The Role of a Pharmacist on the Home Care Team

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Medication-related problems are common among home care clients who take many medications and have complex medical histories and health problems. Helping clients manage medications can be a challenge for all home care clinicians. By partnering with a college of pharmacy at a large university in the community, the agency successfully included a pharmacist as a member of their home care team.

A Collaborative Model Between a College of Pharmacy and a Visiting Nurse Agency

Medication-Related Problems in Home Care

Medication-related problems, including adverse drug events and nonadherence, lead to hospitalizations and emergency room visits. Such medication-related problems are common among home care clients who often take multiple medications to treat a number of chronic diseases, use multiple prescribers and pharmacies, and may have little-to-no supervision at home. Meredith et al. (2001) found that 30% of home care clients had possible medication errors when medication lists were assessed according to two criteria: the Beer's List and the Home Health Criteria, a consensus-based guideline for medication use in home care. This risk increased as the number of medications increased (Meredith et al., 2001). Therefore, it is important to identify, resolve, and prevent medication-related problems among home care clients to minimize hospitalizations and emergency room visits. Although pharmacists have expertise in resolving medication-related problems, few home care agencies have a pharmacist integrated within their care team (Myrka et al., 2011; Setter et al., 2012).

The traditional role of pharmacists in home care has been limited to monitoring intravenous drug therapy or serving as a consultant to patients and home care clinicians (Audette et al., 2002; Raehl et al., 2002; Setter et al., 2012). However, this role is expanding with the provision of pharmaceutical care services (Frey & Rahman, 2003; Hsia Der et al., 1997; Meredith et al., 2002; Myrka et al., 2011; Triller et al., 2000, 2003; Setter et al., 2012; Vink et al., 2011). These services vary by organization but typically include a comprehensive medication review that may target specific conditions (e.g., congestive heart failure, renal insufficiency, pain), high-risk medications (e.g., psychotropics, cardiovascular medications, nonsteroidal anti-inflammatory drugs), polypharmacy, medication reconciliation, suspected adverse drug reactions, and nonadherence (Frey & Rahman, 2003; Meredith et al., 2002; Setter et al., 2009; Triller et al., 2003). The pharmacist-led medication reviews may be conducted by a variety of methods, including chart review, telephone interviews, home visits, or a combination of methods (Frey & Rahman, 2003; Triller et al., 2003; Vink et al., 2011).

The primary purpose of a pharmacist conducting medication reviews is to minimize the number of medication-related problems, defined as "any undesirable event experienced by a client, which involves, or is suspected to involve, drug therapy and that interferes with achieving desired goals of therapy" (Cipolle et al., 2004). In one analysis of just 20 Veterans Affairs Medical Center clients receiving home pharmacist-led medication reviews, clients had an average of three medication-related problems and received one-to-three pharmacist home visits to resolve these problems. Pharmacists' visits revealed the most common problem was that clients were taking unnecessary medications. The number of potentially unnecessary medications averaged 2.9 per client during the first pharmacist home visit. After pharmacist intervention, this number decreased to 1.2 (t = 2.10, p = .042) (Hsia Der et al., 1997). In a study of 259 Medicare clients, 50% of clients receiving care from a pharmacist-nurse collaborative model had improvements in medication use compared to 38% of clients receiving care from a nurse alone, an attributable improvement of 12 patients per 100 (95% confidence interval [CI] = 0.0-24.0, p = .051). Improvement was measured by preset criteria such as eliminating duplicate therapies and achieving treatment goals, for example, goal blood pressure per clinical guidelines. The pharmacist–nurse collaboration had the greatest impact on therapeutic duplication and improper use of cardiovascular medications (Meredith et al., 2002). In an analysis of medication reviews conducted by a pharmacist in a nonprofit home care agency, a total of 232 medication-related problems were identified among 148 clients. Of the problems identified, suboptimal therapy (28%) and use of unnecessary drugs (24%) were most common. Discontinuing a drug (38.6%) and consulting the prescriber (23.2%) comprised the majority of the recommendations (Vink et al., 2011).

Description of the Agency

The agency is a nonprofit organization that has been providing home healthcare and community health services to the Minneapolis/St. Paul Metro Area since 1902. The agency serves individuals and families that are economically disadvantaged with 90% of clients living at or below 200% of the federal poverty guidelines. The mission of the agency is "to provide comprehensive and culturally competent Community Health and related services in collaboration with Public Health and Health Service Providers to ensure a healthy future

Box 1. Position Description of the Pharmacist in This Collaborative Model

A faculty position established in partnership between the agency and the College of Pharmacy will focus on the enhancement of medication use outcomes in home care patients. This position will also seek to establish opportunities for interprofessional education for health professions learners. Supporting these areas of emphasis, this position will have the following responsibilities: A faculty position established in partnership between the agency and the College of Pharmacy will focus on the enhancement of medication use outcomes in home care patients. This position will also seek to establish opportunities for interprofessional education for health professions learners. Supporting these areas of emphasis, this position will have the following responsibilities:

1. Development and management of an interprofessional practice model in which pharmacists and nurses collaboratively provide care to home care patients. This will include the delivery of care by the pharmacist via home visits, prospective chart review, and nurse-initiated consultation.
2. Development of medication-related health service policies at the agency.
3. Scholarly analysis and dissemination of the experience and outcomes of the interprofessional practice model.
4. Other pharmacy-practice related scholarly pursuits, such as dissemination of research, case reports, clinical review articles, and others.
5. Development and delivery of educational initiatives on medication-related topics for nursing staff.
6. Development and coordination of an elective Advanced Pharmacy Practice Experience (APPE) based at the agency. Pharmacy student preceptorship will be managed by the faculty member, but also shall include participation by nursing staff as well.
7. Support experiential education initiatives for nursing and other health professions coordinated via the agency.
8. Contribution of service to collegiate committees, local and national professional associations and/or other health-related organizations.

Academic responsibilities of this position will be based in the Department of Pharmaceutical Care and Health Systems and will report to the department head. For at least the first year, this position is expected to contribute 80% effort "on site" at the agency. Twenty percent effort will be based at the College of Pharmacy. This allocation of effort will be reexamined jointly between the agency and College of Pharmacy at the end of the first year of service.

Source: University of Minnesota College of Pharmacy.

for the area's residents" (Minnesota Visiting Nurse Agency, n.d.). The agency's home healthcare department consists of registered nurses, licensed practical nurses, home health aides, physical therapists, and an occupational therapist, all of whom serve under the direction of a physician. The goal of the home healthcare department is to keep clients safely at home by preventing unnecessary hospitalizations, emergent care, and premature nursing home placement. In 2007, the home health department welcomed a pharmacist from the University of Minnesota's College of Pharmacy to their staff as part of an innovative pharmacy program targeted at home care clients.

Development of the Pharmacy Program

The agency and the university joined forces in July of 2007. At that time, the agency identified a need for a drug information expert to help with their clients' complex medication regimens. A pharmacy resident temporarily joined the agency 3 days/week to provide medication-related information to nurses and to determine how a pharmacist might fit into their home healthcare model. A year later, the agency and the university established a joint faculty position, allowing a pharmacist to remain on staff permanently. The pharmacy program's objective is to have a pharmacist visit clients in their homes to identify, resolve, and prevent medication-related problems, allowing clients to stay safely in their homes. The goals are to improve clients' ability to take medications correctly and reduce client emergent care and hospitalizations resulting from inappropriate medication use (see Box 1 for the physician description of the pharmacist in this role).

Client Recruitment and Home Visits

Upon admission to the agency, any home care client taking nine or more medications, including over-the-counter and herbal products, is offered a pharmacist home visit. (For a case scenario, see Box 2.) In addition, nurses, occupational therapists, and physical therapists can make client referrals on a case-by-case basis. A scheduler then contacts each client to offer the service. Interestingly, 60% of the clients accepted the visit and 40% of the clients refused the visit, often because of perceived lack of benefit, fear of offending their primary care physicians, or wanting to limit the number of individuals

entering their homes. The pharmacist typically sees as many as five clients per day, with home visits lasting between 30 and 60 minutes. Client revisiting will be discussed later in this article.

Before the home visit, the pharmacist reviews the client's list of ordered medications and chart notes from other home care clinicians, such as nurses, occupational therapists, and physical therapists. During the home visit, the pharmacist discusses every medication, including over-the-counter products and herbal supplements, with the client and caregiver to assess their indication, effectiveness, safety, and compliance, including affordability. The ordered list of medications is reconciled with how the client is actually taking medications. For every home visit, the number of conditions, number of medications, number and type of medication-related problems, number of prescriber recommendations made, and outcome of these recommendations are documented.

Medication-related problems are often classified according to the following four types (Cipolle et al., 2004):

1. *Indication*: Medication-related problems classified as "indication" type problems describe instances when clients are taking a medication for which there is no indication or when clients are not taking a medication for which they have an indication. For example, a client may be taking proton-pump inhibitor although he or she does not have a history of gastroesophageal reflux disease or peptic ulcers. Conversely, a client with hypertension and diabetes mellitus may not be taking aspirin, although he or she has an indication for it.
2. *Effectiveness*: Effectiveness-related problems occur when a medication dose is too low or when a more effective drug is available. For example, a patient with chronic pain may be taking acetaminophen when an opioid may be more effective.
3. *Safety*: When a client is taking a medication with a dose that is too high or is taking a medication that causes an adverse drug reaction, he or she is experiencing a safety medication-related problem. For example, a client may not be able to take amitriptyline for insomnia because anticholinergic side effects are too bothersome.

Since the inception of the pharmacy program in 2007, the pharmacist has made 706 visits to 570 clients. Based on data from these visits, on average, clients seen by the pharmacist were taking 17 medications, had eight medical conditions, and had four medication-related problems identified.

4. *Compliance*: Compliance-related problems describe instances when a client prefers not to take a medication, does not understand how to use a medication, or cannot afford a medication. A client is experiencing a compliance-related problem if he or she does not understand how to use an inhaler or prefers not to take a medication to treat a condition.

After the first home visit, the pharmacist contacts the client's prescriber with any recommendations for optimizing drug therapy. This communication is completed by electronic health record, telephone, or fax. Common recommendations include discontinuing unnecessary or duplicate therapies or changing medication doses. If the prescriber approves the medication changes, the pharmacist follows up with the client, caregiver, or nurse to ensure changes are made. As many clients have multiple prescribers and pharmacies, the pharmacist reconciles the client's medication list to reflect any changes and shares the updated list with all of the client's prescribers. All visits rely on collaboration among the pharmacist, client, home care nurse, pharmacy, and physician. Follow-up care is coordinated by the pharmacist and nurse. Because of the large volume of home care clients at the agency, a vast majority of clients see the pharmacist only once. For the pharmacist to visit as many clients as possible, communication and care

coordination between the pharmacist and home care clinicians is essential. After visiting a client, the pharmacist will leave a detailed consultation note, including plan for medication changes or monitoring parameters, in the electronic health record. This plan may also be communicated via telephone conversations between the pharmacist and the home care nurse case manager. A client's home care nurse may request the pharmacist visit the client again if medications are changed or if the nurse suspects the client continues to have medication-related problems.

Box 2. A Client Scenario

Wilma is a 54-year-old female who just moved from Mississippi to Minneapolis/St. Paul with her husband. She is living with her sister and her family in a small two-bedroom home. Wilma has a complicated medical history and has recently established care with the county medical center. Her primary care physician has referred her to the agency for skilled nursing services to help her manage her medications. After the nurse case manager visits the Wilma twice, the pharmacist is scheduled to see Wilma since she takes over nine medications. The nurse case manager's visit notes state that Wilma is very overwhelmed by her medications and thinks that they are different from what she was taking in Mississippi.

Past Medical History

Wilma's past medical history included:

- diabetes,
- coronary artery disease (has had two coronary stents placed in the last 6 months),
- hypertension,
- dyslipidemia,
- schizophrenia,
- major depressive disorder,
- neuropathic pain,
- chronic obstructive pulmonary disease, and
- gastroesophageal reflux disease.

Medications Upon Admission to Home Care

Wilma was consuming several medications when she entered home care:

- Metformin 1,000 mg by mouth twice daily;
- Insulin aspart 10 units subcutaneously with each meal;
- Insulin glargine 20 units subcutaneously at bedtime;
- Metoprolol succinate 100 mg by mouth once daily;
- Clopidogrel 75 mg by mouth once daily;
- Omeprazole 20 mg by mouth once daily;
- Atorvastatin 20 mg by mouth once daily;
- Gemfibrozil 600 mg by mouth twice daily;
- Quetiapine 100 mg by mouth once daily;
- Sertraline 100 mg by mouth once daily;
- Zolpidem 10 mg by mouth at bedtime as needed for sleep;
- Clonazepam 1 mg by mouth twice daily as needed for anxiety;
- Gabapentin 300 mg by mouth three times daily;
- Fluticasone/salmeterol 250/50 µg inhale one puff twice daily;
- Ipratropium/albuterol inhale two puffs four times daily; and
- Albuterol inhaler inhale two puffs every 4 to 6 hours as needed for shortness of breath.

Vitals and Objective Information

Wilma's vitals were:

- Blood pressure: 145/85 mmHg P62;
- Fasting blood glucose: 150–180 mg/dL; and
- Postprandial blood glucose: 240–310 mg/dL.

Pharmacist Visit #1

Medications are reviewed for indication, effectiveness, safety, and convenience. The pharmacist obtains Wilma's most recent labs to review medications appropriately. Wilma reports difficulty adhering to a large number of medications and is interested in simplifying her regimen. She reports her hallucinations are somewhat bothersome and attributes this to a change in her antipsychotic medication. Previously, she was taking risperidone, which was more effective than quetiapine. Wilma is confused by the different insulins she takes and does not take them regularly. She is short of breath most days of the week and cannot remember to take inhalers.

After the visit, the pharmacist contacts Wilma's primary care physician to suggest medication

(continues)

Benefits of the Pharmacy Home Visit Program

What is the difference between the pharmacist home visit and visits conducted by a nurse or therapist? Although nurses and therapist, depending on client need and orders, assess all of a client's needs, the pharmacist is able to focus primarily on medications. The pharmacist systematically reviews each medication to ensure that the client needs to be taking the medication, the medications are working well, the client is not having any side effects, and the medications are easy for the client to take and are affordable. Through this program, pharmacy home care visits have identified and resolved numerous medication-related problems, minimizing the risk of adverse events in clients.

Since the inception of the pharmacy program in 2007, the pharmacist has made 706 visits to 570 clients. Based on data from these visits, on average, clients seen by the pharmacist were taking 17 medications, had eight medical conditions, and had four medication-related problems identified. Approximately 60% of clients seen are female, and 40% are ≥ 65 years old. Approximately 50% of clients are African American. Of the 2,482 medication-related problems identified, one-third were due to compliance. In other words, clients were not taking medications correctly or could not afford medications. For compliance to be considered a medication-related problem, the pharmacist assessed that the manner in which a client was misusing a medication was clinically significant. Approximately 40% of medication-related problems were resolved with the client and his or her family member or spouse, without the need for contacting the clients's primary care provider. The pharmacist made 526 recommendations to primary care providers, of which 48% were accepted, 48% were deferred to the client's next appointment, and 4% were rejected.

The top 10 medications implicated in medication-related problems are listed in Table 1. Acetaminophen was commonly used at doses that were too high or was not given on a scheduled basis, when indicated, to control pain. Ibuprofen was implicated in medication-related problems such as fluid retention and stomach upset or it was used on a scheduled basis unsafely without an indication. Often, clients who had just been discharged from the hospital were taking omeprazole, a medication that decreases acid production in the stomach, even though they had no indication for it. Clients experienced hyperglycemia because insulin doses were too low. Some clients experienced hypoglycemia when they continued to use the same doses of insulin despite changing eating habits or losing weight. Detailed review and

Box 2. A Client Scenario, Continued

changes. Due to the complexity of Wilma's medication regimen, the pharmacist calls the clinic and faxes a note summarizing recommendations. The following changes are made to Wilma's medication regimen at her physician's appointment 1 week after the pharmacist visit. On the pharmacist's request, the clinic called the pharmacist to communicate the medication changes:

1. Lisinopril 10 mg by mouth once daily is added.
2. Aspirin 81 mg by mouth once daily is added.
3. Ipratropium/albuterol inhaler is discontinued and tiotropium inhaler is started.
4. Omeprazole is discontinued and ranitidine 150 mg by mouth twice daily is started.
5. Quetiapine is tapered and risperidone is titrated to previous dose.
6. Gemfibrozil is discontinued.

The pharmacist writes a detailed note in the agency electronic health record and calls the nurse case manager to discuss the medication changes and barriers to adherence discovered during the visit. Because so many medication changes were made, the pharmacist makes a second visit.

Pharmacist Visit #2

The pharmacist reviews the medication changes with Wilma. Strategies to improve adherence to insulin are discussed. Wilma and her husband set goals to control Wilma's diabetes. After the visit, the pharmacist writes a detailed note in the electronic health record describing monitoring parameters and important education points to be reviewed at subsequent nurse visits. The pharmacist calls the nurse case manager again to review the plan of care related to medications. The case manager communicates this plan with other nurses who may visit Wilma. The case manager agrees to have the pharmacist visit Wilma again if medications changes are made or if Wilma continues to have medication-related problems.

Table 1. Ten Medications Most Commonly Implicated in Medication-Related Problems Identified by the Pharmacist

Acetaminophen
Albuterol inhaler
Omeprazole
Insulin (glargine and aspart)
Aspirin
Lisinopril
Ibuprofen
Amlodipine
Senna-docusate
Fluticasone-salmeterol

demonstration of inhaler technique was very important to resolve problems with incorrect use of albuterol and fluticasone-salmeterol. Additionally, clients often misused these medications by taking albuterol too frequently and not using fluticasone-salmeterol consistently or at too low of a dose.

Providing pharmacy services in a client's home has its benefits. Through being in the comfort of their home, clients are more likely to discuss issues they may not reveal in a clinic, doctor's office, or pharmacy setting. For example, a client may mention that he or she is taking a family member's medication. The pharmacist is also able to assess environmental factors that may affect a client's ability to take medications. Having access to medication bottles and products allows for a more accurate understanding of what medications a client is actually taking, which can be especially important when a client is transitioning across healthcare settings, such as from hospital to home.

Summary

The future of the pharmacy program with home visits will rely on more robust evidence of benefit, such as reduced hospitalizations and emergency department visits. Preliminary data from 70 clients from the pharmacy program with complete records showed that hospitalizations and emergency room visits decreased by half after a pharmacist's home visit.

Larger program evaluations will be completed in the future. Additionally, such services will need additional payors as only a few healthcare plans, such as Minnesota Medicaid, cover this service. Although a nurse may address medications during his or her assessments, a pharmacist focuses on medications and comprehensively assesses them for indication, effectiveness, safety, and convenience. There is a role for both clinicians in the management of home care clients' medications. ☗

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Tick-Borne Illnesses in U.S. Move Beyond Lyme Disease

A tick-borne disease that causes symptoms similar to malaria is becoming more widespread in the northeastern United States, researchers say.

Babesiosis invades red blood cells and is carried by deer ticks, which also carry Lyme disease. Between 2000 and 2008, towns in Connecticut reporting cases of babesiosis increased from 30 to 85, according to the researchers.

Since babesiosis was first reported in Connecticut in 1991, cases in the state have risen from 3 to about 100 a year. Symptoms include fever, chills, fatigue, sweats, headache, and muscle pain.

The study's findings were presented at the annual meeting of the American Society of Tropical Medicine and Hygiene, in Atlanta.

"Today's findings underscore the shifting landscape of tick-borne diseases, whose rapid emergence can challenge the best efforts of science and medicine to diagnose, treat, and prevent their occurrence," Dr. Peter Krause, a researcher at the Yale School of Public Health in New Haven, CT, said in a society news release.

The information about babesiosis was accompanied by discussions of other research into newly emerging tick-borne diseases, some of which can cause fatal encephalitis, an inflammation of the brain.

Dr. James Kazura, the society's president, said this "is a real-time illustration of the interconnectedness of human and animal health that many people don't often think about." Ticks carry many human diseases, he said, adding that "efforts like this offer timely information that is of regional and clinical importance."

Lyme disease is the most common tick-borne disease in the United States, with 20,000 to 30,000 cases reported each year. But a growing number of diseases are carried by deer ticks and becoming more widespread in the United States, experts warned.

Data and conclusions presented at medical meetings are typically considered preliminary until published in a peer-reviewed medical journal.