

Polypharmacy and the Elderly: Reducing the Risk of Adverse Events Through Monitoring and Communication

JANUARY 2021

BACKGROUND

As people age, they have an increased chance of developing chronic conditions and comorbidities. Not surprisingly, elderly (meaning 65 or older) individuals in the United States are the likeliest cohort of adults to take multiple medications daily to treat or manage one or more medical conditions; this is referred to as “polypharmacy.” Research suggests that over half of elderly individuals report taking four or more prescription drugs, compared to only about one-third of adults aged 50-64, and one-in-ten of adults aged 18-49.

While no set definition for polypharmacy exists, it is generally defined as the concurrent use of several prescribed medicines. Medical studies vary in how many simultaneous prescriptions qualify as polypharmacy, but many researchers set the threshold at five or more different prescription medications per day. In some cases, polypharmacy can lead to duplicate prescriptions or contraindicated prescribed drug combinations which may result from poor communication between an individual’s health care provider(s) and pharmacy or the patient’s own lack of understanding and knowledge.

Studies estimate that the potentially avoidable costs associated with polypharmacy among the elderly is \$1.3 billion annually. Most of these costs come from emergency room visits and hospitalizations due to the medical issues set forth below. With the U.S. Census Bureau projecting that the number of individuals age 65 or above will increase from 40.3 million in 2010 to 72.1 million in 2030, managing polypharmacy in this population will grow in importance. While polypharmacy may be unavoidable for many elderly patients with chronic conditions and comorbidities, it is important that

health care providers, caretakers, and patients understand polypharmacy’s potential for harm and take steps to ensure that all medications given to elderly individuals are both medically necessary and taken properly.

MEDICAL ISSUES MADE MORE PREVALENT BY POLYPHARMACY

Beyond the duplicate prescriptions and contraindicated prescribed drug combinations mentioned above, polypharmacy can result in other medical issues that are particularly concerning for elderly individuals. These concerns include adverse drug reactions and medication nonadherence.

Adverse Drug Reactions

Due to the physiological changes that occur as humans age, including a reduction in kidney and liver function, the way the body processes medications changes. These physiological changes, when combined with ingesting multiple prescription drugs within a short time, can lead to adverse drug reactions. An adverse drug reaction occurs when medications taken correctly produce an undesired and unexpected occurrence. It is different from a side effect in that an adverse drug reaction is unpredictable and often influenced by patient-specific susceptibility factors. An individual’s risk of suffering an adverse drug reaction increases every time he or she starts a new medication. For example, the risk of an adverse event is 15 percent when two medications are being taken but increases to 58 percent with five medications and 82 percent with seven or more medications. Common drug classes that are associated with adverse drug reactions include anticoagulants, nonsteroidal anti-inflammatory drugs, cardiovascular medications, diuretics, antibiotics, anticonvulsants, benzodiazepines, and hypoglycemic agents. Studies

estimate that 35 percent of non-hospitalized elderly individuals experience an adverse drug reaction each year, and 29 percent of these reactions require hospitalization. Adverse drug reactions that occur because of polypharmacy can be misinterpreted as being a symptom of a (non-existent) medical condition, which then leads to prescribing of additional medications and an increased risk of more adverse drug reactions.

In addition to posing an increased risk of adverse drug reactions, polypharmacy also increases the probability of a drug-drug interaction. A drug-drug interaction occurs when a person ingests two or more drugs that react with each other, and the reaction creates a pronounced side effect. For example, the action of one drug may diminish the action of a second drug, thereby reducing the effectiveness of the second drug. Alternatively, ingesting multiple drugs with the same side effects can intensify the side effect.

Researchers estimate that a patient taking five to nine prescription medications has a 50 percent chance of experiencing a drug-drug interaction. The risk increases to virtually 100 percent when a patient takes 20 or more medications. While most definitions of polypharmacy only include prescription drugs, drug-drug interactions can occur between prescription and non-prescription substances. Individuals who ingest over-the-counter medications, supplements, herbal remedies, or illicit or recreational substances along with one or more prescription drugs have an increased chance of experiencing a drug-drug interaction.

Drug-drug interactions are particularly dangerous to drivers, as certain drugs taken individually might not cause a side effect reaching the level of impairment, but a combination of drugs may. For example, two or more drugs ingested together might produce a pronounced sedative effect in an individual. Given that elderly individuals are more likely to take multiple medications concurrently, elderly drivers face an increased risk of drug-drug interactions. In a survey of 630 drivers age 55 and older (with an average age of 70.4) conducted by the University of Alabama at Birmingham, 60 percent of respondents reported driving six or seven days per week. Moreover, while 78 percent of respondents reported using one or more medications

and 19 percent reported using five or more medications, only 28 percent of respondents expressed awareness of the potential impact of their medications on their driving performance. More troubling, only 18 percent of respondents claimed to have received a warning about potential driver-impairing medications from a health care professional.

Medication Nonadherence

Another concern with polypharmacy in the elderly is the potential for medication nonadherence. A patient's ability to properly adhere to a medication regimen is dependent on many factors and requires the patient to have the knowledge, motivation, skills, and resources to follow his or her health care provider's instructions. Polypharmacy makes medication adherence difficult because a patient may have to navigate a complicated regimen of multiple medications. Not surprisingly, the potential for medication nonadherence rises with each additional medication prescribed to an individual.

Elderly individuals are prone to medication nonadherence and may fail to properly adhere to their medication regimens for a variety of reasons, both intentional and unintentional. Unintentional medication nonadherence is a passive activity, where a patient is careless or forgetful about adhering to a treatment regimen. Forgetfulness, decreased vision, and poor manual dexterity are among some of the reasons why elderly individuals are unintentionally nonadherent. Alternatively, intentional nonadherence is an active activity, whereby a patient chooses to deviate from his or her treatment regimen.

Adverse drug reactions or unpleasant side effects caused by drug-drug interactions may lead to intentional nonadherence by an elderly individual who chooses to decrease the dosage of a medication or stop taking one or more drugs altogether without consulting a health care provider. Additionally, a person's inability to afford his or her medications can cause a person to intentionally not adhere to his or her medication regimen. Proper adherence to medications is vital for the treatment of chronic diseases, and when an individual is not adherent, there is a risk of health complications. Studies estimate that medication nonadherence is linked to 125,000 U.S. deaths each year.

REDUCING RISKS TO THE ELDERLY CAUSED BY POLYPHARMACY

Polypharmacy will remain common among elderly individuals due to the need to treat the various chronic conditions that occur as people age. Although polypharmacy may be unavoidable in many cases, there are steps that health care providers, caretakers, and patients can take to reduce the risks associated with polypharmacy. One step is to limit the prescribing of unnecessary medications. To ensure elderly patients are taking only the necessary medications to treat their conditions, health care providers should evaluate each potential prescription and balance its potential adverse effects against its potential benefits. Providers should ask elderly patients or their caretakers to create an accurate list of all substances taken by the patient (prescribed or over-the-counter), including the brand and generic name of the drug, dosage, the dosing frequency, and the reason it was prescribed. Patients should bring these lists to office visits, where the health care provider can perform a medication review and engage in discussions about medication adherence. These medication reviews can help to reduce duplicate prescriptions, reduce contraindicated medications, and provide ways to ensure that patients understand why they are taking the medications as well as how to take them correctly. Additionally, an elderly individual's health care providers should utilize all technologies available to maintain good communication with each provider and the patient in an effort to minimize problems and maximize adherence. This includes regular use of the prescription drug monitoring program available to the health care provider, even if querying the system is not a requirement under applicable state law.

To reduce the risks associated with polypharmacy: (1) limit the prescribing of unnecessary medications; (2) conduct medication reviews at doctors' appointments; (3) health care providers should utilize existing technologies; (4) stick with one pharmacy; and (5) maintain open lines of communication between patients and providers.

Pharmacists also have a role to play in reducing the risks to elderly individuals due to polypharmacy. Studies show that many elderly individuals use

multiple pharmacies. Alternating between pharmacies can make communication more difficult between patients, pharmacists, and health care providers, thereby increasing the possibility of inappropriate medication use and subsequent adverse consequences. Thus, where possible, elderly patients should use only one pharmacy. In addition, pharmacists can help elderly individuals avoid added risk by engaging in thorough communication with patients and providers. Pharmacist counseling should occur at every patient encounter, as educated patients are more likely to adhere to a medication regimen and take an active role in their own care. Moreover, pharmacists should be cognizant of alerts generated by their computer systems pointing to a potential drug interaction or medication duplication, including any patient-specific information available to the pharmacist through the prescription drug monitoring program.

CONCLUSION

With an aging population, issues associated with polypharmacy, such as unexpected drug interactions and medication nonadherence, will remain an area of concern for elderly individuals for years to come. However, with open lines of communication and coordination efforts between patients, caretakers, health care providers, and pharmacies, those risks can be reduced. These efforts can complement current national endeavors toward a more patient-centered approach to health care.

RESOURCES

Alloway, Rita R. "Nonadherence: Definitions, Monitoring, and Prevention/Maintenance." Accessed December 9, 2020. <https://www.fda.gov/media/104649/download>.

Alpert, Patricia and Tricia Gatlin. "Polypharmacy in Older Adults." *Home Healthcare Now* 33, no. 10 (November/December 2015): 524-529. <https://doi.org/10.1097/NHH.0000000000000299>.

Dagli, Rushabh J. and Akanksha Sharma. "Polypharmacy: A Global Risk Factor for Elderly People." *Journal of International Oral Health* 6, no. 6 (November/December 2014): i-ii. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4295469/pdf/JIOH-6-i.pdf>.

"Fueled by Aging Baby Boomers, Nation's Older Population to Nearly Double in the Next 20 Years, Census Bureau

Reports.” *United States Census Bureau*, May 6, 2014. <https://www.census.gov/newsroom/press-releases/2014/cb14-84.html#:~:text=These%20briefs%20use%20data%20from.Census%20Bureau's%20Population%20Projections%20Branch.>

Golchin, Negar, et al. “Polypharmacy in the Elderly.” *Journal of Research in Pharmacy Practice* 4, no. 2 (April/June 2015): 85-88. <https://doi.org/10.4103/2279-042X.155755>.

HealthXchange. “Possible Drug Interactions: 3 Types and How to Avoid Them.” Accessed December 9, 2020. <https://www.healthxchange.sg/medicine-first-aid/medicine/possible-drug-interactions-three-types-how-avoid>.

IMS Institute for Healthcare Informatics. “Avoidable Costs in U.S. Healthcare.” June 2013: 27-29. http://offers.premierinc.com/rs/381-NBB-525/images/Avoidable_Costs_in%20US_Healthcare-IHII_AvoidableCosts_2013%5B1%5D.pdf.

Kirzinger, Ashley, et al. “Data Note: Prescription Drugs and Older Adults.” *Kaiser Family Foundation*, August 9, 2019. [https://www.kff.org/health-reform/issue-brief/data-note-prescription-drugs-and-older-adults/#:~:text=More%20than%20half%20of%20adults,18%2D29%20\(7%25\)](https://www.kff.org/health-reform/issue-brief/data-note-prescription-drugs-and-older-adults/#:~:text=More%20than%20half%20of%20adults,18%2D29%20(7%25)).

Leheny, Shelby. “‘Adverse Event,’ Not the Same as ‘Side Effect.’” *Pharmacy Times*, February 2, 2017. <https://www.pharmacytimes.com/contributor/shelby-leheny-pharmd-candidate-2017/2017/02/adverse-event-not-the-same-as-side-effect>.

MacLennan, Paul A., et al. “Older Adults’ Knowledge About Medications that Can Impact Driving.” *AAA Foundation for Traffic Safety*, August 2009. <https://aaafoundation.org/older-adults-knowledge-medications-can-impact-driving/>.

Maher Jr., Robert L., Joseph T. Hanlon, and Emily R. Hajjar. “Clinical Consequences of Polypharmacy in Elderly.” *Expert Opinion on Drug Safety* 13, no. 1 (January 2014): 57-65. <https://doi.org/10.1517/14740338.2013.827660>.

Saljoughian, Manouchehr. “Polypharmacy and Drug Adherence in Elderly Patients.” *U.S. Pharmacist* 44, no. 7 (July 2019): 33-36. <https://www.uspharmacist.com/article/polypharmacy-and-drug-adherence-in-elderly-patients>.

Sherman, Justin J., Leslie Davis, and Kori Daniels. “Addressing the Polypharmacy Conundrum.” *U.S. Pharmacist* 42, no. 6 (June 2017): 14-20. <https://www.uspharmacist.com/article/addressing-the-polypharmacy-conundrum>.

ABOUT LEGISLATIVE ANALYSIS AND PUBLIC POLICY ASSOCIATION

The Legislative Analysis and Public Policy Association (LAPPA) is a 501(c)(3) nonprofit organization whose mission is to conduct legal and legislative research and analysis and draft legislation on effective law and policy in the areas of public safety and health, substance use disorders, and the criminal justice system.

LAPPA produces up-to-the-minute comparative analyses, publications, educational brochures, and other tools ranging from podcasts to model laws and policies that can be used by national, state, and local criminal justice and substance use disorder practitioners who want the latest comprehensive information on law and policy. Examples of topics on which LAPPA has assisted stakeholders include naloxone laws, law enforcement/community engagement, alternatives to incarceration for those with substance use disorders, medication-assisted treatment in prisons, and the involuntary commitment and guardianship of individuals with alcohol or substance use disorders.

For more information about LAPPA, please visit: <https://legislativeanalysis.org/>.

© Legislative Analysis and Public Policy Association - This project is funded by a grant from the Office of National Drug Control Policy. Neither the Office of National Drug Control Policy, nor any other federal instrumentality operate, control, or are responsible for, or necessarily endorse this project.