Implementation of Ward-Based Clinical Pharmacy Services in Belgium—Description of the Impact on a Geriatric Unit

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BACKGROUND: Patient-centered clinical pharmacy services are still poorly developed in Europe, despite their demonstrated advantages in North America and the UK. Reporting European pilot experiences is, therefore, important to assess the usefulness of clinical pharmacy services in this specific context.

OBJECTIVE: To report the results of the first implementation of Belgian clinical pharmacy services targeting patients at high risk of drug-related problems.

METHODS: An intervention study was conducted by a trained clinical pharmacist providing pharmaceutical care to 101 patients (mean age 82.2 y; mean ± SD number of prescribed drugs 7.8 ± 3.5) admitted to an acute geriatric unit, over a 7 month period. All interventions to optimize prescribing, and their acceptance, were recorded. An external panel (2 geriatricians, 1 clinical pharmacist) assessed the interventions' clinical significance. Persistence of interventions after discharge was assessed through telephone calls.

RESULTS: A total of 1066 interventions were made over the 7 month period. The most frequent drug-related problems underlying interventions were: underuse (15.9%), wrong dose (11.9%), inappropriate duration of therapy (9.7%), and inappropriate choice of medicine (9.6%). The most prevalent consequences were to discontinue a drug (24.5%), add a drug (18.6%), and change dosage (13.7%). Acceptance rate by physicians was 87.8%. Among interventions with clinical impact, 68.3% and 28.6% had moderate and major clinical significance, respectively. Persistence of chronic treatment changes 3 months after discharge was 84%.

CONCLUSIONS: Involving a trained clinical pharmacist in a geriatric team led to clinically relevant and well-accepted optimization of medicine use. This initiative may be a springboard for further development of clinical pharmacy services.

KEY WORDS: Belgium; clinical pharmacy; drug-related problems; frail elderly; pharmaceutical care.

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Improving patient safety is an important priority for any healthcare system. This involves reducing adverse drug events (ADEs) and optimizing the safe and effective use of medicines. Clinical pharmacy services are patient-oriented services developed to promote the rational use of medicines and, more specifically, to maximize therapeutic effect, minimize risk, minimize cost, and respect patient choice.[1] To achieve this, clinical pharmacists can obtain medication histories, perform medication reviews, attend ward rounds, provide recommendations on drug selection and follow-up, and provide counseling to patients and providers. The positive impact of clinical pharmacy services (or pharmaceutical care services) on clinical, economic, and humanistic outcomes has been demonstrated in numerous publications in North America and the UK.[2,3] Despite this, there is much inter- and intracountry variability in the practice of clinical pharmacy, which is still in the early stages in most European countries. Leblanc and Dasta[4] highlighted that, to ease the development of clinical pharmacy services and demonstrate their value, hospital pharmacists should report their experiences in international journals.

In Belgium, hospital pharmacists spend limited time on clinical tasks.[5,6] However, for many years there has been a desire to develop clinical pharmacy services, and a legal framework has been in place since 1991 (through the definition of the clinical tasks of hospital pharmacists in a Royal Decree). Barriers to the implementation of clinical pharmacy services have been the lack of specific training for pharmacists, the limited pharmacy manpower, the ab-

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sence of financial support, and the fear of poor acceptance from healthcare professionals.[5] Several factors, however, have been identified as driving forces for the implementation of clinical pharmacy services. These include the national and local willingness to improve the quality of drug use and reduce costs as well as a government-planned limitation of the number of practicing physicians.[6] It is in this context that clinical pharmacy education and practice have been developed by a joint effort of our university and university-based teaching hospitals, and a first pilot intervention study has been undertaken in one of the affiliated teaching hospitals.

An important aspect of strategic planning for implementing clinical pharmacy services is to target patients at high risk for ADEs, because they are more likely to benefit. Elderly patients are among these, because of multiple comorbidities, multiple medication use, altered pharmacokinetics and pharmacodynamics, and frequent inappropriate prescribing.[7] Suboptimal prescribing and ADEs/adverse drug reactions (ADRs) can occur on admission to the hospital,[8] during hospital stay,[9] and after discharge.[10] Only a few North American studies have evaluated the impact of multidisciplinary teams that included clinical pharmacists on drug-related outcomes for elderly inpatients.[11,12] Their applicability to European settings, in which clinical pharmacy is developing, is not established.

This article reports the results of the first intervention study performed by a clinical pharmacist providing pharmaceutical care on the geriatric unit of a university hospital. It describes the characteristics of interventions made by the clinical pharmacist, measures their acceptance by prescribers and their clinical significance, and measures their persistence after discharge. This is part of a larger program whose goal is to determine the feasibility of providing clinical pharmacy services to identify the driving forces and barriers for implementation.

Methods

DEVELOPMENT OF CLINICAL PHARMACY

Clinical pharmacy practice and education were created at our university in 2003, through a joint initiative of the faculty of medicine and the affiliated teaching hospitals. The present implementation relies on a new teaching program for hospital pharmacists, consisting of a certificate degree (90 h) and a Masters degree (1 y) in clinical pharmacy and a PhD program for research in clinical pharmacy (www.md.ucl.ac.be/pharma/cfcl/intro.htm). This provided the conceptual and scientific support to enable studies such as this one.

When the project started in 2002, Belgian physicians and pharmacists were not unfamiliar with the concept of clinical pharmacy and its usefulness in terms of improved use of drugs, mainly because of previous contacts with colleagues in North America and the UK. However, its effective implementation had not yet been initiated due to doubts about its feasibility in the national context.

To address this issue and to maximize the chances of success in launching a pilot program, a coordinated action was set up at the level of our institution. Its objectives were to identify the favorable and limiting factors relevant to the local situation[5]; to clearly explain the project and its advantages to all interested parties, without concealing the expected difficulties; and to establish an agenda for the implementation of the necessary changes in both the teaching programs (for undergraduate, postgraduate, and PhD students) and the hospital pharmacy. In this process, critical questions were raised. The answers given were based on a balance between what clinical pharmacy/pharmaceutical care should be and the local constraints or experience. Appendices I and II summarize the important aspects of the implementation process, which may be of interest to pharmacists willing to develop clinical pharmacy services in other countries.

SETTING

The study took place between November 2003 and May 2004 in the geriatric unit (27 beds) of a 350-bed teaching hospital in Belgium. The unit admits frail patients 70 years of age and older who present with typical acute geriatric problems. Patients are cared for by a multidisciplinary team of 2 geriatricians, 2 physicians who specialize in hospital care, nurses, 2 physiotherapists, a social worker, a psychologist, and an occupational therapist. Medical care, rehabilitation, and discharge planning are provided.

All patients admitted to the unit during the study period were eligible for inclusion in the study. Exclusion criteria were the presence of terminal illness; refusal to participate; length of stay 48 hours or less; inability of the pharmacist to perform an abstracted chart within 3 days of admission, due to time constraints; and inclusion during a previous admission. The ethics committee of the institution approved the study protocol. Informed written consent was obtained from each participant, or from a relative or caregiver if the patient was unable to give consent (eg, if the patient was experiencing severe cognitive impairment).

INTERVENTION

The intervention consisted of a clinical pharmacist providing pharmaceutical care from admission to discharge (Figure 1). The pharmacist had a postgraduate degree in clinical pharmacy and previous experience in geriatrics. The pharmacist was present in the geriatric unit 4 days a week, participated in medical and multidisciplinary rounds, had direct contact with patients and caregivers, and had access to the complete medical record, including biologic data and results of diagnostic tests. For each patient, the clinical pharmacist performed a medication history on admission and prepared an abstracted patient record with demographic, clinical, and pharmaceutical data. The appropriateness of treatment was then analyzed and a pharmaceutical care plan was prepared.[13,14] When an opportunity for optimization was identified, on admission or at any time during the hospital stay, the clinical pharmacist intervened. Interventions could occur during rounds or through discussions outside of the scheduled rounds time. They could pertain to acute or chronic medicines, and to medicines prescribed on a regular or as-needed basis. Each intervention was made orally. The pharmacist provided written information when judged necessary or when requested by the prescriber. The pharmacist also answered questions asked by other healthcare professionals about medications. At discharge, the clinical pharmacist provided treatment change information to the patient or caregiver and the general practitioner. A written plan (including names of drugs, indications, dosages and forms, frequency and time of administration, modalities of administration, list of drugs discontinued and reason) was given to the patient or caregiver, together with oral explanations. For the general practitioner, at the end of each discharge letter prepared by the physician, the pharmacist added a section titled, "Reasons for changes in medications and recommendations for follow-up." Its content was approved by the physician in charge.

DATA COLLECTION

The clinical pharmacist recorded each intervention, using a form developed during the pilot phase. The pilot program was conducted over 2 weeks, in a convenience sample of 20 inpatients, to test the feasibility and reliability of data collection. An intervention was defined as a recommendation made by the clinical pharmacist to a healthcare professional, pertaining to drug therapy, which aimed to improve the quality of medication use. Interventions could be initiated by the pharmacist or by another healthcare professional who asked a question of the clinical pharmacist. Patient counseling and medication histories were not recorded as interventions.

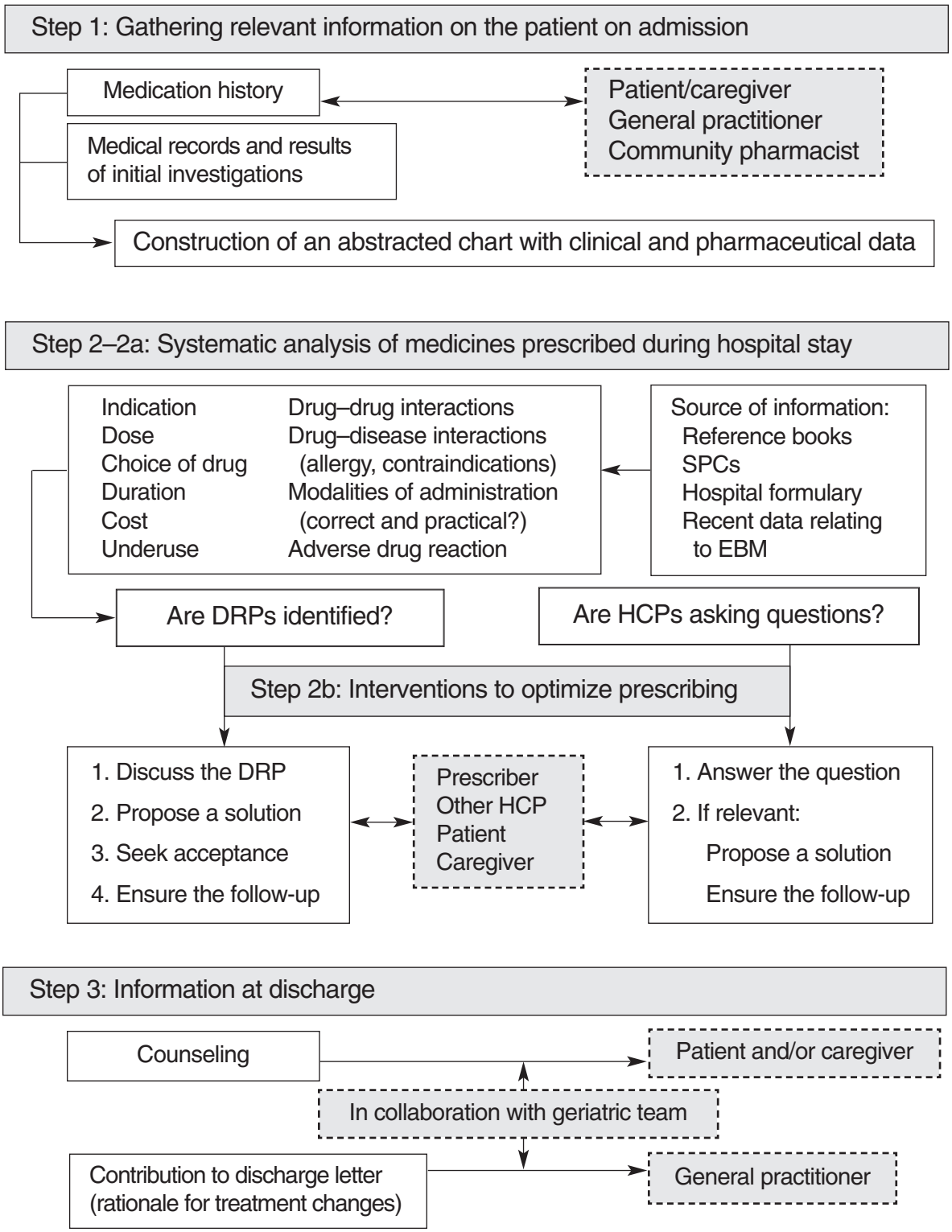

Figure 1. Pharmaceutical care process used in the study. Gray dotted boxes represent persons with whom the clinical pharmacist collaborated. DRP = drug-related problem; EBM = evidence-based medicine; HCP = healthcare professional; SPC = summary of product characteristics.

The following information was recorded on the form: (1) type of healthcare professional eliciting the intervention (ie, clinical pharmacist or other healthcare professional upon request); (2) healthcare professional to whom the pharmacist made the recommendation; (3) underlying drug-related problem (DRP), 17 categories; (4) type of intervention, 13 categories; (5) drug involved (Anatomical Therapeutic Chemical [ATC] code)[15]; (6) description of intervention and outcome, as measured for short-term effects and as anticipated for long-term effects; and (7) acceptance. We defined a DRP as an event or circumstance involving drug therapy that actually or potentially interferes with desired health outcomes.[16] The classification systems for DRPs and types of interventions were based on previous classifications and on pilot work.[14,16,17]

CLINICAL SIGNIFICANCE

All interventions that had potential clinical impact on the efficacy or safety of treatment (excluding those with impact exclusively on cost or compliance) and that were subsequently accepted by healthcare professionals were validated by an expert panel. The panel consisted of 2 Belgian geriatricians and one visiting Canadian clinical pharmacist with expertise in geriatrics and knowledge of the local setting. None was involved in the care of patients included in the study. To rate interventions, the experts used a scale developed according to previous scales (minor: no benefit or minor benefit, depending on professional interpretation; moderate: recommendation that brings care to a more acceptable and appropriate level of practice or that may prevent an ADE of moderate importance; major: intervention may prevent serious morbidity, including readmission, serious organ dysfunction, serious ADE; extreme: life saving; deleterious: may lead to adverse outcome).[18,19] Written instructions and examples from pilot work were provided. Panelists first rated each intervention individually, and then met to compare their ratings. When individual ratings differed, the panel discussed them to reach a consensus for each intervention.

PERSISTENCE OF INTERVENTIONS AFTER DISCHARGE

For interventions related to chronic treatments, we recorded whether the treatment change initiated by the pharmacist and carried out in the hospital was still in application 3 months after discharge. This was done because quantitative evidence indicates that treatment changes are frequent after discharge.[20] All patients were followed up 1 and 3 months after discharge, through telephone calls performed by 2 trained hospital pharmacists who had not been involved in the rest of the study. The questionnaire was developed by one pharmacist and by the main researcher and was pilot tested with 5 patients to check for appropriate questioning and understanding. Data were provided by the person preparing medications (patient or caregiver), and included medicines taken after discharge.

DATA ANALYSIS

Analysis was performed using SPSS (Statistical Package for Social Sciences, version 11.0). Descriptive statistics were used for characterizing interventions. Interrater reliability for classifying DRPs and types of interventions was checked. Two clinical pharmacists coded 33 interventions made during the pilot study. Cohen's kappa[21] was 0.87 for the underlying DRP and 0.96 for the type of intervention, indicating good agreement.

Results

CHARACTERISTICS OF PATIENTS

The clinical pharmacist provided pharmaceutical care to 101 patients; 73% were female, 72% were living in the community, and 36% had received previous geriatric care. Their mean (± SD) age was 82.2 (± 6.9) years. The average number of drugs prescribed on a regular schedule, per patient, was 7.8 (± 3.5) and the average number of daily doses was 9.8 (± 4.7). Mean length of stay was 19.7 (± 12.1) days.

CHARACTERISTICS OF INTERVENTIONS

The pharmacist made 1066 drug-related interventions. The person who initiated the intervention (ie, identified a DRP and made a recommendation to resolve the problem) was the clinical pharmacist in 84.9% (n = 905) of cases and another healthcare professional in 15.1% (n = 161) of cases (ie, the intervention was initiated when another healthcare professional asked the pharmacist a question and the pharmacist made a recommendation). This represents a mean of 8.9 interventions per patient (median 8) initiated by the pharmacist and 1.6 interventions per patient (median 1) initiated by another healthcare professional. Table 1 summarizes the main characteristics of all interventions made. A total of 87.8% of all interventions were fully accepted and 7.2% were partially accepted by physicians. The most common classes of drugs (ATC level 2) were antithrombotic agents (B01; 9.1% of all interventions), psycholeptics (N05—including antipsychotics, anxiolytics, hypnotics, sedatives; 8.8%), psychoanaleptics (N06—including antidepressants, antidementia drugs; 8.2%), analgesics (N02; 6.9%), and drugs for obstructive airway diseases (R03; 6.6%). There were no major differences in the characteristics of interventions initiated by the pharmacist versus interventions initiated by another healthcare professional.

CLINICAL SIGNIFICANCE

The external panel assessed the clinical significance of 700 interventions; 366 interventions were excluded because they had no direct clinical impact (Table 2). Individual ratings differed for two-thirds of evaluations, and discrepancies originated equally from the 3 panelists. After discussion and consensus, there was a mean of 4.7 ± 3.8 (median 4) moderate interventions and 1.9 ± 2.1 (median 1) major interventions per patient. Examples are provided in Table 3. The results were similar for interventions initiated by the pharmacist or by another healthcare professional.

PERSISTENCE OF INTERVENTIONS AFTER DISCHARGE

Three months after discharge, 88% of patients could be reached to obtain follow-up data on the persistence of interventions relating to the treatment of chronic conditions (missing data were related to various types of DRPs and treatment changes). For moderate and major chronic interventions, 83.8% and 85.4% of treatment changes persisted

3 months after discharge, respectively. The majority of treatment changes that had not been followed up were not systematically associated to specific drugs of DRPs.

Discussion

Our study reports the development of patient-centered clinical pharmacy services. A structured process was followed that included a reflection on international experiences as well as focusing special attention on local and national considerations and taking advantage of local driving forces. Several barriers initially thought to limit the development of clinical pharmacy services, such as poor acceptance from healthcare professionals, lack of training, and insufficient hospital–faculty collaboration, were overcome. In addition, careful documentation of impact was done, through the combination of practice and research activities.

To our knowledge, this is the first study to report involvement of a clinical pharmacist in acute patient care in Belgium, and it is one of the first international reports on the

Table 1. Characteristics of Interventions (N = 1066) Made by the Clinical Pharmacist

Drug-Related Problem	Interventions, n (%)	Drugs Most Often Involved
Underuse	169 (15.9)	calcium/vitamin D, antithrombotics, analgesics
Wrong dose	127 (11.9)	antibiotics, psycholeptics,[a] psychoanaleptics,[a] ACE inhibitors, ARAs
Inappropriate duration of therapy	103 (9.7)	psycholeptics, heparins, antiasthmatics, antibiotics
Inappropriate choice of medicine	102 (9.6)	psycholeptics, psychoanaleptics, analgesics
No valid indication	74 (6.9)	antithrombotics, antacids, antiulcer drugs
No specific problem[b]	72 (6.8)	psychoanaleptics, psycholeptics, ACE inhibitors, ARAs, hypolipemics
Inappropriate modalities of administration[c]	65 (6.1)	analgesics, antibiotics, psychoanaleptics, antiasthmatics
Adverse drug reaction[d] suspected or confirmed	57 (5.3)	psychoanaleptics, diuretics, analgesics
Error in medication history	55 (5.2)	psychoanaleptics
Inappropriate follow-up	41 (3.8)	antianemics, cardiac therapy (digoxin)
Prescription writing error	36 (3.4)	psycholeptics
Drug–disease interaction (including allergy)	35 (3.3)	β-blockers, ACE inhibitors, ARAs, bisphosphonates, psychoanaleptics
Duplication	34 (3.2)	psycholeptics, antiasthmatics
Less costly alternative	32 (3.0)	miscellaneous
Modalities of administration not practical for the patient	26 (2.4)	miscellaneous
Drug–drug interaction	24 (2.3)	antithrombotics
Other	14 (1.3)	miscellaneous

ACE = angiotensin-converting enzyme; ARA = angiotensin receptor antagonist.
[a]Psycholeptics include antipsychotics, anxiolytics, hypnotics, and sedatives; psychoanaleptics include antidepressants and antidementia drugs.
[b]No underlying drug-related problem; for example, when physicians asked a question without the presence of a drug-related problem for a specific patient.
[c]Modalities of administration include frequency of administration, time, route, and formulation.
[d]An adverse drug reaction was defined as a noxious and unintended reaction to a drug that occurred at doses normally used in humans, that could not be related to another drug-related problem.

Table 2. Type, Acceptance Rate, and Clinical Importance of Interventions Made

		Acceptance Rate (%)			Clinical Importance (%)[a]				
Intervention Type	n (%)	Full	Partial[b]	Rejected	Minor	Moderate	Major	Extreme	Deleterious
Discontinue drug	261 (24.5)	87.4	6.5	6.1	3.9	63.3	31.4	1.4	0
Add a new drug	198 (18.6)	88.9	6.1	5.1	1.2	66.7	31.5	0	0.6
Change dose	146 (13.7)	92.5	3.4	4.1	2.4	57.7	39.8	0	0
Educate/inform healthcare professional	107 (10.0)	96.8	3.2	0	NA	NA	NA	NA	NA
Switch to other drug	95 (8.9)	76.8	10.5	12.6	1.8	75.0	23.2	0	0
Other	259 (24.3)	85.7	10.8	3.5	2.2	84.4	13.3	0	0
TOTAL	1066 (100)	87.8	7.2	5.0	2.6	68.3	28.6	0.4	0.1

NA = not applicable (ie, clinical importance not assessed by the external panel because the intervention was not initiated by the clinical pharmacist, and/or because it did not lead to direct change in the treatment of a specific patient).
[a]N = 700 interventions (the external panel assessed the clinical significance of 700 interventions; the remaining 366 were excluded because they had no direct clinical impact).
[b]Advice accepted but not acted upon, or partially acted upon.

involvement of clinical pharmacists in the care of acutely ill, frail, elderly patients. We found that the clinical pharmacist, through the provision of pharmaceutical care, was able to propose a large number of interventions relating to a wide variety of DRPs and drugs. The majority of these interventions were accepted and were deemed clinically relevant.

Several reasons may have accounted for the high acceptance rate of interventions (Table 4); these could be considered for developing additional clinical pharmacy services in Belgium and abroad. The clinical pharmacist used a structured approach to provide pharmaceutical care.[13,14] Furthermore, the communication between the clinical pharmacist and the physician (as well as other healthcare professionals) may have been critical. Previous studies reported acceptance rates that varied from less than 50% to more than 90%.[22,23] A low value of 47.5% was observed in a European study, in which the authors stated that there was a lack of communication and an insufficient multidisciplinary approach.[22] Higher values (67–81%) were reported in a North American study in which the pharmacist met with the physician to discuss DRPs.[23] In our study, the pharmacist was part of the multidisciplinary team, and there was direct contact between the pharmacist and the prescribers. The fact that most interventions persisted after discharge is also encouraging. To our knowledge, as of November 1, 2005, that kind of measure has rarely been reported.

A comparison of the characteristics of our interventions with data from the literature gives external validity to the results. First, the most frequent DRPs underlying the interventions (Table 1) fit prevalent types of inappropriate prescribing in the elderly population. This emphasizes the relevance of our interventions. For example, observational studies have identified high levels of undermedicating for the treatment of osteoporosis,[24] for the prevention of thromboembolic diseases,[25] and for pain control.[26] Underdosing of angiotensin-converting enzyme inhibitors is frequent,[27] as is inappropriate use of psychotropic drugs.[28] In a study describing DRPs in 827 patients hospitalized in Norway (mean age, 71.7 y), the number of DRPs per patient was lower than in our study, but the drugs most often involved for each type of DRP were similar to those in our results.[29] Second, the drugs most commonly involved in interventions in our study (ie, antithrombotic agents, psycholeptics, psychoanaleptics, analgesics) frequently lead to ADEs/ADRs in the elderly.[11,30] Therefore. the clinical pharmacist has probably helped improve patient safety through the prevention or resolution of frequent ADEs.

The external validation of the clinical importance of interventions, by Belgian and foreign experts, further strengthens the results. Direct comparison with other studies is difficult, however, for several reasons. First, the definitions of minor versus moderate versus major interventions vary from one study to another. Second, the clinical importance of a single intervention made for an adult versus that made for a frail older patient may be different, because the risk and seriousness of ADEs is higher in the latter group. Hence, the age and frailty of the population should be taken into consideration when assessing clinical importance. This was done by having experts in geriatrics on the panel.

Our study has several limitations. First, it represents interventions made by a single clinical pharmacist working on one geriatric unit, raising the issue of generalizability. Such a limited pilot study was, however, essential in our context, and we believe that it will lead the way for generalization of clinical pharmacy services delivered by other

Table 3. Examples of Interventions Initiated by the Clinical Pharmacist

Interventions of moderate clinical importance
Drug-related problem: zopiclone was started the day after admission for insomnia; 2 weeks later, the patient was about to be discharged and was sleeping well, but was at risk of falling.
Intervention: discontinue zopiclone and explain the rationale to the patient (treatment must be short term, no need for it at home, and risk of adverse effects, including falls).
Drug-related problem: 2 antihistamines (hydroxyzine and cetirizine) prescribed by general practitioner for pruritus; both prescriptions rewritten in the hospital.
Intervention: duplication of treatment; little benefit, but increased risks of adverse effects. Discontinue hydroxyzine (more anticholinergic and sedative effects than with cetirizine) and monitor for symptoms of pruritus.
Interventions of major clinical importance
Drug-related problem: nausea reported; digoxin dose increased 3 days prior.
Intervention: check electrocardiogram and digoxin blood level; discontinue or decrease dose if intoxication confirmed (note: intoxication was confirmed).
Drug-related problem: patient with diabetes and peripheral arterial disease; no cardiovascular prophylaxis and no contraindication.
Intervention: start aspirin 100 mg/day.

Table 4. Factors Likely to Have Contributed to Successful Implementation

Before the study
hospital and ward managers open to collaboration
close collaboration with the hospital pharmacy department
willingness to target patients at high risk of adverse drug events
needs identification through qualitative analysis
objectives of the study well defined and communicated to healthcare professionals
During the study
presence of pharmacist on a regular basis (0.8 full-time equivalent)
structured process for pharmacist to evaluate patient
pharmacist with adequate training in clinical pharmacy/pharmacotherapy in the elderly population
direct contact with members of the multidisciplinary team, patients, and caregivers
close collaboration with hospital pharmacy department

pharmacists, on other units, and with other physicians. In fact, the pharmaceutical care model described here is now being replicated in other units in our institution, and a full-time position for a clinical pharmacist has been created. Second, we did not address the pharmacoeconomic aspects of the intervention, although we are aware that these will be essential to justify further development of clinical pharmacy. Third, from a research perspective, measuring pharmacists' interventions is only an indirect measure of the impact on the quality of medicines use. Further work should address the impact of the intervention on direct measures of prescribing appropriateness and/or on actual ADEs.

Conclusions

Patient-centered clinical pharmacy services aim to promote a rational use of medicines. This practice is well developed in North America and the UK. Our study shows that it is possible to implement new ward-based clinical pharmacy services in Europe, using a structured approach. In addition, our study provides new data on the impact of pharmaceutical care in a population for which limited international data are available, namely, frail elderly inpatients. Most interventions made by the clinical pharmacist were accepted by healthcare professionals, were deemed clinically relevant by external experts, and the improvements made were largely maintained after discharge. Attention paid to key factors required for success in developing clinical pharmacy services may have significantly contributed to the results.

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Appendix I. Steps in the Implementation of Ward-Based Clinical Pharmacy Services

A. Preparing the hospital pharmacy
- Make sure that hospital pharmacists agree on the willingness to change practice; define the objectives and the means.
- Optimize the distribution and administrative tasks.
- Identify the training needs of hospital pharmacists and the needs relative to medicine information resources and skills.

B. Preparing the key persons at the hospital level
- Sensitize the hospital board managers and the medical therapeutic committee to the willingness to change; agree on the objectives and methods of the pilot project.

C. Developing a comprehensive but realistic academic teaching program
- Identify the training needs of hospital pharmacists, and implement relevant changes at each educational level (undergraduate, postgraduate, research programs).

D. Launching pilot ward-based clinical pharmacy projects
- Define 1 or 2 wards on which 1 or 2 clinical pharmacists can start.
- Establish a first contact with the key persons of the ward (main doctor and main nurse) and agree on the objectives and method of the project.
- Reflect on the pilot experience at regular intervals with the key persons involved, and perform a detailed evaluation at the end of the pilot phase.

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EXTRACTO

TRASFONDO: Los servicios farmacéuticos clínicos centrados en el paciente todavía están pobremente desarrollados en Europa a pesar de que sus ventajas han sido demostradas en la América del Norte y el Reino Unido. El reportar experiencias de programas piloto europeos es por lo tanto importante para la evaluación de la utilidad de los servicios de farmacia clínica en este contexto en específico.

OBJETIVO: Reportar los resultados de la primera implementación de servicios farmacéuticos clínicos belgas teniendo como objeto pacientes en alto riesgo de problemas relacionados a fármacos.

MÉTODOS: Un estudio de intervención realizado por un farmacéutico clínico adiestrado proveyendo cuidado farmacéutico a 101 pacientes (edad promedio 82.2 años; número promedio de fármacos prescritos 7.8 ± 3.5) admitidos a una unidad de cuidado geriátrico agudo por un período de 7 meses. Todas las intervenciones para hacer óptima la prescripción y su aceptación fueron documentadas. Un panel externo (dos geriatras y un farmacéutico clínico) evaluaron su importancia clínica. La perseverancia de las intervenciones después del paciente haber sido dado de alta fue evaluada a través de llamadas telefónicas.

RESULTADOS: Se realizó un total de 1066 intervenciones durante el período de 7 meses. Los problemas relacionados a fármacos más

Appendix II. Important Questions Raised During the Implementation Process

1. What is the value of considering the North American/UK experience? Should we attempt to replicate it?
   In our case, the experience of North America and the UK was highly valuable, but we did not simply replicate it. International experts participated and/or gave advice for the implementation process. In parallel, several Belgian pharmacists were trained abroad. This enabled us to clearly define the potential models of clinical pharmacy/pharmaceutical care practice and education and objectively inform the decision-making persons about the respective successes and failures of the North American/UK models. None of them, however, entirely match the local needs. The driving forces were not the same, and the baseline education programs and skills of graduated Belgian pharmacists were also quite different from those in the US or UK. The model that we developed, therefore, took account of these baseline differences.
2. Should clinical pharmacists be distinct from hospital pharmacists?
   This "distinct model," which is most frequently encountered in the US, was considered unacceptable by Belgian hospital pharmacists, who wanted to be the future clinical pharmacists (as in the UK and Canadian models). In our present model, clinical pharmacists are, therefore, hospital pharmacists who acquire an additional certificate or Masters degree in clinical pharmacy. They are able to perform clinical and nonclinical tasks.
3. What were the respective roles of faculty members and of hospital pharmacists?
   Responsibilities were shared. Faculty members were responsible mainly for creating the necessary educational programs, and for defining the pilot projects linked to PhD research programs. Hospital pharmacists oversaw the implementation of the pilot projects within the hospital setting, managed the contacts and exchanges with healthcare providers at all levels, and ensured that the activities of the clinical pharmacists in the hospital were made with the full respect of ethical and medical requirements with which they are familiar. A close faculty–hospital collaboration has been essential to the present success of our implementation.
4. Should the activities of the clinical pharmacists be linked to research activities?
   This was considered a major requirement for successful implementation in a university teaching hospital. Our present model encompasses clinical pharmacists seeking a PhD degree (4- to 5-year program with presentation of a full dissertation and publications in peer-reviewed international journals) and clinical pharmacists with more limited research activities but who must, nevertheless, contribute to the development of research in clinical pharmacy.
5. Should pharmacoeconomy be an important part in the development of clinical pharmacy?
   In contrast to the prevailing situation in the US, most clinical and pharmaceutical activities are still performed under a fee-for-service structure in Belgium. Drug savings were, therefore, not perceived as critical and could even be counterproductive as far as hospital pharmacies and pharmaceutical industries are concerned. This situation is, however, under reevaluation as financing based on diagnosis-related group is being implemented. Clinical pharmacists may, therefore, play an additional important role in the near future to support this.

frecuentes justificando intervenciones fueron: menos uso (15.9%), dosis incorrecta (11.9%), duración de la terapia inadecuada (9.7%) y selección del medicamento inadecuada (9.6%). Las consecuencias más frecuentes fueron: descontinuar un fármaco (24.5%), añadir un fármaco (18.6%) y cambiar la dosis (13.7%). El nivel de aceptación por los médicos fue de 87.8%. Entre las intervenciones con impacto clínico, 68.3% tuvieron significado clínico moderado y 28.6% mayor impacto. La perseverancia de cambios en tratamiento crónico tres meses después del paciente ser dado de alta fue 84%.

CONCLUSIONES: El envolvimiento de un farmacéutico clínico adiestrado en un equipo geriátrico llevó a hacer óptimo el uso de medicamentos de forma relevante clínicamente y bien aceptada. Esta iniciativa puede servir de impulso para el desarrollo adicional de servicios farmacéuticos clínicos.

Brenda R Morand

RÉSUMÉ

OBJECTIF: Présenter les résultats d'une première étude de services pharmaceutiques cliniques en Belgique; étude effectuée auprès d'une population âgée à haut risque de problèmes reliés à la pharmacothérapie.

MÉTHODES: Une étude d'intervention a été réalisée pendant une période de 7 mois. Durant cette période, une pharmacienne clinicienne a prodigué des soins pharmaceutiques chez 101 patients (moyenne d'âge de 82.2 ans et nombre moyen de médicaments prescrits 7.8 ± 3.5) admis à l'unité de gériatrie aiguë. Toutes les interventions pour optimiser la prescription et leurs acceptations ont été documentées. Un panel externe (2 gériatres et une pharmacienne clinicienne avec une expertise en gériatrie) ont évalué l'importance clinique des interventions. Le suivi des recommandations au congé a été effectué via des appels téléphoniques.

RÉSULTATS: Un nombre de 1066 interventions a été effectué pendant une période de 7 mois. Les problèmes reliés à la pharmacothérapie les plus fréquemment rencontrés étaient: sous utilisation (15.9%); dose inappropriée ou incorrecte (11.9%), durée de traitement inappropriée (9.7%) et choix inapproprié de médicaments (9.6%). Les modifications dans les prescriptions étaient les suivantes: cesser un médicament (24.5%); ajouter un médicament (18.6%) ou modifier une posologie (13.7%). Le pourcentage d'acceptation des recommandations par les médecins était de 87.8%. Parmi les interventions avec impact clinique, 68.3% et 28.6% avaient une importance clinique de modérée à majeure respectivement. Le suivi des recommandations trois mois suite au congé du patient était de 84%.

CONCLUSIONS: L'implication d'un pharmacien clinicien au sein d'une équipe gériatrique a permis d'optimiser l'utilisation des médicaments Cette initiative pourrait servir de tremplin pour permettre le développement d'autres services cliniques.

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