

Polypharmacy in Older Adults

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In the United States, prescription and over-the-counter medications greatly benefit the health outcomes of numerous populations. Medical and pharmacological advancements have created several treatment options to increase quality of life and length of life. Yet, on the horizon of fast-tracked drug development, another phenomenon is emerging called polypharmacy. In medical literature, it is generally defined as an individual who takes more than 5 medications¹. This trend is usually seen in older adults (65 years and older), especially those who have comorbid conditions². According to Healthy People 2030, 15.9% of older adults used inappropriate medications in 2015³. Although the use of 5 or more medications may be necessary depending on the patient's health, inappropriate medications cause harmful outcomes for certain individuals. There should be more public education on polypharmacy in older adults because this is a prevalent problem amongst geriatric populations. Older adults are at an increased risk of adverse drug events, which result in more hospital admissions and other negative health outcomes. Educational resources can increase awareness of this issue so patients can become advocates in their own healthcare.

PREVALENCE

Older populations are steadily increasing across the world. Our advances in medicine, sanitation and infrastructure have allowed people to live well into their eighties and nineties. Given our longer life span, people can accumulate multiple chronic conditions such as hypertension, hypercholesterolemia, arthritis and coronary artery disease. In fact, 80% of adults older than 65 have more than one chronic condition² and 30% of older adults take 5 or more medications⁴. This is expected to grow to 50% by 2040¹. This trend was reflected in one study showing that prescription drug use has nearly doubled in those 65 years and older, in a survey of over 13,000 participants from the years 2005 to 2011⁵.

The medical community speculates on the exponential use of medications and there are a few causes to note. The “prescribing cascade” occurs when multiple medications are prescribed to address a singular problem¹. For example, an older patient may use a non-steroidal anti-inflammatory drug (NSAID) for pain. The NSAID may cause hypertension in this individual. As a result, this may motivate their provider to then prescribe an antihypertensive medication. However, this new drug makes the patient nauseated, so then they are prescribed an antiemetic drug. This is one of numerous ways to which a patient may be prescribed various medications for one chief complaint. A contributing factor to the prescribing cascade trend is uncoordinated care. Nowadays, medical practices primarily collaborate in comprehensive care teams. While this enhances patient care in many aspects, it comes with the risk of miscommunication. Unchecked medication lists, multiple prescribing specialists and misunderstandings between providers are just a few examples of misperceptions that can lead to polypharmacy.

CONSEQUENCES

Even though polypharmacy afflicts other populations, its heaviest consequences fall on the elderly due to their pharmacokinetics. Older adults have more body fat which increases the volume of distribution of fat-soluble medications. They also have reduced gastrointestinal motility, liver metabolism, and kidney function all of which result in delayed drug elimination from the body and increased risk for toxicity⁶. These natural aspects of aging increase the potential of adverse drug events (ADEs), which are injuries resulting from a medical intervention related to a drug. This can include medication errors, allergic reactions and overdoses, and adverse drug reactions. Most commonly, these reactions in older adults ultimately lead to hospital admissions⁶. According to the CDC, adverse drug reactions result in over 700,000 emergency visits per year⁷. These visits comprise of falls, fractures, kidney injuries, along with

other serious ailments⁸. In 2013 and 2014, it was estimated that 34.5% of ER visits related to ADEs occurred among older adults, where anticoagulants, antibiotics, and antidiabetic medications accounting for 46.9% of these visits¹. Beyond hospital admissions, older adults may experience polypharmacy in their daily living. These effects include frailty, sarcopenia, decreased cognitive function and lower gait speed⁸. Even though it is difficult to correlate poor quality of life and function with polypharmacy, numerous studies were able to identify negative health outcomes as a result of using an inappropriate amount of medications⁸. Lastly, polypharmacy significantly increases healthcare expenses, costing approximately 1.3 billion dollars in avoidable healthcare costs in 2012¹. Specifically, treatment for ADEs in elderly accounts for more than 880 million dollars per year according to the National Academy of Sciences¹.

COMMON MEDICATIONS

Unfortunately, there is no one class or category of drug to fault for polypharmacy because there are various medications to avoid or to use with caution in older adults. NSAIDs are not favorable for regular or long-term use because they can increase the risk of bleeding stomach ulcers, hypertension, damage the kidneys and worsening heart failure⁹. The medication digoxin, can be used to treat heart failure and irregular heartbeats, nevertheless it is commonly known to be toxic in older adults as well⁹. Antidiabetic drugs such as glyburide reverse high blood sugar so well that it can cause dangerously low blood sugar (hypoglycemia) in older adults⁹. Hypoglycemia can cause dizziness, weakness, drowsiness, delirium, all which can increase risk for falls in older populations. Drugs for psychiatric conditions such as benzodiazepines and zolpidem (Ambien) can be overly sedating, causing similar symptoms such as grogginess, falls, constipation, and confusion⁹. These same symptoms are also seen with certain over-the-counter

products such as diphenhydramine (Benadryl) and Tylenol PM. If these drugs are used in combination, they can potentiate even more sedating effects. Other drugs to avoid in geriatric populations include certain anticholinergics, and antipsychotics. This array of commonly used drugs, both prescription and OTC, demonstrates the importance of reviewing patients' medication lists frequently, regardless of what kind of medical conditions they have.

GUIDELINES

Adverse drug effects in the elderly have concerned providers for many years. In 1991, geriatrician Mark H. Beers formulated the Beers Criteria, a comprehensive list of potentially inappropriate medications for the elderly¹. It has since been adopted by the American Geriatrics Society and is considered a critical guideline in evaluating medical treatments for older adults. Another valuable tool is the STOPP (Screening Tool of Older Persons' Prescriptions) and START (Screening Tool to Alert to Right Treatment) criteria. Like Beers, it contains a list of potentially avoidable medications and is meant to function as a quick reference¹.

One study compared the Beers Criteria alone to a three tool assessment including Beers, START/STOPP, and MAI (medication appropriateness index) in a small oncology clinic¹⁰. The 3 tool assessment was three times more likely to identify potentially inappropriate medications. It recognized at least three inappropriate medications per patient, which were safely deprescribed. Two-thirds of all participants reported less symptoms, and more than \$4,000 in healthcare costs per patient was avoided as an outcome of deprescribing¹⁰. The study sample was small (26 participants), however, the results were significant. Another study compared a pharmacist-led educational intervention amongst older patients who were prescribed at least one Beers criteria medication to no education¹¹. Over six months, discontinuation was significantly higher in the intervention group than the control group. Even though the study focused the role of the

pharmacist in patient education, role can be applied to other healthcare providers. Education can inform patients of the risks of their current treatments and lead to deprescribing when necessary^{10,11}. It may not be feasible to use all tools in every clinic setting, but even using one tool may combat polypharmacy in geriatric populations.

EDUCATION

Even though these aides exist for providers, there needs to be more patient awareness on this issue. One systematic review found that any type of education (written word, diagrams, audio recordings, videos) was superior to no education in improving patient knowledge about their medications¹². There was even more success when these interventions were used with a physician consultation, as shown across 24 trials¹². However, given the wide heterogeneity across the studies, the data could not analyze health outcomes of these interventions. Yet, it summarizes a key point; multimedia education further increases patient knowledge, allowing them to be their own health advocate. This means that any education, even without Beers or STOPP/START criteria can decrease the prevalence of polypharmacy. One cross-sectional study of 385 patients found that those who were well-versed in polypharmacy were less likely to be victims of it¹³. Although this study did not differentiate between primary, secondary, and tertiary levels of education on the matter, the correlation shows that informed patients were less likely to experience ADEs due to their medications¹³.

PUBLIC OUTREACH

Education on the consequences of polypharmacy can empower patients to collaborate with their providers to combat its prevalence. There are a number of educational pamphlets in the form of PDFs publicly available on the American Geriatric Society (AGS) website that explain basic, patient friendly aspects of polypharmacy^{7,9,14,15}. These pamphlets encompass a myriad of

aspects that can help older patients manage their medications. There is one that discusses commonly used drugs that can cause adverse drug events, and another that lists possible alternative treatments^{9,15}. In addition, there is a pamphlet that specifically addresses what to do if a patient is prescribed a medication on the Beers Criteria¹⁴. The American Board of Internal Medicine currently sponsors a campaign called Choosing Wisely, which supports these same messages¹⁶. The primary goal of the Choosing Wisely Campaign is to eliminate any unnecessary tests, imaging and medications that have the potential to garner more harm than benefit for an individual. The geriatric resource section, which is available publicly on their website, discusses the same risks mentioned above and includes measures to help providers avoid hospital acquired injuries.

While these resources are accessible by being online, they lack the ability to reach those without internet access, or a computer. Unfortunately, it is not uncommon for geriatric populations to not have internet access, especially those who live in disadvantaged communities¹⁷. Furthermore, locating these sources online may be impossible for those with limited cognitive function, which may impair their ability to use a computer, or poor vision, which may make reading pamphlets very challenging. Considering these barriers, it is imperative that healthcare professionals are aware of these resources so that they can inform patients and provide printouts if needed. As seen in one systematic review, this type of education is ideal for supplementing a patient's visit and can be a source for further reference outside the clinic or hospital for both patients and caregivers¹².

In conclusion, polypharmacy greatly impacts older adults in the United States. The rates of geriatric patients on numerous medications has been rapidly expanding and has contributed to a spike of hospital admissions and poor health outcomes. As a result, decreasing the number of

inappropriate medications in geriatric populations has been added as a new goal for Healthy People 2030³. Fortunately, there are evidence based tools for providers, such as the Beers and START/STOPP Criteria, that bring attention to inappropriate treatments for patients greater than 65 and older. In addition, the use of public pamphlets provided by reputable sources can expand patient awareness and boost their confidence in handling their own medications in collaboration with their providers. Using these tools together can diminish polypharmacy and foster patient centered care, where both providers and the patient are focused on improving the patient's quality of life.

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