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RESEARCH ARTICLE

Risks and concerns about supplementary prescribing: survey of primary and secondary care pharmacists

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Abstract
Objective (of the study) To provide data on the views of chief pharmacists (CPs) and primary care trust pharmacists (PCTPs) on the risks and concerns surrounding supplementary prescribing.
Setting Secondary and primary care within England.
Method Postal questionnaire surveys of chief pharmacists and primary care trust pharmacists.
Main Outcome Measure Significance of the association between the extracted factors.
Results The response rate was 68% for both the primary care (183/271) and secondary care surveys (97/143). The survey tool was subjected to factor analysis and reliability testing. For both sectors, the three factors that were extracted described concerns over the training model for supplementary prescribing, concerns about the professional competency/responsibility of the supplementary prescribers once trained, and positivity about the implementation of supplementary prescribing. For both sectors, as trusts have more experience of supplementary prescribing by nurses, the respondents had less concerns about the supplementary prescribing training model. For secondary care, as the total number of pharmacists employed within the trust increases, the respondents had less concerns over the limitations of the supplementary prescribing training model.
Conclusion Although both sectors have concerns over the training model for supplementary prescribing and also professional competence and responsibility once trainees qualify, there is overall a positive attitude towards supplementary prescribing and there is a belief that pharmacists wish to take this role on.

Keywords Supplementary Prescribing · Pharmacist · Factor Analysis · Questionnaire · Nursing · Risk · United Kingdom · Opinions

- This is the first research to be published on the views of chief pharmacists (CPs) and primary care trust pharmacists (PCTPs) on the risks and concerns surrounding supplementary prescribing.
- This research indicates that there are still concerns within both primary and secondary care about the supplementary prescribing model (such as the lack of clinical assessment during training) and also professional competence and responsibility once trainees qualify. The Department of Health may therefore need to undertake a review of this development in order to ensure that such concerns are not valid in practice.
- Although CPs and PCTPs have these concerns, overall there is a positive attitude towards supplementary prescribing and there is a belief that pharmacists in England wish to take this role on. This underlying support for the role extension of pharmacists is very important in ensuring that pharmacist prescribing achieves its full potential.

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Introduction

Supplementary prescribing (SP) is in its infancy in the UK and there are currently 635 registered SP pharmacists (August 2005) out of a total of 46,490 (2005) pharmacists on the register (1.4%). A more detailed discussion on the scope of SP has been presented previously [1].

During 2006, pharmacists who have qualified as independent prescribers will be able to prescribe any licensed medicines for any medical condition (with the exception of controlled drugs). (Also extended formulary nurse prescribers will be able to do this as from Spring 2006) [2]

Therefore the developing prescribing role by pharmacists is a hot topic for debate in the UK at the moment [3].

Development of pharmacist prescribing in the UK has drawn upon the experience gained in the United States with pharmacist prescribing. Pharmacist prescribing was first introduced in California in the late 1970's, and since then has been extended to at least 16 states. Only one state (Florida) has introduced independent prescribing, where pharmacists are prescribing from a limited list of drugs [4]. A collaborative drug therapy management model is used in the United States for pharmacist prescribing, whereby the pharmacist has a collaborative arrangement with a physician to dependently prescribe certain medications as agreed in a management plan. Supplementary prescribing in the UK is a similar model, but unlike pharmacist prescribing in the United States where a generic management plan is produced for a certain condition, instead a tailored clinical management plan is produced for each patient that the pharmacist is going to prescribe for.

In the rest of Europe, New Zealand and Australia, pharmacists do not have the right to prescribe. Although in many European countries, pharmacists are active in preventing and correcting drug-related problems (such as Belgium, France, Germany, The Netherlands, Norway, Sweden), pharmaceutical care is in its infancy in the majority of Europe. It has been suggested that European pharmacists have a lack of authority to take an active part in decision-making for drug prescribing, and lack support from some physicians to be part of the healthcare team [5]. It is now recognised that there needs to be substantial changes made to most university's curriculum in Europe in order to arm pharmacists with the suitable knowledge and skills to implement pharmaceutical care efficiently [5].

Although the rest of Europe is not at the stage where pharmacist prescribing can be implemented, lessons can be learnt from pharmacist prescribing experience in the UK, which can support further development of the clinical role for pharmacist colleagues in Europe.

We have previously reported that the majority of chief pharmacists (CPs) within secondary care in England intended to implement supplementary prescribing by pharmacists by the end of 2005 (57%, $n = 55$) [1]. This was also similar for primary care trust pharmacists (PCTPs) (56%, $n = 100$). CPs in secondary care, and PCTPs in primary care will need to decide how extensively they intend to implement SP by pharmacists within their trust and will oversee its implementation. They will also have to develop a strategic plan for utilising this development in the optimum manner for patients dependent upon available staffing resource.

Pharmacists are employed by PCTs to control drug prescribing budgets. Some primary care pharmacists are entitled "pharmaceutical advisors'' whose role also includes policy development. Most work with individual GPs to assist with drug audits and medication review. These pharmacists will have an important role in overseeing the development of SP within primary care trusts.

Although implementation of SP by nurses will more than often be overseen by a different person within the trust such a senior nurse, that person will need to liaise with the CP or PCTP as these people have the expertise to advise upon issues such as medicines management and clinical governance concerning medicines and prescribing.

Liaison between these health professionals will also ensure that the patients are receiving the SP service from the most appropriate health care professional.

Therefore CPs and PCTPs will have an interest in the development of nurse prescribing within their trust (and vice-versa) and it is clear that development of prescribing by non-medical health care professionals within a trust will benefit from input from both professions.

The implementation of SP will be influenced by many external factors such as attaining funding of the service, funding for the training itself, funding for backfill whilst the pharmacist is training and ability to recruit a designated medical practitioner (DMP) to supervise part of the training. It may also be influenced by the perceptions that the people who may be in overall charge of implementation have with respect to supplementary prescribing.

During the consultation process for SP [6], many issues and risks with the proposed SP model were raised with the Department of Health [7]. Although some of these envisaged problems were dealt with as part of the consultation process, some negative perceptions and issues that were raised may have had an impact on health care professional's perceptions of SP.

Although SP is currently the only legal form of pharmacist prescribing in the UK, several reports have identified other pharmacist prescribing roles (NON-SP), such as in pre-admission clinics (to obtain patient medication histories, write their in-patient drug chart and discharge prescription) [8–10], out-patient clinics [11] and discharge management [12–16] which may be taking place without using the SP model. Previous experience of these types of prescribing within a trust may also influence CPs and PCTP's opinions upon how successful SP will be.

The work reported here was part of a larger study of supplementary prescribing, part of which has previously been reported [1].

Only the results of section C of the questionnaire survey will be presented in this paper. In this section of the questionnaire, the respondent's attitude to a number of statements about supplementary prescribing was measured on a five point likert scale.

Aim of the Study

The objectives of this part of the study were to investigate the perceptions of CPs and PCTPs upon the risks and concerns surrounding SP, using a questionnaire survey as the research tool.

Method

Questionnaire development

Construction of the questionnaire was aided by literature review. A list of pharmacists holding important positions in England (policy-making/academic) were also identified, and their suggestions upon key questions that need answering with respect to supplementary prescribing were sought.

Semi-structured interviews were then held individually with a clinical governance lead, a nurse educator on a supplementary prescribing course, a chief executive of a hospital and a clinical governance co-ordinator ($n = 4$) in order to develop a more detailed perspective on the risks and concerns surrounding the development of SP.

All of this data was then used to suggest topics for discussion at a focus group. A more detailed description of the development of the questionnaire has been described previously [1].

One questionnaire was designed for CPs of secondary care acute hospital trusts, and a very similar questionnaire, with minor differences in orientation, was designed for primary care trust pharmacists. The questionnaire was divided into three sections. Section A inquired about general demographic data about themselves and their Trust. Section B inquired about the implementation of SP within their trust and Section C measured the respondent's attitude to a number of statements about SP. A likert scale was used in section C to score the level of agreement to each item on a five point scale. According to convention, the high numbers indicated agreement and the scales were subsequently reversed for negative questions. Confidentiality was maintained by number-coding the questionnaires. A medical statistician advised on data analysis. Ethical permission for the study was obtained from the multicentre research and ethics committee (MREC).

Validation and piloting

In order to assess face validity of the secondary care questionnaire, one CP was observed whilst completing the questionnaire and discussed any ambiguities that arose with the researcher, and another CP completed the questionnaire and posted it back with written comments about any ambiguities. Minor adjustments were then made to the question structure to clarify these ambiguities. Although this process does not constitute full validation, face validity was further assessed in responses to the pilot questionnaire for both primary and secondary care.

In order to validate the primary care questionnaire, one PCTP completed the questionnaire and provided feedback via telephone and the other PCTP completed the questionnaire and provided written feedback.

Reliability of the survey tool cannot easily be tested (test-re-test reliability) as it would produce survey fatigue if re-tested in the same, limited, population.

For section C of the questionnaire, construct validity was used to assess the validity of the scale.

During February and March 2004, the secondary care questionnaire was piloted in 17 randomly selected (via a random number generator) hospitals from the sample ($n = 168$).

At the same time, the primary care questionnaire was piloted in 30 randomly selected (via a random number generator) pharmacists from the sample ($n = 303$). Several amendments were made to the questionnaire after piloting. Some questions were removed in order to reduce the length of the questionnaire and some questions had extra options added or removed from them. Therefore, data collected from the pilot questionnaires were not included in the final analysis.

Main survey

Both questionnaires were distributed in May 2004. The secondary care questionnaire was sent to named CPs within every NHS trust in England providing acute hospital services. Details of the handling of the questionnaire and follow-up have been described previously [1].

Following piloting, a total of 151 hospital pharmacy departments were included in the main study. Eight of these hospitals were removed from the study after it was established that they had merged with another trust or were not an acute trust, leaving 143 hospitals for the study.

For primary care, after piloting, 273 primary care trusts (PCTs) were included in the main study. Two of these trusts were removed from the study after it was established that they were not a primary care trust or did not have a pharmacist employed as a pharmaceutical advisor. This left 271 PCTs eligible for the study.

Data obtained from returned questionnaires were coded and analysed using the Statistical Package for the Social Sciences (SPSS) version 11.

The data was also analysed by region/strategic health authority that the hospital or PCT was from in order to assess whether there were any poor responses from particular regions.

Factor analysis

Factor analysis was used to explore the relationships thought to exist between the items in section C of the questionnaire and to assess the degree to which items were measuring the same concept.

Principal components analysis (PCA) was used as the method of extracting the factors from the item population. The extracted factors were rotated obliquely using the direct oblimin method, interpreted and tested for internal reliability [17].

The significance of the association between the factors themselves and between the factors and responses to certain questions in sections A and B of the questionnaire was assessed using the non-parametric tests chi-squared, Kruskal–Wallis and bivariate correlations (Spearman's rho), where appropriate.

Results

General demographics

Of the 143 hospitals, responses were received from 97 (68% response rate) and for the 271 PCTs, responses were received from 183 (68% response rate).

No particular patterns emerged when assessment of response rate from regions was undertaken.

Validation processes

The frequencies of responses to the survey items in section C were explored during the process of construct validity (Table 1). Construct validity was assessed by considering whether the responses to individual statements are consistent with other similar statements in the questionnaire.

Secondary care The percentage of respondents whom stated that they did intend to implement SP by pharmacists within their trust by the end of 2005, and also agreed/strongly agreed with the statement "Development of SP by pharmacists will be a priority within the trust'' was $n = 21$ (38.1%).

The percentage of respondents whom stated that they did intend to implement SP by nurses within their trust by the end of 2005, and also agreed/strongly agreed with the statement "Development of SP by nurses will be a priority within the trust'' was $n = 28$ (46.6%).

Primary care The percentage of respondents whom stated that they did intend to implement SP by pharmacists within their trust by the end of 2005, and also agreed (no-one strongly agreed) with the statement "Development of SP by pharmacists will be a priority within the trust'' was $n = 39$ (39.0%).

The percentage of respondents whom stated that they did intend to implement SP by nurses within their trust by the end of 2005, and also agreed/strongly agreed with the statement "Development of SP by nurses will be a priority within the trust'' was $n = 85$ (62.0%).

As a result of this process, no statements were removed from the survey at this stage.

Factor analysis

Bartlett's test of sphericity was significant ($P < 0.001$) for both the primary and secondary care questionnaire. Also the Kaiser–Meyer–Olkin (KMO) measure of sampling adequacy was adequate for both questionnaires. This verifies that the majority of items within the survey were sufficiently related to each other to proceed with factor extraction. More than half the items had a correlation coefficient of greater than 0.3, for both questionnaires, suggesting a strong correlation between the items. Six factors were extracted using PCA with an eigenvalue greater than 1 for the secondary care questionnaire, and on review of the scree plot, either three or five factors could be retained. However, after examining both models and advice from a medical statistician, a three factor model was thought to be the most appropriate explanation of the data. This explained 40.5% of the total variance.

For the primary care questionnaire, seven factors were extracted using PCA with an eigenvalue greater than 1. On review of the scree plot and discussion with a medical statistician, three factors were retained, which explained 37.0% of the total variance. The extracted factors were rotated using oblique rotational methods.

For the secondary care questionnaire, item 31 did not load at all on the factors and therefore this item was dropped at this stage. Items 30 and 35 (Table 1) do not load significantly on any factor (significance = factor loading > 0.4), and therefore these two items would be further assessed on the internal consistency of the extracted factors.

For the primary care questionnaire, items 30 and 33 (Table 1) did not load at all on the factors and therefore these questions were dropped at this stage. Item 20 did not load significantly on any factor and therefore this item would be further assessed on the internal consistency of the extracted factors.

Testing the internal consistency of the extracted factors

The internal consistency of items within a factor was ascertained. The reliability coefficient (Cronbach's coefficient alpha) was calculated to indicate the

Table 1 Questionnaire section C statements

Question no.		Statement	Strongly agree no. (%)		Agree no. (%)		Uncertain no. (%)		Disagree no. (%)		Strongly disagree no. (%)	
1°	2°		1°	2°	1°	2°	1°	2°	1°	2°	1°	2°
20	19	There is a risk that SP's may not appreciate the significance of signs and symptoms that the patient declares to them during the consultation	1 (0.5)	2 (2.1)	51 (27.9)	31 (32.3)	28 (15.3)	19 (19.8)	**88 (48.1)**	**37 (38.5)**	15 (8.2)	7 (7.3)
21	20	Multiple prescribers, arising from the introduction of SP, will increase the prevalence of iatrogenic disease	0	2 (2.1)	18 (9.9)	11 (11.3)	51 (28)	**35 (36.1)**	**82 (45.1)**	33 (34)	31 (17)	16 (16.5)
22	21	Amongst other developments being undertaken within the NHS, development of SP by **PHARMACISTS** WILL be a priority within our trust	1 (0.5)	3 (3.1)	48 (26.4)	23 (23.7)	48 (26.4)	24 (24.7)	**64 (35.2)**	**37 (38.5)**	21 (11.5)	7 (7.3)
23	22	Amongst other developments being undertaken within the NHS, development of SP by **NURSES** WILL be a priority within our trust	17 (9.4)	4 (4.1)	**86 (47.5)**	**44 (45.4)**	42 (23.2)	28 (28.9)	34 (18.8)	19 (19.6)	2 (1.1)	2 (2.1)
25	25	Lack of assessment of applied therapeutics in the prescribing area means that the training model for SP is not sufficiently robust	19 (10.6)	10 (10.6)	57 (31.7)	23 (24.5)	**68 (37.8)**	**28 (29.8)**	29 (16.1)	27 (28.7)	7 (3.9)	6 (6.4)
26	26	The paperwork and development of individual clinical management plans will be prohibitive to the development of SP	5 (2.8)	9 (9.5)	55 (31.1)	31 (32.6)	43 (24.3)	17 (17.9)	**70 (39.5)**	**34 (35.8)**	4 (2.3)	4 (4.2)
27	27	The majority of pharmacists in 1°/2° care do not wish to take on the SP role	7 (4)	4 (4.2)	47 (26.7)	24 (25)	**61 (34.7)**	23 (24)	53 (30.1)	**40 (41.7)**	8 (4.5)	5 (5.2)
28	28	Reassessing and maintaining competency of SP pharmacists will limit the uptake of SP	1 (0.6)	1 (1.1)	56 (31.5)	19 (20)	40 (22.5)	26 (27.4)	**78 (43.8)**	**46 (48.4)**	3 (1.7)	3 (3.2)
29	29	The DMP should undergo prescribing training themselves before assessing the prescribing competency of SP trainees	16 (9)	13 (13.8)	**77 (43.3)**	**37 (39.4)**	25 (14)	15 (16)	56 (31.5)	27 (28.7)	4 (2.2)	2 (2.1)
30	31	An employee SP should have their own indemnity insurance, as the trust's vicarious liability may not be sufficient	20 (11.3)	6 (6.3)	**72 (40.7)**	16 (16.7)	50 (28.2)	15 (15.6)	29 (16.4)	**36 (37.5)**	6 (3.4)	23 (24)

Table 1 Continued

Question no.		Statement	Strongly agree no. (%)		Agree no. (%)		Uncertain no. (%)		Disagree no. (%)		Strongly disagree no. (%)	
1°	2°		1°	2°	1°	2°	1°	2°	1°	2°	1°	2°
31	32	Non-SP pharmacists will regard themselves as "second-class citizens" compared to prescribing colleagues	2 (1.1)	1 (1)	13 (7.3)	7 (7.3)	35 (19.1)	17 (17.7)	**104 (58.4)**	**54 (56.3)**	24 (13.5)	17 (17.7)
32	33	The SP role will cause conflict with the pharmacist's role of providing impartial advice to patients upon medicines	2 (1.1)	1 (1)	11 (6.2)	11 (11.5)	27 (15.3)	11 (11.5)	**101 (57.1)**	**50 (52.1)**	36 (20.3)	23 (24)
33	34	In the future, I believe that it will be appropriate for undergraduate pharmacy students to qualify as SP's when they graduate	25 (14)	6 (6.3)	**63 (35.4)**	21 (22.1)	7 (3.8)	11 (11.6)	46 (25.8)	**33 (34.7)**	37 (20.8)	24 (25.3)
34	35	In 1°/2° care, there will be more extensive uptake and use for pharmacists as INDEPENDENT prescribers rather than as supplementary prescribers	47 (26.6)	25 (26)	**76 (42.9)**	**37 (38.5)**	40 (22.6)	20 (20.8)	13 (7.3)	10 (10.4)	1 (0.6)	4 (4.2)
24	–	Currently, poor IT links will limit the development of community pharmacist SPs	**98 (53.6)**		72 (39.3)		4 (2.2)		7 (3.8)		2 (1.1)	
–	23	Insufficient pharmacist resource will be a major limitation to development of pharmacist SP within secondary care		**41 (42.3)**		36 (37.1)		3 (3.1)		12 (12.4)		5 (5.2)
–	24	Lack of 24-h opening of pharmacy departments will be a limitation to development of pharmacist SP		10 (10.8)		23 (24.7)		8 (8.6)		**39 (41.9)**		13 (14)
–	30	Pharmacists who currently transcribe discharge prescriptions should be trained as SP's to continue this role		10 (10.8)		20 (21.5)		10 (10.8)		**40 (43)**		13 (14)

N.B. 1° = primary care, 2° = secondary care
Missing data: primary care $n = 58$, secondary care $n = 17$

strength of the relationship of each item within the factor. The consistency of the factor constructs are presented in Table 2.

Secondary care Assessment of the individual reliability coefficient for each item in the extracted factors suggested that items 22, 32 and 35 needed to be removed from factor 1, items 30 and 32 needed to be removed from factor 2 and item 25 from factor 3 as they adversely affected the internal consistency of the extracted factor.

Primary care Assessment of the individual reliability coefficient for each item in the extracted factors suggested that items 23 and 31 needed to be removed from factor 1, item 21 needed to be removed from factor two and item 20 from factor 3 as they adversely affected the internal consistency of the extracted factor.

Testing the overall reliability of the scale

Item-total correlations were assessed, which compares the scores on individual statements with the total score of the scale. Statements were considered for rejection if their item-total correlation was below 0.2.

Also the overall correlation between items within the scale was measured using the cronbach's alpha score. A reliability coefficient of 0.7 or above is recommended which would imply that 70% of the measured variance is reliable and 30% is owing to random error.

Secondary care The reliability scores as outlined above therefore suggest removing items 30, 31 and 35 from the overall scale. As item 32 was removed from two of the three factors upon internal consistency measurement, the overall cronbach's alpha coefficient was also calculated for the scale minus this item as well. This produced the best overall cronbach alpha for the scale = 0.75, (minus items 30, 31, 32 and 35).

Primary care The reliability scores as outlined above therefore suggest removing items 20, 30 and 33 from the overall scale. However, the best overall cronbach alpha score for the scale is with items 23, 30, 31 and 33 removed from the scale = 0.602. Therefore this overall reliability coefficient score coupled with the poor internal consistency of the extracted factors suggests that this scale is not reliably measuring the attitudes on the scale.

Table 2 Reliability coefficients of the extracted subscales

Factor construct	No. of items		Coefficient	
	Primary care	Secondary care	Primary care	Secondary care
1	5	5	0.519	0.597
2	4	6	0.587	0.694
3	4	3	0.555	0.622

Interpreting the factors

Tables 3 and 4. Display the interpretation of the emergent constructs. The factor analysis process had grouped various statements from the questionnaire that were related to each other into each factor. The items within each of these emergent factors were then reviewed and the concepts underlying them were described and interpreted.

Exploring the factor scores

The distributions of the scores for the extracted factors are summarised in Tables 5 and 6. Spearman's rho was used to explore the relationships between the total scores for the extracted factors. (Table 7). Summarises the relationships between the factors.

Secondary care There was a strong association between factors 1 and 2. Positive attitude towards limitations of the SP training model may be related to a positive attitude that trained supplementary prescribers will not encounter issues that threaten their professional competence or responsibility.

Primary care There was a strong association between factors 1 and 3. The positive attitude that trained supplementary prescribers will not encounter issues that threaten their professional competence or responsibility (Also that issues such as IT provision will not be an obstacle and that independent prescribing will not be more useful.) may be related to a positive attitude towards limitations to the SP training model. (Also that they did not think that multiple prescribers would increase the prevalence of iatrogenic disease.)

Therefore the same strong association was found amongst secondary and primary care.

Exploring relationships between the factors and the respondents

Table 8 presents the relationships between factor scores and relevant questionnaire responses.

Table 3 Interpretation of the emergent factor constructs (secondary care)

Factor 1: Limitations of the SP training model	High scoring respondents were being positive about SP, were willing to put more effort into the development of SP (if necessary) and they thought there would not be many limitations to the SP training model
	Low scoring respondents were being negative about the SP training model, were less likely to put much effort into the development of SP and were agreeing that there were problems with it
Factor 2: Professional competence/responsibility issues once trained	High scoring respondents were being positive about SP and were suggesting that trained supplementary prescribers will not encounter issues that threaten their professional competence or responsibility
	Low scoring respondents were being negative about SP and were suggesting that trained supplementary prescribers would encounter issues that threaten their professional competence or responsibility
Factor 3: How commonly SP will be implemented	High scoring respondents had more will to introduce SP and were suggesting that implementation would be a priority within trusts and that pharmacists in secondary care did want to take on this role
	Low scoring respondents had less will to introduce SP and were suggesting that implementation of SP would NOT be a priority within their trust and that pharmacists did NOT want to take on this role

Secondary care There was a weak to moderate association between factor 1 and the total number of pharmacists employed in the trust. This suggests that as the total number of employed pharmacists increases the respondents had less concerns over the limitations of the SP training model.

There was also a weak to moderate association between factor 1 and the total number of current pharmacist prescribing activities (NON-SP). This suggests that as the trust has more of these prescribing activities being undertaken, there are less concerns over the limitations of the SP training model.

There was also a slightly stronger association between factor 1 and the total number of current nurse SP activities. Suggesting that as trusts have more experience of SP by nurses, the respondents have less concerns over the SP training model.

A relationship was found between factor 1 and the intention to implement pharmacist SP by the end of 2005. Respondents were more likely to state that they were intending to implement SP by pharmacists if they did not have concerns over the SP training model.

A relationship was also found between factor 3 and the intention to implement pharmacist SP by the end of 2005. Respondents were more likely to state that they were intending to implement SP by pharmacists if they thought that implementation of SP was going to be a priority within their trust and that pharmacists wanted to take on this role.

Primary care There was a weak to moderate association between factor 2 and the total number of pharmacists employed in the trust. This suggests that as the total number of employed pharmacists increases the respondents thought that implementation of SP would be a priority within their trust, that pharmacists did want to take on this role and that reassessment and maintaining competency would not be an issue once qualified.

A strong association was found between factor 3 and the total number of current pharmacist prescribing activities (NON-SP). As the number of current pharmacist prescribing activities (NON-SP) increases, the respondents had less concerns over the limitations of the SP training model and professional competency and responsibility issues.

A relationship was found between factor 2 and the intention to implement pharmacist SP by the end of 2005. Respondents were more likely to state that they were intending to implement SP by pharmacists if they thought that implementation of SP was going to be a priority within their trust, and that pharmacists did want to take this role on. Also that reassessment of the trained supplementary prescriber and maintenance of competency would not be an issue.

A relationship was found between factor 1 and the intention to implement or train more nurses as supplementary prescribers within your trust by the end of 2005. Respondents were more likely to state that they were intending to implement SP by nurses if they thought that supplementary prescribers would not encounter issues that threaten their professional competency or responsibility once qualified. They would also not consider that IT provision would be a problem or that independent prescribing would be more useful than SP.

A relationship was also found between factor 2 and whether pharmacists currently undertake "prescribing-type activities" (NON-SP) in any format within the trust. Respondents who answered yes to this question were more likely to think that implementation of SP would be a priority within the trust and that pharmacists did want to take this role on. Also that reassessment of the trained supplementary prescriber and maintenance of competency would not be an issue.

Discussion

Comments upon individual items in the scale

For question 19 (secondary care)/20 (primary care) (Table 1), the majority of primary and secondary care disagreed with this statement. Open comments were

Table 4 Interpretation of the emergent factor constructs (primary care)

Factor 1: Professional competence/responsibility issues once trained plus limitations to uptake of SP	High scoring respondents were being positive about SP suggesting that trained supplementary prescribers will not encounter issues that threaten their professional competence or responsibility. Also that issues such as IT provision will not be an obstacle and that IP will not be more useful Low scoring respondents were being negative about SP and were suggesting that trained supplementary prescribers would encounter issues that threaten their professional competence or responsibility They also thought that IT provision would affect implementation of SP and that IP would be of more use
Factor 2: How commonly SP will be implemented plus limitations to uptake of SP	High scoring respondents had more will to introduce SP and were suggesting that implementation would be a priority within trusts and that pharmacists in secondary care did want to take on this role. Also that reassessment and maintaining competency once qualified was not an issue Low scoring respondents had less will to introduce SP and were suggesting that implementation of SP would NOT be a priority within their trust and that pharmacists did NOT want to take on this role. Also that reassessment and maintaining competency once qualified was an issue
Factor 3: Limitations of the SP training model plus professional competence/responsibility issues once trained	High scoring respondents were being positive about SP, were willing to put more effort into the development of SP (if necessary) and that they thought there would not be many limitations to the SP training model They also did not think that multiple prescribers would increase the prevalence of iatrogenic disease Low scoring respondents were being negative about the SP training model, were less likely to put much effort into the development of SP and agreed that there were problems with the SP training model They also thought that multiple prescribers would increase the prevalence of iatrogenic disease

Table 5 Distribution of scores (secondary care)

Factor 1: Limitations of the SP training model	Normal distribution of scores The tendency towards lower scores indicates that the respondents agreed that there were limitations to the SP training model	Mean scale score: −1.73, std. deviation: 3.42, median scale score: −2.00, minimum score: −8.00, maximum score: 10.00
Factor 2: Professional competence/ responsibility issues once trained	Normal distribution of scores The small tendency towards lower scores indicates that respondents agreed that there were professional competency/ responsibility issues post qualification	Mean scale score: 0.86, std. deviation: 4.09, median scale score: 1.00, minimum score: −7.00, maximum score: 11.00
Factor 3: How commonly SP will be implemented	Skewed distribution of scores The higher proportion of high scores indicates that respondents were positive about the implementation of SP, that it would be a priority of trusts and that pharmacists wanted to take the role on	Mean scale score: 0.22, std. deviation: 2.23, median scale score: 0.00, minimum score: −6.00, maximum score: 6.00

made that there is a risk for ANY prescriber that they will not appreciate the signs and symptoms being declared to them by the patient. Also, clinical governance should help to prevent this sort of problem occurring, thorough maintenance of competency from on-going continuing professional development and audit.

For question 20 (secondary care)/21 (primary care), several open comments were made. As long as good communication between prescribers was maintained then this should reduce the risk of iatrogenic disease. Good communication should be improved when level 3 electronic prescribing is implemented [18]. Comments were also made that this may be more applicable to nurse supplementary prescribers, especially those who prescribe in a very narrow, specialist area, who may not be aware of the impact that their drug initiation may have on concurrent conditions that the patient may have. For pharmacists, this may not be such an

Table 6 Distribution of scores (primary care)

Factor 1: Professional competence/responsibility issues once trained plus limitations to uptake of SP	Skewed distribution of scores The higher proportion of lower scores indicates that respondents were being more negative about SP and were suggesting that trained supplementary prescribers would encounter issues that threaten their professional competence or responsibility and that IT provision would affect implementation of SP and that IP would be of more use	Mean scale score: −0.58, std. deviation: 2.54, median scale score: −1.00, minimum score: −7.00, maximum score: 6.00
Factor 2: How commonly SP will be implemented plus limitations to uptake of SP	Skewed distribution of scores The higher proportion of high scores indicates that respondents were positive about the implementation of SP, that it would be a priority of trusts and that pharmacists wanted to take the role on. Reassessment and competency maintenance were not viewed as being an issue once qualified	Mean scale score: 0.29, std. deviation: 2.55, median scale score: 0.00, minimum score: −6.00, maximum score: 6.00
Factor 3: Limitations of the SP training model plus professional competence/ responsibility issues once trained	Skewed distribution of scores The higher proportion of lower scores indicates that respondents were being more negative about the SP training model and were agreeing that there were problems with it They also thought that multiple prescribers would increase the prevalence of iatrogenic disease	Mean scale score: 0.21, std. deviation: 2.55, median scale score: 0.00, minimum score: −6.00, maximum score: 7.00

issue due to their broad knowledge of pharmacotherapeutics.

For question 25 (for both primary and secondary care), there were some comments made that they would agree that the lack of assessment of applied therapeutics in the prescribing area *for nurses* (not pharmacists) meant that the SP model was not robust. Certainly, the descriptive research regarding the pharmacological knowledge base of community nurses has consistently suggested that they may have knowledge deficits [19–21]. It will therefore be very important, in terms of risk management, to ensure that the principles of clinical governance are adhered to. Trusts need to ensure that they have an accountable and safe system in place, with formalised support for their non-medical prescribers, to ensure that patient safety is maintained. Undoubtedly, pharmacists will have a major part in the development of such a system.

However, the people answering this question and making these comments were pharmacists, so there could have also been some professional bias in their responses and comments.

Initial evaluation of the SP training for pharmacists suggests that the trainees would prefer there to be more training in physical examination and consultation skills within the courses investigated, and less basic pharmacology and pharmacokinetics [22]. Although the participants in this study tended to be experienced senior clinical pharmacists, who would be expected to have a good knowledge of basic pharmacology and pharmacokinetics, it does suggest that the requirements of nurses and pharmacists are very different in terms of training needs to become supplementary prescribers. It would therefore seem appropriate for profession specific courses to be utilised rather than generic supplementary prescribing courses.

Table 7 Correlations between the factors

	Correlation coefficient rho ($n = 169$–174 primary care) ($n = 88$–92 secondary care) (P value) Percentage variance explained			
	Factor 1		Factor 2	
	Primary care	Secondary care	Primary care	Secondary care
Factor 2	0.309 ($P = 0.000$) 9.5%	0.511 ($P = 0.000$) 26.1%		
Factor 3	0.415 ($P = 0.000$) 17.2%	No significant relationship	0.173 ($P = 0.024$) 3%	No significant relationship

Table 8 Correlations between the factor scores and respondents

Spearman's rho	Correlation coefficient rho (*P* value) Percentage variance explained *n*					
	Factor 1		Factor 2		Factor 3	
	Primary care	Secondary care	Primary care	Secondary care	Primary care	Secondary care
Total number of WTE pharmacists employed by trust	No significant results	0.303 (*P* = 0.008) 9.2% 76	0.267 (*P* = 0.000) 7.1% 170	No significant results	No significant results	No significant results
Total number of current pharmacist prescribing activities (NON-SP)	No significant results	0.300 (*P* = 0.021) 9.0% 59	No significant results	No significant results	0.441 (*P* = 0.008) 19.4% 35	No significant results
Total number of current nurse prescribing activities (SP)	No significant results	0.359 (*P* = 0.011) 12.9% 49	No significant results	No significant results	No significant results	No significant results
	Chi squared (P value) Df					
	Highest mean ranking (yes answer) *n*					
Kruskal Wallis	Factor 1		Factor 2		Factor 3	
	Primary care	Secondary care	Primary care	Secondary care	Primary care	Secondary care
Intention to implement pharmacist SP by end of 2005	No significant results	20.523 (*P* = 0.000) 3 57.75 92	12.224 (*P* = 0.007) 3 96.95 172	No significant results	No significant results	14.128 (*P* = 0.003) 3 55.92 96
Intention to implement/train more nurse SP's by end of 2005?	9.659 (*P* = 0.022) 2 126.88 (No answer) 174	No significant results	No significant results	No significant results	No significant results	No significant results
Do pharmacists undertake "prescribing-type activities" (NON-SP) in your trust?	No significant results	No significant results	8.913 (*P* = 0.012) 2 106.64 173	No significant results	No significant results	No significant results

Although pharmacists do have a standardisation of their original basic qualification, like nurses, there is no form of competency assessment once qualified to formerly differentiate the skills and expertise for example, of a senior clinical pharmacist from an aseptic production pharmacist. Antoniou et al. have been working on the development of a competency framework for pharmacists within secondary and primary care that will, if taken on by the profession, help to eradicate this issue [23]. If the standardised competency framework was tied in with the requirements for pharmacist supplementary prescribers, it will make the prescribing role a safer one for both the prescriber and the patient, and would tackle some of the concerns about lack of therapeutics assessment within the SP training. Similar requirements would of course, be necessary for nurse supplementary prescribers.

Although it was most common for primary and secondary care respondents to agree with the question 29, (for both primary and secondary care) that DMPs ought to undertake prescribing training themselves before assessing the prescribing competency of other health care professionals, there were comments made that this, however, would not happen, and that if it were a requirement, there would be even less medical practitioners willing to take on the DMP role. However, it has been suggested that in the future, ALL health-care professionals who are going to prescribe ought to pass a "prescribing exam'' before they start prescribing. (Personal communications, Professor Judy Cantrill, BPC 2003) This would seem to be a fair approach, and would help to avoid the situation described at a hospital in the Wirral where pre-registration house officers are not allowed to prescribe for their first 6 weeks of practice without close supervision [24]. It would also avoid the perception of increased medication prescribing errors being made when newly qualified doctors start prescribing as well as reduce opportunity for litigation.

Question 33/32 (secondary care/primary care) upon conflict within the pharmacist's role with respect to being a prescriber and providing impartial advice to the public, was included after it had been suggested that this might be an issue for pharmacists especially in community pharmacies where it may not be possible to separate the prescribing and dispensing roles. However, the majority of respondents in primary and secondary care disagreed with this statement, and comments were made that the pharmacist's professional and ethical duties would prevent this from happening.

Question 34/33 (secondary/primary care) suggested that undergraduate pharmacy students should qualify as supplementary prescribers upon graduation. The majority of secondary care respondents disagreed with this statement whereas primary care respondents mainly agreed with it. For those who disagreed with this statement, the comments suggest that it was thought to be appropriate to teach the principles and theory of SP at undergraduate level, but that there was a period of practice as a pharmacist required before becoming a qualified supplementary prescriber. However, it seems that the intentions of the Department of Health are to consolidate all of the SP training into the undergraduate course over the next few years, so that they will qualify upon graduation [25]. It is possible that primary care has less concerns about pharmacy graduates attaining the SP qualification upon graduation, as newly qualified pharmacists in primary care have much more autonomy upon qualification, and often manage their own pharmacies.

Both primary and secondary care respondents agreed to question 35/34 (secondary/primary care) upon whether independent prescribing would be more useful than SP. For secondary care respondents, this may reflect that SP is for chronic disease management and therefore the SP model does not suit secondary care very well because it manages acute illness.

Primary care respondents also agreed with the statement, which may reflect that for community pharmacists, independent prescribing may be more suitable and fit in with the majority of their premises not being located within GP surgeries. It would be especially suitable for their role in dealing with minor ailments and minor injuries. It was commented that for practice pharmacists, dealing with chronic conditions, that SP would be the prescribing model of choice.

Factor scores

The distribution of scores for the three factors in primary and secondary care illustrate that both sectors have a tendency towards negativity about the SP training model. For secondary care, the concerns were around the paperwork and the clinical management plan that needs to be developed, how reassessment of on-going competency of the supplementary prescriber will take place, the suitability of the DMP to supervise the training and about undergraduate pharmacy students qualifying as supplementary prescribers upon graduation. For primary care, they had the same concerns over the paperwork involved and the suitability of the DMP to supervise, but also had concerns over the lack of clinical assessment in the SP training and the risk of increased prevalence of iatrogenic disease due to poor communication between prescribers.

Both sectors also have concerns about professional competence/responsibility once that pharmacists and nurses qualify as supplementary prescribers. For secondary care the concerns were around the risk of increased prevalence of iatrogenic disease due to poor communication between prescribers, the conflict that

arises with the pharmacist's role of provision of impartial advice to patient's about medicines, the lack of clinical assessment in the SP training and supplementary prescribers not understanding the significance of symptoms that are declared to them during the consultation. For primary care, they had the same concerns about impartial advice provision, increased prevalence of iatrogenic disease but also had concerns about how reassessment of on-going competency of the supplementary prescriber will take place, the obstacles that poor information technology provision will bring, and that independent prescribing will be more useful.

However, both sectors are positive about the implementation of SP, and believe that pharmacists wish to take this role on. People who scored highly on factor 1 (secondary care) or factor 3 (primary care) either did not perceive SP to require much effort on their part, or, if they did, that the effort was worth it.

Therefore it would appear that although the profession has concerns about the training model and competency of supplementary prescribers once qualified, there is an understanding of the importance of this development, and that it needs to be taken forward within the constraints presented.

A small survey of community pharmacist's views upon supplementary prescribing would seem to support this finding of positivity about the implementation of SP. The survey found that a large majority wanted to become supplementary prescribers although only a few of them were currently in training for the role and that SP was being viewed very positively in terms of increased use of clinical knowledge, job satisfaction, responsibility and patient benefit [26].

Exploring relationships between the factors and the respondents

The results suggest that as respondent's had more experience of non-medical prescribing within their trust (such as pharmacists writing discharge prescriptions) they were less likely to have concerns over the SP training model. Therefore the concerns that respondents had about training may not turn out to be an issue in practice.

Reflection on findings in an international context

On the basis of the UK experience, consideration should be given to the introduction of prescribing into the education programmes of pharmacists at an early stage if the SP model is to be developed in other countries. Where specialisation exists, for example the hospital pharmacy specialisation programmes in France and Spain, training in prescribing in secondary care could be included relatively easily. This issue should be discussed on a wider level, and perhaps European initiatives such as the Bologna Agreement could be used as a means of introducing prescribing practice into the undergraduate pharmacy curriculum.

Critique of method

A critique of the method with regards to the full questionnaire has been reported previously [1], therefore this critique will focus upon section C alone.

It was noted that some respondents commented in the open comments section of the questionnaire that if the questions in section C were dealt separately with nurses and pharmacists, they would have answered the questions slightly differently.

There were also some comments made that in some of the questions in section C, the term "primary care" was used, which can be misunderstood as just meaning PCT pharmacists. It is only recently that PCT pharmacists have been more often recognised as being their own specialist sector, separate from community pharmacy. Therefore the term "primary care" should no longer be used as a general term to collectively describe PCT pharmacists and community pharmacists, without further definition.

Respondents also commented that they would like to be able to make open comments to explain their answers to each item in section C. Some respondents did this anyway, where they felt they needed to qualify their answer. Although this is useful, it is also not usual for attitude scales to allow extra space for explanation of their response. Also, the longer a questionnaire survey is, the more negative impact it will have on the response rate. However, the comments were taken note of, and are referred to in the discussion of the results.

Construct validity did not work as well as expected. On reflection, the questions used for this validity test, were probably not as closely related as they should have been. Even if CPs or PCTPs intended to implement SP, this does not necessarily mean that it would also be a priority within the trust. The two statements that were explored to assess construct validity only address one aspect of construct validity for this issue and do not prove anything with regard to the other statements that were included in the questionnaire. Extensive assessment of construct validity is not achievable when assessing such a narrow frame of questions. Therefore further questions should have been put into section C which correlated more closely with questions in section B, in order to test construct validity more effectively.

Representation of PCTs from a pharmaceutical adviser in the focus group and in the semi-structured interviews would have helped to improve the overall reliability of the scale for the primary care questionnaire.

The attitude scale for secondary care did produce a statistically valid cronbach's alpha value for the overall scale, however, none of the cronbach's alpha values for the extracted factors demonstrated a high level of internal consistency (as recognised in standard textbooks of what constitutes a reasonable level of consistency, reliability coefficient >0.7) (Table 2). This would suggest that some caution is needed when interpreting the meaning of the factors and their associations.

Unfortunately the scale for section C for primary care did not produce an overall high level of internal consistency (cronbach's alpha value), and neither did the individual extracted factors (Table 2). This suggests that the scale is not measuring what it was intended to for primary care. Since an almost identical scale for secondary care did have an overall high level of internal consistency (cronbach's alpha value), (and therefore was measuring what was intended reliably) it suggests that the scale items needed further development to make them more suitable for primary care. The poor cronbach's alpha values for the extracted factors were apparent in terms of developing an overall meaning for the factor (Panel 2). Some of the individual items did not "fit into'' the group as well as other items.

An original assumption was made that PCT advisers were a homogenous group, and it is apparent that this is not the case, as they may have very different pharmacy backgrounds, have very different job roles and influence within their PCT. Also, the respondents were not all entitled pharmaceutical advisers, so may have had roles with very different focuses within the PCT. Different PCTs will also have different healthcare provision pressures upon them, which will be affected by whether they look after a rural or urban population. Also, if there is a large proportion of dispensing doctors within a PCT, this may have a negative effect upon the development of pharmacist SP due to there being a previous history of disagreement between the two professions upon the need for separation of prescribing and dispensing.

Although the scale does not have a high level of internal consistency in terms of the cronbach's alpha value achieved, the results can be used to provide some insight into the views of PCTPs upon the risks and issues surrounding SP in primary care, and to also highlight differences in those views between primary and secondary care.

Conclusion

It would appear that although the department of health may feel that the training model and patient safeguards that have been put into place are sufficient, there are still concerns within both primary and secondary care about the SP model (such as the lack of clinical assessment during training) and also professional competence and responsibility once trainees qualify. It is apparent that in order for SP to be a safe system for patients, pharmacists will have a central role in the development process in terms of risk management and the safe use of medicines. The department of health may need to provide more support for this role, showcase examples of good practice, and support research into the role in order to provide an evidence-base that SP is providing patients with at least an equivalent service to doctors, and is also increasing access to healthcare for patients, without compromising safety. Only then will SP be more extensively implemented.

Although CPs and PCTPs have these concerns, overall there is a positive attitude towards SP and there is a belief that pharmacists wish to take this role on.

Further work needs to be undertaken to further develop a survey tool to evaluate views of PCTP upon the risks and issues of SP more effectively.

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