Applying the pharmaceutical care model to assess pharmacist services in a primary care setting

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Introduction

Within the past 10 years, close to 200 family health teams have been established in Ontario. Many of them include pharmacists as part of the teams. Here at the North York Family Health Team (NYFHT), there are 3 pharmacists working in an interprofessional team environment with about 80 family physicians, as well as a health care team of nurses/nurse practitioners, dietitians, social workers, a chiropodist and a physician assistant. Pharmacists are consulted either by the patient directly during appointments or by physicians and other health care providers regarding pharmacotherapy for specific patients through electronic communication or “hallway” conversations. At this time, pharmacist services may vary widely from one family health team to another, and there is currently no well-established framework to assess pharmacist services in a primary care setting.

Objectives

Pharmaceutical care, as described by Cipolle et al.,¹ is a professional model of practice that provides medication management services to patients. It involves the identification and resolution of drug therapy problems (DTPs), with the goal of optimizing pharmacotherapy and improving patient outcome. In this report, we attempt to apply the pharmaceutical care model to characterize pharmacist services within our family health team and to benchmark the clinical outcome of pharmacist interventions.

Methods

After being consulted by patients or other health care providers, the pharmacist enters specific information about the consultation into an electronic online portal (maintained by FHT Stats: <https://secure.fhtstats.net/>) with a preset form adapted from the pharmaceutical care practice model.¹ Information collected includes the disease condition(s) consulted on, the category of DTPs identified, the interventions taken to address the DTPs, the patient outcome at follow-up, as well as the amount of time spent as a workload measurement.

Results

Data have been consistently collected since October 2013, and reports were generated for the 2-year time period between October 2013 and September 2015. The pharmacists were consulted on a total of 1799 patients. The top 10 medical conditions that pharmacists were most often consulted on (in decreasing order of frequency as a percentage of all consultations) were infectious diseases and immunization (9%), mental health conditions (8.4%), diabetes (8%), chronic pain and musculoskeletal conditions (7.9%), hematological conditions including international normalized ratio management (7.4%), hypertension and dyslipidemia (6.3%), women’s health issues including medication use during pregnancy and lactation (5.2%), gastrointestinal conditions (5%), respiratory conditions (including smoking cessation; 3%)

FIGURE 1 Drug therapy problems (DTPs) identified by pharmacists at initial patient consultations

and neurological conditions (such as seizures, migraines, Parkinson's disease and dementia). It is expected that the above statistics would vary significantly across different primary care sites and may change from time to time, depending on factors such as the demographics and socioeconomic status of the local population, type of clinical programs available and the changing clinical and quality improvement priorities identified.

Figure 1 shows the DTP categories identified by the pharmacist at initial patient consultations and their frequency as a percentage of all DTPs identified. A total of 1634 DTPs were identified. The DTP categories were defined by Cipolle et al.¹ The results are remarkably similar to those reported by Cipolle et al., whose findings were based on a pilot sample of 22,694 patients from their Assurance Pharmaceutical Care Documentation System database between April 2006 and September 2010. Their patients were provided care by practitioners in community pharmacies, ambulatory clinics, or referred by a physician for pharmaceutical care services.¹ Cipolle et al. did not report on the proportion of patients for whom no DTPs were found at the initial assessment. At the NYFHT, no DTPs were found in about 12% of the patients who were referred to the pharmacist for assessment. For these patients, further education, reassurance and monitoring were often provided.

Two categories of DTPs as defined by Cipolle et al., "dosage too low" and "dosage too high," were combined into one: "inappropriate dosage." In practice, this is often helpful in situations in which the patient starts to experience

dosage-dependent side effects before an optimal dose is reached for effectiveness. For example, the opioid dosage of patients with chronic pain may need to be further increased despite side effects, as the overall benefit outweighs the risk. Also, patients on insulin may have too high a dose at a certain time of the day but too low a dose at another time of the day, making it easier to classify such a DTP under the single category of "inappropriate dosage."

Figure 2 shows the patient outcome at 1430 follow-up visits. As defined by Cipolle et al., the outcome status at follow-up is assessed to be "resolved," "stable," "improved," "partially improved," "unimproved," "worsened," "failure," or "expired."¹ The objective definitions and examples for each of the outcome statuses are listed in Appendix 1 (available in the online version of the article). Positive outcome (original condition was resolved, stable, improved, or partially improved) was seen in 79.2% of patients at follow-up. As part of a quality assurance initiative, we retrospectively audited 10 consecutive patients with diabetes seen by the pharmacist as part of the interdisciplinary team of the Diabetes Education Program in the period from June 2015 to March 2016 to initiate basal insulin therapy. The pharmacist, along with the diabetes nurse at times, then followed up with the patient in person or by telephone to titrate the insulin to the target dose and monitored the patient to help ensure safety and efficacy of therapy. In 3 to 6 months after the initial assessment, the average hemoglobin A1c of these patients had reduced from the baseline of 10 ($\pm 1.9\%$) to 8% ($\pm 0.4\%$). At follow-up, 8 of the 10 patients

FIGURE 2 Patient outcome at follow-up (in-person or phone visits)*

*See Appendix 1.

had significantly improved, with hemoglobin A1c reduced by at least 1%, whereas the other 2 patients were unimproved or slightly worsened for various reasons. The results from this mini-audit on a small subset of all the patients seen and followed by the pharmacist were consistent with the overall results reported above. Ongoing assessments, interventions, monitoring and follow-ups were offered to help all patients reach their treatment goals.

Discussion

This study has used a common framework, the pharmaceutical care model, to assess pharmacist services based on patient outcome in a primary care setting, regardless of the patient's underlying medical condition. Positive clinical outcome was seen in about 80% of patients at follow-up. Previous studies have demonstrated the positive clinical impact of pharmacist services on managing specific chronic diseases, such as diabetes or hypertension.^{2,3} The current study demonstrates that it is possible to use a standardized method to evaluate the impact of pharmacist services on the outcome of patients with different clinical conditions.

The Canadian health care system has been under increasing financial pressure to take care of a higher number of and more complex patients with fewer resources. In recent years, the role of the pharmacist has expanded beyond traditional dispensing to provide medication review and management services. According to Cipolle

et al.,¹ the return on investment (ROI) of medication management services in the United States has been estimated to average around 3:1 to 5:1 and can be as high as 12:1, resulting in a reduction in the direct mean medical cost of between \$1200 and \$1872 per patient per year for each of the first 5 years for those patients with chronic diseases such as diabetes, cardiovascular health issues, asthma and depression. In Canada, a systematic review by the Canadian Health Services Research Foundation in 2012 pointed out that integrating pharmacists into primary care practice has been shown to be effective in improving a number of clinical health outcomes.⁴ The report also suggested that pharmacist integration in primary care has the potential to be cost-effective based on the estimated ROI, especially in the management of some common chronic diseases, including hypertension and diabetes. A more recent review published in 2016 on the health and economic evidence for the value of pharmacy services in Canada also suggested that team-based care, in which pharmacists collaborate with other health professionals to co-manage the care of patients with some chronic diseases, such as cardiovascular disease and related conditions, asthma and chronic obstructive pulmonary disease, smoking cessation and neuropsychological health, as well as to assess and prescribe treatment for ambulatory conditions (also known as minor ailments), has the potential to improve patient outcome and be cost-effective.⁵ In our experience, the recently

expanded scope of practice for pharmacists in Ontario to adapt and renew prescriptions and to prescribe medications for smoking cessation has helped make interprofessional collaboration between pharmacists and other health care professionals more seamless in the provision of care to patients. In other provinces, pharmacists are also beginning to be able to prescribe for some common ambulatory conditions and order laboratory testing to monitor the efficacy and safety of pharmacotherapy. Having a standardized way to measure the outcome of pharmacist interventions will be crucial in assessing the impact of various pharmacist services and the changes anticipated to occur in the near future.

Interpractitioner variability was not assessed in this study, although all 3 pharmacists in this study are familiar with the definitions of the various categories of DTPs and outcomes as described by Cipolle et al.¹ To reduce this variability, the 3 pharmacists met to review together prior to collecting data to improve standardization. Also, some patients were lost to follow-up, estimated to be less than 5%, because of patients either not showing up at scheduled appointments or not being reachable by telephone.

This was a single-site study. The results may therefore not be generalizable to other family health teams or primary care settings. Future studies involving multiple sites and practices, including ambulatory clinics, community pharmacies and even hospitals, would provide valuable insights on how best to incorporate the pharmaceutical care practice model in the assessment of pharmacist services at different settings.

Patient satisfaction, access to service and quality-of-life measures were not included in this study, although these are important factors to consider in the provision of pharmaceutical care. Including these measures can help assess pharmacist services more comprehensively from the patient's point of view and should be considered for future studies.

This study also did not investigate how the patient outcomes were linked to the rate of hospital admissions or the frequency of visits to the family doctor or other specialists and the associated financial implications. Further research to better characterize the extent of health and economic impact of pharmacist services will help Canadians achieve high-quality health care services more efficiently and cost effectively. ■

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Author Contributions: E. Lui wrote the initial draft of the article. R. Ha and C. Truong reviewed and revised the article. All authors approved the final version of the article.

Declaration of Conflicting Interests: The authors declared no potential conflicts of interest with respect to the research, authorship and/or publication of this article.

Funding: The authors received no financial support for the research, authorship and/or publication of this article.

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