disease interactions prioritised	21	−3.312	0.001			
Drug–disease interactions action taken	22	−3.438	0.001			
Calculation of dose	25	−2.447	0.014	4	−0.272	0.785
Selection of dosing regimen	25	−3.771	0.000	4	−0.447	0.655
Selection of formulation and concentration	24	−2.546	0.011	3	−0.447	0.655
Prescription is unambiguous	25	−2.673	0.008	3	−1.604	0.109
Prescription is legal	24	−1.387	0.166	3	0.000	1.000
Identification of pharmaceutical problems	26	−3.355	0.001	4	−1.890	0.059
Prioritisation of pharmaceutical problems	25	−3.372	0.001	4	−1.857	0.063
Use of guidelines	23	−3.337	0.001	4	−1.841	0.660
Resolution of pharmaceutical problems	25	−3.066	0.002	3	−1.732	0.830
Consultation or referral	26	−2.435	0.015			Ψ
Need for information is identified	24	−3.213	0.001	3	−1.604	0.109
Accurate and reliable drug information is communicated	22	−3.275	0.001			Ψ
Documentation	23	−3.049	0.002	3	0.000	1.000
Assessing outcomes of contributions	20	−3.244	0.001	2	−1.414	0.157

Ψ—Statistical analysis could not be performed due to small sample size or missing data.

TABLE V Categories and coded and their definitions

Category	Code	Code description
Assessment issues	1. Ass-diff	1. The difficulties of the assessment are raised.
	2. Ass-res	2. Results of the assessment reported
	3. Ass-cons	3. Consistency of the assessment process
	4. Ass-method	4. Methods which assessment is undertaken
Service specification issues	1. Spec-alt use	1. Alternative use of the service specification which highlight other issues within the service.
	2. Spec-exist	2. Service specification exist or does not already exist
	3. Spec-dev grid	3. Development of a service specification from the grids, general to all wards
	4. Spec-dev grid unique	4. Development of a service specification from the grids, unique to individual wards
	5. Spec-dev grid res	5. Development of a service specification from the grids, for the purpose of the project only
Organisational effect	1. OrgEff-con	1. An effect of the project imposes a condition which introduces conflict
	2. OrgEff-train	2. The effect of the innovation is to introduce training issues for the innovation
	3. OrgEff-Rel	3. Effect of the innovation on relationships with others in the department not associated with the project.
	4. OrgEff-Time	4. Time issues raised specific to the project
	5. Acty-change	5. The site has changed the way it performs its service due to the initiation of this project
	6. Grid-incorp	6. The grids have not changed or led to developments of new standards or service specification. They are incorporated in to existing structures.
	7. Grid-diag	7. The grid being used to diagnose and look at the existing system
Empowerment	1. Emp-ass	1. The empowerment lies with the assessor.
	2. Emp-equ	2. The empowerment is shared between the assessor and basic grade

Sites adopted the framework as a diagnostic tool for the pharmaceutical services to the hospital, the implicit assumption being that, in general, hospital pharmacists agree with the grid content provided and, on this basis, were willing to develop services around it. No evidence was found that hospital sites disagreed with the content of the grids.

Again, a detachment from the assessment and teaching and learning is made here:

> "We advised them [in response to not meeting the competency standard] self-directed learning but perhaps the certificate tutor needs to be involved."

Although the grid system is being used as an assessment tool on this site, it is recognised that some form of educational intervention is needed in using this system.

Organisational Effects

The effects of the introduction and use of the grids to measure competency in basic grades brought about a degree of organisational change beyond that of those personnel immediately involved in the project. The need for teamwork to ensure a consistent approach was adopted. This was indicated by the use of terms such as "*we decided*" and "*together*" during the interviews.

Assessment Issues

Generally, the use of the grids was to have improved the practice of the junior pharmacists (these comments were made prior to the project evaluation):

> "We have seen improvements and have brought up their practice quicker."

This comment is typical and is suggestive that this behaviour would have been observed anyway but change has happened more quickly than expected and is discussed in a beneficial manner. The term "brought up" is suggestive of an active process

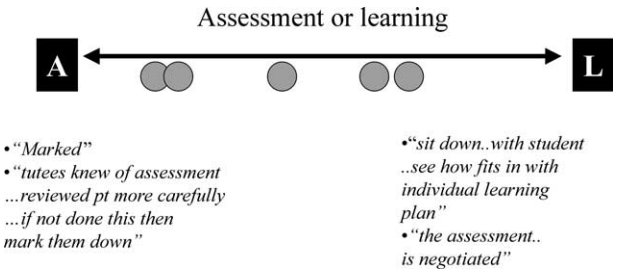

FIGURE 4 Interviewees' representations of "assessment" (A) against "learning" (L) in using the grids for junior pharmacists' competency development.

facilitated by the assessors and, therefore, the grids help in this facilitation. The interviewees displayed a range of views on the issue of learning versus assessment prompted by using the grids. Figure 4 shows the range together with some exemplar quotes. It would seem that use of the grids satisfies both of these constructs.

DISCUSSION

This is the first study that describes the findings of a competency-based assessment of junior grade hospital pharmacists. The results suggest that the competency matrix developed is able to differentiate between the clinical practices and to detect a change over time in individual practice.

There are many reasons for competency to be embraced as a necessary requirement for pharmacy practice; however, no objective, valid and reliable method for assessing practice in secondary care has been previously described. Experienced practitioners developed the patient care competency assessment grid as a framework for the clinical practice of junior pharmacists (McRobbie *et al.*, 2001). It provides tutors with a tool to identify appropriate service levels in addition to a means of assessing whether they were being achieved. It was possible to identify an individual's training needs from deficits between what was expected and what they could actually do. The junior pharmacists were given clear guidance on what was required, thereby providing a focus for their learning and personal development.

Although literature on competency assessment exists in medicine (Miller, 1990; Bashook and Parboosing, 1998; McKinley *et al.*, 2001) and primary care pharmacy (National Prescribing Centre/NHS Executive, 2000) none relates to hospital pharmacists and very few have been empirically tested. Many current methods used for competence assessment are acknowledged to be invalid or unreliable (Newble, 1994); the purpose of this project was to pilot a patient care competency grid through investigating the impact on the ability of junior pharmacists to complete the tasks required of them.

The pharmacists recruited to the active group were based at different types of hospitals across London and the South East of England, while the control group was from a single teaching hospital. Data collection at only one control site limited the number of control tutees that could be recruited but was sufficient for this pilot study and the statistical analysis used. Further work, using a significantly larger sample size of practice and control groups, is underway in the South of England based on these initial results.

At baseline there were significant differences in adjusted competency between cohort groups for some competencies ("selection of dosing regimen," "identification of pharmaceutical problems," "prioritisation of pharmaceutical problems" and "resolution of pharmaceutical problems"), where tutees were more competent in the active group than in the control group. This range in performance is supported by reports that newly qualified pharmacists possess different skills and knowledge base at the end of their pre-registration year (McRobbie and Davies, 1996). However, by using adjusted competency ratings, the greater improvement in the active group compared with the control group was successfully tested and proven.

Although the trial groups did not begin with comparable competency, evaluating the individuals' performance at baseline and 12 weeks later allows the impact of such features to be minimised, i.e. individuals act as their own control. A significant improvement in active tutee performance over the 12 weeks for all but one competency ("prescription is legal") was seen. This is in contrast to the control group where no measurable improvement in overall performance was seen. This means that at 12 weeks, pharmacists in the active group were approaching the clinical service expected when compared to those in the control group. Although the result suggests the performance of pharmacists improves over 12 weeks, there is insufficient evidence to suggest the study intervention (the competency grid) has caused the difference and that it is not just a time effect.

Beliefs around the clinical service specification were explored in the tutor interviews. Tutors had similar ideas of what clinical service specification should be but each compiled it slightly differently. They tended to fall into one of two categories—a grid *tailored* to the ward and patient group served or an *ideal* where every competency was to be completed for the highest frequency ("always"). Some tutor expectations, as seen through the clinical service specification ratings, decreased with time, i.e. the tutors expected less from the tutees at 12 weeks than at baseline. This change in expectations could make the tutees seem more competent at 12 weeks than at baseline, thus confounding results. However, this change seems contradictory; some tutors claimed

the grids stimulated discussion around standards of service and junior pharmacists' limitations. Initially, it may seem "ideal" to have pharmacists completing all of the competencies all of the time, but this is unrealistic. Hence a less demanding, more tailored clinical service specification was deemed more appropriate.

Investigation of the clinical service specification ratings revealed there was little agreement as to how important clinical activity is to the service as a whole. For example, one of the biggest differences is seen in the "drug history" competency where 52% of tutors thought this behaviour should *always* be undertaken while 48% indicated that it should *sometimes* be completed. Reasons for this inconsistency may represent the way in which the service is configured; for example, one hospital used a dedicated technician to take drug histories; another an admissions unit where patient histories were usually completed prior to transfer to the general wards; and a third in the variety of ward services provided, i.e. most wards receive a traditional once or twice daily visit as opposed to a more patient-focussed ward based service. This highlights one of the strengths of the grids: they are adaptable to the individual trust requirements. All tutors had considered drug history taking an appropriate task but had different views on its relative priority and delivery.

Surprisingly, only two competencies were identified as *always* being required by all active tutors: "prescription is unambiguous" and "prescription is legal." These may be classed as core requirements or, in other words, a behaviour that is paramount to any clinical situation compared to other behaviours that may be optional depending on the circumstances. Perhaps an unexpected result, given the current emphasis on reflective practice, is that the expectation of junior pharmacists to "assess the outcomes of their contributions" is low (less than half of the service specifications classed this as an *always* rating).

One of the aims of the competency grids was that they should provide clear guidance on what constitutes a competent practitioner and therefore aid judgement of performance. Analysis of the correlation achieved by the simultaneous assessment undertaken by two tutors for the actual site provides some evidence that the grids promote objectivity.

Variations in how the tutees were assessed may reflect whether the tutor saw the grid primarily as a method of assessment or as an aid to identify the training needs of junior pharmacists. During the tutor interviews, all tutors reported comparing tutees' performance of their previous assessments while only two claimed to compare the assessment with the clinical service specification. This implies that the tutors use the grids more as a means of identifying the needs of junior staff.

The results indicate that the competency grids allowed judgement of junior pharmacists' performance and a way of comparing with pre-defined standards. The results of this pilot study show that the introduction of a competency framework had significant positive effects on the competency of junior grade hospital pharmacists across a range of skills, compared with a control group.

References

Bashook, P. and Parboosing, J. (1998) "Continuing medical education: recertification and the maintenance of competence", *British Medical Journal* **316**, 545–548.

Davies, J.G., Webb, D.G., McRobbie, D. and Bates, I.B. (2002) "A competency-based approach to fitness for practice", *Pharmaceutical Journal* **268**, 104–106.

McKinley, R.K., Fraser, R.C. and Baker, R. (2001) "Model for directly assessing and improving clinical competence and performance in revalidation of clinicians", *British Medical Journal* **322**, 712–715.

McRobbie, D. and Davies, G. (1996) "Assessing clinical competence—a new method of evaluating hospital preregistration trainees", *Pharmaceutical Journal* **256**, 908–910.

McRobbie, D., Webb, D.G., Bates, I., Wright, J. and Davies, J.G. (2001) "Assessment of clinical competence: designing a competence grid for junior pharmacists", *Pharmacy Education* **1**, 67–76.

Miller, G.E. (1990) "The assessment of clinical skills/competence/performance", *Journal of Academic Medicine* **65**, 563–567.

National Prescribing Centre/NHS Executive (2000). *Competencies for pharmacists working in primary care*. Available: http://www.npc.co.uk/publications/CompPharm/competencies.htm (accessed March 2003).

Newble, D. (1994) "Guidelines for the development of effective and efficient procedures for the assessment of clinical competence", In: Newble, D., Jolly, B. and Wakefield, R., eds, *The Certification and Recertification of Doctors: Issues in Clinical Competence* (Cambridge University Press, Cambridge).

NHS Executive (2000a). The NHS Plan. Available: http://www.nhs.uk/nationalplan/nhsplan.pdf (accessed March, 2003).

NHS Executive (2000b). Pharmacy in the future—implementing the NHS plan; a programme for pharmacy in the National Health Service. Available: http://www.doh.gov.uk/pdfs/pharmacyfuture.pdf (accessed March 2003).

Royal Pharmaceutical Society of Great Britain (2000) *Medicines and Ethics Guide for Pharmacists* (Pharmaceutical Press, London).

Whiddett, S. and Hollyford, S. (2000) *The Competencies Handbook*, 1st Ed. (Institute of Personnel and Development, London).

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