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Quality use of medicines in residential aged care

Background

Older people are more likely to be exposed to polypharmacy. People with dementia, especially those living in residential aged care facilities (RACFs), are at particularly high risk of medication harm. We sought to describe medications prescribed for a sample of people with dementia living in RACFs.

Methods

A total of 351 residents with dementia aged over 65 years were recruited from 36 RACFs in Western Australia. Data on all medications prescribed were collected, including conventional medications, herbal medications, vitamins and minerals.

Results

Polypharmacy was identified in 91.2% (average 9.75 medications per person); one-third were prescribed an antipsychotic medication; and 50.4% were found to be taking at least one potentially inappropriate medication. The combination of antipsychotics and antidepressants was the most frequently observed drug-drug interaction, being prescribed to 15.7% of participants.

Discussion

People with dementia living in RACFs are commonly exposed to polypharmacy. Prescription of contraindicated medications, antipsychotics, medications with high anticholinergic burden, and combinations of potentially inappropriate medications is also common. There may be substantial scope to improve prescribing for older people with dementia living in RACFs.

Keywords: dementia; polypharmacy; adverse effects



Approximately 190 000 people in Australia were estimated to have dementia in 2006, with the prevalence expected to increase to 465 000 by 2031.¹ The prevalence of dementia increases with age, from 6.5% of Australians aged 65 years and over to 22% of Australians aged 85 years and over.² Dementia is associated with a large burden of disease in Australia's aging population, costing Australia \$1.4 billion in 2003.² Most of this burden was associated with residential aged care facilities (RACFs).² Dementia is the medical problem most frequently managed by general practitioners attending RACFs.³ Ninety-six percent of people with dementia living in care accommodation in Australia have moderate or severe dementia, compared to only 7% of people with dementia living in households.¹ Therefore people requiring residential care tend to be among the frailest and sickest in the community, with substantial physical and behavioural needs and multiple comorbidities.

Polypharmacy, defined as the concurrent use of five or more medications, can result in an increased risk of drug-drug interactions (DDIs) and adverse drug events (ADEs).⁴ People with dementia are at a higher risk of polypharmacy, with greater increased risk as the disease progresses.⁵ A study of Victorian RACFs found that one-third of drug related problems are caused by overprescribing, including unnecessary drugs, duplication of therapy or inappropriate duration.⁶ Other causes of drug related problems included dosing errors, suboptimal drug monitoring, and underprescribing.⁶ Certain classes of drugs are particularly associated with a

high risk of ADEs in frail older people. For example, anticholinergic drugs commonly produce adverse effects in elderly people and are more likely to be prescribed to people with dementia than those without.⁷

Antipsychotic medications are commonly used to manage the behavioural and psychological symptoms of dementia (BPSD), such as psychosis, depression, agitation, aggression and disinhibition.^{1,8} There is concern that antipsychotics are used too frequently as a first line treatment for BPSD, with the risks of antipsychotic use outweighing the benefits at their likely level of use.⁸ For example, risperidone, an atypical antipsychotic prescribed frequently for the treatment of aggression, has been associated with increased risk of cerebrovascular adverse events.⁹

Recognised experts in clinical geriatric care, clinical geriatric pharmacology, pharmacoepidemiology and psychopharmacology have established the 'Beers Criteria', a list of potentially inappropriate medications (PIMs).^{10,11} This list was created using a consensus method, based on an extensive literature review and questionnaire.^{10,11} The Beers Criteria identifies medications that should be avoided altogether, as well as doses, frequencies and duration of other medications that should be avoided in the elderly.^{10,11} These medications have been identified as being associated with higher medical costs, increased rates of ADEs and poorer health outcomes.^{10,11}

A considerable number of people in RACFs are exposed to dangerous DDIs, with one study demonstrating that 60.2% of elderly inpatients were prescribed potential DDIs.⁷ The study participants were most likely to be exposed to DDIs involving psychotropic medications, notably antipsychotics with antidepressants, which can cause further

cognitive deterioration.⁷ The scope of potential DDIs, and antipsychotic and PIM use in Australia has only been studied to a limited extent.¹¹

Australia's National Medicines Policy highlights quality use of medicines as a central objective and the Australian Commission on Safety and Quality in Health Care has been established to, in part, promote quality use of medicines.¹² Despite this, the problem of ADEs persists.¹² Prescribing to elderly people is complicated by several factors including changing pharmacokinetics with age, increased likelihood of multiple comorbidities, the need for polypharmacy to address these conditions, and poor communication between health professionals.^{12–15} This results in an increased likelihood of practitioners failing to adjust medication doses in the elderly, and to monitor and review their medications.¹² Consequently, medications can be used at incorrect doses, for longer durations than clinically indicated, when they are ineffective, and when an equally effective but safer alternative is available.¹²

This study aimed to describe the patterns of prescribing for a sample of older people with dementia living in RACFs, including:

- number of medications prescribed
- extent of psycholeptic use
- use of potentially inappropriate medications
- drug-drug interactions
- anticholinergic burden.

Methods

A total of 351 people were included in the study (Figure 1). Inclusion criteria were: resident of a Western Australian RACF; recorded diagnosis of dementia; age over 65 years; Mini-Mental State Examination (MMSE) score of <24. Residents were excluded if the facility staff identified them as being acutely medically unstable or suffering from delirium, or in the terminal stages of dementia or a comorbid illness.

Consent for trial participation was sought from the participant if able to give consent. Agreement for trial participation was also sought from residents' surrogates (next of kin or other identified proxy) and the GP.

Data collected from residents comprised part of the baseline data in a larger ongoing randomised trial of educational interventions. The medication survey recorded medications that

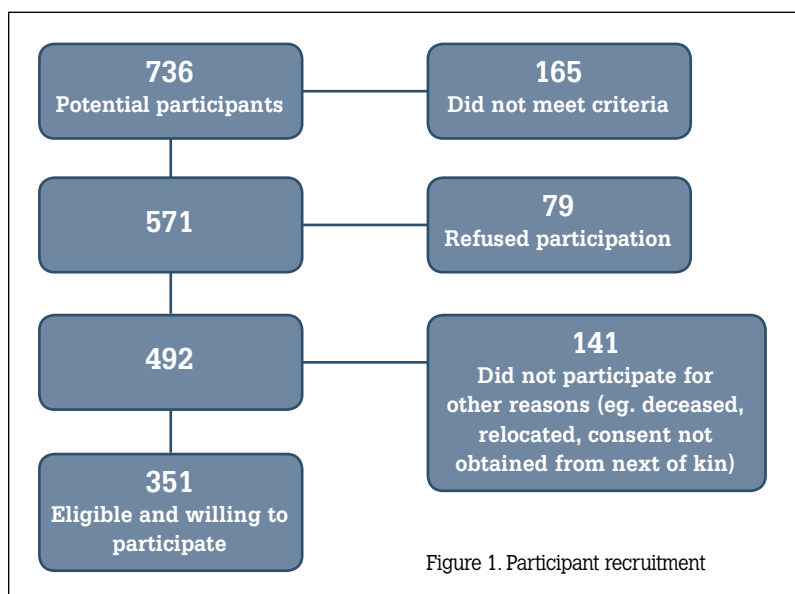


Figure 1. Participant recruitment

the participants were prescribed at the time of data collection, either as a regular or pro re nata (PRN or 'as required') medication. Data on all medications was collected, including conventional medications as well as herbal medications, vitamins and minerals.

The drug data was cleaned by removing items that were not medications (eg. hearing aid), removing duplicate drugs, correcting spelling errors, converting all drugs to generic names, and coding all drugs using the World Health Organization Anatomical, Therapeutic, and Chemical (ATC) Classification System.¹⁶ The number of drugs was counted, with polypharmacy defined as five or more drugs. The number of psycholeptic (ATC code N05, including antipsychotics [N05A], anxiolytics [N05B] and hypnotics/sedatives [N05C]) and antidepressants (N06A) were also counted. The modified Beers Criteria were used to define PIMs (Table 1).¹⁰ A list of potential DDIs was compiled using previously published data.^{7,17} The anticholinergic drug scale was used to determine anticholinergic burden.^{18,19} Using the scale, each medicine was rated on a scale from 0–3 according to their anticholinergic activity, with a rating of 0 indicating no anticholinergic potential and 3 indicating marked anticholinergic potential,¹⁸ and the scores summed.

Data were analysed with descriptive statistics in the Statistical Package for the Social Sciences 16.0 (SPSS).²⁰

The research was approved by the Human

Research Ethics Committee of the University of Western Australia.

Results

Of the 351 participants in the study, the mean age was 85.24 (SD: 7.87); 75.4% were female. The mean MMSE score was 12.50 (SD: 7.61).

Polypharmacy was identified in 320 participants (91.2%). The number of medications taken by each participant ranged from 1 to 21 (mean: 9.75, SD: 3.88).

One-hundred and seventeen (33.3%) of the study participants were prescribed an antipsychotic, with nine of these 117 being prescribed two antipsychotic medications (Table 2). Risperidone, prescribed to 55 study participants, was the most commonly used antipsychotic. Other commonly prescribed antipsychotics were quetiapine (prescribed to 22 participants), olanzapine (17 participants), and haloperidol (15 participants).

Fifty-five (15.7%) study participants were prescribed a combination of antipsychotics and antidepressants.

Potentially inappropriate medications were prescribed to 177 participants (50.4%). Of these participants, 115 (32.8%) were taking one potentially inappropriate medication, 55 (15.7%) were taking two, while seven participants (2.0%) were taking three. The short acting benzodiazepines, temazepam (92 residents) and oxazepam (52 residents), were the most frequently prescribed PIMs.

Table 1. Potentially inappropriate medications*¹⁰

Alprazolam	Cyproheptadine	Hyoscyamine	Orphenadrine
Amiodarone	Desiccated thyroid	Indomethacin	Oxaprozin
Amitriptyline	Dexchlorpheniramine	Isoxsuprine	Oxazepam
Amphetamines	Diazepam	Ketorolac	Oxybutynin
Barbiturates (except phenobarbital)	Dicyclomine	Lorazepam	Pentazocine
Belladonna alkaloids	Digoxin	Meperidine	Perphenazine amitriptyline
Bisacodyl	Diphenhydramine	Meprobamate	Piroxicam
Carisoprodol	Dipyridamole	Mesoridazine	Promethazine
Cascara segrada	Disopyramide	Metaxalone	Propantheline
Chlorazepate	Doxazosin	Methocarbamol	Propoxyphene
Chlordiazepoxide	Doxepin	Methyldopa	Quazepam
Chlordiazepoxide amitriptyline	Ergot mesyloids	Methyldopa-hydrochlorothiazide	Reserpine
Chlorpheniramine	Ethacrynic acid	Methyltestosterone	Temazepam
Chlorpropamide	Ferrous sulfate	Mineral oil	Thioridazine
Chlorzoxazone	Fluoxetine	Naproxen	Ticlopidine
Cimetidine	Flurazepam	Neoloid	Triazolam
Clidinium-chlordiazepoxide	Guanadrel	Nifedipine	Trimethobenzamide
Clonidine	Guanethidine	Nitrofurantoin	Tripeleennamine
Cyclandelate	Halazepam	Oestrogens only	
Cyclobenzaprine	Hydroxyzine		

* Not all of these drugs are available in Australia. Some medications are only potentially inappropriate in higher doses, certain forms or for certain conditions

Table 2. Psycholeptic and antidepressant use

Medication	Number of study participants	Percentage of study participants
Antipsychotics	117	33.3%
Anxiolytics	74	21.1%
Antidepressants	169	48.1%
Hypnotics and sedatives	97	27.6%

Mean anticholinergic burden score among the participants was 1.93 (SD: 1.68). Only 64 participants (18.2%) had no anticholinergic burden. Over 50% of the participants had an anticholinergic burden score of 1 (31.1%) or 2 (21.1%). Twenty-five (7.1%) of the participants were prescribed at least one medication classed with marked anticholinergic potential (anticholinergic burden score of 3). Amitriptyline and promethazine were the most frequently prescribed medications with marked anticholinergic potential.

Discussion

The present study has described prescribing for a population of Australian residents of RACFs with dementia. Previous literature has demonstrated

that elderly people in Australian RACFs are prescribed an average of seven medications, but that people with dementia are at an increased risk of polypharmacy.⁶ The findings of this study are consistent with these findings.

One-third of the study participants (n=117, 33.3%) were taking at least one antipsychotic medication. This finding is consistent with censuses of antipsychotic use among people with dementia in RACFs in the United States in 2004 (33.1%), and England in 1997 (30.7%).^{21,22} Atypical antipsychotics are the most common pharmacological treatment for BPSD.⁸ It has been reported that antipsychotic medications have limited efficacy in the treatment of BPSD however, and may contribute to morbidity and mortality.⁸

Future research should focus on determining the efficacy of other treatments for BPSD. Psychological interventions and alternative medications may ameliorate BPSD without additional morbidity and mortality risk. The RACFs are resource limited environments however, and frequent use of antipsychotic medications may reflect barriers to the use of nonpharmacologic interventions for BPSD. Given that BPSD may be transient, pharmacotherapy of BPSD often does not need to be long term. Our data does not include the length of time that antipsychotics had been prescribed.

Drug-drug interactions are common among elderly people with dementia, and previous studies have shown that the most frequently involved drugs are the psychotropic drug class.⁷ These findings are reflected in this study, in which 55 people (15.7%) were prescribed a combination of antipsychotics and antidepressants.

The most commonly prescribed PIMs in the present study were benzodiazepines, notably temazepam, oxazepam, lorazepam and diazepam. Despite the dangers associated with benzodiazepine use in the elderly, they are frequently prescribed.^{6,11}

The risk of developing anticholinergic adverse effects is related to the anticholinergic burden.^{18,19} Higher anticholinergic burdens are associated with a greater number of adverse effects and are of particular concern in people with dementia.^{18,19} In this study, 81.8% of study participants had an anticholinergic burden score of 1 or more with an average anticholinergic burden score of 1.93 (SD: 1.68). Kolinowski et al²³ found similar results, with an average anticholinergic burden score of 2.55 (SD: 1.9). These data suggest that a substantial proportion of participants are exposed to potential adverse anticholinergic effects.

Limitations of this study

Relatively few studies have investigated the use of medications and patterns of prescribing in people with dementia. Using medication charts allowed for reliable and systematic data collection. Limitations of the present study include potential volunteer bias, lack of detail regarding indication for medication use, duration of use, and dose. The data are descriptive and do not allow conclusions to be drawn regarding the appropriateness of prescribing.

This study included older people with dementia living in RACFs and cannot be generalised to the wider population of people with dementia, such as those living in the community, without further detailed investigation. This study also does not describe facility characteristics. Future studies could investigate differences in medication use between high and low care facilities. Future studies should also describe duration of medication use, and outline who is initiating the medications: GPs, geriatricians or other specialists. Finally, assessment of prescribing quality in the present study was limited. Future studies should address underutilisation of medications to provide a more complete assessment of prescribing quality.

Conclusion

This study suggests that people with dementia living in RACFs continue to be exposed to substantial polypharmacy and medications with uncertain risk-benefit ratio. These data suggest that there may be substantial scope to improve prescribing for older people with dementia living in RACFs. Substantial use of

psychotropic medications may reflect barriers to the implementation of nonpharmacologic approaches to caring for people with dementia and behaviours of concern.

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Conflict of interest: none declared.

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