Strategies for Reducing Polypharmacy in Older Adults

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ABSTRACT

Polypharmacy is a major concern in the care of older adults. Multiple factors contribute to this problem, and recognizing these factors is an initial step in addressing the problem. Further, identifying those individuals at risk for medication problems, as well as implementing specific strategies in practice to reduce the problem, will enable clinicians to develop safe and evidence-based medication regimens that minimize the risk of adverse drug reactions. The key to treating older adults is not necessarily to find a set number of medications and try to stay below it, but to find the right medication at the right dosage and for the shortest possible duration on a case-by-case basis. This individualized approach to treating patients will provide a much safer and effective means of practicing and will improve patients' quality of life.

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Polypharmacy can occur in people of all ages but is typically more prevalent among older adults. This population often has multiple morbidities and is thus at high risk for polypharmacy and adverse drug events (Hajjar, Cafiero, & Hanlon, 2007; Hanlon et al., 1997). In addition to concerns about patient safety, the health costs of polypharmacy can quickly compound. Older adults account for more than $3 billion in annual prescription drug sales (Kaufman, Kelly, Rosenberg, Anderson, & Mitchell, 2002). Bootman, Harrison, and Cox (1997) found that for every $1 spent on medications in nursing homes, $1.33 was spent on treating the effects of adverse drug events. In another study, Field et al. (2004) found that adverse drug reactions are responsible for 5% to 28% of acute geriatric hospital admissions and occur in 35% of community-dwelling older adults.

Polypharmacy is frequently identified by the use of multiple medications, multiple prescribers, several filling pharmacies, too many forms of medication, medications taken when there is no clinical indication, multiple dosing schedules, and appropriate medications for which the patient must take too many pills, resulting in "pill burden" (Fulton & Allen, 2005; Haque, 2009; Zarowitz, Stebelsky, Muma, Romain, & Peterson, 2005). Interestingly, Michocki (2001) made a distinction between *polymedicine* and *polypharmacy*. Polymedicine is the use of many medications to treat multiple health problems, whereas polypharmacy is described as the use of multiple medications, duplicative medications, high-dosage medications, and medications prescribed for too long a period of time. This array of definitions has left many prescribers still wondering if there is some arbitrary number of drugs that defines polypharmacy, but no such number is specified in the literature. Clearly, polypharmacy is problematic, unfortunately widely practiced, and often unnecessary (Michocki, 2001). The fact that many older individuals are on multiple medications to treat comorbid conditions is not by itself problematic. Polypharmacy occurs when there is inappropriate or unnecessary prescribing that results in negative outcomes (Hajjar et al., 2007).

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The challenge for clinicians is to develop safe and evidence-based medication regimens that minimize the risk of adverse drug reactions. To achieve this outcome, clinicians must be aware of the typical characteristics of patients with medication problems, have a clear understanding of what constitutes polypharmacy, and implement specific strategies in practice to reduce this problem.

TYPICAL CHARACTERISTICS OF PATIENTS WITH MEDICATION PROBLEMS

Many providers have a difficult time empirically identifying which patients are taking too many medications, but there are some ways to identify them. In terms of general features, Bushardt and Jones (2005) identified several key characteristics of individuals who might be at higher risk for having medication problems (see the **Sidebar** on page 10).

In addition to these characteristics, the reason for the increased incidence of polypharmacy in older adults mainly has to do with the kinetic changes that take place in the body over time. Due to normal age-related pharmacokinetic and pharmacodynamic changes, there is an increased risk of adverse drug reactions. Each component of pharmacokinetics (i.e., absorption, distribution, metabolism, elimination) is thought to slow down as individuals age. Gastric pH levels increase and bowel surface area decreases, thus slightly altering the onset of action. Water and lipid distribution typically increase as one ages; therefore, medications that are highly lipophilic (e.g., diazepam [Valium®]) or hydrophilic (e.g., promethazine [Phenergan®]) migrate to those areas and remain for extended periods of time. Over time, hepatic metabolism through the cytochrome P-450 system generally slows down.

In addition to the normal age-related changes that decrease renal function, the patient's state of hydration, cardiac output, and the presence of intrinsic renal disease should be considered (Kane, Ouslander, Abrass, & Resnick, 2009). Prior to initiating any renally eliminated medication, it is imperative that the clinician calculate the patient's kidney function. Although there are a multitude of equations to determine this, the two most commonly used are the Modification of Diet in Renal Disease (Fadem & Rosenthal, 2009) and the Cockcroft-

KEY CHARACTERISTICS OF INDIVIDUALS AT HIGHER RISK FOR MEDICATION PROBLEMS

- Age 85 and older.
- Some level of renal insufficiency.
- Low body weight.
- Six or more chronic disease states.
- Taking more than 12 dosages of medications per day.
- Previous history of adverse drug reactions.

Source. Bushardt and Jones (2005) .

Gault (Cockcroft & Gault, 1976) formulas. Neither equation has been validated in this population, but it should be noted that the vast majority of medication package inserts use the Cockcroft-Gault equation when suggesting renal dosing.

FACTORS CONTRIBUTING TO POLYPHARMACY

For clinicians to understand how to prevent polypharmacy, they first need to understand how it starts. One of the more common etiologies is the use of multiple prescribers and pharmacies. Patients will typically be seen by different specialists according to their disease states. Likewise, depending on convenience, distance, and cost, patients may go to more than one pharmacy to receive their medications. The problem with this is that it often leads to incomplete medication histories, which can result in a multitude of problems that can cause more medications to be prescribed than necessary. Many patients may believe they only need to report what medications they are currently taking, depending on which specialists they are seeing or what acute conditions they are currently experiencing. In addition, herbal supplements and over-the-counter products are frequently omitted from patient reports. Specialists may not be completely knowledgeable of potential interactions that may occur with some maintenance medications. Pharmacists may not be fully aware of other medications the individual is currently taking that may inhibit a new prescription or work through a similar mechanism of action. Patients should be encouraged to standardize their provider and pharmacies in an effort to minimize drug interactions (Gupta, Rappaport, & Bennett, 1996; Meyer, Van Kooten, Marsh, & Prochazka, 1991).

Another factor contributing to polypharmacy occurs when patients demand prescription medications during an office visit. Regardless of age, many patients expect the physician to prescribe a drug at each visit, as prescriptions are seen as acknowledgment of true ailments (Kane et al., 2009).

Another possible link to polypharmacy is inadequately treated disease state management. Included in this category are potential issues with nontreatment, subtherapeutic dosages, multiple medications in the same drug class, nonadherence, and misdiagnoses. For example, a subtherapeutic dosage of donepezil (Aricept®) prescribed for a patient with dementia who then requires an additional medication, risperidone (Risperdal®), for yelling behavior reflects inadequate initial treatment. Prescribing the combination of olanzapine (Zyprexa®) and risperidone or famotidine (Pepcid®) and ranitidine (Zantac®) for a patient reflects the use of two medications from the same drug class and is problematic. However, the use of multiple appropriate medications to manage one disease is not polypharmacy. Treating a patient for hypertension with lisinopril (Prinivil®), metoprolol (Lopressor®), and amlodipine (Norvasc®) to control blood pressure or prescribing docusate (Colace®) and polyethylene glycol (MiraLAX®) for a patient with constipation may reflect the best combination of medications to adequately treat the disease state or clinical problem.

There are many reasons why a prescriber may deem it unnecessary to treat a disease state pharmacologically. However, in some cases, nontreatment of one disease may lead to less favorable outcomes of others. For example, uncontrolled pain can lead to depression and behavioral problems (Bair, Robinson, Katon, & Kroenke, 2003). Likewise, chronic urinary incontinence puts patients at higher risk for pressure ulcer development (Bliss, Zehrer, Savik, Thayer, & Smith, 2006). Subtherapeutic dosing frequently occurs in patients for whom medication titration is desirable, but for various reasons the patient never reaches the therapeutic dosing level. The use of these lower-dosed medications offers little to no therapeutic benefit at the expense of increasing cost, nursing time, and potentially more side effects.

Nonadherence is predominantly due to patients' refusal to take their prescribed medications. Refusing medications is the result of many factors, including adverse drug effects, cost, dementia, and lack of knowledge about the benefits of the medications. However, another component of nonadherence exists in the form of inappropriate dosage forms. For example, crushing medications that have specially designed extended-release properties will lead to medications not having their anticipated duration and could potentially cause problems prior to the administration of the next dosage. It is important in these cases to switch the medications to a liquid or crushable formulation to optimize their kinetic properties.

Lack of adherence to evidence-based guidelines for disease state management is also a problem. Several reasons given by prescribers for lack of adherence include lack of credible authors or evidence, too simplistic or too complicated protocols or guidelines, decreased flexibility, reduced autonomy, and problems with a "cookbook approach" to care (Oeyen, 2007). Finally, misdiagnoses can lead to multiple medications being used in the event that the original medications used to treat an inaccurate diagnosis are not stopped.

STRATEGIES TO AVOID POLYPHARMACY

When first looking at a patient's complete medication list, the clinician should try to make an effort to identify a diagnosis for every medication on the list. Hamdy et al. (1995) recommended not only identifying the indication but asking, "Is the indication for which the medication was originally prescribed still present?" Other questions should include:

- Are there duplications in drug therapy from the same class, and does the list include medications prescribed for an adverse drug reaction?
- Are the medication dosages therapeutic, and are there any significant drug-drug or drug-disease interactions?
- Have nondrug interventions been considered when possible?

The most unnecessary medication use occurs at the level of indication, efficacy, and duplication (Hajjar et al., 2005).

Haque (2009) developed the ARMOR (Assess, Review, Minimize, Optimize, Reassess) tool to evaluate polypharmacy in older adults. This very helpful tool is a systematic and organized stepwise approach that assesses medications, reviews for possible interactions, minimizes nonessential medications, optimizes by addressing duplication and adjusting dosages, and reassesses the patient for functional, cognitive, and clinical status along with medication adherence. Haque (2009) noted that this tool considers a patient's functional ability and clinical status in an effort to balance best prescribing practices with the patient's physical profile so that a patient's quality of life is improved.

Some specific medications should be continually assessed for long-term use. The Beers criteria provide a list of potentially inappropriate drugs and drug classes that should generally be avoided in the treatment of older patients (Fick et al., 2003). Some of the drugs identified by the Beers criteria may be considered appropriate at times given the patient's clinical condition, degree of renal/hepatic impairment, and the potential for interactions with existing drug therapies (Egger, Bachmann, Hubmann, Schlinger, & Krähenbühl, 2006).

Another problem that occurs in long-term care settings is the issue of a drug prescribing cascade. This occurs when a side effect of one drug is treated by adding another medication (Rochon & Gurwitz, 1997). For example, some patients will report problems with constipation due to their use of a calcium supplement. Instead of impulsively adding a stool softener or laxative to the medication list, clinicians should review which kind of calcium product the resident is receiving and decide whether the benefits still outweigh the risks.

Finally, it is imperative to be mindful of medications that have anticholinergic properties. The use of two or more medications with anticholinergic properties may enhance the risk of peripheral anticholinergic effects such as dry mouth, blurred vision, increased heart rate, as well as central nervous system complications, including sedation, delirium, and cognitive impairment (Lechevallier-Michel, Molimard, Dartigues, Fabrigoule, & Fourrier-Réglat, 2005). Conventional antipsychotic, tricyclic and tetracyclic antidepressant, first-generation H1 receptor antagonist, antiparkinson, and antispasmodic agents all fall into this category.

INDIVIDUAL EXAMPLE

The following patient situation applies the strategies discussed in this article to reduce the incidence of polypharmacy.

Mr. J. is a 74-year-old male resident of a long-term care facility. He has a history of hypertension, hyperlipidemia, atrial fibrillation, diabetes, depression, pain, peptic ulcer disease, osteoarthritis, and Crohn's disease. His family requested that the facility review Mr. J.'s medications for excess use and cost and to make medication adjustments as needed.

Mr. J.'s medication list included:

- For hypertension: Prinivil 5 mg twice per day, Lopressor 25 mg twice per day, and Norvasc 2.5 mg once per day.
- For peptic ulcer disease: Metoclopramide (Reglan®) 10 mg once per day and ferrous sulfate 325 mg once per day (for anemia secondary to peptic ulcer disease).
- For diabetes: Glyburide (Micronase®) 5 mg twice per day.
- For Crohn's disease: Budesonide (Entocort EC®) 3 mg once per day, mesalamine (Asacol®) 800 mg twice per day, methotrexate (Trexall®) 2.5 mg once per week, and folic acid (a supplement for methotrexate) 2 mg once per day.
- For hyperlipidemia: Simvastatin (Zocor®) 20 mg at bedtime.
- For pain management secondary to acute Crohn's disease: fentanyl (Duragesic®) 25 micrograms every 72 hours, pregabalin (Lyrica®) 50 mg twice per day, tramadol (Ultram®) 50 mg three times per day, and gabapentin (Neurontin®) 300 mg twice per day.
- For depression and poor appetite: Megestrol (Megace®) 20 mg once per day and sertraline (Zoloft®) 50 mg at bedtime.

The following were Mr. J.'s laboratory test values:

- Complete blood count, basic metabolic panel, lipid panel, liver function enzymes, and HbA1c laboratory tests from within the last 3 months were all within normal limits.
- Creatinine clearance (using the Cockcroft-Gault equation) was approximately 60 mL to 70 mL per minute.
- Vital signs: Pulse rate = 69 beats per minute, blood pressure = 120/75 mmHg, weight = 145 pounds (no change in past 6 months).
- Pain scores and fasting blood sugars were assessed, and Mr. J. was not found to have any acute problems.

Medication Evaluation

Mr. J. was reporting some dizziness when standing up in the

morning, so his Prinivil prescription was changed to 10 mg every morning in an effort to decrease possible orthostasis related to his evening dosage. Mr. J. had been taking Reglan for more than 12 weeks for peptic ulcer disease, but this medication was stopped due to lack of evidence available for long-term use and a potential for increased adverse effects. Zantac 150 mg at bedtime as needed was added for any future possible reflux or indigestion. Mr. J. had started taking Entocort EC approximately 9 months ago for an acute Crohn's disease flare but is currently asymptomatic; therefore, this steroid was stopped due to the appropriate use of an 8-week treatment upon onset of symptoms with no recurrent symptoms.

Mr. J. had been getting duplicate therapy with the Lyrica and Neurontin, so in an effort to decrease cost, the Neurontin was titrated up and Lyrica was stopped. Likewise, Ultram was also being used for neuropathic pain. This medication was stopped and changed to acetaminophen (Tylenol®) 500 mg every 6 hours as needed for breakthrough pain. Mr. J.'s antidepressant agent, Zoloft, was started around the same time he reported significant pain. At this time, he was not showing any clinical symptoms of depression, so the dosage was reduced to 25 mg and changed to be taken in the morning due to possible issues with insomnia. Finally, the Megace was assessed for efficacy. He had been taking this medication for a few months, and as noted above, his weight was not increasing. However, he was eating larger portions of his meals. For this reason, the Megace was continued and would be reevaluated in 30 days.

CONCLUSION

Determining the benefit-to-risk ratio of drug therapy individually for each patient is essential to minimizing polypharmacy. Providers need to understand that in regard to medications, sometimes less is better. Nonpharmacological interventions should be used whenever possible. Furthermore, there is no universal number to identify polypharmacy. Three medications may be too much for one person, while 10 may be appropriate for another. The key to treating older adults is not necessarily to find a set number of medications and try to stay below it, but to find the right medication at the right dosage and for the shortest duration possible on a case-by-case basis. This individualized approach to treating patients will provide a much safer and effective means of practicing and improve patients' quality of life.

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