Implementing the Practice Functions of Pharmaceutical Care — a Pilot Study in Critical Care

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INTRODUCTION

The implementation of pharmaceutical care in practice requires that a pharmacist make a subtle but significant change in perspective and re-orient his or her pharmacy practice from providing services in a specific practice site to providing care to individual patients. Although the underlying philosophy and practice functions required for the delivery of pharmaceutical care have been defined, it is still a relatively new concept.[1-3] Hence it is beneficial for pharmacists to share their experiences in incorporating the pharmaceutical care model into institutional practice settings.

At St. Michael's Hospital in Toronto, Ont., the Medical Surgical Intensive Care Unit (MS-ICU) was chosen as a pilot site for the development, implementation, and initial assessment of the practice functions and tools necessary for the delivery of pharmaceutical care. This site also served as a testing ground for the work being undertaken by the Faculty of Pharmacy at the University of Toronto in defining practice and education models based on the philosophy of pharmaceutical care.[2,4]

St. Michael's Hospital is an urban acute care teaching hospital. The pilot site is a 6-bed MS-ICU, with medical care provided by anesthesia staff physicians, fellows, and residents. Comprehensive clinical pharmacy services have been provided at this site for over 10 years and have included intensive monitoring of pharmacotherapy for individual patients, pharmacokinetic dosing, consultations on drug regimens, attendance at physician rounds, drug information and in-service education, involvement in research, and development of drug protocols. The literature describes many beneficial impacts of this type of clinical pharmacy service in the critical care setting.[5,6] However, full implementation of pharmaceutical care, as described by Hepler and Strand[1] and based on the explicit practice model described by Winslade and colleagues,[2] has not been reported from a critical care setting.

The objective of this article is to describe the experience of a clinical practitioner (J.M.B.) and a director of pharmacy (K.W.) in transforming a traditional comprehensive clinical pharmacy practice in a critical care setting into one that incorporates both the principles and the process of pharmaceutical care.

IMPLEMENTATION STEPS

The implementation of pharmaceutical care in the MS-ICU was considered a pilot project, to allow the department to assess the feasibility and the initial impact of providing pharmaceutical care throughout the institution. The implementation was divided into 3 phases to allow for gradual transition, development of skills and tools, and assessment of workload. The implementation was carried out mainly by a single practitioner (J.M.B.) with occasional back-up coverage provided by another critical care pharmacist trained in pharmaceutical care.

Data were collected during the baseline and implementation phases to answer questions regarding feasibility and impact. The data included the number of drug-related problems (DRPs) identified by patients, the types of DRPs,[7] the number and type of interventions, the number of DRPs resolved or prevented, the number of interventions accepted, and the time requirements.

In addition, throughout the implementation phases the practitioner and the manager met to discuss

their observations of the benefits and concerns and ways to resolve any problems. This information was documented by steps in the pharmaceutical care process to be shared later with others considering implementation.

Baseline

The baseline phase, which covered the month before implementation, was used to collect activity data while providing comprehensive clinical services. The patient population for this 1-month period was representative of the typical patient mix in the MS-ICU. Usual practice activity was maintained and was consistent with previous years' workload measurement statistics.[8]

Phase I — Early Implementation Period

At the time of implementation, the philosophy of pharmaceutical care was relatively new and only partially defined. Therefore, during phase I, which lasted 8 months, the practitioner's focus was on learning about the concept and developing the processes for delivering pharmaceutical care. Proficiency was acquired by reading the literature, engaging in debates with colleagues, giving presentations on the topic, and providing pharmaceutical care to 1 or 2 patients at a time. Initial training was also provided by Linda Strand, co-originator of the philosophy, through the University of Toronto. During this period the drug therapy of the other patients was monitored in the traditional comprehensive manner.

To ensure that the pharmaceutical care process was followed, 2 specific tools developed at the University of Toronto's Faculty of Pharmacy were employed: the pharmacist's management of drug-related problems (PMDRP) teaching tool[9] and a structured critical thinking approach entitled "therapeutic thought process."[10]

Phase II — Transition Period

During the transitional phase (which lasted 4 months), approximately 50% of patients in the 6-bed MS-ICU were assessed by means of the pharmaceutical care process. During this phase, a hospital-specific practice version of the PMDRP form was developed by the ICU coordinator.

Phase III — Pharmaceutical Care to All Patients

During phase III, the practitioner provided pharmaceutical care to all patients who were in the unit from Monday to Friday during regular working hours. The data reported are for a 12-month period.

RESULTS

Before the final level of care could be achieved and consistently maintained, 1 year was spent on developmental work (phases I and II). The 7 main components of the pharmaceutical care process — relationship with the patient, data collection, assessment, development of a pharmacy care plan, implementation of intervention, follow-up, and documentation — will be used as the framework for presenting the results.

Relationship with the patient

The development of a direct relationship with the patient was possible for only a few of the less critically ill MS-ICU patients because most of the patients were too ill for direct contact. The inability to initiate a dialogue with every patient generated some controversy, and it was questioned whether pharmaceutical care could be given to ICU patients, who are often sedated or incompetent. To make pharmaceutical care feasible in the MS-ICU, the practitioner made a conscious and considerable effort to determine patients' preferences for their health care outcomes. If this could not be achieved directly through discussion with the patient, it was achieved indirectly through discussions with the patients' families or legal delegates or with other ICU staff (specifically physicians and nurses).

Data collection

The PMDRP form was an extremely useful teaching tool for collecting, synthesizing, and processing data. In an ICU setting, it can be time-consuming to sift through the large volume of information available for each patient. The PMDRP guided the collection of information and forced a systematic search for information from different sources (including the chart, the patient, nurses, and physicians). This made the assessment efficient and thorough. With practice, the questions asked in the PMDRP became internalized, and documentation was simplified.

One of the main challenges encountered at this stage was the difficulty in finding drug information. Examples of specific content that was not readily accessible included comprehensive lists of drugs that could cause a specific medical problem or condition, time frames for expected changes in disease- or drug-related parameters to define the pharmacotherapeutic

endpoints, and comprehensive comparisons of all therapeutic alternatives. The practitioner trained the drug information pharmacist in pharmaceutical care so that she could anticipate and understand the questions being asked by the practitioner. As a result, the drug information filing system was modified.

Assessment: data integration and identification of the patient's DRPs

As the number of patients receiving pharmaceutical care increased over the implementation phases, an increasing number of DRPs were identified. During the baseline period, an average of 1.9 DRPs/patient (n = 26 patients) were identified during the ICU stay. By the end of phase III (at which time pharmaceutical care was being provided to all patients), this had increased to an average of 5.0 DRPs/patient (range 1 to 25 per patient, n = 107 patients) (Table I). Table II illustrates the numbers of DRPs in the 8 categories for the baseline period and for phase III. With the pharmaceutical care process, the main difference was in the numbers of patients requiring but not receiving treatment.

Development of a Pharmacy Care Plan

The structure of the pharmacy care plan was useful and easy to follow. The mean number of therapeutic interventions per patient increased for each phase of implementation. During phase III the physicians' acceptance of the pharmacist's recommendations for therapeutic interventions was 98% (n = 741 interventions proposed). In 88% of cases the pharmacotherapeutic endpoints as defined in the pharmacy care plan were met. Incorporating routine use of pharmacotherapeutic endpoints was useful as a self-assessment tool, to identify when additional intervention was required, and also for determining common time frames for resolution of signs and symptoms.

Implementation of intervention

Both verbal communication and chart documentation of the care plan were beneficial. These measures are recommended to counter physicians' distraction when addressing emergencies or their failure to see notes located in the back of the chart.

Follow-up

The practitioner struggled initially in implementing follow-up assessment for all patients because of other job responsibilities (related to teaching commitments and covering for vacation and illness) and inability to always be present when a specific parameter required reassessment. A pharmacist back-up system assisted in resolving this problem. Also, some patients stayed on the unit for very short periods, and full implementation of the pharmacy care plan on the unit was not possible.

Documentation

The pharmacist's documentation in the patient chart was defined and consisted of a form for DRPs and another for pharmacy progress notes. These forms were approved by the hospital's Records Committee and became a permanent part of the multidisciplinary section of the patient's medical record. The DRPs form consisted of a table listing all of the patient's DRPs with a brief description of the problem, specific recommendations to the physicians in terms of therapeutic changes and monitoring, and current status of the DRP (for example, whether the physician had been contacted, whether the medication order had been changed, and whether the DRP was still active or had been resolved). The physicians, nurses, and back-up pharmacist could quickly note the patient's current and past DRPs, action recommended, and action taken.

The second form, for pharmacy progress notes, consisted of a blank lined page similar to physicians'

Table 1. Drug-Related Problems and Interventions for Each of the Implementation Phases

		Interventions			
Phase	DRPs (Mean No./Patient)	Mean No./Patient	Total No. Proposed	Total No. (and %) Accepted	
Baseline	1.9	2.4	62	57	(92)
Phase I	2.3	3.0	694	680	(98)
Phase II	2.8	4.0	369	365	(99)
Phase III	5.0	6.9	741	726	(98)

DRP = drug-related problem.

Table II. Types of DRPs Identified in MS-ICU Patients during Baseline Period and Implementation Phase III (Full Pharmaceutical Care)

DRP	No. (and %) of DRPs at Baseline*		No. (and %) of DRPs at Phase III†	
Drug not indicated	7	(14)	34	(6)
Drug required but not prescribed	5	(10)	164	(31)
Wrong product prescribed	8	(16)	67	(12)
Dose too low	7	(14)	78	(15)
Dose too high	12	(24)	131	(24)
Drug not administered as prescribed	0	(0)	0	(0)
Adverse drug reaction	9	(18)	41	(7)
Drug interactions	2	(4)	19	(4)

DRP = drug-related problem.

MS-ICU = medical surgical intensive care unit.

* Over a 1-month period (total of 50 DRPs).

† Over a 12-month period (total of 537 DRPs).

progress notes, which served as an important tool for communication among the pharmacists. For each new DRP, the following information was documented under 3 headings: "data," the subjective and objective history of the DRP, consisting of data about the patient, the disease, and any drugs; "assessment information," a comprehensive and relevant explanation of the DRP, an assessment of the therapeutic alternatives, and the rationale for the recommended therapeutic plan; and "plan," a description of the clinical and pharmacotherapeutic outcomes, the therapeutic plan or recommendation, and a detailed monitoring plan.

Other members of the ICU team and the back-up pharmacist gave positive feedback on the documentation system. Although documentation adds time to the initial assessment, both confidence and speed increased with practice. We found that taking the time to document patient care in the manner described decreased the amount of work and time required for follow-up by the primary and back-up pharmacists and by the pharmacists continuing care after transfer out of the MS-ICU.

Time commitments

It took more time to complete a comprehensive patient assessment when providing pharmaceutical care, particularly when implementation first began. While the practitioner was becoming familiar with the process and tools, it could take several hours to collect the patient data and drug information required to identify, solve, or prevent DRPs. With practice in using the teaching PMDRP form, the initial ICU patient assessment and the development of the pharmacy care plan were completed within 1 h, and follow-up took approximately 30 min per patient. Once familiar with the process, the practitioner was able to use a shorter practice version of the data collection tool, and the initial patient assessments could be completed in 30 min with follow-up assessments taking 10 to 15 min.

DISCUSSION

The practitioner's perspective

From the practitioner's perspective, the change to pharmaceutical care has been favourable and desirable, but not painless nor instantaneous. It was exciting to see the pharmacist's role defined so clearly and with such a strong patient focus. It took time to acquire an understanding of the pharmaceutical care process and to appreciate the differences from the clinical pharmacy practice model. The advantages associated with pharmaceutical care included the highly structured approach to assessing patients, the increased focus on patients, consideration of the wishes of the patients and family members throughout the process, the focus on setting desired endpoints and following the patient until these were achieved, and the documentation, which facilitated communication and decreased duplication of pharmacists' effort.

It was evident in phase I that the pharmaceutical care process is feasible in our setting, because patients' DRPs can be accurately identified, solved, or prevented and, with adjustment and support, these duties could be fitted into the pharmacist's workload. But also at this stage it became obvious that the work involved was challenging and required a change on the part of the practitioner. It seemed overwhelming at first to imagine how this type of care could be provided consistently to a greater number of patients. Without appropriate pharmacy management and university educational support, implementation would have been more difficult.

During the implementation it was difficult to balance the practitioner's desire to immediately provide this type of care to all patients with the reality of having to implement the changes gradually because of time constraints. Concern about what the MS-ICU patients were missing, even though they were receiving comprehensive clinical services, created feelings of anxiety and guilt. However, these feelings had a positive

effect, for they provided a source of energy that helped to maintain momentum and persistence with the implementation plan through periods of frustration.

It was observed that, with practice, completion of the patient assessment and follow-ups became more efficient. The pharmacist's satisfaction with the care provided increased because his or her impact on the patient's care was more visible to the pharmacist, to the other members of the health care team, and even to some patients. For example, upon a patient's discharge from the unit, it was satisfying to be able to say that the pharmacist had identified 5 DRPs, 3 had been resolved, 1 had been prevented, and the fifth would be addressed by the pharmacist on the ward. It was also rewarding to have several former MS-ICU patients return to the unit before discharge, remember their pharmacist, and show their appreciation for the care received.

One aspect of patient care that was frightening and new for pharmacists was dealing with responsibility for negative outcomes. After one such experience early in the MS-ICU implementation phase, it became obvious that an appropriate monitoring plan and a back-up system were crucial.

In the provision of pharmaceutical care, the pharmacist's role is clearly delineated and focussed on the patient's drug-related needs. This probably played a large role in the high acceptance of pharmaceutical care by other members of the health care team, as indicated by the high acceptance of recommended interventions and the positive comments from staff and residents, especially in phases II and III.

The manager's perspective

To facilitate successful implementation of pharmaceutical care, several considerations should be kept in mind. Both managers and practitioners must recognize that pharmaceutical care represents a major shift from current practice, and staff must share with managers their vision of this new practice. As with any change, acceptance is greater if the practitioners participate in the planning, implementation, and evaluation stages. Practitioners need the pharmacy manager's support to implement this form of practice, from both resource and emotional perspectives. Modifying a practice to one that incorporates pharmaceutical care will require practitioners to undergo a change in the way they think and practice. Individual capability and workload may act as barriers to implementation and need to be addressed. Appropriate re-education and drug information support must be provided. Our staff education program for pharmaceutical care required approximately 18 to 21 contact hours in a structured workshop setting before practitioners felt ready to start providing pharmaceutical care to one patient at a time. Although practitioners commonly requested a shorter patient assessment form, use of a shorter form should be delayed until the process is well understood and the practitioner demonstrates competency. Having an enthusiastic, dedicated person in charge of the change makes a big difference in the speed of progressive implementation steps. In addition, designating someone to monitor progress, preferably the department head, is important to maintain momentum. The effort to bring about such a change is worthwhile from an administrative perspective, in that pharmacists are trained to function independently as health care practitioners, and it creates a structure for systematic provision of patient care.

CONCLUSION

Our pilot project demonstrated that it is feasible for pharmacists in a critical care setting to deliver patient care using the pharmaceutical care model. Initial impact data indicated many benefits of changing our practice to one based on the provision of pharmaceutical care, and 3 main outcomes were identified. First, pharmaceutical care provided a satisfying role for the pharmacist: there was a clear focus on responsibilities that contribute to patient care and are easy to communicate to other health care professionals. Second, the systematic process identified more DRPs and patients in need of treatment. Third, pharmaceutical care provided a structure involving a standardized system for delivering patient care, which thereby ensured a system of accountability.

ACKNOWLEDGEMENTS

The authors would like to acknowledge the assistance of Nancy Winslade, PharmD, and Don Perrier, PhD, from the Faculty of Pharmacy, University of Toronto, and Linda Strand, PhD, from the University of Minnesota, Rochester, for their leadership and guidance in the development of this pharmaceutical care practice; Elaine Tom, BScPhm, who provided clinical back-up during various stages of implementation; and Tom Einerson, PhD, for reviewing the manuscript.

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