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Training, clinical medication review performance and self-assessed competence: Investigating influences

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Abstract

The aim of the study was to evaluate the influence of community pharmacists' training performance on providing clinical medication reviews, and the influence of their training and medication review performances on their self-assessed competence in two Primary Care Trusts (PCT) in England. Data were collected on training and medication reviews, and a postal survey, developed to measure pharmacists' self-assessed competence, was administered. Simple regression was used to predict medication review performance and multiple regression to predict self-assessed competence. The better the pharmacists' performance in *Pharmaceutical care planning* module, the better their performance in suggesting actions to solve drug related problems (DRPs) in medication reviews. In addition, the better the pharmacists' performance in suggesting actions to solve DRPs, the poorer their self-assessed competence in "delivery of patient care" competency cluster. While the training supported the provision of medication reviews, pharmacists may need more continuous, individual support and feedback to further develop their ability to self-assess competence.

Keywords: *Clinical therapeutics training, community pharmacy, clinical medication reviews, performance, regression, self-assessed competence*

Introduction

The document "Room for Review" described problems related to medicine taking, for example, patients with long-term conditions may not be taking their medicines as prescribed (Medicines Partnership, 2002). The "National Service Framework for Older People" recommended annual medication reviews for all patients over 75 years and six-monthly for those with four or more medicines to minimise any medication related problems (Department of Health, 2001a). In 2005, the community pharmacy contract for provision of NHS services outlined the provision of clinical medication reviews as an enhanced service on a local level (Department of Health, 2005a). Primary Care Trusts (PCT) commissioning enhanced services are required to ensure that these are provided by appropriately trained and qualified pharmacists (Department of Health, 2005a). However, the competencies or the training required of pharmacists providing clinical medication reviews have not been defined (Department of Health, Pharmaceutical Services Negotiating Committee, and NHS Confederation, 2005). While different types of training have been provided for community pharmacists reviewing patients' medication (Krass & Smith, 2000; Benrimoj et al., 2003; Maclaren, Mackie, Lowrie, & Tennant, 2003; Hansford, Krska, & Gill, 2005; Holland et al., 2005; Anonymous, 2006) the impact of performance in training on performance in clinical medication reviews has not been evaluated.

Performance and competence are inherently related; being competent is described as "having the necessary ability or knowledge to [perform] something

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successfully" (Oxford English Dictionary). Healthcare professionals (HCPs) are expected to be competent in what they are doing to provide safe, high quality services, thus maintaining and attaining competence is important (Department of Health, 2001b,c). HCPs have been encouraged to assess their own skills and knowledge and to identify their learning needs and competence gaps, whilst acknowledging that the level of competence may vary within a HCP's career and between HCPs (Department of Health, 2001c, 2004). Pharmacists need to develop and maintain expertise in new areas, for example, in clinical medication reviews (Department of Health, 2003).

Taking responsibility for one's development is important in adult learning (Kaufman, 2003). However, pharmacists or other HCPs may not be able to attain or maintain competence unless they are aware of their own competence. In one study, whilst general practitioners' knowledge and self-assessed competence were higher, their performance was similar to general practitioner trainees' performance, indicating difficulties in self-assessing competence (Jansen et al., 1995). Pharmacists with at least 25 years' work experience have been reported to show greatest difficulty in meeting required standards in "patient care competencies" and community pharmacists tended to score less in the "patient care competencies" than hospital pharmacists (Austin, Marini, Croteau, & Violato, 2004). Community pharmacists may be less supported in professional development or may not regard professional development as their own responsibility. The aim of this study was to evaluate the effect of clinical pharmacy training performance on clinical medication review performance, and the influence of training and medication review performances on self-assessed competence amongst a group of community pharmacists.

Materials and methods

The study assessed the influence of community pharmacists' performance in training on their subsequent performance in providing clinical medication reviews, and the influence of their training and medication review performances on their self-assessed competence. Ethics approval was obtained for the study.

Sample

Pharmacists. In 2001, Barking and Dagenham, and Havering PCT in North East London invited all 80 community pharmacists working within the PCTs to provide a clinical medication review service to elderly primary care patients; 43 were recruited.

General practices and patients. Nineteen local general practices were recruited. Eligible patients registered at these surgeries were aged 65 years or over, receiving four or more medicines on repeat prescription; 672 patients consented to participate. Patients were randomly allocated to *intervention* and *non-intervention* groups.

Training for pharmacists

Independent of any previous clinical pharmacy training or medication review experience, all pharmacists completed bespoke training in clinical therapeutics at postgraduate certificate level, provided and assessed by the Robert Gordon University, in 2002 before becoming accredited as medication reviewers. The training comprised: a two-day workshop on patient interviews and care planning; five distance learning modules (compulsory modules: *Pharmaceutical care planning*; *Cardiovascular therapeutics 1 and 2*; and *Endocrine therapeutics*; and one optional module: *Respiratory*; *Musculoskeletal*; or *Gastrointestinal therapeutics*); and, a one-day IT-training workshop.

Clinical medication reviews

In 2003 the pharmacists were allocated a minimum of 20 patients whose medications required a review. They received standardised summaries of patients' medical notes written by the researcher and another pharmacist. After patient interviews, the pharmacists wrote a pharmaceutical care plan for each patient, detailing all identified drug related problems (DRPs) and actions suggested for solving them. Patient referrals in the *intervention* group prioritising the most important DRPs and actions were sent to the GPs to implement (Mackie et al., 2005). No life threatening DRPs were found in either group.

A clinical pharmacist reviewed all patient referrals, including care plans, to ensure the community pharmacists had not missed any DRPs or actions, and, if required, revised the referrals before sending them to the GPs. *Accurate* and *incomplete* identifications of DRPs and suggested actions could benefit the patients and were considered to be a *favourable* performance. All other discrepancies between the patient referrals written by the community pharmacists and the clinical pharmacist, including *inaccurate* identifications of DRPs and suggested actions, not observing DRPs or not suggesting actions, were regarded as a potential risk: an *unfavourable* performance. Pharmacists who reviewed *intervention* patients' medications received feedback limited to revisions of the patient referrals from the clinical pharmacist.

Self-assessed competence survey

Design. A self-completed questionnaire was designed in collaboration with another researcher based on a previously developed survey tool comprising behavioural statements for measuring self-assessed

Table I. Pharmacist characteristics.

Characteristic		Training % (*n*/*N*)	Medication review % (*n*/*N*)	Self-assessed competence % (*n*/*N*)
Gender	Female	22 (8/37)	25 (5/20)	24 (7/29)
	Male	78 (29/37)	75 (15/20)	76 (22/29)
Employment	Employee	47 (17/36)	45 (9/20)	45 (13/29)
	Owner	53 (19/36)	55 (11/20)	55 (16/29)
Primary care trust	Barking and Dagenham	57 (21/37)	55 (11/20)	59 (17/29)
	Havering	43 (16/37)	45 (9/20)	41 (12/29)
Consultation area	Consultation area	42 (15/36)	40 (8/20)	43 (12/28)
	No consultation area	58 (21/36)	60 (12/20)	57 (16/28)
Additional appointment	Appointment	17 (6/36)	25 (5/20)	28 (8/29)
	No appointment	83 (30/36)	75 (15/20)	72 (21/29)
Additional qualification	Qualification	25 (9/36)	40 (8/20)	42 (11/26)
	No qualification	75 (27/36)	60 (12/20)	58 (15/26)
Year of graduation	Median	1984	1983	1984
	Range	1964–2000	1964–1999	1964–1999
Year when started at current job	Median	1991	1987	1989
	Range	1975–2002	1975–2002	1977–2003

competence (Mills, Laaksonen, Bates, Davies, & Duggan, 2005). The questionnaire included a set of eighty-one behavioural statements which were grouped into four competency clusters: "delivery of patient care"; "personal"; "problem solving"; and "management and organisation". A four-point ordinal scale, ranging from *always* (4), *usually* (3), *sometimes* (2) to *never* (1), measured how often the respondents perceived they showed a behaviour in any one statement.

Administration. The questionnaire was posted to 35 pharmacists with a cover letter and a pre-paid self-addressed return envelope in 2004 (Laaksonen et al., 2007a). Two follow-up questionnaires were administered to non-respondents at two and four week intervals to maximise response. The questionnaires were coded to keep track of non-respondents.

Data analysis

All collected data were entered onto an SPSS database 12.01 for statistical analyses. χ^2 test was used to test differences in frequencies, Mann–Whitney *U* test was used to test differences in medians, Spearman's ρ was used to test associations, simple regression was used to predict performance in medication reviews and multiple regression was used to predict self-assessed competence (Field, 2000).

Results

Thirty-seven pharmacists completed the training and became accredited; two withdrew due to personal reasons. Nine felt that they could not provide the service, leaving 26 to interview patients (Laaksonen, Duggan, Bates, & Mackie, 2007b). The performance assessment was based on the referrals that 20 community pharmacists completed, and reviewed by the clinical pharmacist. The postal survey was sent to all 35 accredited pharmacists; 29 responded. Table I summarises the characteristics of pharmacists during the training, providing the service and self-assessing their competence.

Training

The overall training result ranged between 47 and 79% (median = 66%); pharmacists performing well in one compulsory module were likely to do so in others (Laaksonen et al., 2007b). No associations were found between the characteristics and the training performance.

Medication reviews

In this study, the clinical pharmacist reviewed referrals written for 173 *intervention* and 71 *non-intervention* patients. The community pharmacists identified a median of 63% of DRPs (range 27–83%) and suggested a median of 46% actions (range 17–74%) of all DRPs identified and all actions suggested by the moderating clinical pharmacist. No associations were found between the characteristics and the medication review performance.

Self-assessed competence

Overall, the median cluster scores were all within the *usually* response (median scores 3.2–3.3), indicating that the respondents were mostly competent but had some learning needs (Table II). No associations were found between the characteristics and the self-assessed competence.

Table II. Self-assessed competence of the community pharmacists.

Competency cluster	Mean	Median	Range
Delivery of patient care competencies ($n = 18$)	3.2	3.2	2.4–3.9
Personal competencies ($n = 24$)	3.3	3.3	2.5–3.9
Problem solving competencies ($n = 26$)	3.2	3.3	2.3–3.9
Management and organisation competencies ($n = 17$)	3.1	3.2	2.2–3.7

Influence of training on medication reviews performance

Measures of beneficial performance were: the number of conducted medication reviews; the number of written patient referrals; *favourable* "identifications of DRPs" and "actions suggested to solve them". Pharmacists who did well in identifying DRPs were also likely to suggest more beneficial actions to solve them (Spearman's $\rho = 0.836$, $p = 0.0005$; Figure 1).

The pharmacist characteristics and the overall training performance were not associated with the performance measures. However, pharmacists who did well in *Pharmaceutical care planning* may have gained confidence to conduct a greater number of reviews and to write a greater number of referrals (Spearman's $\rho = 0.427$, $p = 0.042$; Spearman's $\rho = 0.435$, $p = 0.034$). Experience of conducting more medication reviews and writing more referrals, or receiving more feedback did not lead to more *favourable* performance in "identifying DRPs" or "suggesting actions to solve them".

The performance in *Pharmaceutical care planning* was entered into regression analysis together with the performance measures of "identifying DRPs" and "suggesting actions to solve them" after removing cases that may have undue influence on the solution of regression analysis (Figure 2a–d). Standardised DfBeta values were used to identify influential cases; values greater than $2/\sqrt{n}$, where n is the number of pharmacists ($n = 20$), indicate the cases that may have undue effect on a parameter in a regression model (Pardo Merino & Ruiz Díaz, 2002).

While the regression model for "identifying DRPs" improved after removing the influential cases, it was not a better prediction of performance than the mean value for "identifying DRPs" (ANOVA, $F = 4.005$, $p = 0.064$). A linear relationship was found between performance in *Pharmaceutical care planning* and

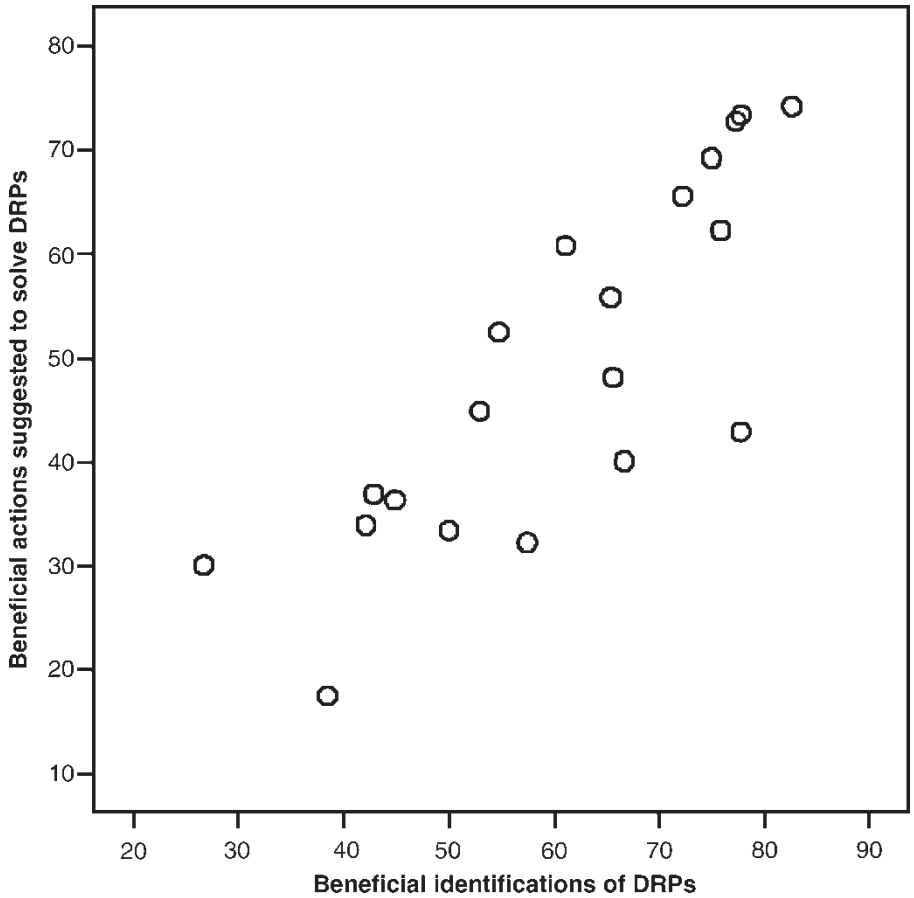

Figure 1. Scatterplot of correlation between *favourable* performance in identifying DRPs and suggesting actions to solve them.

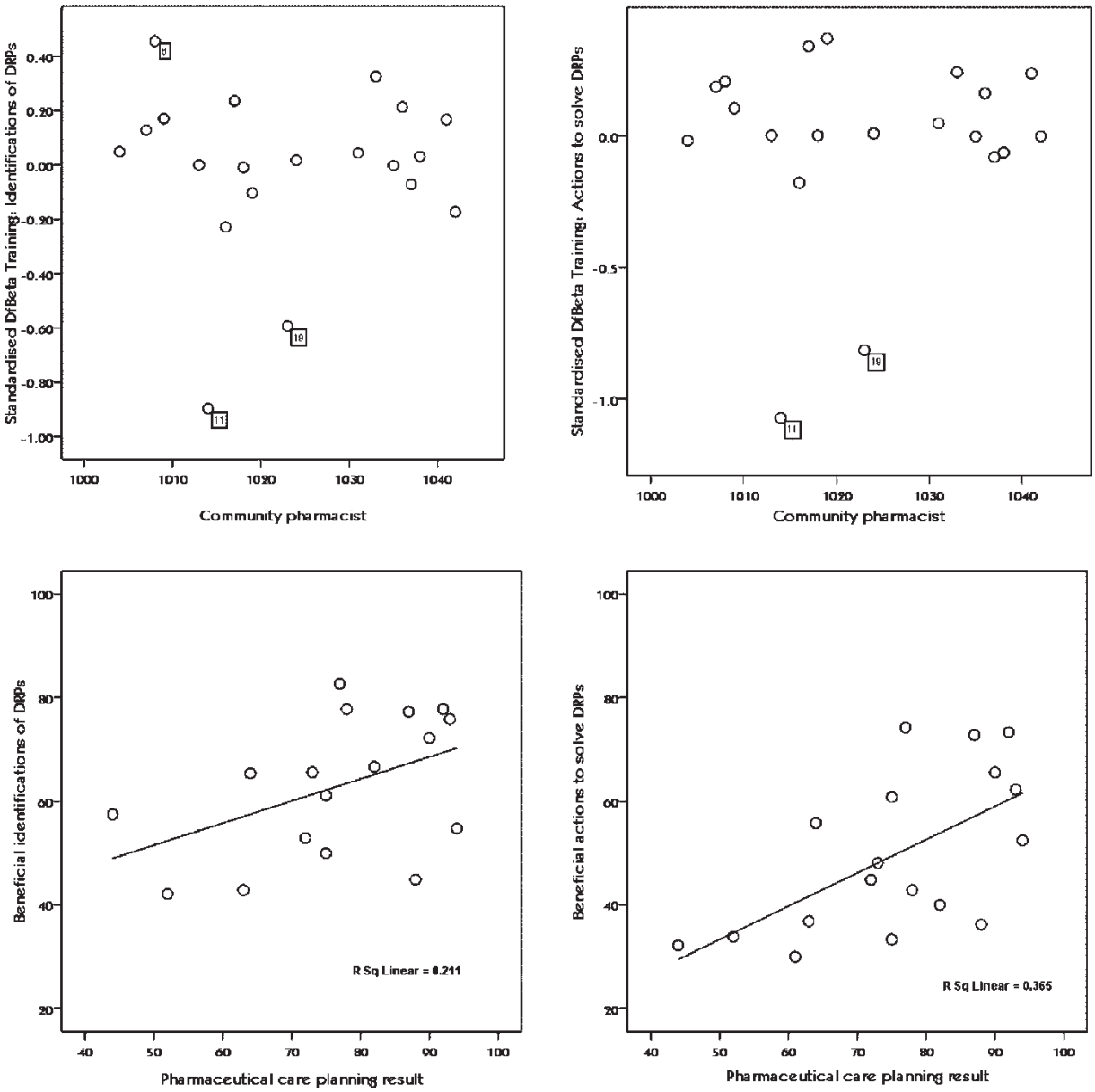

Figure 2. a. Scatterplot of pharmacists and standardised DfBetas for performance in *Pharmaceutical care planning* module and in "identifying DRPs". Three influential cases are marked. b. Scatterplot of pharmacists and standardised DfBetas for performance in *Pharmaceutical care planning* module and in "suggesting actions to solve DRPs". Two influential cases are marked. c. Scatterplot of performance in *Pharmaceutical care planning* module and "identifying DRPs" after removing the influential cases. d. Scatterplot of performance in *Pharmaceutical care planning* module and in "suggesting actions to solve DRPs" after removing the influential cases.

in "suggesting actions to solve DRPs". This regression model was a better prediction of performance than the mean value for "suggesting actions to solve DRPs" (ANOVA, $F = 9.182$, $p = 0.008$) in a sample of pharmacists who achieved a result of 44–94% in the *Pharmaceutical care planning* module. The regression equation for *favourable* performance in "suggesting actions to solve DRPs" is shown in Table III. In this sample, this training result shared 36.5% of the variance with "suggesting actions to solve DRPs" ($R^2 = 0.365$), indicating multiple influences.

Table III. Regression equations predicting pharmacists' performance in "suggesting solutions to drug related problems" and self-assessed competence in "Delivery of patient care".

("Suggesting actions to solve DRPs") = 1.213 + 0.642 (Pharmaceutical care planning)	$t = 3.030$, $p = 0.008$, $\beta = 0.604$
("Delivery of patient care") = 4.164 − 0.016 ("Suggesting actions to solve DRPs")	$t = -3.457$, $p = 0.006$, $\beta = 0.738$

Influences of training and medication review performance on self-assessed competence

The pharmacist characteristics were not associated with self-assessed competence. The total training result correlated negatively with "personal" competency cluster scores, comprising statements on communication with other HCPs and taking responsibility for patient care (Spearman's $\rho = -0.404$, $p = 0.050$). Furthermore, performance in "identifying DRPs" correlated negatively with "management and organisation' competency cluster scores (Spearman's $\rho = -0.686$, $p = 0.041$), and performance in "suggesting actions to solve DRPs" negatively correlated with "personal", "problem solving" and "management and organisation" competency cluster scores (Spearman's $\rho = -0.510$, $p = 0.044$; Spearman's $\rho = -0.674$, $p = 0.003$; Spearman's $\rho = -0.912$, $p = 0.001$, respectively).

The competencies, such as "monitoring drug therapy", "need for the drug", "medicines information", "patient consultation" and "evaluation of outcomes", within "delivery of patient care" cluster are essential for providing advanced and enhanced community pharmacy services. Therefore, the performance measures of "identifying DRPs" and "suggesting actions to solve them" were entered into multiple regression analysis using stepwise entry together with "delivery of patient care" cluster after removing cases that may have undue influence on the solution of regression analysis (n = 14 Figure 3a–d).

Performance in "identifying DRPs" did not fit the regression model. A linear relationship was found between performance in "suggesting actions to solve DRPs" and "delivery of patient care" competencies. This regression model was a better prediction of self-assessed competence than the mean value (ANOVA, $F = 11.953$, $p = 0.006$) in a sample of pharmacists who showed *favourable* performance in "suggesting actions to solve DRPs" ranging from 32 to 74%. The regression equation for self-assessed "delivery of patient care" competency cluster score is shown in Table III. In this sample, self-assessed "delivery of patient care" competency cluster scores shared 54.4% of the variance with "suggesting beneficial actions to solve DRPs" ($R^2 = 0.544$), indicating multiple influences.

Discussion

Better performance in training led to better performance in clinical medication reviews, indicating the usefulness of the training but also individual differences in providing the service. However, pharmacists performing well in training and providing medication reviews had a lower perception of their own competence, suggesting difficulties in self-assessment.

Strengths and limitations

The community pharmacists working within Barking and Dagenham, and Havering PCTs had been recruited by the PCTs and may have been self-selected. Therefore, their performances and perceptions may not be representative of a wider population. A pragmatic approach to sampling was applied due to the high level of commitment required of pharmacists over a long period of time. However, the range of training and medication review performance and self-assessed competence varied from poorer to better, suggesting that the sample may have been representative of a larger population. Two reminders were sent to pharmacists who had not responded to the survey in an attempt to maximise response. Most pharmacists continued their participation in the project throughout the study as they may have wanted to contribute to development of local pharmacy services.

Influence of training on performance in medication reviews

Better performance in training resulted in better performance in clinical medication reviews. GPs' performance was higher in an examination setting than in a practice setting (Rethans et al., 1991), suggesting multiple influences, such as limited time, on real performance. Holding a previously attained postgraduate degree, a requirement for participation in another medication review study (Holland et al., 2005), and other characteristics did not influence medication review performance, perhaps due to the small sample.

Previously, tests on pharmacists' knowledge of appropriate advice, patients' perceptions of pharmacists' advice and simulated patients have been employed to evaluate healthcare interventions among community pharmacists to test change in practice (Anderson, 1995; Krass, 1996; Bond, Grimshaw Taylor, & Winfield, 1998; Watson et al., 2002). This study showed that performance in medication reviews may be predicted by performance in a training module. Pharmacists who performed well in one module were likely to do so in others (Laaksonen et al., 2007b); performances in the other modules may also have influenced medication review performance, suggesting inherent competence or striving for better performance.

Different type of training may yield different results in medication review performance. For example, outreach visits made little difference to GPs' prescribing habits, whereas formal seminars and workshops were reported to change their behaviour (Santoso, 1996; Watson, Gunnell, Peters, Brookes, & Sharp, 2001; Witt, Knudsen, Ditlevsen, & Hollnagel, 2004). Community pharmacists may not be able to perform all tasks expected of them when they start to provide a service. Close feedback provided by mentors with a competency framework improved junior hospital pharmacists' performance and was sustained

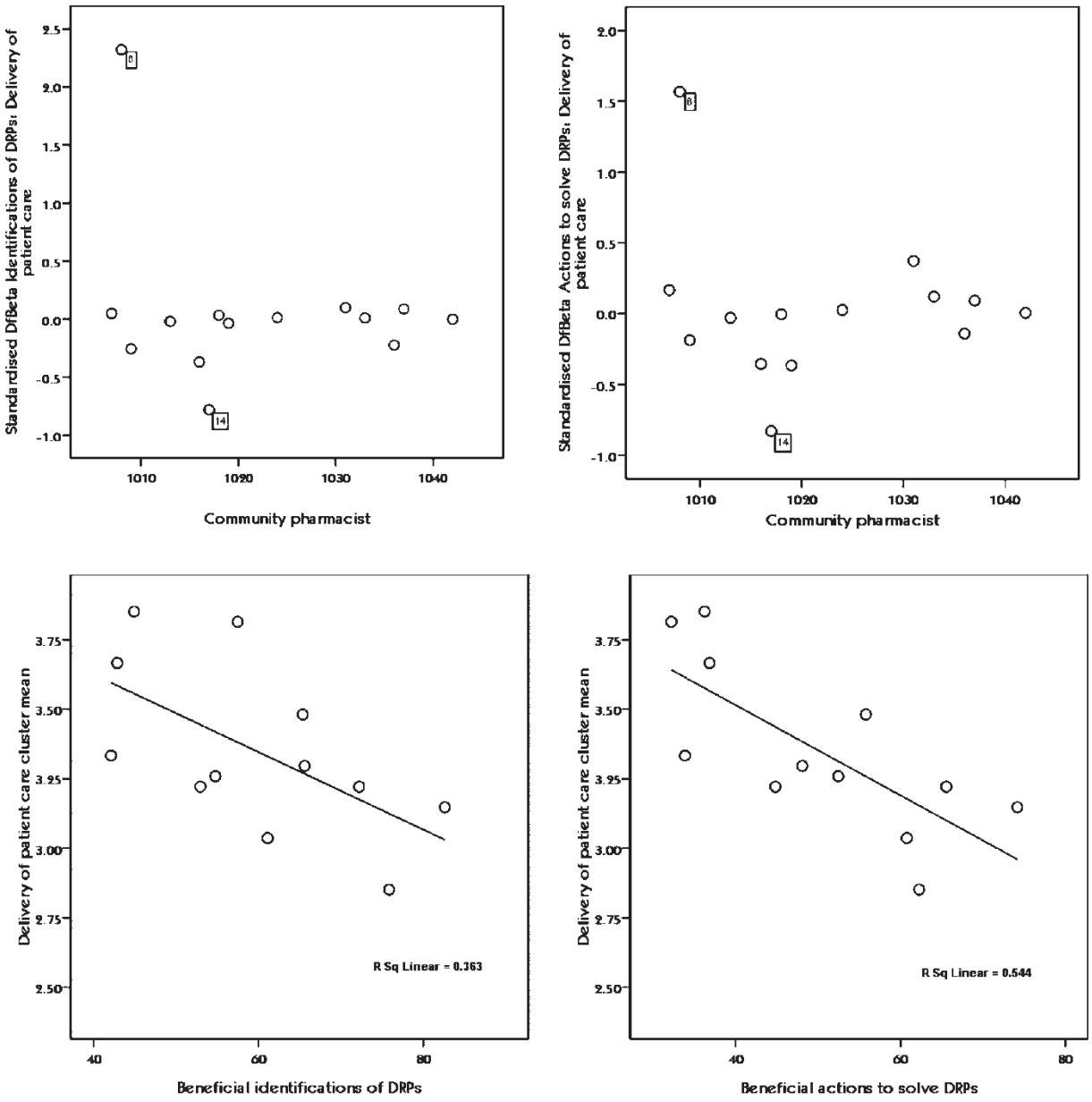

Figure 3. a. Scatterplot of pharmacists and standardised DfBetas for performance in "identifying DRPs" and self-assessed competence in "delivery of patient care". Two influential cases are marked. b. Scatterplot of pharmacists and standardised DfBetas for performance in "suggesting actions to solve DRPs" and self-assessed competence in "delivery of patient care". Two influential cases are marked. c. Scatterplot of performance in "identifying DRPs" and self-assessed competence in "delivery of patient care" after removing the influential cases. d. Scatterplot of performance in "suggesting actions to solve DRPs" and self-assessed competence in "delivery of patient care" after removing the influential cases.

over a period of time (Antoniou et al., 2005). In this sample, the limited feedback may have resulted in diverse performance and not feeling confident enough to write patient referrals.

Influence of training and medication reviews on self-assessed competence

The self-assessed competence did not reflect performance: better performance in training and medication reviews was related to poorer self-assessed competence. Pharmacists performing poorly in training may have participated in other learning activities and increased their knowledge after completing the training. However, this seems unlikely as performance in medication reviews also correlated negatively with the different competency cluster scores. Those performing well in medication reviews may have become more aware of their learning needs and they may have started to think more about their competence gaps and may have assessed their competence more truthfully. Future self-assessed competence in "delivery of patient care" cluster may be predicted by performance in "suggesting favourable solutions to DRPs". Furthermore, the correlations between medication review performances and the other

competency clusters suggest that behaviours in more than one cluster were involved with *favourable* performance in medication reviews.

Other HCPs have reported over- and underestimations of their performance (Jansen et al., 1995; Tracey, Arroll, Barham, & Richmond, 1997; Latif et al., 1998; Glajchen & Bookbinder, 2001; Barnsley et al., 2004), suggesting others may require support in their pursuit of self-awareness of competence. Social desirability and overconfidence, or a lack of confidence were factors interfering with reporting true performance (Jansen et al., 1995; Latif et al., 1998; Glajchen & Bookbinder, 2001; Barnsley et al., 2004).

While it is expected that with more experience HCPs become more independent and self-directed in their learning (Kaufman, 2003; RPSGB, 2004), community pharmacists were reported to perceive that professional development was not possible without external facilitation (James, Beaumont, Carter, & Davies, 2002). Pharmacists may require more individual support and feedback on their performance to develop their competence in medication reviews, also suggested for smoking cessation services (National Institute for Health and Clinical Excellence, 2005). Different types of training need to be studied to find the most suitable and effective. Early medication reviews may have to be viewed as part of the training (Maclaren et al., 2003). The support offered for pharmacists in the future may have to include performance appraisals as recommended for all NHS staff by the Department of Health (2005b). It may be possible to use the General Level Competency Framework that has been shown to improve performance of junior hospital pharmacists (Antoniou et al., 2005), to support competence development of community pharmacists in providing clinical medication reviews (Mills et al., 2005).

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