The Effect of Pharmacy-Led, Small-Group Academic Detailing on Prescribing Patterns in an Ambulatory Care Clinic

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Abstract

Background: While academic detailing seems to be the most promising intervention to improve prescribing patterns, implementation could be challenging for small community practices. Objective: A pharmacy-led, interactive, and tailored small-group academic detailing in a federally qualified health center is described. The primary objective of the study was to determine if the small-group academic detailing improved the prescribing patterns of the medical providers for select disease states: type 2 diabetes mellitus (T2DM), hyperlipidemia (HLD), and essential hypertension (HTN). Methods: Prescribing patterns in a federally qualified health center were examined in relation to small-group academic detailing sessions from April 2010 to March 2015. The markers for improvement were the increase in utilizing metformin and statins in patients diagnosed with T2DM and HLD, respectively, and the reduction of β-blocker use in patients diagnosed with essential HTN. Changes in prescribing patterns were evaluated using Pearson’s χ² and Fisher’s exact tests. Results: The average number of active, adult patients with T2DM, HLD, and essential HTN was 839, 1768, and 2547, respectively. Utilization of metformin in T2DM increased from 5.5% at baseline to 37.7%, statin utilization in HLD increased from 77.1% to 86.9%, and β-blocker use in HTN decreased from 17.9% to 13.8% (P < .005). Conclusions: A pharmacy-led, small-group academic detailing program improved and maintained appropriate prescribing patterns in an underserved community practice. This study serves as a successful pilot emphasizing the pharmacist’s role as an educator and a resource to medical providers regarding appropriate medication use.

Keywords
prescribing patterns, ambulatory care, medical education, clinical pharmacy, community practice, academic detailing

Background

Provider prescribing practices have a significant impact on patient outcomes and health care costs. Compared with providers in other countries, those in the United States tend to prescribe newer and more costly medications that are not necessarily associated with better outcomes.1 Furthermore, research has shown that adopting evidence-based recommendations by providers in the United States is slow and incomplete.2-4

To improve providers’ prescribing practices, pharmacy benefit managers and health systems have utilized various interventions. Formulary restrictions have shown to have a strong impact on prescribing patterns of primary care providers (PCPs), limiting the use of costly medications to patients that would benefit most from these medications.5,6 However, the use of formulary restrictions could lead to reduced patient and provider satisfaction, delay of medication access, and avoidance of medication use despite a need.7

Additionally, since formulary restrictions focus on cost containment, it usually does not target low-cost generic medications. Alternatively, computer decision support systems have not been consistently effective in improving providers’ prescribing practices.8,9 Similarly, traditional educational presentations, commonly used in institutional settings to train medical residents, have inconsistent effect.8,9

While formulary restrictions, computer decisions support systems, and educational programs have limitations and/or inconsistent results, academic detailing has shown to be consistently effective in improving prescribing
practices. Academic detailing is an interactive, tailored, one-on-one educational outreach by an experienced health care professional to improve clinical outcomes and reduce costs. Published studies evaluating the impact of academic detailing, whether pharmacy-driven or not, describe the success of impermanent academic detailing interventions, focused around a specific prescribing issue, in improving the short-term outcomes with the longest follow-up at 1-year post intervention.

**Objective**

This article will describe the development and implementation of small-group academic detailing in a community practice. The primary objective of the study was to determine if the small-group academic detailing (intervention) improved the prescribing patterns (outcome measure) of the medical providers for select disease states: type 2 diabetes mellitus (T2DM), hypertension (HTN), and hyperlipidemia (HLD). The markers for improvement were the increase in utilizing metformin and statins in patients diagnosed with T2DM and HLD, respectively, and the reduction of β-blocker use in patients diagnosed with essential HTN.

The selected markers were linked to the main educational messages that were covered in the program. For T2DM, the American Diabetes Association guidelines recommended metformin as the first-line therapy since the initiation of the in-service program in 2010. The pharmacy program promoted statin use over non-statin drugs since its first HLD in-service in January 2011, prior to the American College of Cardiology/American Heart Association guidelines released in 2013. Although the National Cholesterol Education Program–Adult Treatment Panel (NCEP-ATP) III guidelines released in 2002 did not state a strong preference for statins over non-statin classes, the pharmacy program promoted statin use based on the compiling evidence, which demonstrated their superiority to reduce fatal cardiovascular events compared with non-statin medications. Similarly, for HTN, the pharmacy program recommended against the use of β-blockers in patients without cardiovascular disease, even though the Seventh Report of the Joint National Committee on Prevention, Detection, Evaluation, and Treatment of High Blood Pressure, released in 2004, considered β-blockers a first-line option for treatment of essential HTN. The pharmacy recommendation was based on the building evidence for the superiority of thiazides, angiotensin-converting enzyme inhibitors/angiotensin II receptor blockers, and calcium channel blockers over β-blockers in reducing primary events, which was confirmed later in the 2014 Evidence-Based Guideline for the Management of High Blood Pressure in Adults.

**Methods**

**Participants and Setting**

AxessPointe is a federally qualified health center (FQHC) with 5 locations and provides services to approximately 20,000 unique patients, offering family medicine, dental, and both clinical and dispensing pharmacy services to medically underserved, underinsured, and uninsured patients. AxessPointe is staffed by 5 physicians, 10 nurse practitioners, 5 dentists, 4 pharmacists, and 3 pharmacy residents. On-site pharmacies are available at 3 sites. However, clinical pharmacy services are offered at all locations. The pharmacists are fully integrated within AxessPointe through direct access to the electronic health records (EHRs) and consult agreements.

The underuse of cost-effective and evidence-based therapeutic options prompted the pharmacy department at AxessPointe Community Health Center to seek interventions to improve the providers’ prescribing practices. For example, in 2010, only 29% of patients being seen at the clinic with persistent asthma were on controller medications, and the generic utilization rate was 58%. Areas for improvements were recognized through quality measures and prescribing reports in addition to common drug therapy problems (DTP) identified by the clinic’s pharmacists during medication therapy management (MTM) encounters.

**Interventions**

In October 2010, in order to improve patient care by promptly adopting evidence-based recommendations and to boost quality measures tracked by stakeholders, the pharmacy department facilitated monthly academic detailing sessions (in-services) to the medical providers. However, to effectively extend its limited resources, the pharmacy department intervention targeted its entire small group of medical providers at once rather than targeting each provider individually. Still, in some situations, individual providers were approached for a focused intervention or to seek input. The purpose of this program was to improve prescribing practices through a series of interactive and tailored small-group academic detailing sessions provided to the medical team by the pharmacy department. The program goals included (1) developing interactive, ambulatory care–focused content tailored to providers’ needs; (2) utilize providers’ feedback to improve the program; and (3) assess the effect of the program on the prescribing patterns of the medical providers.

The 1-hour in-service was delivered in-person at an alternate clinic site every month through PowerPoint presentations. Providers from other sites were encouraged to travel to the presentation location, and slides were sent in advance to all medical providers by email. Pharmacists,
pharmacy residents, and pharmacy students developed and delivered the presentations. In general, pharmacy students and residents were given 2 to 3 weeks to develop the slides and another week to finalize it based on preceptor comments. Pharmacists assigned the in-services with a list of topics to cover and educational messages to highlight. Additionally, pharmacists provided feedback about the materials, format, and the presentation approach. When applicable, the medical director was assigned brief portions (5-10 minutes) related to diagnosis.

The topics were planned in advance for the entire year. Yet, some flexibility was allowed to account for emerged priorities and needs within the clinic. The medical director was involved in setting the topic schedule and the educational messages for each topic. The topics presented covered common disease states seen in the primary care setting such as T2DM, HTN, HLD, depression, pain, asthma, and acid reflux. With a long list of common disease states to be covered, topics were repeated only to account for new and relevant studies, medications, and/or guidelines. However, topics such as T2DM, HTN, and HLD were covered more frequently (ie, biennially) due to the large population of patients at the clinic with these conditions.

The majority of the in-service was dedicated to pharmacological treatment including recommended therapies, brief overview of mechanism of action, dosing, monitoring parameters, relevant drug interactions, common and serious adverse drug reactions, tips to mitigate common and serious adverse drug reactions, and practice pearls. Open discussions over supportive studies and practice cases were utilized to interactively hone in on areas of controversy and/or those needing improvement among the medical providers.

In July 2012, the pharmacy department offered continuing medical education (CME) credit for the program in collaboration with Northeast Ohio Medical University (NEOMED). The CME credit provided an incentive to providers to attend the program.

Design and Outcome

In 2016, the pharmacy department conducted a quality improvement retrospective analysis to evaluate the impact of the pharmacy-led, small-group academic detailing program on the markers for improvement. The study was reviewed and determined exempt by the institutional review board of NEOMED. To follow an intent-to-treat analysis structure and to reduce the selection bias, the prescribing patterns of all PCPs at AxessPointe were included in the primary analysis, regardless of program attendance, level of engagement, and period of employment. For each of the 3 disease states evaluated (T2DM, HTN, and HLD), active patients (defined as being seen at least once in the past 12 months), 18 years of age or older, with the corresponding International Classification of Diseases (ICD)-9 codes were included for each quarter starting from April 2010 until the end of March 2015 (Table 1). For each disease state, the drug classes utilized to manage the identified patients were determined for each quarter. AxessPointe implemented an EHR system in March 2010. Data after March 2015 were omitted due to the transition to ICD-10, which affected the accuracy of EHR reporting. Quarterly data were imported into SPSS v24.0 software (IBM Corporation, Armonk, NY) and aggregated by intervention epoch based on the timing of the relevant in-services. For HTN and HLD, distributional equivalence of drug classes, across each of the study epochs, was tested via Pearson’s χ² test. For T2DM, distributional equivalence was tested via Fisher’s exact test due to sparse expected cell counts. In the presence of overall significant differences across the study epochs (P < .05 via 2-sided testing), Bonferroni-adjusted z-tests were performed to determine which post-intervention epochs were statistically distinct. The Bonferroni adjustment required P < .005 via 2-sided testing for statistical significance due to multiple testing.

Providers’ feedback about the program was collected in 2 ways: (1) CME evaluation form collected at the end of each session and (2) periodic surveys of medical providers’ satisfaction with the pharmacy services provided at AxessPointe, including the monthly in-services. The feedback included the providers’ perception of the program value, ideas to enhance the program, and future topics of interest.

Results

The average program attendance was 85%. The changes in utilization of major drug classes to manage active, adult patients with T2DM, HTN, and HLD are shown in relation to the in-services covering these disease states in Figures 1, 2, and 3, respectively. There was an overall change within each disease state across the study epochs (P < .001 for each). Bonferroni-adjusted z-tests show that the metformin use increased significantly from the baseline value of 5.5% across post-baseline epochs (P < .005). Additionally, the percentage of metformin showed another significant increase after the second intervention from 24.7% to 34.8% (P < .005), which was maintained at the third post-baseline epoch at a value of 37.7% (Table 2). For HTN, the proportion of β-blocker use decreased significantly from the pre-intervention baseline value of 17.9% to statistically significant post-baseline value of 14.5% (P < .005). The lower prescribing level was maintained till the end of the data collection period. Last, the percentage of statins did not significantly change after the first in-service. However, after the second and third interventions, the percentage of statins increased significantly at each epoch from 75.8% to 82.6% and 86.9%, respectively (P < .005 for each pairwise epoch comparison).
Discussion

Cost-effective evidence-based prescribing is important to meet quality measures and to provide higher quality care at a lower cost. A literature review revealed that academic detailing was the most promising intervention with consistent results to improve prescribing patterns. However, the widespread utilization of academic detailing is likely limited by variation of effect from small to modest, inability to explain this variation, and lack of cost-effectiveness studies.8-10 Additionally, implementing academic detailing to improve PCP prescribing practices could be challenging for small community practices with limited resources. To meet its responsibility to improve the medication use process, the pharmacy department launched an innovative, interactive, and tailored in-service program that adopts the principles of academic detailing. Yet, to effectively extend its limited resources, the pharmacy department delivered the program to its entire small group of providers at once and utilized pharmacy residents and students in the delivery of the educational sessions. To tailor the educational messages to the medical providers’ needs and to track progress, 2 mechanisms were used: (1) quality measures and prescribing reports and (2) common DTP identified during pharmacist-led MTM encounters. Additionally, the identified DTP and providers’ responses to the pharmacists’ recommendations were utilized as a feedback mechanism to fine-tune the educational messages and to modify the approach. For example, AxessPointe pharmacists identified multiple DTP related to medical provider’s misunderstanding of the cough associated with angiotensin-converting enzyme inhibitors and misconception of their combined use with angiotensin II receptor blockers. Therefore, the first HTN in-service contained figures and studies to clarify both issues.24,25 The educational messages included encouraging the use of angiotensin II receptor blockers for eligible patients who experienced a cough associated with angiotensin-converting enzyme inhibitors and to limit the combined use of these drugs. During the same in-service, more emphasis was placed on limiting the use of β-blockers in general patient

<table>
<thead>
<tr>
<th>Table 1. Average Number of Patients Includeda.</th>
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<tr>
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<tr>
<td>Average number of active patients (defined as being seen at least once in the past 12 months)</td>
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<tr>
<td>Average number of active, adult (18 years of age or older) patients</td>
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<tr>
<td>Average number of active, adult patients with type 2 diabetes</td>
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<tr>
<td>Average number of active, adult patients with hyperlipidemia</td>
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<tr>
<td>Average number of active, adult patients with essential hypertension</td>
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*aNumber of patients was determined for each quarter starting from April 2010 until the end of March 2015.
Figure 2. Change in utilization of major antihypertensive agents to manage active, adult patients with hypertension in relation to in-services covering the management of hypertension.

Figure 3. Change in utilization of major antihyperlipidemic agents to manage active, adult patients with hyperlipidemia in relation to in-services covering the management of hyperlipidemia.
Table 2. Utilization of Metformin, β-Blockers, and Statins to Manage Active, Adult Patients With Type 2 Diabetes Mellitus, Hypertension, and Hyperlipidemia, Respectively, Aggregated by Intervention Epoch Based on the Timing of the Relevant Interventions.

<table>
<thead>
<tr>
<th>Epoch</th>
<th>Pre-Intervention Baseline</th>
<th>First</th>
<th>Second</th>
<th>Third</th>
</tr>
</thead>
<tbody>
<tr>
<td>Metformin</td>
<td>5.5%</td>
<td>24.7%</td>
<td>34.8%</td>
<td>37.7%</td>
</tr>
<tr>
<td>β-Blockers</td>
<td>17.9%</td>
<td>14.5%</td>
<td>14.0%</td>
<td>13.8%</td>
</tr>
<tr>
<td>Statins</td>
<td>77.1%</td>
<td>75.8%</td>
<td>82.6%</td>
<td>86.9%</td>
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*Statistically significant (P < .005) change from the prior epoch via 2-sided Bonferroni-adjusted z-tests.

populations with HTN, despite the lack of an updated guideline to reflect the new accumulating evidence of β-blocker use in this patient population.\textsuperscript{21-23} Unwarranted use of β-blockers was noticed while evaluating the top 20 medications prescribed by AxessPointe and was also noticed during MTM encounters. Due to the improvement after the first HTN in-service, the second HTN in-service slightly shifted focus to another subsequent issue: inappropriate use of clonidine to treat hypertensive urgency.

Results from the present analysis demonstrate that the pharmacy-led, small-group academic detailing had a significant impact on improving and sustaining the outpatient prescribing patterns of an ambulatory care practice across 3 different disease states. The increases in metformin use (from 5.5% to 24.7%) and the reduction in β-blocker use (from 17.9% to 14.5%) were statistically significant and immediately followed the first intervention in comparison to a baseline of 3 quarters. Given that the NCEP-ATP III did not state a strong preference for statin use over non-statin classes, providers’ concern about the claimed liver toxicity risk with statin use counteracted the pharmacy department push to favor statins when managing HLD. This concern, which was identified through the interactive communications at the first HLD in-service, was addressed by the Food and Drug Administration decision, released in February 2013. The Food and Drug Administration removed the liver enzymes monitoring requirements during statin therapy, owing to the recently found low risk of liver injury associated with statin use.\textsuperscript{26} Therefore, the pharmacy department changed its program schedule to share the new data with the providers in March 2012, which resulted in a statistically significant increase of statin use from 75.8% to 82.6%. This was followed by another statistically significant increase to 86.9% after the third HLD in-service. The increase in metformin and statin prescribing accompanied a reduction in thiazolidinediones and fibrates prescribing, respectively, despite the marketing efforts of the pharmaceutical representatives promoting the medications in these 2 classes during that time period. For all 3 disease states, the improvements were maintained for over 3 years, until the end of the data collection period, despite AxessPointe’s growth in number of sites, patients, and providers. The pharmacy-led program did not only target the slow and incomplete adaptation of published guidelines by American providers,\textsuperscript{2-4} but it also prompted change in response to newer evidence and prior to changes in HTN and HLD guidelines.

Beyond the measured study markers, the prescribing practices have seemingly improved for other disease states that were covered by the pharmacy program. For example, the percentage of patients with persistent asthma on controller medications (a reported quality measure for FQHCs) has increased from 29% in 2010 to 62% in 2014 and 89% in 2016. Additionally, as the program focused on the appropriate use of cost-effective therapies, AxessPointe’s generic utilization rate has increased form 58% in 2010 to 87% in 2013. The generic utilization rate has remained consistently above 85% since then, which allowed AxessPointe to be exempt from formulary restrictions by a major health insurance provider in the state.

The providers’ feedback helped improve the program. In January 2013, and in response to the providers’ feedback about the travelling time and missing in-services on scheduled days off, the pharmacy department utilized technology in the form of a videoconferencing software to broadcast the program. In 2014, PCPs positively commented on a session that only utilized application cases to review insulin use featuring actual patients managed by the pharmacists. As a result, the pharmacy department has repeated this format whenever applicable.

This quality improvement study was limited by the quasi-experimental design, incomplete documentation in the EHR, and by EHR reporting limitations. For example, EHR reporting limitations prevented accounting for metformin contraindications while tracking the changes in the prescribing patterns. Similarly, authors were not able to exclude patients on β-blockers for indications other than essential HTN. Another limitation is the lack of the clinical data to signify the impact of the program on the clinical outcomes. However, this study confirmed the immediate and significant impact of the small-group academic detailing program on multiple prescribing issues. Additionally, this study adds to the academic detailing published studies by presenting data on a long-term intervention beyond the published 1-year follow-up.\textsuperscript{13,14} By evaluating the program in a multisite FQHC and by including all providers regardless of their period of employment or level of engagement, the results of this program could be applicable to the general community practice settings in the United States. Further study is needed to evaluate the cost-effectiveness of this intervention and the ability to replicate it in larger settings without compromising the tailored and interactive educational approach.
Conclusions

A pharmacy-led, small-group academic detailing program in an underserved community practice was successful in achieving 3 goals: (1) developing interactive, ambulatory-care focused content tailored to the providers’ needs; (2) utilizing providers’ feedback to improve the program; and (3) confirming the positive impact of the program on prescribing patterns of the medical providers. This project and quality improvement study serves as a successful pilot supporting the immediate and long-term benefits of a pharmacy-led, small-group academic detailing program. It also emphasizes the pharmacist’s role as an educator and a resource to the medical providers regarding appropriate medication use.

Declaration of Conflicting Interests

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