Polypharmacy and Medication Adherence in the Older Adult

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"We combined all your medications into ONE convenient dose."
NICKEL

Objectives

- Differentiate among the multiple definitions of polypharmacy
- Discuss data regarding prevalence, risks, and impact of polypharmacy
- Discuss the relationship between polypharmacy and adherence
- Define inappropriate medications for elderly patients
- Describe tools used to screen for polypharmacy and improve adherence

Polypharmacy Definition

- No consensus definition
- ≥ 5 or 6 medications used by some
- Medication underuse also identified
- Potentially inappropriate medications (PIM)
- Generally defined as “Administration of more medications than clinically indicated, representing unnecessary or inappropriate drug use”

Balducci L. Ann Oncol. 2013 Oct;24 Suppl 7:vii36-40.
Maggiore RJ. 2010;15(5):507-22.

Elderly Population and Medications

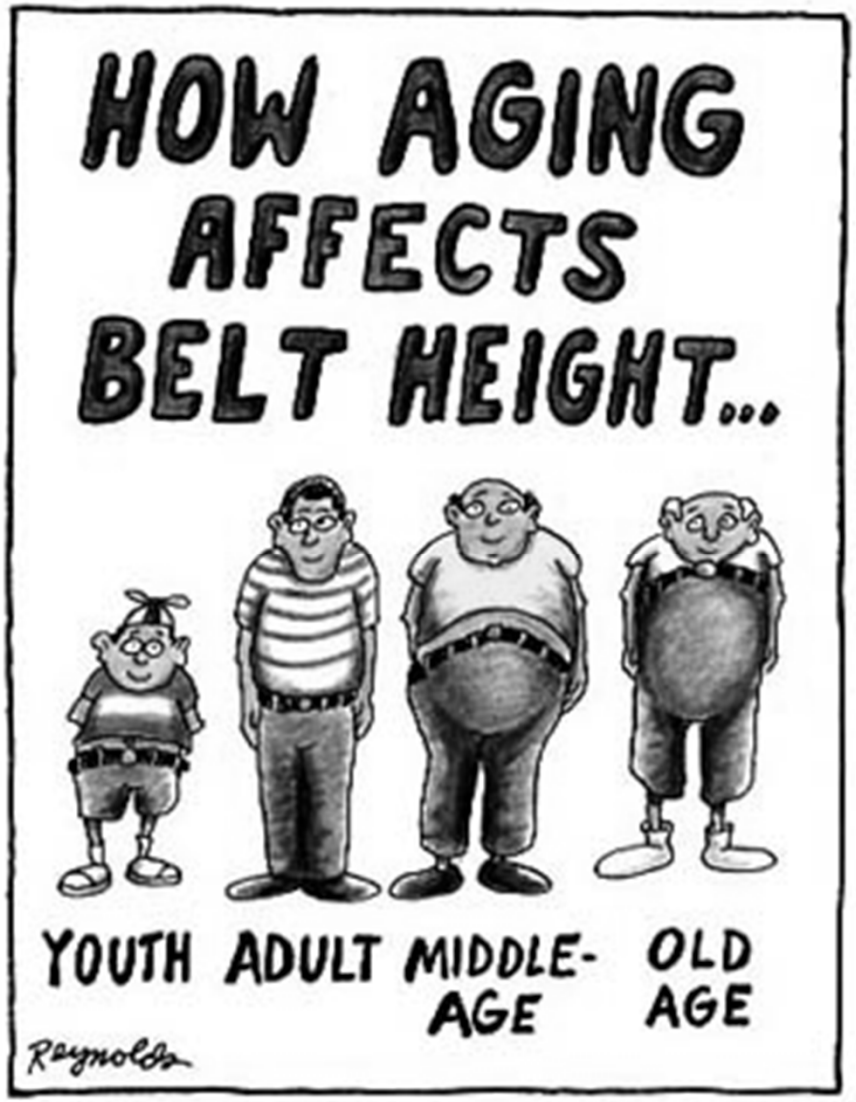
- Receive more than 50% of all prescription medications
- More than 90% of non-institutionalized patients are on at least 1 Rx med
- Most who engage in healthcare system take 6-8 medications
- Comorbidities such as HTN, DM, Heart failure that require multiple medications

Pretorius RW. *Am Fam Physician. 2013;87:331-6*

Don’t Forget OTC and CAM

- Older adults purchase 40% of OTCs
- Use of OTCs is 3-fold higher in elderly
- Nearly $40 billion spent each year on complimentary alternative medicines (CAM)
  - 50% of older adults take supplements
  - 25% take herbal medications

Many Things Change as We Get Older



Pharmacokinetic Changes with Age

- Hepatic blood flow drops by 40%
- Half of pts >65 have some form of CKD
- Heart failure patients can further exacerbate these decreases
- First-pass clearance decreases in elderly
  - Warfarin
  - Benzodiazepines
  - Opiates

Pharmacokinetics continued

- Protein binding changes
  - Malnutrition
  - Dentures
  - Food preparation differences
  - Dietary restrictions
- Dietary and environmental factors can affect absorption and metabolism
  - Up to 10% use significant alcohol

Polypharmacy in Older Patients

- Prevalence of those taking 5 or more medications reported to be 35-80%
- Prevalence of those taking at least one inappropriate medication is 20-50%
- Up to 27% of patients have at least one drug-drug interaction
- As many as 10% are taking duplicate medications

Balducci L. Ann Oncol. 2013 Oct;24 Suppl 7:vii36-40.
Maggiore RJ. The Oncologist. 2010;15(5):507-22.

Contributors to Polypharmacy

- Older patients with several co-morbidities require multiple medications
- Many times appropriate
- Multiple providers and pharmacies
- Inaccurate reporting of full list of meds
- Hoarding
- Changes in health or financial status
- Change in caregivers

Polypharmacy = Negative Outcomes

- Adverse Drug Events
- Poor Adherence
- Geriatric “Syndromes”
  - Urinary Incontinence
  - Cognitive Impairment
  - Loss of balance leading to falls/fractures
- Unnecessary drug expense

Adverse Drug Events

- WHO: “Unintended and undesired effects of a medication at a normal dose”
- Five primary categories:
  - **Adverse Drug Reaction**
  - Medication Error
  - Therapeutic Failure
  - Adverse Drug Withdrawal Event
  - Overdose

Adverse Drug Events

- Risk is 15% with two medications
- Risk increases to 58% with 5 meds
- Risk increases to 82% with ≥ 7 meds
- Additional medications lead to greater incidence of drug interactions

Fulton MM. *J Am Acad Nurs Pract 2005;17(4):123–32.*
Prybys KM. *Emer Med Rep 2002;23(11):145–53.*
Gallagher LP. *Appl Nurs Res 2001;14(4):220–4.*

ADE and the Elderly = Morbidity

- Nearly 17% of hospital admissions due to ADE
- Rate increases to 33% in patients ≥ 75 years old
- While in hospital, 17% of elderly experience an ADE

Chan M . *Intern Med J. 2001;31(4):199-205.*
Page RL. *Am J Geriatr Pharmacother.2006;4(4):297-305.*
Tangiisuran B. *Age Ageing. 2009;38(4):358-359.*

Adherence and Polypharmacy

- Prevalence of non-adherence in older patients as high as 55%
- Adherence negatively associated with increased number of drugs
- Positively associated with higher educational level, women, and higher scores on executive function test
- Critical concern in patients with cancer taking oral agents

How Non-Adherence Defined?

- Objective method based on measurement of drug levels in blood
- Electronic pill bottles, pill counts, and frequency of refills
- Subjective methods based on clinical interviews
- Little is known about the prevalence and significance

Tools to Promote Adherence

- Calendar or daily checklist
- Pillboxes
- Keep meds visible
- Make med taking part of daily routine.
- Say out loud, “I am taking my pills”
- Ask for reminders
- Electronic reminders;
- Cell phone alarm
- Alarm clocks or timers
- Smartphone apps
- Vibrating pillboxes
- Text messages or phone calls
- Medication-dispensing machines

Burhenn PS. Clin J Oncol Nurs. 2015 Jun;19(3Suppl):53-9.


WELL... THE GLAXO PILL PROTECTS MY HEART FROM THE SIDE EFFECTS OF THE PFIZER PILL THAT PREVENTS POTENTIAL LIVER FAILURE DUE TO THE MERCK PILL THAT MINIMIZES THE RISK OF STROKE POSED BY THE NOVARTIS PILL THAT REDUCES BLOOD CLOTS CAUSED BY THE GLAXO PILL.
THE DEVIL OF IT IS I CAN'T REMEMBER THE ILLNESS THAT STARTED ALL THIS...
JOHN COLE

Potentially Inappropriate Medications (PIM)

- Medication that may not be appropriate for a given patient due to age or concurrent illness
- Not always black and white
- Most frequently used measure of polypharmacy in the literature
- Several criteria used to define PIM

Tools Used to Define PIM

- **Beers Criteria**
- **MAI**
- STOPP Criteria
- START Criteria

Beers Criteria

- Most commonly used tool
- Available at http://www.americangeriatrics.org
- App available on Itunes
- Two “avoidable” lists
  - One independent of diagnosis
  - One based on drug-disease interactions
- Graded by quality of evidence and strength
- Includes a list of drugs to be used with caution
- Examples of new additions in 2015
  - Proton pump inhibitors
  - Desmopressin
  - Meclizine

American Geriatrics Society J Am Geriatr Soc. 2015 Nov;63(11):2227-46.

Examples of Beers Medications

- Anticholinergics except amitriptyline
- Antipsychotics
- Benzos (especially long-acting)
- Indomethacin and Ketorolac
- Nitrofurantoin
- Digoxin > 0.125mg daily
- Spironolactone > 25mg daily

American Geriatrics Society. J Am Geriatr Soc. 2015 Nov;63(11):2227-46.

Medication Appropriateness Index (MAI)

- Consists of 10 questions
- 1 = appropriate, 2 = marginally appropriate, and 3 = inappropriate
- Indication, effectiveness, dosage, directions, ddI, ddxI, duplication, duration, cost
- Each question is also weighted for relative importance and a total numerical is computed.

Hanlon JT. J Clin Epidemiol. 1992 Oct;45(10):1045-51.

"Right now I take a blue pill, a purple pill, an orange pill, a white pill, and a yellow pill. I need you to prescribe a green pill to complete my collection."

Does Intervention Make a Difference?

- Cochrane review identified 12 studies
- Over 21,000 patients on at least 4 chronic medications
- Median age of 74 years old on 8 medications
- Type of intervention: 11 primarily complex interventional; 1 computer decision support
- MAI (8 studies) and Beers (4)

Patterson SM. Cochrane Database Syst Rev 2014; 16;5:CD008165.

Interventions for Polypharmacy

- Primary outcomes

  –Appropriateness of meds prescribed by scoring system (MAI or Beers)

  –Hospital admissions

- Secondary outcomes

  –Adherence

  –ADRs, medication errors, drug-drug interactions

  –Quality of life

Patterson SM. Cochrane Database Syst Rev 2014; 16;5:CD008165.

Primary Outcomes

- Number of inappropriate medications decreased by MAI score and Beers criteria but only significant for MAI scores
- No impact on hospital admissions (only 4 studies looked at this outcome)

Patterson SM. Cochrane Database Syst Rev 2014; 16;5:CD008165

Secondary Outcomes

- ADRs decreased (p=0.05)
- Med errors unchanged
- Data for drug interactions poor
- Adherence not different (only one study)
- Quality of life not different

Patterson SM. Cochrane Database Syst Rev 2014; 16;5:CD008165

Conclusions from Cochrane

- Intervention had significant impact on incidence of polypharmacy
- Hard outcomes data limited
- Longevity of interventions?
- Prospective audit and feedback needed
- More studies examining effect on hospitalizations needed

Methods for Decreasing Polypharmacy

- Professional
  – Educational activities for providers or patients
- Organizational
  – Polypharmacy clinic
- Financial
  – Incentive programs
  – Regulatory interventions

Patterson SM. Cochrane Database Syst Rev 2014; 16;5:CD008165.

Future Directions

- Incorporation of criteria in the electronic medical record
  - POE systems
  - Outpatient Pharmacy Records
  - PCMH models
- Need tools with greater sensitivity
  - Identify greatest potential for ADEs
- Need tools with greater specificity
  - "Alert fatigue" leading to ignoring potentially important ADEs

Pearls for Decreasing Polypharmacy

- Start low and go slow
- Don’t set it and forget it
- Ask about OTCs and complimentary meds
- Trust but verify
- Avoid narrow therapeutic index meds

Pearls for Decreasing Polypharmacy

- Review medication lists regularly
- Avoid too many changes at one time
- Begin with the end in mind
- Utilize Beers criteria or other for regular assessment
- Utilize tools to improve adherence

Summary

- Polypharmacy represents a significant cause of morbidity in the elderly
- Data showing significant effects of intervention on “hard” outcomes is limited
- Limiting the number of PIM and increasing adherence is the goal
- Constant re-assessment, education, and re-enforcement required

Questions?

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Growth of Older Population

- Represent nearly 46 million

  ~ 15% of total population
- Has increased 32% since 2005
- At 65th birthday median life expectancy of 18-20 years
- Over one-third of elderly received 90% of income from social security
- Over 14% are below the poverty level

http://www.aoa.gov/Aging_Statistics/Profile/2015/2.aspx

STOPP Criteria

- Screening Tool of Older Persons' Potentially Inappropriate Prescriptions
- Comprised of 65 clinical criteria
- More common avoidable practices
- Some overlap with Beers criteria
- Not comprehensive

Gallagher P. Int J Clin Pharmacol Ther 2008;46(2):72–83.

START Criteria

- Screening Tool to Alert Doctors To Right Treatments
- Used in conjunction with STOPP criteria
- Identifies potential errors of omission for elderly patients
- Composed of 22 criteria

Gallagher P. Int J Clin Pharmacol Ther 2008;46(2):72–83.

Beers vs. STOPP

- 600 patients screened using either criteria
- Teaching hospital over 4-month period
- ADEs recorded and verified by expert panel for causality or contributory
- STOPP Criteria associated with avoidable ADEs leading to hospitalization ($p<0.001$)
- Beers Criteria NOT associated ($p=0.11$)

Hamilton H. Arch Intern Med. 2011;171(11):1013-1019.

Information from Your Family Doctor

Adverse Drug Events in Older Adults: How to Avoid Them

What is an adverse drug event?

It is an unintended and unwanted effect that happens after taking a normal dose of a medicine.

Why are they more common in older adults?

Medicines have not been studied as much in older adults. The risks and benefits of medicines can vary, because getting older and getting sick affect people differently. There is less room for error, because older adults' bodies do not adapt or repair themselves as easily.

Why do they happen?

They can happen from taking too many medicines or when several different medicines interact with each other. They can also happen because of changes in the kidneys and liver that occur as you age, and because of problems with adequate nutrition. Poor fluid balance, including either too much or too little fluids, can be a factor. Sometimes, a new condition or illness can cause adverse drug events.

How do I know if I am having one?

If you have new symptoms that you did not have before you started a new medicine or changed the dose of a medicine you have been taking, you may be having an adverse drug event. Tell your doctor if you have any new symptoms.

What will my doctor do if I have one?

Your doctor may have you stop taking a certain medicine, lower the dose of a medicine, or have you take a different one. Try to have one doctor, such as your family doctor, review all of your medicines, even ones prescribed by other doctors.

Where can I get more information?

Your doctor

AAFP's Patient Education Resource
http://familydoctor.org

American Geriatrics Society
http://www.americangeriatrics.org

Consumer Reports Best Buy Drugs (reviews by drug, condition, and category)
http://www.consumerreports.org/health/best-buy-drugs/index.htm

Health in Aging
http://www.healthinaging.org

March 2013

AMERICAN ACADEMY OF FAMILY PHYSICIANS

http://familydoctor.org