

Clinical Pharmacy Practice: Implications for Pharmacy Education in Belgium

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Belgian hospital pharmacy practice is in a process of transition, with the clinical role of the pharmacist being progressively developed. Knowledge and skills specific to clinical pharmacy (CP) will be required in the future. The objectives of the study were to identify the scope of CP practice and the education and training needs in Belgian hospitals. A questionnaire design was used. Academic members and hospital pharmacists from four Belgian universities took part in the survey ($n = 16$, 76% response rate). The main outcome measures were: definition of CP; scope of current practice and plans for the future; driving forces and barriers; education and training needs; perceived level of knowledge and skills in CP. Results show that changes in curriculum are required to better prepare Belgian hospital pharmacists to their clinical role. Educational strategies developing the pharmacists' patient-focused approach in CP practice are needed.

Keywords: Belgium; Clinical pharmacy; Pharmacy curriculum; Questionnaire

INTRODUCTION

Background

In many countries, hospital pharmacy has moved away from its traditional role of procurement and supply of drugs to a more proactive role involving patient care (Leufkens *et al.*, 1997). This is not fully applicable to pharmacy practice in Belgium. The main duties for hospital pharmacists in Belgium are the preparation and distribution of drugs. Limited time, if any, is spent on clinical tasks. The lack of

manpower and the lack of clinical competence are the main reasons for this.

Pharmacy education in Belgium is taught as a product-oriented profession with a focus on the basic sciences. This contrasts with the United States and the United Kingdom, where pharmacy has a focus on basic sciences, but there is also an emphasis on the clinical and patient-oriented aspects of the profession. Similarly to other European countries, the changing role of pharmacists in the health care system is impacting on clinical pharmacy (CP) practice and education, and changes are being introduced (World Health Organisation, 1989 and 1997). The aim of this study was to identify the scope of CP practice and the education and training needs in Belgian hospitals.

Objectives

1. To describe the respondents' definition of CP and views on areas of CP practice.
2. To identify the scope of current practice of CP and the plans for the future.
3. To identify the driving forces and barriers to the development of clinical pharmacy services (CPSs).
4. To identify the education and training needs in CP in Belgian hospitals.
5. To assess the level of knowledge and skills of hospital pharmacists in CP.
6. To identify gaps in undergraduate and post-graduate pharmacy education.

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METHODS

Tools and Techniques

Training needs identification (TNI) is the process required to detect and specify training needs at individual or organisational levels. Previous studies undertaken in other countries used qualitative and/or quantitative methods. The methods are selected according to the course involved, the category of needs to be identified, and the sample chosen. Ideally, in order to maximise validity and reliability, the sample defining needs should be multi-disciplinary, and a variety of instrumentation should be used (Cyrs, 1978). Our search of the literature did not identify previous work in the area of TNI in CP in Belgium. Consequently, a qualitative approach was adopted.

Setting and Conduct

The study was conducted in four Belgian teaching hospitals. The bed-capacity of each hospital ranged from 635 to 1000 beds. The pharmacy department of each hospital employed pharmacists, pharmacy technicians and administrators. The number of pharmacists per hospital-bed ranged from 1:71 to 1:171.

A purposive sample made up of eight hospital pharmacists, four chief pharmacists and four academics (four individuals from each hospital, $n = 16$) was selected. Unstructured interviews with the chief pharmacists were conducted, in order to support the instrument design process. Chief pharmacists and academics will hereafter be referred to as "managers".

The TNI questionnaires designed by the London Pharmacy Education and Training Group (2001), and other published TNI questionnaires were reviewed (Smith *et al.*, 1990; Parish *et al.*, 1993; Quinones and Mason, 1994).

The questionnaire examined the following areas:

- (1) Open questions to address: the understanding of the concept of CP; the perceived driving forces and barriers to the development of CPSs; the future plans for the development of CPSs; the perceived additional knowledge and skills required by hospital pharmacists for CP practice.
- (2) Closed questions to identify the current practice of 12 specific areas of CP practice (one option was designated as "other" with space provided for further answers). These areas were identified from national surveys of CP practice (Cotter *et al.*, 1994; European Association of Hospital Pharmacy, 1996; Tenni and Hughes, 1996; Wilson *et al.*, 2000; Raehl and Bond, 2000).

- (3) Closed questions to identify the perceived levels of knowledge and skills of hospital pharmacists in CP. All items were rated on a 6-point anchored scale. Hospital pharmacists were asked to rate their current levels, while managers were asked to rate pharmacists' levels upon graduation. The 14 "knowledge and skills" items were identified from international guidelines (ESCP and UKCPA, 1988; ACCP, 1992; Society of Hospital Pharmacists of Australia, 1993; WHO, 1994 and 1997). The strategy was to include the most important knowledge and skills required by clinical pharmacists, but to limit the number to a level that would encourage a good response rate. Ten non-Belgian clinical pharmacists selected the 14 most relevant items (seven knowledge items and seven skill items) from a list of 24 items.
- (4) Questions to elicit the opinions of managers on the future development of CP.
- (5) Demographic questions such as year of graduation, qualifications, experience, job description, e-mail address and telephone number.

A glossary with definitions of terms specific to CP was also provided.

Pilot Phase

Six hospital pharmacists and pharmacy managers, from Belgium and the UK, piloted the instrument. The answers and comments were used to improve the targeting of relevant issues. A double-way translation ensured the validity of the translation of the English questionnaire into French.

The questionnaires were mailed to each chief pharmacist, who were then asked to distribute the questionnaires to the relevant respondents. Cover letters and return addressed, postage-paid envelopes were included. The cover letter explained the purpose of the survey and assured the respondents of confidentiality. A postal reminder was sent to non-respondents two weeks after the initial mailing. A further follow up telephone call was given one more week later. After receiving the completed questionnaires, follow-up calls were given to clarify ambiguous answers, and to check for internal reliability of answers to closed questions.

Data Analysis

Information from the returned questionnaires was entered into Excel for subsequent analysis. Responses to open questions were grouped by themes for the development of appropriate coding frames. Another researcher repeated the coding process, to ensure its reliability. The data relative

to both open and closed questions were analysed using descriptive statistics. Knowledge and skill ratings on the 6-point anchored scale were collapsed into three categories: "very poor" and "poor" (scores 1 and 2) renamed as "poor", "fair" (score 3), "good" and "very good" (scores 4 and 5) renamed as "good". "Excellent" ratings were treated as exceptions. "Not applicable" responses were treated as missing data in order to prevent an artefact in the data set. The results were compared between topic areas, hospital sites, categories of respondent, and years of experience of pharmacists.

RESULTS

Sample Characteristics

Seven hospital pharmacists and six managers (chief pharmacists and academics) from three university teaching hospitals returned the questionnaire (76% response rate). No questionnaires were returned from the fourth teaching hospital. Table I summarises the demographic data of the respondents. One pharmacist had a PhD degree; another pharmacist had done a two-week training in CP in Switzerland.

Concept of CP

Ninety-two percent of all the respondents ($n = 13$) agreed that CP was the practice of pharmacy with a focus on the patient. A 50% added that CP involved some teamwork with other health care professionals (HCPs). More than half the respondents believed that CP aimed to promote rational prescribing (67%) and aimed to improve the safety of drug use (58%). A 25% added that CP also intended to improve the cost-effectiveness of drug use.

TABLE I Demographic features of respondents

Position	n	Characteristics
<i>Managers</i>		
Chief pharmacists	3	Male 3 Female 0 Involved in teaching 3
Academics	3	Male 3 Female 0 Working in the hospital 1
<i>Hospital pharmacists</i>		
	7	Male 1 Female 6 Years of experience: <6 years 2 6-10 years 0 >10 years 5 PhD 1

Current Practice of CP in Belgium

Table II summarises which services were provided by the pharmacy department of each hospital. Not all services were routinely delivered. Limited patient-specific services were provided at all three teaching hospitals.

Driving Forces and Barriers

Driving Forces

Seven factors that may positively impact on the development of CPSs were identified, as shown in Table III. These driving forces were grouped into three main categories: health policy level, practice site level and faculty level. One chief pharmacist emphasised that:

"Past attempts to implement CPSs failed because both the hospital and faculty environment were not favourable to it. However I am convinced that recent and impending changes will play a major role in the development of CP in Belgium in the next future." (Chief pharmacist 2.1)

Barriers

The perceived barriers to the development of CPSs were linked to the hospital, the pharmacy or the faculty. The results are shown in Table III.

TABLE II Clinical pharmacy services currently provided

Services	Teaching hospital		
	1	2	3
<i>General services*</i>			
Participating on drug and therapeutic committee	+	+	+
Development of therapeutic guidelines and protocols	+	+	+
Participating in decisions for updating the formulary	+	+	+
DUE and DUR	- [†]	+	+
Providing support for clinical trials	+	+	+
Operating an ADR monitoring scheme	+	+	+
<i>Information and education services*</i>			
Providing medicine information to HCPs	+	+	+
Educational sessions for HCPs	- [†]	+	+
<i>Patient-specific services*</i>			
Monitoring drug therapy for inpatients	-	- [‡]	- [‡]
Participating in medical ward rounds	-	-	- [‡]
Therapeutic drug monitoring	-	-	-
Counselling patients about their medication	-	-	-
<i>Other services</i>	+	-	-

ADR, adverse drug reaction; DUE, drug use evaluation; DUR, drug use review; HCP, health care professional. *Distinction in the types of services as described by Barber (1996). [†]Services that used to be provided but that were stopped because of lack of personnel. [‡]Three respondents answered "yes". On questioning, it appeared that there was some degree of monitoring for oncologic patients (doses and combinations prescribed) when the cytotoxic regimens were prepared in the pharmacy. [§]Pharmacists at hospital 3 had been on the wards on a few occasions but this had been temporarily stopped because of difficulties encountered.

TABLE III Perceived driving forces and barriers for the development of clinical pharmacy services in Belgium

	Respondents (%) (n = 13)
<i>Driving forces</i>	
Health policy	
Will to improve quality of drug use	54
Will to decrease ADEs	38
Shift in drug financing policy	46
Reduction in the number of doctors	46
Practice site	
Lack of nurses	31
Computerised prescribing	54
Faculty	
Change in education and training	31
<i>Barriers</i>	
Hospital	
Acceptance from HCPs	46
Poor collaboration with HCPs	15
Pharmacy	
Lack of funding	46
Manpower/time	69
Faculty	
Lack of training	62
Poor collaboration hospital-faculty	31

ADE, adverse drug event; HCP, health care professional.

Training Needs Identification

Pharmacists and managers identified various knowledge and skill items required for CP practice. The top four needs identified in terms of knowledge were disease state (62%), therapeutics (46%), pharmacokinetics and drugs (38% each). With regard to the need for additional skills, communication skills were by far the most frequently identified item (62%), followed by problem-solving and critical appraisal skills (38%). Finally, the need for more practical training was mentioned by almost half the respondents (46%).

There was a major difference in the *number* of education and training needs identified by pharmacists from different hospital sites. The two pharmacists from hospital three identified twice and three times as many items as the pharmacists from the two other hospitals.

Perceived Level of Knowledge and Skills in CP

Knowledge and skills of pharmacists were most frequently rated as being fair (46%) or poor (45%), but only a small proportion rated them as good (9%). One manager did not answer the question. From the 6-point anchored scale in the questionnaire, "very good" or "excellent" ratings were never selected. As a group, the managers rated pharmacists' knowledge and skills lower than the pharmacists did.

Figure 1 illustrates the perceived level of knowledge of pharmacists in specific areas of CP. With regard to skills, 29% of all the items were selected as "not applicable", because the tasks had never been performed by the pharmacists.

Pharmacists were well or fairly skilled at providing medicines information service (MIS) and at conducting drug use evaluation (DUE) and drug use review (DUR). In contrast, the two areas where pharmacists were less skilled, were drug history taking and laboratory data interpretation. Two other areas where pharmacists and managers agreed that pharmacists were fairly or poorly skilled at, were the application of therapeutics and the discussion of a patient's treatment with HCPs.

Subgroup analyses showed that there was a trend towards higher ratings at hospital 1 and lower ratings at hospital 3 (29 and 4% of "good" ratings, respectively). More experienced pharmacists rated their knowledge and skills as higher than less experienced pharmacists. However, the percentage of "poor" ratings was similar in both groups (47 and 52%).

Future Plans in CP Practice and Education

Although planning strategies varied between hospitals, CP services to be developed in the near future commonly included ward pharmacy, medicine information and drug use reviews. Commenting on a CP course, managers agreed that basic elements of CP, such as pharmacotherapy, should be first taught at the undergraduate level. In addition, they all

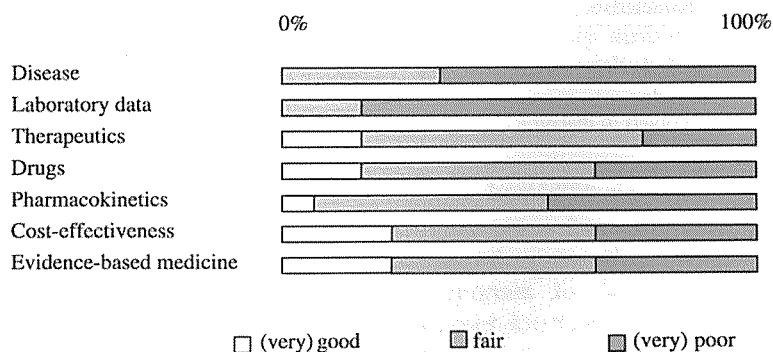


FIGURE 1 Perceived level of knowledge of Belgian hospital pharmacists in areas of clinical pharmacy (% of respondents).

emphasised that a postgraduate course in CP was needed in order for pharmacists to acquire knowledge and skills specific to CP practice.

DISCUSSION

Study Limitations

The sample was small and not representative of all Belgian hospitals. However, teaching hospitals were chosen because they were expected to be the most advanced hospitals in terms of CPSs development, in contrast with non-teaching hospitals. The results therefore cannot be generalised to non-teaching hospitals. Due to the selection procedure, the sample contained a majority of pharmacists (5/7) with more than ten years experience. As a result, discrepancies related to professional experience and educational background may have biased the results. To avoid this, we could have surveyed newly graduated hospital pharmacists, as Parish *et al.* (1993) did in their identification of areas of weaknesses in the curriculum. However, these pharmacists may never have been involved in CP practice, and consequently may not have been able to reflect on CP practice and TNs.

Finally, perception is only an indirect measure of the real variable, i.e. knowledge and skills, and is subject to bias. However, given the purpose of this exploratory study, using the most experienced cohort of pharmacists in settings most likely to be involved in CPSs, can be justified.

Concept of CP

More than 50% of the respondents mentioned the impact of CP on the efficacy and safety of drug use. This issue is not specific to Belgium, as ensuring better treatment and safer medicines is a universal health issue. Respondents seemed to be less aware of the positive impact of CPSs on cost, and the same was reported in the United States when CP first developed (Borgsdorf *et al.*, 1973).

CP Practice

Patient-specific services were limited. A pilot project (ward pharmacy) at hospital 3 had been stopped because the pharmacists lacked the clinical knowledge and skills to perform this task. This incident reflects the need for education and training in patient-focused areas of CP, even though other factors may have contributed to the decision to stop the pilot project (such as lack of time and planning). Other unsuccessful attempts of CPSs mentioned may also have been due to a lack of planning. At the time of the survey, two hospitals had started to develop

a strategy for the development of CP in the future. It is crucial that strategic planning is carefully considered by all in the future, because it can substantially enhance the success of CPSs in hospitals (Kelly and Seaver, 1981). Basic principles of planning include: (1) The importance of national and local needs and priorities; (2) The targeting of CP practice in view of the needs and potential impact; (3) The identification of opportunities at the practice site (Kelly and Seaver, 1981).

Driving Forces

In addition to universal driving forces, such as the will to improve the quality of drug use and the introduction of new technology, changes very specific to Belgian healthcare were emphasised. Firstly, drug financing in hospitals will soon shift from a retrospective and fee-for-service system towards a prospective system in which funds are allocated by disease states. The same measure was implemented in Australia (Doecke, 1992). This is expected to impact on the development of DUEs and DURs, and formulary decisions (personal communication). Secondly, in consequence to a recent *numerus clausus* in the number of doctors who would have access to accreditation for practice, there will be a reduction in the number of doctors in the near future. This measure is expected to encourage the development of ward pharmacy in the future.

Barriers

The time and workforce issue was a real concern and appears to be a universal problem (Bond *et al.*, 1995). There is a need to increase manpower in the pharmacy departments of Belgian hospitals (the current ratio of pharmacist:number of hospital beds is 1:150). Additional measures that could be taken to address this issue include: more responsibilities for pharmacy technicians; development of hospital information system; collaboration between HCPs to target CPSs to those who most need them and could benefit from them (Cotter and McKee, 1997).

Education and Training Needs

The findings, in response to both open and closed questions, suggest that there is a gap between the level of knowledge and skills currently possessed by pharmacists, and the level they will need to attain to competently perform their new role. Many of the gaps identified are similar to those reported in other countries (Carlin, 1968; Clarck and Golberg, 1980; 1992; Heide, 2000). An analysis of pharmacy curricula in Belgian universities reinforces this finding. Firstly, the time spent on CP teaching at undergraduate and postgraduate levels is very low

(around 10%). Secondly, pharmacy students in Belgium are educated thoroughly about what medicines are and how they act, but less about the context in which they are used. This explains the need for additional knowledge in disease states, investigations and therapeutics. Thirdly, gaps in various skills such as problem-solving and critical thinking may be linked to the fact that no or limited time was allocated to CP training in all three universities. In addition, the limited collaboration of hospital pharmacists with HCPs and patients can explain the gap in communication skills.

The curricula analysis nevertheless shows that recent changes in undergraduate and postgraduate curricula are being planned or recently introduced in some universities (for example modules in pharmacotherapy, rational drug use, ward pharmacy training) (Leemans and Laekeman, 2000). They will need to be further expanded in the future. The identified training needs and the comparison with pharmacy curricula in other countries and international recommendations on pharmacy education, will be of value in further adaptation of the curriculum. Joint programs between universities in Belgium and abroad may also be beneficial, as previously reported (Nyfort-Hansen and May, 1998; Mangues and Dhillon, 2000; Kanke *et al.*, 2000).

Subgroup analyses showed differences in results between hospital sites and respondents' position. Although statistical analysis could not be undertaken in view of the small sample size, the following comments can be made. Firstly, managers rated pharmacists' levels of knowledge and skills lower than pharmacists did. The difference may have arisen from the fact that managers were asked to rate pharmacists' knowledge and skills at the time of graduation, while pharmacists were asked to rate their current knowledge and skills. Secondly, pharmacists at hospital 3 identified more education and training needs, and rated themselves more strictly than pharmacists at hospital 1. The fact that the pharmacists at hospital 3 were the only ones with past experience in ward pharmacy (through a pilot project in the hospital and an experience abroad for one pharmacist), may suggest that they had had more opportunities to identify training needs, and that they were more critical, or had higher expectations, regarding the levels pharmacists should achieve.

CONCLUSION

In summary, the key findings of the study are as follows: (1) a perceived role of CP on efficacy, safety and cost of drug use; (2) a limited scope of patient-specific CPSs in Belgian teaching hospitals, but a desire to develop these services in the future;

(3) identification of driving forces and barriers for CP practice which are similar to other countries, in addition to factors specific to the Belgian healthcare system; (4) a need to re-engineer undergraduate and postgraduate pharmacy education in view of the training needs identified, the present level of knowledge and skills of hospital pharmacists in CP and the gaps in the current curricula. Educational strategies to develop the pharmacists' patient-focused approach in CP practice are needed.

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