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An Advanced Registered Nurse Practitioner-Community Pharmacist Team-Based Approach to Managing Hypertension in a Rural Community Pharmacy

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Abstract

Purpose: To evaluate the implementation of an Advanced Registered Nurse Practitioner (ARNP) – community pharmacist team-based collaborative model for managing hypertension in a rural, Midwestern, community pharmacy and family medicine clinic using the core functions of the patient centered medical home model (PCMH).

Methods: Thirteen patients with uncontrolled hypertension, 5 of who were newly diagnosed, were referred to the pharmacist by the ARNP. The pharmacist rechecked the patient's blood pressure (BP) every 2 weeks after referral and made drug therapy change recommendations to the ARNP if the patient was not below goal.

Results: Following the intervention, the average SBP and DBP decreased 24 mmHg and 12mmHg, respectively. The pharmacists made 21 recommendations (dose increase (11), add a medication (6), change a medication (2), and addition of an adherence tool (2)), 100% of which were accepted by the ARNP.

Conclusion: A team-based approach to managing hypertension in a rural community pharmacy and family medicine clinic was an effective way to lower blood pressure. In addition, the core functions of the PCMH model can be delivered in a small family medicine practice. Creating specific expectations for each member of the team prior to referring patients improved the efficiency of the intervention.

Background

The Agency for Healthcare Research and Quality (AHRQ) defines the patient centered medical home model (PCMH) as an organization of primary care that delivers the core function of primary health care. These 5 functions include: 1) comprehensive care, 2) patient-centered, 3) coordinated care, 4) accessible services, and 5) quality and safety.¹ Creating a team of diverse care providers to meet the needs of the patient is commonly done in large organizations.² Access to rural primary care services continues to be a challenge for those with chronic diseases. While 25% of the U.S. population live in rural communities, only 10% of general practice physicians work in these rural communities.³ An American Academy of Nurse Practitioners 2009-2010 national survey showed that 17.8% of ARNPs practice in a rural setting.⁴ Smaller practices in rural settings can deliver similar levels of comprehensive care by linking themselves and their

patients to providers and services available in their communities.¹

Hypertension is a chronic disease that is poorly controlled in the United States.^{5,6} According to the CDC, 1 in 3 Americans, 67 million people, have hypertension. Of those, less than half, 47%, are controlled.⁷ One theory as to why hypertension is so poorly controlled despite many patient-physician interactions is time constraints during office visits that don't allow for the physician to address hypertension when it is not the patient's chief complaint.⁸ Previous literature has also suggested that medications are not optimally used when blood pressure is uncontrolled.^{9,10}

Studies have found that while education is important, used alone it is not an effective approach in lowering BP.^{11,12} Physician-pharmacist team-based care has been utilized as a much more intensive approach to identify, manage and control hypertension.¹³ According to an analysis of clinical trials conducted by the Stanford-UCSF Evidence-based Practice Center for the AHRQ, interdisciplinary management of hypertension was one of the most effective strategies.¹²

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A review of studies examining the incorporation of pharmacists into ambulatory and family medicine clinics has shown improvement in patient care.¹⁴ Community pharmacists in a chain pharmacy setting also have been shown to improve BP control and to increase adherence to medications.^{15,16} The additional steps of having the community pharmacist monitor BP, educate patients about lifestyle changes and the importance of medication adherence, and making specific medication related recommendations to the primary care provider (PCP) are thought to lead to the improvement in blood pressure control.

The purpose of this study was to determine if a team-based collaborative model between an ARNP and a community pharmacist in a rural setting would be effective at managing uncontrolled HTN.

Setting and Practice Description

The project was conducted at Mercy Family Pharmacy in Cascade, IA, a rural community pharmacy located in the same building as a family medicine clinic, though under separate ownership. Pharmacists at the site routinely provide clinical pharmacy services, including an anticoagulation clinic with a collaborative practice agreement, immunization administration, medication therapy management (MTM), blood pressure monitoring, cholesterol screening, and diabetes education. The pharmacy employs two pharmacists, with one pharmacist staffing daily along with two pharmacy technicians and an average daily volume of 150-200 prescriptions.

The family medicine clinic employs one full-time ARNP, one part-time ARNP and one part-time MD, with only one provider seeing patients each day. The total number of patients seen by these providers averages 30 patients per day, with 60% of the patient visits being for acute conditions. The patient population ranges from newborn and pediatric to geriatric.

Methods

At the start of the project, the two pharmacists and the ARNP participated in a face-to-face 60-minute team building session during which they discussed their team approach. The approach was to translate a proven physician-pharmacist team management within-clinic model in a community pharmacy where the team members were not working within a clinic for the same employer. Decisions were made on how to identify patients for team care, practitioner roles, and communication processes. The team completed a team worksheet that described their decisions for these topics (Table 1). A copy of the completed team worksheet was given

to each team member for future reference. Within one month of starting the hypertension clinic, the second ARNP and MD began referring patients for the pharmacist to manage. These two individuals did not participate in the initial team building session, but were briefed on specifics. Data from patients referred by the MD and second ARNP are not included in this manuscript.

A toolkit document on team management of BP was used to support establishing and maintaining the provider-pharmacist team. Both a printed version and an electronic version (E.g. pdf files) of the toolkit were given to the practitioners during the team building session. Topics addressed in the toolkit included: project team contact information, description of the team model to BP management, evidence supporting the team approach, goals for the project, references to the Seventh Report of the Joint National Committee on Prevention, Detection, Evaluation, and Treatment of High Blood Pressure (JNC7)¹⁷, detailed suggestions for team management of BP, sample interventions to address uncontrolled BP, and instructions for proper measurement of BP. In addition, numerous one-page documents suitable for patient education (E.g. diet, home BP monitoring) were included in the materials.¹⁸

Patients were identified by multiple methods. First, all patients newly diagnosed with hypertension by the ARNP were referred to the pharmacy for follow-up monitoring. Second, poorly controlled patients, identified by the ARNP as patients who have had multiple follow-up visits to address their hypertension, were referred to the pharmacist. Third, patients already diagnosed with hypertension who filled a new hypertensive medication prescribed by the ARNP at the pharmacy were identified by the pharmacist and enrolled in the team-based hypertension management clinic.

Each pharmacist reviewed proper blood pressure technique and was trained to measure BP using standardized guidelines.¹⁹ BP was measured 3 times using an automated Omron BP-785 device. The second and third BP values at each visit were averaged and used to determine the BP value. Patients were asked if they had any blood work done in the last 5 days or had a mastectomy, and if so, the arm opposite where blood was taken from or opposite side the mastectomy occurred was used. It was decided prior to seeing any patients that since the pharmacist had read-only access to the electronic medical record (EMR), the pharmacist would record BP readings for each patient in a Microsoft Excel spreadsheet and provide these data to the clinic nurse on a weekly basis so she could enter the readings into the EMR in order to improve continuity of care.

Each patient enrolled in the team-based hypertension management clinic received an initial visit with the pharmacist ranging from 30-45 minutes per session. During this visit, the pharmacists educated the patients on proper home blood pressure monitoring technique as well as measured the circumference of the patient's arm to determine the appropriate cuff size. The pharmacist discussed the importance of blood pressure control, risks associated with uncontrolled blood pressure, how their blood pressure medications work, possible adverse effects from their medications, how to take their medications, and lifestyle modifications like physical activity and the Dietary Approaches to Stop Hypertension (DASH) eating plan.²⁰

Patients were scheduled for a 2 week follow-up BP check at the conclusion of the initial visit using a Microsoft Outlook shared calendar accessible by the pharmacists and technicians. Patients were encouraged to check their BP daily and to keep a log of the readings, the date taken, the time of day taken, and any pertinent information that may have affected their readings (E.g. missed medication doses or taking over-the-counter medications). If the patient did not have a home BP monitoring device, model suggestions were made by the pharmacist and in some cases, home BP monitors were purchased from the pharmacy after the initial visit.

All patients in the team-based hypertension management clinic were documented in the pharmacy dispensing software program using a template created by one of the pharmacists to identify them as a hypertension patient as well as utilizing the prescription refill option as a reminder of Microsoft Outlook scheduled follow-up BP check appointments. The technician would put the "refill" in as a pending order to be processed the date prior to the appointment date. The technician would then call the patient the day prior to their follow-up appointment as a reminder.

At the 2 week follow-up appointment the pharmacist took the patient's BP, and if a patient's BP was not below goal, assessed as to why the appropriate reduction in BP was not obtained. If it was determined the patients were adherent to their medications and they were implementing the suggested lifestyle changes, then the pharmacist recommended to the PCP titration of BP medication doses, or the addition of an additional BP medication if already at maximum doses. Patients were seen at 2 week intervals until goal BP was achieved. These follow-up visits ranged from 5-15 minutes in length.

Results

All BP values used for analysis were extracted from the clinic EMR. Initial BP values were those readings documented by the ARNP prior to referring a patient to the pharmacist. Final BP values were those in the EMR closest to the April 2014 end date. A total of 13 patients with uncontrolled hypertension, five of who were newly diagnosed, were referred to the team-based hypertension management clinic by the ARNP starting February 2013, with the final patient referred March 2014. The initial average SBP and DBP readings were 157 mmHg and 98 mmHg, respectively. Following the intervention, the average SBP was 133 mmHg and DBP was 86 mmHg, a decrease of 24 mmHg and 12mmHg respectively. Each patient's initial and final BP, number of visits with the pharmacists, and if they reached BP goal are shown in Table 2. The pharmacists made 21 recommendations (dose increase (11), add a medication (6), change a medication (2), and addition of an adherence tool (2)), 100% of which were accepted by the ARNP.

The number of visits each patient had with the pharmacist ranged from two to 22. The patient with 22 visits had a weekly medbox filled by the pharmacy, due to his history of non-adherence and multiple uncontrolled chronic disease states. The next highest number of visits with the pharmacist was nine.

Discussion

The team-based collaborative model between the ARNP and pharmacists was implemented in a rural community pharmacy to manage hypertension. The success rate of this program is consistent with prior studies looking at a similar intervention in rural and urban community pharmacies.^{6,21} A system was established supporting the team-based approach. The system components included an effective process for identifying and referring patients, clear roles for the team members, trusting relations between the team members, and effective communication procedures. Given the growth of ARNPs in rural settings, these findings support the use of ARNP-community pharmacist team-based management as a viable approach for improving BP control for rural patients. Another factor making the team-based collaborative model a more effective approach to managing HTN is the expertise pharmacists have optimizing medication regimens. Studies have shown that pharmacists improve BP control through medication intensification.¹³ Addressing adherence also played a critical role in helping patients achieve goal BP. The pharmacist would determine, through interviews with the patient, whether poor adherence was intentional or unintentional. If unintentional, adherence aids would be recommended. If intentional, the pharmacist would work

with the patient identifying methods to overcome the barriers.

Additional factors that contributed to the success of this particular project included pharmacist access to the EMR, an established collaborative relationship with the ARNP, and the participation of the nurses in the clinic to facilitate communication between the pharmacist and the ARNP. It has been common practice for the pharmacist to provide curbside consults for the ARNP multiple times per day leading to a collaborative relationship. Since the number of healthcare practitioners in rural settings is limited, PCPs and community pharmacists should be able to establish working relationships in order to increase access to healthcare for patients in these communities. Such relationships provided an important platform to support the team management of HTN in this case. While this specific type of relationship may not be needed to implement a clinical pharmacy service in a community pharmacy setting, the development of relationships with other healthcare providers in the community may enhance the success of such a service.

This project was funded through a grant from the Iowa Department of Public Health to help defer some of the costs associated with a team-based model of \$1000 each for the clinic and the pharmacy. These costs primarily included the team building session and additional time spent by the ARNP and pharmacist collaborating on the hypertensive patients. No fees were available for the pharmacy visits. In many rural clinic settings it would not be financially feasible to employ a full-time clinical pharmacist, but a solution could be for one clinical pharmacist to share his/her time across multiple locations.

Future research is needed to determine if a team-based approach for managing hypertension between an ARNP and community pharmacist can reduce both SBP and DBP. In order to eliminate the possibility of cross-contamination of the intervention by adding a control group at the same clinic, a cluster-randomized study design, where clinics are randomized as opposed to individual subjects, would be preferred. A larger sample size should also be considered to help determine what impact the pharmacist intervention has on lowering BP.

Limitations

This project had limitations. First, the ability to expand this model to other settings may be difficult since the pharmacists had access to the EMR. However, with improving health information exchange it is likely more pharmacists will have access to EMRs in the future. Also, the pharmacists had an existing collaborative relationship with the ARNP, including a

collaborative practice agreement to independently manage anticoagulation. There was also no control group to compare the results to and it is unknown if the recommendations the pharmacists made to the ARNP impacted her prescribing habits for other patients in the clinic. We are unsure what component of the intervention decreased BP. In addition to the pharmacist recommendations for medication and lifestyle changes, it is possible it could have been increased frequencies of BP checks or some other confounding factor. Finally, no statistical testing was performed to analyze the data. Instead, average BPs have been reported, which likely tempers the conclusion of the pharmacists' impact on lowering BP.

Unfortunately, the amount of time spent by each pharmacist per each patient interaction was not documented until 6 months into the project. This information would help to determine if the intervention could be cost effective and a viable business model. The pharmacists were not able to submit reimbursement claims for their time to the patient's insurance companies as this was not a covered service. Thus, it is difficult to determine the cost-effectiveness of the team-based care to the pharmacy.

Conclusions

A team-based collaborative approach to managing hypertension may be an effective way to lower BP in a rural community pharmacy setting. ARNP-pharmacist team-based management models are unique since most clinics utilize physician-pharmacist models for team-based management of chronic disease. In addition, the core functions of the PCMH model can be delivered in a small family medicine practice. Outlining expectations for each team member helps create a workflow supporting the team-based approach. An existing collaborative relationship with the PCP as well as access to the EMR are additional resources that can add to the success of the service.

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Table 1. Team building worksheet

Prescriber's Roles	<ul style="list-style-type: none"> • Coordinate hypertension treatment • Refer patients to pharmacist - prn • Respond to pharmacist recommendations
Pharmacist's Roles	<ul style="list-style-type: none"> • Generate initial report of HTN patients • Conduct BP visits with patients • Communicate with physicians - prn • Patient education – prn • Charting/Log
Patient Identification	<ul style="list-style-type: none"> • Pharmacy generates initial list of common patients with HTN diagnosis • Physician identifies patients with new HTN diagnosis • Determine BP control status
Communication Strategies	<ul style="list-style-type: none"> • Faxes - Email – Face to Face – Phone – EMR's
Patient Follow-up Schedule	<ul style="list-style-type: none"> • • • •
Team Follow-up Session	<ul style="list-style-type: none"> • Recommended in 6-8 weeks • Debrief and comment • Implement modifications

Table 2. Initial and final BP readings and total visits with pharmacist

Subject	Initial BP (mmHg)	Final BP (mmHg)	Reached goal BP (*=yes)	Total visits with pharmacist
1	136/90	122/82	*	2
2	152/94	150/80		4
3	135/91	148/78		3
4	158/89	129/93	*	3
5	131/92	129/86	*	22
6	129/92	142/84		4
7	163/100	114/68	*	4
8	141/95	125/100		9
9	165/109	107/72	*	6
10	158/98	127/94		5
11	168/100	144/82	*	3
12	161/97	134/90		1
13	155/110	158/103		4