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A controlled study of the general level framework: Results of the South of England competency study*

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Abstract

Background: Inconsistency in the practice of clinical pharmacy at a junior level encouraged our group to develop a general level competency framework (GLF) to facilitate practitioner development and assessment. The framework consists of patient-related, personal and problem-solving clusters of competencies assessed on a four-point frequency scale. This study describes a large, controlled study to determine whether the framework could improve the clinical practice of junior hospital pharmacists.

Method: One hundred and two junior grade pharmacists in 22 acute NHS trusts in the south of England were recruited. The hospitals were enrolled as either intervention ($n = 13$; 72 pharmacists) or non-intervention sites ($n = 9$; 30 pharmacists). The pharmacists ("tutees") and senior supervisors ("tutors") in the active sites used the competency framework for practice development. Tutees and tutors in the control sites did not have access to the competency framework, and measures were taken to ensure these trusts remained isolated from the assessment outcomes. All pharmacists were assessed at baseline, 3, 6 and 12 months. Non-intervention pharmacists were assessed by external evaluators.

Results: A repeat measures analysis (month-6 compared to baseline, month-12 compared to baseline) revealed that the intervention group showed an improvement in 24 of the 25 competencies at month-6, which was sustained at month-12. In contrast, the non-intervention pharmacists demonstrated an improvement in just 7 of the competencies at month-6 increasing to 12 competencies by month-12 (Table I). Using an aggregated competency score for each recruit, intervention and non-intervention pharmacists were compared using an application of Kaplan-Meier analysis. Event status was defined as the achievement of competence, detected by the attainment of a predefined threshold score. A significant difference existed between the groups at all time points ($\log \text{rank} = 7.97$, $p = 0.0048$).

Discussion: This controlled study demonstrates that tutees in the intervention sites improved significantly in 24 of the 25 patient-related competencies at 6 months and that this was sustained at 12 months. By contrast, non-intervention candidates showed progression in only 12 of the 25 competencies.

Keywords: *Competence, controlled trial, CPD, competency framework, pharmacy*

Introduction

In July 2000, the government published its plan for the National Health Service (NHS). The vision was of an NHS that offered fast and convenient care, available when people require it, tailored to their individual needs and delivered to a consistently high standard (Department of Health, 2000a). Assurance of service quality is an overriding concern to government and professional agencies as well as patients. "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

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Table I. Competency framework.

Cluster	Individual competencies	Examples of specific behaviours
Personal	Organisation Communication	Prioritisation, punctuality with nurses, doctors, patients.
	Team work Professionalism	Multidisciplinary working, confidentiality, responsibility
Problem solving	Gathering information	Accesses, abstracts information, Evaluation, decision-making, accurate, relevant and timely, pathology, pharmacology
	Analysing information	
	Providing information	
	Knowledge	
Delivery of patient care	Need for a drug	Drug history
	Selection of a drug	Drug interactions
	Administration	Calculations
	Provision of product	Clarity, legality
	Monitoring	Identifies problems, refers
	Information, education	Identifies need
	Evaluation of outcomes	Contributions

competence if they wish to remain on the register" (Department of Health, 2000b).

The Royal Pharmaceutical Society of Great Britain (RPSGB) endorsed this vision and started the process of developing competencies in their phase 1 report "Competencies of the Future Pharmacy Workforce" (RPSGB, 2004). This report will be used to inform the RPSGB's strategic development of pharmacy education and training at all stages from undergraduate to specialist and "higher level" practice, including continuing professional development (CPD).

The report in 2001 by Professor Kennedy, relating to paediatric cardiac surgery in the Bristol area, highlighted important issues about quality of care (Department of Health, 2001a). A fundamental principle stated in the report was that patients should expect minimum standards of care, and these should be explicit:

> "A patient is entitled to be cared for and by healthcare professionals with relevant and up-to-date skills and expertise."

The report emphasised the need for regulation aimed at maintaining the competence of health care professionals, the importance of periodic performance appraisal (coupled to CPD) and the introduction of revalidation. This is a significant endorsement of the principles of clinical governance and its components of accountability, clinical risk management, remedy of poor performance and CPD (Department of health, 2000b). In addition, the expectations of an increasingly well-informed and sceptical public, makes clear the need for a strategy that will develop practitioners who are "fit for purpose".

Although literature on competency assessments exists in medicine (Miller, 1990; McKinley et al., 2001), primary care pharmacy (National Prescribing Centre, 2000) and advanced to consultant pharmacy practice (Meadows et al., 2004; Department of Health 2005), none relates to hospital pharmacists and very few have been empirically tested. Many current methods used for competence assessments are acknowledged to be invalid or unreliable (Epstein and Hundert, 2002) so that the purpose of this study was to assess a patient care competency framework through investigating the impact on the ability of junior pharmacists to complete the required tasks.

To facilitate the development of staff, the department of health has also produced a working document: "'Working Together–Learning Together' A framework for lifelong learning for the NHS" (Department of Health, 2001b) to help the delivery of the NHS plan. This strategic framework aims to set out for the first time a co-ordinated approach to lifelong learning in health care. It states that the principles for post-registration education will increasingly be work based, with the acid test being "competence in doing". It also highlights that CPD will in the future be quality assured in a number of ways:

- Through the requirements of regulatory bodies in respect of re-registration or re-validation;
- Through employers' responsibility to ensure their workforce is up to date and clinically effective

Inconsistency in the practice of clinical pharmacy at junior level encouraged McRobbie, Webb, Bates, Wright and Davies (2001) to develop the general level competency framework (GLF) to facilitate practitioner development and assessment based on the method described by Whiddett and Hollyforde (1999) for the development of a competency framework. In order to progress to a nationally agreed strategy for practitioner development, the Competency Development and Evaluation Group (CoDEG) proposed four

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levels of practice each with a recognised title; a registered pharmacist (MRPharmS), a general pharmacist practitioner (GPP), an advanced pharmacist practitioner (APP) and a consultant pharmacist (CP) (Davies et al., 2002). These tiers are consistent with the progression described for health care scientists and can be mapped meaningfully against the profiles published for pharmacists under the "Agenda for Change" (Department of Health, 2003).

Competency framework

The development of the GLF being tested in this study has been described elsewhere (McRobbie et al., 2001). The GLF consists of three competency clusters: Personal, problem-solving and delivery of patient care. The personal and problem solving clusters concentrate on the generic skills of individuals, whilst the delivery of patient care cluster focuses on clinical performance and is aligned to the drug use process. Within each cluster reside a range of descriptive competencies, each with an associated range of behaviours (Table I), and which use a four item scale to allow the performance of the individual to be measured. This scale uses the frequency descriptors of "always", "usually", "sometimes" and "never".

A pilot study based in hospitals across London and the South-East of England evaluated clinical competence in junior pharmacists and provided early evidence of the benefit for both the individual and the organisation (Goldsmith et al., 2003). As a consequence, a decision was made to proceed to a larger, controlled trial to test the effect of the GLF on the clinical practice of junior pharmacists. The results of this trial are reported here.

Materials and methods

All hospitals in the London and South East of England regions were invited to participate in the study. The inclusion criteria were that the hospital had to employ junior pharmacists, classified as those employed at initial national career grades, and a senior clinical pharmacist to serve as a local coordinator for the study.

Any volunteer sites who had been previously involved in the pilot work were allocated to the intervention group (these hospitals had already been exposed to the GLF and could not form a control site). All other volunteer hospitals were allocated to the intervention or non-intervention group. Randomised allocation was not possible for ethical reasons, and volunteer sites who expressed an interest in being specifically allocated into either the intervention or non-intervention groups had these wishes granted.

Junior grade pharmacists (referred to as "tutees" in this paper) and senior pharmacists ("tutors") in the intervention group used the competency framework for practice development. The non-intervention sites were blinded with regard to the content of the GLF. The tutors in the intervention group were asked to assess the competence of the tutees using the GLF at baseline—3, 6 and 12 months.

Prior to commencement, tutors in the intervention group used the GLF to define the competency level expected of the tutee (at this career grade) for providing the clinical service for which they were responsible. For example, whether they thought a "drug history" should *always, usually, sometimes* or *never* be completed. Tutees were then assessed by their tutors in the ward environment using the previously defined service level. From these assessments, the training needs of the tutee could be identified based on any difference between the observed and the standard.

The non-intervention group all received orthodox training supervised by their respective clinical pharmacy supervisors. The tutees in these hospitals were assessed at the same time intervals by experienced external tutors, using the GLF, for those competencies in the delivery of patient care cluster. The two generic competency clusters (problem-solving and personal) could only reasonably be assessed for those tutees in the intervention group. A sample of these independent assessments was subject to quality assurance by another (simultaneous) senior assessor to determine consistency of interpretation. This approach was used to qualitatively inform the assessment process across the intervention sites.

Analysis

Data was coded and entered onto a database for analysis. Quality assurance of the data set was conducted to minimise error. Differences in competency scores for the two groups over time was analysed using a repeat measure Wilcoxon signed-rank test. Initially, the median performance rating expected by the clinical pharmacist tutors was calculated. Aggregated competence was determined at each time point for all tutees. The time period when the threshold score was achieved could then be noted, and used to construct a Kaplan-Meir plot to illustrate the rate of aggregated competence attainment between the groups.

Results

One hundred and four junior grade pharmacists (tutees) were recruited from 22 acute NHS hospitals, with 74 in the intervention group (representing 13 hospitals) and 30 in the non-intervention group (representing 9 hospitals).

The two groups of pharmacist were similar with respect to baseline characteristics (Table II) with no

Table II. Demographic data.

Demographic	Non- Intervention (n=30)	Intervention (n=74)
Mean age [yrs] (± SD)	27.2 (5.0)	26.87 (4.2)
Gender (% female)	73	84
Sector of Pre-registration (%)		
Community	11 (36.7)	26 (35.1)
Hospital	17 (56.7)	39 (52.7)
Split	2 (6.7)	9 (12.2)
Post-registration qualification (%)		
Certificate	11 (36.7)	24 (32.4)
Diploma	0	1 (1.4)
Time employed by hospital		
Weeks (mean)	42.9	41.8
Weeks (median)	26	26

significant differences ($p \geqq 0.05$) found between the groups for gender, age, sector where the pharmacist undertook their pre-registration training or the length of time employed at the hospital. A similar proportion of pharmacists in each group had obtained a postgraduate certificate or diploma in pharmacy practice.

Competency attainment

Repeat measures analysis (month-6 compared to baseline, month-12 compared to baseline) revealed that the intervention group showed an improvement in 24 of the 25 competencies at month-6, which was sustained at month-12. By comparison, the control only demonstrated an improvement in 7 of the competencies at month-6 increasing to -12 by month-12 (Table III). Using an aggregated competency score for each recruit, intervention and non-intervention pharmacists were compared using a Kaplan-Meir plot (Figure 1). Event status was defined as the achievement of competence, detected by the attainment of a threshold score, derived from the median performance rating expected by clinical pharmacy managers. A significant difference existed between the groups at 3, 6 and 12 months ($\log \text{rank} = 7.97$, $p = 0.0048$).

Table III. Within-group comparison (Wilcoxon signed rank) of intervention and non-intervention groups at 6 and 12 months for the 25 delivery of patient care competencies.

Competency	Delivery of Patient Care Competency Cluster							
	6 month change				12 month Change			
	Non-intervention		Intervention		Non-intervention		Intervention	
	Z	Exact Sig	Z	Exact Sig	Z	Exact Sig	Z	Exact Sig
Relevant patient background	1.508	0.234*	3.766	0.000	1.890	0.125*	3.532	0.000
Drug history	1.582	0.156*	3.956	0.000	2.332	0.027	3.601	0.000
Drug-drug interactions								
Identified	2.543	0.014	4.116	0.000	1.930	0.094*	2.878	0.004
Prioritised	2.437	0.018	4.297	0.000	2.060	0.063*	3.624	0.000
Appropriate action	2.230	0.036	4.341	0.000	2.070	0.063*	3.398	0.000
Drug-patient interactions								
Identified	1.588	0.152*	4.093	0.000	2.251	0.031	3.274	0.001
Prioritised	1.461	0.195*	4.204	0.000	2.121	0.063*	3.090	0.001
Appropriate action	1.150	0.332*	3.603	0.000	1.933	*0.094	2.878	0.004
Drug-disease interactions								
Identified	1.611	0.180*	4.155	0.000	2.232	0.031	3.337	0.000
Prioritised	1.811	0.113*	4.549	0.000	2.251	0.031	3.473	0.000
Appropriate action	1.811	0.113*	4.304	0.000	2.232	0.031	3.078	0.001
Calculation of appropriate dose	0.711	0.628*	3.840	0.000	1.155	0.398*	3.274	0.000
Selection of dosing regimen	0.632	0.754*	4.933	0.000	2.121	0.063	4.117	0.000
Selection of formulation and concentration	0.047	1.000*	3.697	0.000	1.318	0.281*	2.693	0.008
The prescription is unambiguous	2.121	0.070*	2.408	0.018	1.732	0.250*	2.652	0.009
The prescription is legal	1.633	0.219*	2.001	0.059*	1.414	0.500*	1.667	0.180*
Identification of pharmaceutical problems	2.496	0.020	3.829	0.000	2.714	0.008	3.522	0.000
Prioritisation of pharmaceutical problems	2.714	0.008	4.556	0.000	2.251	0.031	3.288	0.001
Use of guidelines	2.803	0.04	4.083	0.000	2.516	0.016	3.704	0.000
Resolution of pharmaceutical problems	2.333	0.039	4.282	0.000	2.640	0.008	3.350	0.000
Consultation or referral	1.190	0.344*	4.120	0.000	2.460	0.016	2.946	0.003
Need for information is identified	1.999	0.72*	4.901	0.000	2.111	0.063*	3.704	0.000
Accurate and reliable drug information is communicated	1.265	0.359*	4.627	0.000	1.633	0.250*	3.144	0.001
Provision of written information	1.000	0.625*	3.715	0.000	2.530	0.016	2.924	0.003
Assessing outcomes of contributions	1.414	0.289*	4.415	0.000	1.667	0.188*	3.019	0.002

* Competencies non-significant at $p = 0.05$ level.

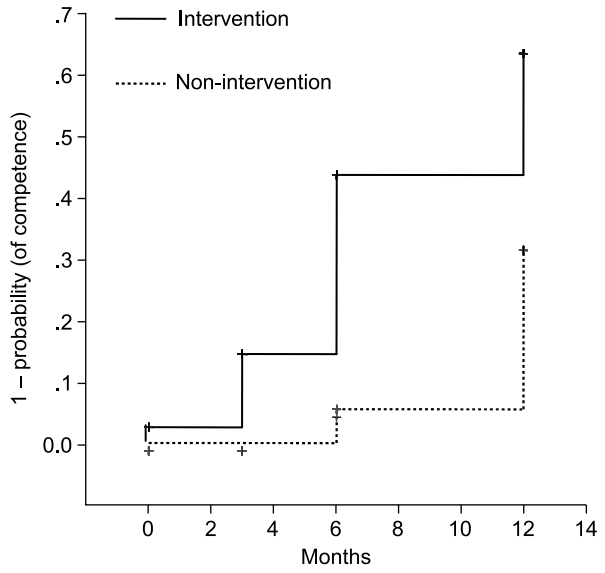

Figure 1. Kaplan-Meier plot comparing competency achievement between the two groups. The *y*-axis measures the probability of attainment of global competency score, as described in text.

Generic competencies

The two generic competency clusters, problem-solving and personal, could only be applied to pharmacists in the intervention group so that no comparative analysis between the two groups could be undertaken. Using a repeat analysis approach significant improvement was seen in 31 of the 33 competencies located in these clusters (Table IV). "Punctuality" and "Recognising the value of the pharmacy team" were the only two competencies where, no significant improvement was observed over the study period.

Follow-up analysis

Of the initial 104 pharmacists recruited, 41 (39%) remained at the end of the 12 month period. The main reason pharmacists left the study early was promotion (Table V). Eleven pharmacists left the study for other reasons, which included maternity leave, post-graduate study and for personal reasons.

Table IV. Comparison of the generic competencies encompassing "personal" and "problem solving" clusters for the intervention group only.

	Personal competency cluster			Problem solving competency cluster	
	Z	Exact sig		*Z*	Exact sig
Prioritisation	3.051	0.003	Accesses information	3.226	0.001
Punctuality*	1.414	0.289*	Abstracts information	3.945	<0.0001
Demonstrates initiative	3.317	0.001	Logic	2.676	0.010
Time efficiency	2.814	0.005	Pathophysiology	3.557	<0.0001
Nursing staff communication	3.207	0.001	Pharmacology	3.755	<0.0001
Medical staff communication	3.000	0.004	Side effects	2.829	0.006
Other HCP communication	2.530	0.016	Evaluates information	3.258	0.001
Mentor/tutor communication	3.162	0.002	Appraises information	2.777	0.006
Other pharmacy staff communication	2.646	0.016	Decision making	2.183	0.048
Recognises value of pharmacy team*	2.236	0.063*	Provides accurate information	2.652	0.009
Works effectively within pharmacy team	2.449	0.031	Provides relevant information	2.982	0.004
Recognises value of multi-disciplinary team	3.051	0.002	Timely information	2.828	0.007
Works effectively within multi-disciplinary team	2.828	0.008	Ensures resolution of problem	2.179	0.045
Maintaining confidentiality	2.646	0.016			
Recognising limitation	2.673	0.011			
Appropriate info documented	3.216	0.001			
Consults with patients	3.207	0.001			
Responsibility for own action	2.449	0.031			
Responsibility for patient care	2.828	0.008			
Continuing professional development	2.961	0.002			

* Indicates non-significant change ($p > 0.05$).

Table V. Attrition rates of pharmacists during the study period.

	Non-intervention ($n = 30$)	Intervention (74)
Promotion	15	17
Locum ± travelling	3	11
Return home	0	6
Other	1	10
Remaining in study at 12 months	11	30

Those who left the study due to promotion were subject to analysis of their last available assessment (3 or 6 months). Of the 15 promoted in the non-intervention group, only one was deemed competent at the time of leaving. However it should be noted that 6 of the 15 left after baseline assessment and were therefore unlikely to be competent (Table VI). Within the intervention group, 12 out of the 17 were deemed competent at their final assessment before leaving.

Discussion

This is the first controlled study that describes a competency based assessment of junior grade hospital pharmacists. The results suggest that the GLF is able to differentiate between the clinical practice of pharmacists and to detect change in an individuals' practice over time.

The GLF was developed, and its content validated, by experienced practitioners able to define the performance elements of practice appropriate for junior level pharmacists (McRobbie et al., 2001). The GLF provides tutors with a tool to describe the appropriate service levels as well as a pragmatic assessment tool from which the training needs of the individual can be identified. For the first time, junior pharmacists were given formal guidance on what was expected, thereby providing a focus for their learning and personal development. The GLF allows for a structured assessment that is sensitive to change, that allows for any improvement in the performance of junior pharmacists' to be observed.

Application of the GLF in the way described led to significant improvement in the competency of those pharmacists, compared to pharmacists working in the non-intervention sites, where an orthodox approach to practitioner development was in operation. Using an aggregated competency score plotted against time, a significant difference in favour of the intervention sites was found. However, this competency score does not describe the standard required for individuals, merely as a marker for change. A more extensive mapping evaluation is required to inform a typical competency profile for a general level practitioner.

The analysis used repeat measures techniques that allowed any initial differences in baseline competence to be controlled for. Any bias was therefore minimised as individuals functioned as their own control. A significant difference in the intervention tutees' performance was observed over the 12 months of the study for all but one competency, "prescription is legal", for which tutees achieved a satisfactory rating throughout, suggesting this is a ubiquitous competence for registered pharmacists.

Throughout the study, pharmacists in the intervention group demonstrated significant competency progression within all aspects of the two generic competency clusters, except for two competencies, "punctuality" and "recognising value within the pharmacy team" again suggesting these may be common criteria held by the majority of junior pharmacists following their five year education and training period.

The Kaplan-Meier method, using the attainment of an aggregated competency score against time, demonstrated that significantly more tutees within the intervention sites achieved a defined competency level more rapidly than the non-intervention pharmacists. This suggests that the GLF provides a structure that enables practitioners to develop in a more efficient manner, reaching a level of safe practice sooner. This may be as a result of providing a tool for practitioners to more clearly identify and meet their CPD needs.

One concern in the outcomes was the relatively high drop out in both groups due to job promotion. In particular, the high proportion of pharmacists in the non-intervention group who secured promotion despite a failure to attain a satisfactory level of competence within the study parameters. This further illustrates the need for accepted and measurable standards of performance, attainment of which can be used as evidence for supporting practitioner progression.

In summary, the study indicates that the introduction of the GLF improves the practice of junior hospital pharmacists. Pharmacists using framework develop their practice more efficiently than those not so exposed. The grids are sensitive to change allowing improvements in junior pharmacists' performance to be observed. Assessment using the GLF facilitates identification of individual training needs, and is a crucial step in any CPD programme.

Table VI. Individuals dropping out of the study due to promotion.

	Non-intervention group		Intervention group	
Assessment period	Number leaving	Number competent	Number leaving	Number competent
Baseline	6	0	1	0
3 months	2	0	6	4
6 months	7	1	10	8
Total	15	1	17	12

Whilst this study focussed on the secondary care sector, there is now a clear need to further develop the GLF for use in both primary care and community pharmacy, to support a common framework for practitioner development.

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