










National Medicines Information Centre

ST. JAMES'S HOSPITAL • DUBLIN 8
TEL 01-4730589 or 1850-727-727 • FAX 01-4730596
E-Mail: nmic@stjames.ie

**VOLUME 6
NUMBER 1
2000**

PRESCRIBING IN THE ELDERLY

SUMMARY

-  The elderly constitute 11%, and rising, of the Irish population yet receive 47% of all prescribed drugs on the GMS
-  Age-related changes in drug-handling render the elderly more prone to drug toxicity
-  Polypharmacy is the norm predisposing to adverse drug reactions particularly, and drug interactions
-  Non-pharmacological treatment options should be considered, where appropriate
-  When drug therapy is considered necessary, use an evidence base and start low and go slow
-  Common problematic drugs include psychotropics, NSAIDs, digoxin and other cardiovascular drugs
-  Drug regimens should be kept simple to promote compliance and reviewed regularly with a view to stopping medication, where appropriate

INTRODUCTION



The elderly (over 65s) constitute 11.4% of the Irish population yet receive 47% of all prescribed medicines on the GMS; it is estimated that 32 items per year are prescribed per elderly person.¹ This is due to the presence of multiple pathologies, the increasing range of available medicines, inappropriate prescribing, lack of medication review and an increased emphasis on preventative treatments.² Polypharmacy is the norm not the exception. A significant factor is repeat prescribing particularly where patients are not reviewed regularly. Institutionalised patients tend to be on an even larger number of drugs.^{3,4} Self-medication with over the counter (OTC) medicines or continued treatment for a previous condition that has resolved is also common.⁵

As elderly patients are exposed to a greater number of drugs, they are more susceptible to adverse drug reactions (ADRs) and drug interactions. Other therapeutic risks may arise from age-related changes in pharmacokinetics and pharmacodynamics, impaired homeostasis and poor compliance. The challenge to the physician is to provide appropriate and beneficial treatment for often multiple conditions while minimising inappropriate prescribing and risk of iatrogenic disease. Choosing optimal drug

regimens that meet the complex needs of elderly patients requires careful consideration.^{2,6}

INAPPROPRIATE PRESCRIBING IN THE ELDERLY

Inappropriate prescribing may be defined as over-use of drugs, irrational choice of drugs or under-use of drugs.^{7,8} As the elderly have multiple medical conditions, symptomatic prescribing may give rise to unnecessary prescriptions. Drugs are often prescribed in the elderly where effective social measures are indicated.^{9,10} Where possible, non-pharmacological treatments should be used (see **Table 1**). Manifestations of ageing may be mistaken for disease leading to inappropriate prescribing *eg* prochlorperazine for dizziness due to postural instability. ADRs may be attributed to old age *eg* tricyclic-induced memory impairment or a new pathology *eg* phenothiazine-induced parkinsonian tremor, NSAID-induced hypertension, thiazide-induced gout. A new drug is then prescribed, placing the patient at additional risk of ADRs.¹¹ New signs and symptoms should always be considered as a possible consequence of current medication. An inappropriate drug may be prescribed by treating the symptom rather than the underlying cause *eg* benzodiazepines for insomnia due to depression. Also the decision to prescribe a drug may be inappropriate *eg* an antibiotic for a viral throat infection or sometimes the wrong choice of drug is made *eg* ciprofloxacin for a chest infection.

SUB-OPTIMAL PRESCRIBING IN THE ELDERLY

In some instances failure to prescribe an effective drug results in sub-optimal disease management. Despite the problems associated with polypharmacy in the elderly, drug therapy should not be withheld where warranted as this can also impact on functional capacity and quality of life.² Examples include warfarin for atrial fibrillation and stroke prevention, aspirin for primary and secondary prevention and statins post-myocardial infarction.

QUALITY PRESCRIBING IN THE ELDERLY

Where drug therapy is considered necessary the rationale should be evidence based and only essential drugs should be prescribed. Tailored doses should be used as the elderly population commonly require lower doses (start low and go slow). The possibility of drug-drug interactions *eg* potassium supplement with an ACE inhibitor and drug-disease interactions *eg* NSAID in hypertension, should be considered. Medication should be reviewed on a regular basis for appropriateness.¹²⁻⁵ Some drugs may require gradual tapering of dose *eg* antidepressants, benzodiazepines, antiepileptics, to avoid withdrawal symptoms, as in other patients. Simplified regimens, appropriate formulations, clear instructions and accessible drug packaging should all be considered to promote compliance.¹³ **Table 2** gives a check list for quality prescribing in the elderly.

Table 1 Non-pharmacological treatments

Physiotherapy for osteoarthritis
Dietary/lifestyle intervention for NIDDM
Dietary/lifestyle changes for hypertension
Support services for isolation
Speech therapy for dysphagia
Relaxation therapy for insomnia

CHANGES IN PHARMACOKINETICS

Age-related physiological changes may render the elderly more susceptible to drug-related risks. Pharmacokinetic parameters of drug handling (absorption, distribution, metabolism and elimination) may be significantly altered. Pharmacokinetics may be considered as "what the patient does to the drug".¹⁶ It is important to take physiological changes into account when prescribing a drug for an elderly patient in order to minimise toxicity and maximise therapeutic gain.¹⁷⁻²¹ This is particularly important for drugs with a narrow therapeutic index. Age-related changes in pharmacokinetics of clinical significance are primarily:

- increased body fat *eg* enhanced distribution of psychotropics
- reduced muscle mass *eg* increased digoxin levels
- reduced capacity of the liver for oxidative metabolism *eg* TCAs, cimetidine, warfarin
- reduced excretion by the kidney *eg* digoxin, lithium, opioids
- reduced binding to albumin especially in the very ill *eg* phenytoin

In practice, deterioration in renal function is the most significant pharmacokinetic change; GFR decreases by 1% per year after the age of forty. It should also be remembered that biological age often differs from chronological age. Certain drugs with a long half-life, *eg* glibenclamide, nitrazepam may cause toxicity due to age-related accumulation. **Table 3** lists some problem drugs in the elderly.

CHANGES IN PHARMACODYNAMICS

Pharmacodynamics may also be significantly altered due to changes in responsiveness of target organs; it may be considered as "what the drug does to the patient".¹⁶ Altered receptor sensitivity and affinity and impaired homeostatic mechanisms may predispose to drug toxicity. Examples of pharmacodynamic changes in the elderly are:

- Increased sensitivity to CNS drugs *eg* benzodiazepines, opioids and antiparkinsonian drugs.²²⁻³
- Impaired orthostatic circulatory responses leading to drug-induced hypotension *eg* alpha-blockers.²⁴⁻⁵
- Postural instability predisposing to drug-related falls.²⁶⁻⁸
- Impaired thermoregulatory mechanisms predisposing to iatrogenic hypothermia

Table 2 Check list for quality prescribing

- ? Is the drug needed
- ? Is there an evidence base for the drug
- ? Is it the best choice of drug for the patient
- ? Is the dose correct (NB: start low and go slow)
- ? Is the formulation suitable for the patient
- ? Is the drug likely to interact with other medication
- ? Is the drug likely to interact with other diseases
- ? Is the regimen as simple as possible
- ? Does the patient understand how to take the drug
- ? How long is the medication to be continued for
- ? Will the drug require monitoring

POTENTIAL FOR DRUG TOXICITY

Age-related changes in pharmacokinetics and pharmacodynamics together with impaired homeostatic mechanisms and the high incidence of polypharmacy predispose the elderly to ADRs. There is a three-fold greater incidence of ADRs in patients over the age of 65 compared to those <30 years.³ The majority of ADRs in the elderly are dose-dependent and therefore predictable rather than idiosyncratic. Many are also preventable by good prescribing practice.^{6,28} Sample selection bias in clinical trials contributes to the risk of drug toxicity in the elderly; the relatively small numbers of elderly patients recruited in clinical trials impedes collation of drug safety data in this patient group.²⁹

Older patients are more likely to be admitted to hospital with iatrogenic disease. It is estimated that up to 10-17% of admissions to acute care of the elderly units are due to ADRs.^{3,6} Adverse reactions also tend to be more

Table 3 Examples of problem drugs in the elderly

Drugs with a narrow therapeutic index
digoxin
lithium
theophylline
warfarin
Drugs with a long half-life
glibenclamide
nitrazepam, diazepam
fluoxetine
Drugs which predispose to falls
psychotropics
benzodiazepines
antihypertensives eg alpha-blockers
Drugs which predispose to bleeding
NSAIDs
warfarin
Drugs which can cause hypothermia
phenothiazines
TCAs
Drugs which cause Parkinsonian effects
metoclopramide
psychotropics
Drugs which cause confusion/memory impairment
psychotropics e.g. thioridazine
benzodiazepines
anticholinergics
co-proxamol
cimetidine

severe. Many are due to inappropriate prescribing with substantial costs to the health service (and the patient). Cardiovascular drugs, NSAIDs and psychotropics are the three drug groups most commonly implicated in drug-related disease.³⁰⁻¹ Gastrointestinal, particularly haemorrhage, and haematological side-effects tend to be the most common. Instances of iatrogenic disease necessitating hospital admission are much higher for inappropriate drug use, than where drugs have been prescribed appropriately.³² Detection of ADRs is however particularly difficult in the elderly due to the co-morbidity and polypharmacy which exists. Risk of ADRs after hospital discharge is associated with new drugs and poor cognition.³³

DRUG INTERACTIONS

As polypharmacy increases with age, the potential for drug interactions increases. Frequency of drug interactions in the elderly is proportional to: age of the patient, frailty of the patient, the number of medications taken and the number of physicians involved in the care of that patient.¹² When a patient presents with a new symptom or problem, the possibility of interacting medications should be considered. Interactions may be pharmacokinetic or pharmacodynamic. Given the age-related changes in both parameters, the elderly are more predisposed to significant interactions.¹³ Computer decision support systems aid awareness of clinically significant interactions.⁵ Such systems do not however identify the use of OTC medicines. Patients should be encouraged to advise their GP as to which OTC remedies they are taking.

Self-medication with drugs prescribed for others is not uncommon; it is estimated that 10% of elderly patients take medicines prescribed for others *eg* friends, neighbours, family.³⁴ The elderly also have a tendency to hoard medicines. Removal of drug stock piles from the home will avoid confusion and reduce the risk of medication errors.



COMPLIANCE

Non-compliance is a major health issue resulting in significant morbidity and mortality and is a financial burden to the health service.³⁵ The elderly are generally more compliant than the younger population, however many factors can lead to poor compliance in this group, resulting in treatment failure.³⁶ Compliance may be intentional or non-intentional (see Table 4) and should always be considered if no therapeutic response is observed. Cognitive impairment is characteristic of old age and can be problematic. Many drugs *eg* anticholinergics can cause subtle cognitive dysfunction. Patients who are confused or whose memories are poor are less likely to be compliant; they are also more prone to medication errors and accidental poisoning.³⁷ Involvement of carers in administration of medicines should be encouraged where appropriate. Use of drug calendars, medication charts and measured dose systems *eg* dosette boxes are useful compliance aids. Annotations on tablet bottles may act as helpful reminders *eg* heart tablet/water tablet/sleeping tablet.

Table 4 Reasons for poor compliance

Intentional
Don't like taking tablets
Drugs are chemicals
Poor acceptability
Poor tolerability
Non Intentional
Lack of awareness
Forgetfulness
Cognitive impairment
Visual/auditory impairment
Dysphagia
Tablet container inaccessible
Poor dexterity/strength
Poor mobility
Polypharmacy

Patient education is important; improving patient knowledge has been shown to promote compliance.³⁸ Drug regimens should be kept as simple as possible. Combination preparations *eg* Frumil® may be used where possible to keep numbers of tablets to a minimum. Modified-release preparations should be prescribed where appropriate to reduce dosing frequency. Medication administration should be linked to activities of daily living as these are useful memory prompts *eg* breakfast, watching the evening news.³⁹⁻⁴¹ Physical disabilities may pose particular problems. Patients with

poor mobility may not be able to collect their medicines. Many elderly patients have difficulty swallowing tablets and capsules *eg* following stroke. Liquid formulations may be preferable for such individuals. Failing eyesight and hearing are common and impair compliance. Similarly many patients may not be able to read patient information leaflets easily and may need separate written instructions.

Pharmaceutical packaging is another factor contributing to poor compliance. It is estimated that 40 percent of elderly patients have difficulty in accessing their medicines.³⁵ Manual dexterity and coordination are often impaired and many cannot open child resistant containers; ordinary bottle tops should be used instead. Moreover, many suffer from arthritis, stroke and Parkinsons disease which impair their ability to open standard containers.⁴¹⁻² Blister packaging, eye-drop bottles and inhalers can prove difficult to manage. Devices are available to aid instillation of eye-drops. Colour coding of bottles or marking bottles *eg* RE for right eye, may be helpful. Increasingly, inhaler devices on the market are more suited to the elderly. Use of aids such as spacer devices should be considered.

ROLE OF THE PHARMACIST

The pharmacist has an important role to play in promoting quality care of the elderly population. Pharmacists can help identify drug-related problems *eg* polypharmacy, ADRs, interactions, inappropriate prescribing. They can also dispense medicines in appropriate containers, improve compliance through education and counselling, advise on appropriate use of OTC medications and promote rational prescribing.^{40,43-7} Good liaison between prescribers and pharmacists is to be encouraged.⁴⁸⁻⁹ This may be developed by shared educational initiatives.⁵⁰

NURSING HOMES

Drug consumption is even higher in institutionalised patients, polypharmacy being a hallmark of both residential and nursing home care. This is compounded by patients being seen by different doctors and drugs prescribed without adequate patient/medication review.⁵¹ It is estimated that patients in residential care receive an average of 7 drugs.⁵² A review of 12 nursing homes found

40% of residents receiving at least one inappropriate medicine while 10% were receiving two or more inappropriate drugs.⁵³ Table 5 lists some of the problems inherent in prescribing for patients in nursing homes. Systems to improve quality prescribing should be developed and implemented.⁵⁴⁻⁶ This will require good communication between GPs, the matron/nursing staff and community pharmacist. Increased resources to improve multi-disciplinary professional contact are needed.

Table 5 Problems inherent in therapeutic care of institutionalised patients

Overuse of antipsychotics
Overuse of sedatives
Inappropriate prescribing of laxatives
Overuse of home nebulisers
Lack of medication review
Multiple prescribers
Nurse initiated prescribing (may be useful)
Excessive use of catheterisation
Inappropriate timing of drug administration
Use of one patient's medicines for another

THERAPEUTIC GOALS

The aims of drug treatment in the elderly are to improve functional well-being and maximise functional independence. Mere prolongation of life is not always valid; for many quality of life is the treatment goal.^{2,57-8} Treatment should be evidence based and should consider non-drug therapies, thereby simplifying drug regimens. Moreover, "*it is a good remedy to sometimes do nothing*". Input from allied health care services can lead to improved function and quality of life that cannot be achieved by drug treatment alone. Care of the elderly should be multi-disciplinary and good communication between all health-care professionals is important to achieve therapeutic goals. Patients and their carers should be encouraged to take an active role in their management. Self-medication programmes for elderly in-patients have been shown to improve patient knowledge and compliance after discharge.³⁹ Admission to care of the elderly units provides a useful opportunity for rationalisation of drug therapy. The elderly represent the greatest therapeutic challenge, but the rewards are also considerable.

BIBLIOGRAPHY

Selected references and recommended reviews

- | | |
|--------------------------------------|---|
| 2. Prescriber 1999;10:75-83 | 23. Drugs Aging 1993;3:335-48 |
| 3. Drug Safety 1998;19:243-50 | 32. Age Aging 1992;21:294-300 |
| 5. Postgrad Med J 1997;73:720-2 | 34. J Clin Psychiatry 1995;56 [Supp 1]: 18-24 |
| 6. Prescribers J 1998;38:199-204 | 36. Br Med J 1996;313:926-9 |
| 7. Br J Clin Pharmacol 1997;43:91-7 | 39. Pharm J 1995;254:578-5 |
| 11. Br Med J 1997;315:1096-9 | 42. Eur J Clin Pharmacol 1996;49:255-9 |
| 16. Mod Med Ire 1998;28:28-38 | 49. Ann Pharmacother 1997;31:823-9 |
| 17. Prescribers J 1998;38:205-10 | 51. Drugs Aging 1995;6:426-35 |
| 18. Clin Pharmacokinet 1998;35:49-65 | 52. Update 1997;6:430-3 |
| 21. Postgrad Med J 1998;74:423-40 | 60. Ir Med J 1996;89:115 |

(References 1-60 available on request. A more extensive review is available from the Centre on request)

Every effort has been made to ensure that this information is correct and is prepared from the best available resources at our disposal at the time of issue. Prescribers are recommended to refer to the drug data sheet or summary of product characteristics (SPC) for specific information on drug use.