

Educating the Older Adult in Over-the-Counter Medication Use

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The number of over-the-counter (OTC) medications is increasing as more prescription medications are being switched to OTC status. Many older adults rely on self-management of medications to treat common medical conditions such as the common cold, pain, diarrhea, and constipation. Although OTC medications are regulated by the U.S. Food and Drug Administration and Health Canada, many people are unaware of proper dosing, side effects, adverse drug reactions, and possible medication interactions that may not be clearly labelled. This article reviews the major side effects of common OTC medications and how to recognize these adverse effects, and provides health care professionals with information to offer to older adults and their caregivers about safe OTC medication use.

Key words: over-the-counter, self-medication, older adults, side effects, patient education

Introduction

There are over 100,000 over-the-counter (OTC) medications on the market.¹ Governments view OTC medications as an effective way to shift a greater share of health care costs to the consumer.^{2,3} Recently, many prescription medications are being switched to OTC status.⁴

Even though OTC drugs are readily available and are regulated by the U.S. Food and Drug Administration and Health Canada, they may still be harmful. Consumers may not follow directions regarding the dosage, storage and side-effect profiles of nonprescription medications, as well as they do for prescription medications, because they assume that there will be no consequences to their health. Consequently, many people may benefit from having their OTC medications monitored by a health care professional.

Studies in the U.S. have shown that adults over 65 years are the largest users of prescription and OTC medications, accounting for up to 40% of all nonprescription medication use.⁵ Twice as many OTC drugs as prescription drugs were being used by older adults.⁶ Older adults are two to seven times more likely to experience an adverse drug reaction (ADR) than younger adults,⁸ and approximately one third of hospital admissions of older adults are associated with a problem related to prescription medication use.⁹ In older adults, the chances of a serious drug reaction are increased because of altered pharmacokinetics, pharmacodynamics, impaired renal function, reduced hepatic blood flow and liver size, increased body fat, decreased lean body mass, changes in receptor sensitivity, and increased number of medical conditions,¹ so the frequent use of OTC drugs makes older adults even more vul-

nerable to the risks of concurrent or inappropriate medication consumption (Figure 1).⁷

Many older adults independently manage their prescription and nonprescription (OTC) medications; this is referred to as self-management of medication. The most common self-medication practices that contribute to medication mismanagement are outlined in Table 1.^{9,10}

While self-medication can lead to many different problems, ADRs are the most serious. Medication interactions are believed to be the leading cause of ADRs.⁹ As the number of medications ingested increases, so does the chance of an ADR occurring and conversely, when one medication is dropped from an eight-medication regimen, the risk of an ADR occurring decreases by more than two thirds.¹¹ Taking two medications presents a risk of 6%, but the risk increases to 100% when taking eight medications.⁹

The purpose of this article is to review the major side effects of common OTC medications and how to recognize these adverse effects, and to provide health care professionals with information to offer older adults and their caregivers about safe OTC medication use.

Pain Medications

Pain is the most common symptom treated with OTC medications.^{15,16} Nonsteroidal anti-inflammatory drugs (NSAIDs) are frequently used for self-medication of pain. Commonly used drugs include acetylsalicylic acid (ASA), ibuprofen, naproxen, and ketoprofen. Twenty to thirty percent of individuals over 65 consume analgesics on a given day.^{17,18} Gastrointestinal (GI) bleeding is the major risk factor associated with NSAID use, and studies have shown that older adults are at increased risk compared with younger individuals. One study found that GI bleeding from a peptic ulcer in older individuals was associated with NSAID use in 81% of patients. Ninety-five percent of those patients were using nonprescription NSAIDs.¹⁹ When individuals have impaired renal function, hypertension, or congestive

Figure 1:
Over-the-Counter Medication

adverse drug reactions

Studies in the US have shown that older adults are significant consumers of nonprescription medications, accounting for up to 40% of all nonprescription medications. In the older adult, the chances of a serious drug reaction are increased because of altered pharmacokinetics, pharmacodynamics, impaired renal function, reduced hepatic blood flow and liver size, increased body fat, decreased lean body mass, changes in receptor sensitivity, and increased number of medical conditions. Studies have shown older adults are two to seven times more likely to experience an adverse drug reaction than younger adults and approximately one third of hospital admissions of older adults are associated with a prescription medication related problem.

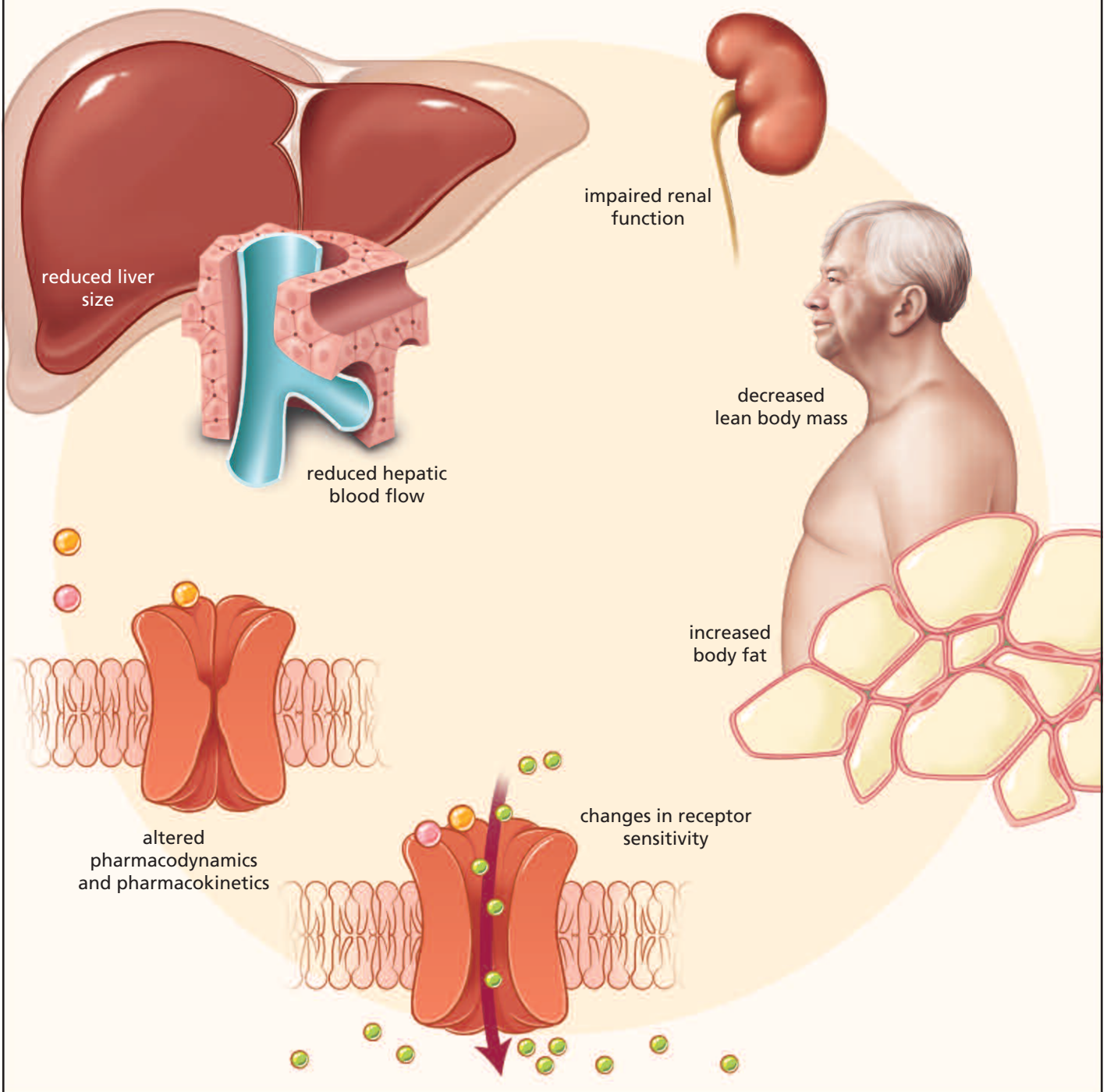


Table 1: Common Self-Medication Practices Contributing to Medication Mismanagement

Discontinuing prescriptions because of side effects, improvement in symptoms, fear of dependency, or inadequate funds to refill prescription
Failure to follow recommendations for consumption with food or avoidance of certain foods
Keeping poor records (retaking, skipping a dose)
Mixing OTC drugs with a prescription medication written for the same problem
Taking an additional dose if symptoms are not relieved
Taking medications only when symptoms occur
Taking the wrong dose
Using the wrong techniques with inhalers, suppositories, or nasal sprays

heart failure or take an angiotensin-converting-enzyme inhibitor, they may be at risk for compromised renal function, kidney failure, or fluid overload.¹

Low-dose ASA (81 mg) is commonly taken by older adults for cardiovascular protection. Both low-dose and enteric-coated ASA can cause GI bleeding, especially when taken concurrently with other NSAIDs for pain.²⁰ Other side effects of NSAIDs include tinnitus, diarrhea, and nausea (see Table 2).

Acetaminophen is commonly recommended by health care professionals as it does not possess the same risk for GI bleeding as NSAIDs; however, acetaminophen-related toxicities are not uncommon and account for approximately 13,000 emergency visits and 2,100 hospitalizations. Note that a toxic dose of acetaminophen in a chronic older user can be only 2 g a day, not the 4 g a day indicated on the bottle.²¹ It is pertinent to educate older adults about acetaminophen concentrations in combination OTC medications and prescription products, as ingestion of these can lead to an unintentional overdose of acetaminophen. Liver damage, concomitant use of hepatotoxic drugs such as azoles and macrolides, and alcohol use increase an individual's risk for the hepatotoxic effects of acetaminophen. Patients who consume three or more alcoholic drinks per day should avoid taking acetaminophen.

Individuals taking warfarin for anticoagulation therapy should be aware that the interaction of warfarin with doses even lower than the total daily recommendations of acetaminophen can increase the International Normalized Ratio to a dangerous level.²²

Cough and Cold Medications

The common cold is the most common reason for a visit to a primary care physician and many medications are used to alleviate symptoms. Pseudoephedrine is one of the most commonly used OTC

drugs and is used for its decongestant properties. Even when taken at indicated dosages, there are serious risks when older adults take this medication, such as hypertension, vasospasm, arrhythmia, and stroke. Older adults need to be educated when taking pseudoephedrine in conjunction with other proarrhythmic medications such as beta-blockers or digoxin due to an increased risk of arrhythmia.¹ Seizures, hallucinations, chronic headaches, and insomnia can also occur with long-term use.

Topical nasal decongestants are used for cough, cold, and allergy symptoms. Their extended use can lead to rebound swelling and nasal stuffiness, otherwise known as rhinitis medicamentosa. Among people with heart disease, hypertension, thyroid disease, diabetes, or benign prostatic hypertrophy, and among older adults prone to urinary retention, topical and oral decongestants should be avoided completely due to the risk of dangerous hypertension.¹² People taking monoamine oxidase inhibitors may experience a life-threatening rise in blood pressure if they take a decongestant (see Table 3).

Antihistamines with anticholinergic side effects, such as diphenhydramine, are used for symptoms of cough, cold,

Table 2: Over-the-Counter Pain Medications*

Medication	Side Effects	Interactions	Cautions
Acetaminophen	Liver toxicity	Hepatotoxic drugs (azoles, macrolides, warfarin)	Cirrhosis Poor nutrition Alcohol use
NSAIDs	Tinnitus Diarrhea Nausea Gastritis GI bleeding Renal failure	Warfarin ACEIs	Renal failure Congestive heart failure Cirrhosis

ACEI = angiotensin-converting-enzyme inhibitor; GI = gastrointestinal; NSAID = nonsteroidal anti-inflammatory drug.

*Only drugs with significant risk are listed.

Source: Rolita L and Freedman M, 2008.¹

Table 3: Over-the-Counter Cough and Cold Medications*

Medication	Side Effects	Interactions	Cautions
Anticholinergic antihistamines	Cognitive dysfunction	Antiparkinsonian drugs	Closed-angle glaucoma
	Hallucinations	Tricyclic antidepressant agents	Dementia
	Sleep disruptions	Phenothiazine medications	
	Dry mouth	Oxybutynin	
	Constipation		
	Impaired diaphoresis		
	Increased thirst		
	Papillary dilation		
	Urinary retention		
	Seizures		
	Arrhythmia		
Heat stroke			
Pseudoephedrine	Hypertension	Beta-blockers	Heart disease
	Vasospasm	Digoxin	Hypertension
	Arrhythmia	Monoamine oxidase inhibitors	Thyroid disease
	Stroke		Diabetes mellitus
	Seizures		Prostatic hypertrophy
	Hallucinations		Urinary retention
	Chronic headaches		Closed-angle glaucoma
	Insomnia		
Tremor			
Topical nasal decongestants	Rhinitis medicamentosa	Same as for pseudoephedrine	Same as for pseudoephedrine
	Hypertension		

*Only drugs with significant risk are listed.
Source: Rolita L and Freedman M, 2008.¹

allergy, and insomnia. Older adults are at particular risk for an increased anticholinergic load when multiple drugs with anticholinergic activity are taken together. Many older adults take prescription medications with anticholinergic properties, such as oxybutynin. Anticholinergic side effects include cognitive dysfunction, disrupted sleep, confusion, hallucinations, and delirium. They may result in decreased vision and motor reflexes, placing the individual at risk for injury from a fall or motor vehicle accident.^{13,14}

Most drugs with anticholinergic properties are inappropriate for use by

older adults. Second-generation H1 antagonists, such as loratadine and fexofenadine, are less likely to have these effects when used in appropriate dosages; however, the second-generation antihistamines are more useful for allergic rhinitis or urticaria than for cough and cold symptoms.¹

Dextromethorphan, a morphine derivative, is a common ingredient in OTC cough preparations. It acts centrally by suppressing the cough reflex. Although side effects are rare, it is important to recognize the occasional dizziness, lethargy, and nausea that can result with its use.

Dyspepsia and Heartburn Medications

Heartburn is a common symptom experienced by older adults, and the risk for developing gastroesophageal reflux disease (GERD) increases with age. Sixty percent of people use nonprescription medications to treat their symptoms instead of visiting their physician.²³ There are three types of OTC medications for the treatment of dyspepsia or heartburn: antacids, histamine2 receptor antagonists (H2RAs), and proton pump inhibitors (PPIs) (see Table 4).

Over-the-counter antacids made of alumina, magnesium, calcium carbonate,

Table 4: Over-the-Counter Dyspepsia and Heartburn Medications*

Medication	Side Effects	Interactions	Cautions
Antacids	Electrolyte imbalance	Ibuprofen	Kidney stones
	Diarrhea	Sulfonylurea drugs	Hypercalcemia
	Constipation	Tetracycline	Renal failure
	Kidney stones	Ciprofloxacin Isoniazid	Congestive heart failure
Histamine 2 receptor antagonists	Liver disease	Fluoxetine	Cirrhosis
	Tachyphylaxis	Chemotherapy drugs	Anticoagulation
		Theophylline	
		Warfarin	
		Carbamazepine	
		Phenytoin	
		Isoniazid	
		Ciprofloxacin	
		Ketoconazole Valproic acid	

*Only drugs with significant risk are listed.
Source: Rolita L and Freedman M, 2008.¹

or simethicone have been used for many years. They neutralize gastric acid and have a fast and brief onset of action. These medications are considered safe and are well tolerated by most; however, they may mask symptoms of more serious underlying problems such as Bar-

rett’s syndrome or esophageal adenocarcinoma. Adverse effects to be aware of include diarrhea with the use of magnesium-containing agents, constipation with the use of aluminum-containing agents, and milk-alkali syndrome with the overuse of calcium carbonate agents.

People who are at risk for kidney stones should be cautious of calcium overload. Also, antacids can interfere with the absorption of certain medications (see Table 4).

H2RAs have a slower onset of action and a longer duration than antacids. Severe side effects are rare. Cimetidine has been reported to cause acute liver disease.²⁴ The use of cimetidine with fluoxetine presents the risk of parkinsonism. See Table 4 for drug interactions.

Many PPIs have recently been switched to OTC. Symptomatic relief cannot be expected until multiple dosages have been taken as these have the slowest onset of action and the longest duration. Proton pump inhibitors have the same drug interactions as H2RAs and are generally well tolerated with few side effects. They must be taken on an empty stomach, 30 minutes prior to a meal to work correctly.

All chronic symptoms of GERD or heartburn should be addressed by a health care professional. People should know that treatment of dyspepsia and heartburn could potentially mask an underlying illness. There is a higher rate of GERD complications among the older adult; thus, an appropriate evaluation is warranted.¹

Diarrhea Medications

The most common OTC antidiarrheal medications are bismuth subsalicylate and loperamide. Bismuth subsalicylate’s main side effect is discoloration of feces and the tongue. This side effect may mask underlying GI bleeding in older adults. Otherwise, these drugs are well tolerated. See Table 5 for drug interactions.

Loperamide holds a significant risk for electrolyte disorder, fluid loss, and dehydration secondary to its antiperistaltic properties. Paralytic ileus is a rare occurrence. Individuals should seek medical attention if diarrhea lasts >2 days, if they experience blood in their stool, or if they develop a fever, as the risk of severe dehydration increases (see Table 5).

Table 5: Over-the-Counter Diarrhea Medications*

Medication	Side Effects	Interactions	Cautions
Bismuth subsalicylate	Discolored feces	Warfarin	Anticoagulation
	Discolored tongue	Tetracycline	Infectious diarrhea
	Fecal impaction	Steroids	
		Valproic acid	
		Uricosuric drugs Antacids	
Loperamide	Electrolyte imbalance	None	Cirrhosis
	Fluid loss		Infectious diarrhea
	Dehydration		
	Paralytic ileus		

*Only drugs with significant risk are listed.
Source: Rolita L and Freedman M, 2008.¹

Constipation Medications

Older adults have decreased gut motility and often use stool softeners or laxatives to relieve their constipation. Symptoms of constipation should be evaluated by a health professional because underlying causes, such as cancer or obstruction, are increased in older adults. People should include a proper amount of fibre in their diet or take OTC psyllium supplements to prevent constipation. There are three categories of laxatives: stimulant, osmotic, and surfactant. Stimulant laxatives such as bisacodyl and senna can lead to electrolyte imbalances and cathartic colon. Osmotic laxatives such as magnesium hydroxide and magnesium sulfate can also cause electrolyte imbalances if patients have poor fluid intake, and these drugs are contraindicated in renal failure (see Table 6). Surfactant agents such as docusate sodium or mineral oil are a good first-line agent as they are generally safe; however, there is a risk of aspiration with mineral oil.¹

Why Do Some Older Adults Fail to Adhere to the Proper Therapeutic Regimen?

Failure to comply with the proper therapeutic regimen is reported to occur in 25–60% of older adults who self-manage medication.²⁵ Both human and environmental factors contribute to medication mismanagement by older adults. Health care professionals are responsible for overseeing the individual safety of patients. Over-the-counter medication use should be an informed process, and patients must be encouraged to obtain clear information regarding safe dosing and effective usage.²⁶ Studies have shown that better communication between patients and health care providers predicts better self-management of medications.²⁵ However, this is often not feasible. Although 80% of physician office visits result in new prescriptions,²⁷ severe time constraints of physicians limit the available time to educate patients. Problems related to the improper use of medications may go undetected as patients may feel it is not important to disclose information about OTC use, and many doctors do

Table 6: Over-the-Counter Constipation Medications*

Medication	Side Effects	Interactions	Cautions
Bisacodyl, senna	Electrolyte imbalance Cathartic colon	None	None
Magnesium hydroxide, magnesium sulfate	Electrolyte imbalance Edema	Quinolones Azoles Thyroid medications Digoxin	Renal failure Bone disease

*Only drugs with significant risk are listed.
Source: Rolita L and Freedman M, 2008.¹

not ask patients about OTC medication use. One study showed that only 58% of patients told their physicians about their OTC use, and that physicians asked about OTC drug use in only 37% of encounters.²⁸ Often signs and symptoms of a drug reaction are interpreted as changes due to aging instead of as ADRs—this is why it is so pertinent to review medications at every visit and to educate health care aides, family members, and other caregivers. One solution to office time constraints is the use of home visiting nurses, who are able to extensively review an individual’s medication in the home.

Pharmacists also have an important role in identifying drug interactions in users of nonprescription medications; however, research has shown that physicians often leave out important information regarding significant medication interactions between OTC drugs and prescription drugs when counselling patients.² New interventions for educating patients in OTC use and interactions include interactive computer programs such as personal education programs (PEPs); these are designed for the learning styles and psychomotor skills of older adults. One study showed that people who used a

Key Points

- Older adults are the most common users of over-the-counter (OTC) medications.
- The use of OTC medications may mask underlying symptoms of a more serious disease process.
- Physicians must review prescription and OTC medications at every visit.
- Self-medication practices need to be monitored by a health care professional to prevent adverse drug reactions and dangerous medication interactions.
- Home visiting nurses and pharmacists may help physicians oversee self-medication practices.

Clinical Pearls

- Have each patient bring a bag of all medications they are taking to each visit.
- Keep a running list of medications in the front of every chart, marking off what they no longer take and listing what is added at each visit.
- Educate patients to read commentary on back of medication labels.

PEP had significantly greater knowledge and self-efficacy scores on how to avoid drug and alcohol interactions when compared with a control group.²⁹ Patient education via computers is promising for future practice, but further studies are needed to demonstrate how to provide appropriate education based on patients' needs, knowledge, and skills.

Conclusion

Patients should continue to play an active role in their own health care, while understanding the purpose of OTC drugs, their ADRs, and when to seek medical attention. It is crucial that health care providers educate their patients and involve caregivers to protect the safety and longevity of the aging population.



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References

- Rolita L, Freedman M. Over-the-counter medication use in older adults. *J Gerontol Nurs* 2008;34:8–17.
- Westerlund LT, Marklund BR, Handl WH, et al. Nonprescription drug-related problems and pharmacy interventions. *Ann Pharmacother* 2001;35:1343–9.
- Berry D, Raynor T, Knapp P. Over the counter medicines and the need for immediate action: a further evaluation of European Commission recommended wordings for communicating risk. *Patient Educ Couns* 2004;53:129–34.
- Amoako EP, Richardson-Campbell L, Kennedy-Malone L. Self-medication with over-the-counter drugs among elderly adults. *J Gerontol Nurs* 2003;29:10–5.
- Maiese DR. Healthy people 2010—leading health indicators for women. *Womens Health Issues* 2002;12:155–64.
- Conn VS. Self-management of over-the-counter medications by older adults. *Public Health Nurs* 1992;9:29–36.
- Francis SA, Barnett N, Denham M. Switching of prescription drugs to over-the-counter status: is it a good thing for the elderly? *Drugs Aging* 2005;22:361–70.
- Higsbee MD. Consumer guidelines for using medication wisely. *Generations* 1994;18:43–7.
- Curry LC, Walker C, Hogstel MO. Teaching older adults to self-manage medications; preventing adverse drug reactions. *J Gerontol Nurs* 2005;31:33–42.
- Cervantes E, Heid-Grubman J, Schuerman CK. The effects of medication on older adults. *Caring* 1996;15:58–63.
- Golden AG, Preston RA, Barnett SD, et al. Inappropriate medication prescribing in the homebound older adults. *J Am Geriatr Soc* 1999;47:948–53.
- Pray SW, Pray JJ. Safe use of nasal decongestants. *US Pharm* 2004;29:22–7.
- Miller CA. The connection between drugs and falls in the elders. *Geriatr Nurs* 2002;23:109–10.
- Grisso JA, Kelsey JL, Strom BL, et al. Risk factors for falls as a cause of hip fracture in women. The Northeast Hip Fracture Study group. *N Engl J Med* 1991;324:132–31.
- Barber N. Drugs: from prescription only to pharmacy only. *BMJ* 1993;307:640.
- Stoller EP, Follow R, Forster LE. Older people's recommendations for treating symptoms: repertoires of lay knowledge about disease. *Med Care* 1994;32:847–62.
- Roumie CL, Griffin MR. Over-the-counter analgesics in older adults: a call for improved labelling and consumer education. *Drugs Aging* 2004;21:485–98.
- Stoehr GP, Ganguli M, Seaberg EC, et al. Over-the-counter medication use in an older rural community: the MoVIES Project. *J Am Geriatr Soc* 1997;45:158–65.
- Cebollero-Santamaria F, Smith J, Gioe S, et al. Selective outpatient management of upper gastrointestinal bleeding in the elderly. *Am J Gastroenterol* 1999;94:1242–7.
- Kelly JP, Kaufman DW, Jurgelon JM, et al. Risk of aspirin-associated major upper-gastrointestinal bleeding with enteric-coating or buffered product. *Lancet* 1996;348:1413–6.
- Nourjah P, Ahmad SR, Karwoski CB. Safety analysis of acetaminophen (APAP)-associated hepatotoxicity. Presentation at the meeting of the U.S. Food and Drug Administration's Nonprescription Drugs Advisory Committee Meeting; 2002; Rockville, MD. <http://www.scribd.com/doc/2791155/Proposed-Rule-Human-drugs-Internal-analgesic-antipyretic-and-antirheumatic-products-OTC-tentative-final-monograph-required-warnings-and-other>. Accessed October 20, 2008.
- Hylek EM, Heiman H, Skates SJ, et al. Acetaminophen and other risk factors for excessive warfarin anticoagulation. *JAMA* 1998; 279:657–62.
- Sontag SJ. The medical management of reflux esophagitis. Role of antacids and acid inhibition. *Gastroenterol Clin North Am* 1990;19:683–712.
- Garcia Rodriguez LA, Wallander MA, Stricker BH. The risk of acute liver injury associated with cimetidine and other acid-suppressing anti-ulcer drugs. *Br J Clin Pharmacol* 1997;43:183–8.
- Peterson AM, Dragon CJ. Improving medication adherence in patients receiving home health. *Home Healthcare Consultant* 1998;5:25–7.
- Berry D, Raynor T, Knapp P. Over the counter medicines and the need for immediate action: a further evaluation of European Commission recommended wordings for communicating risk. *Patient Educ Couns* 2004;53:129–34.
- Cornish J. Color coding patient medications. *Caring* 1992;11:46–51.
- Sleath B, Rubin R, Campbell W, et al. Physician-patient communication about over-the-counter medications. *Soc Sci Med* 2002;53:357–69.
- Neafsey PJ, Strickler Z, Shellman J, et al. An interactive technology approach to educate older adults about drug interactions arising from over-the-counter self-medication practices. *Public Health Nurs* 2002;19:255–62.