Drugs - Real World Outcomes (2015) 2:289–298
DOI 10.1007/s40801-015-0038-1

ORIGINAL RESEARCH ARTICLE

How Prolific is Psychotropic Medicines Use in People with Dementia in Australia Within the Community Setting? A Retrospective Analysis

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Published online: 1 September 2015

Abstract

Background When used for a therapeutic purpose such as for psychiatric illness, psychotropic drugs may enhance quality of life; however, when used to treat behaviours associated with dementia, they may have only a modest effect but lead to negative outcomes.

Objective We undertook an analysis of community-dwelling people with dementia or cognitive impairment to ascertain how prolific psychotropic medicine use is within the Australian community setting, which psychotropic medicines are being prescribed and to whom, and whether the use of such medicines is in accordance with therapeutic guidelines.

Methods We undertook a retrospective review of medication records, including medication charts, for 412 people with cognitive impairment, discharged from a home nursing service in Victoria, Australia, during the 6-month period between 1 January and 30 June 2013.

Results Cholinesterase inhibitor use exceeded the number of individuals with a recorded diagnosis of Alzheimer's disease; in some cases, the dosage exceeded recommendations. Antidepressants were used by more than double the number of people documented with a history of depression. Antipsychotic medicines were prescribed for undocumented purposes, in some cases above maximum response levels, and multiple benzodiazepines were prescribed.

Conclusions Psychotropic medicine use was common in our study population, and use of these medicines was often not in line with therapeutic guidelines. Further research is required to ascertain reasons for the high use of psychotropic medicines in this group, and greater consideration is required by health professionals of the appropriate use and regular review of psychotropic medicines. Improved documentation of diagnoses and the indications for prescribing psychotropic medicines is needed, as is greater implementation of educational programmes to support care workers and carers.

Key Points

Use of psychotropic medications was high in people with dementia living in the community, and further research needs to be undertaken to understand why.

Greater consideration by health professionals of appropriate use and regular review of psychotropic medicines is required.

Improved documentation of the indications for prescribing psychotropic medicines is required.

There is a need for greater implementation of educational programmes to support care workers and carers of people with dementia living in the community setting.

1 Background

Psychotropic drugs are medicines that impact on mental functioning and may alter cognition, emotions and behaviour. The word psychotropic originates from the Greek

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term 'psycho', referring to 'the mind', and 'tropic', referring to 'turning'. Psychotropic drugs may be used in either a positive or a negative manner. When used for a therapeutic purpose such as for the treatment of psychiatric illness, these drugs may enhance quality of life; however, when used to treat behaviours associated with dementia, they have been shown to have only a modest effect and may lead to many negative outcomes [1].

Psychotropic medicines include the following: antipsychotics—medicines used to treat psychotic disorders; antidepressants—medicines used to treat depression and anxiety disorders; anxiolytics—medicines used to treat anxiety disorders; hypnotics—used to treat insomnia; mood stabilisers—used to treat bipolar disorders; and cholinesterase inhibitors—used as cognition-enhancing agents in Alzhiemer's disease [2]. More specifically, antipsychotic medicines, benzodiazepines and antidepressants became available in the 1950s as a treatment for schizophrenia, psychosis, paranoid delusions, abnormal thoughts or behavioural disorders and depression. However, since the late 1980 s, there has been a steady stream of new agents introduced to treat depression, anxiety, insomnia and neuropsychiatric and behavioural disturbances [2].

Behavioural and psychological symptoms of dementia (BPSD), including agitation and aggression, are increasingly recognised as a major risk factor for caregiver stress and institutionalisation of people with dementia [3–5]. The use of psychotropic drugs to control BPSD in older people with dementia is widespread, both in Australia [6] and internationally [7, 8]. Treatment of BPSD using psychopharmacological approaches, especially antipsychotics, is problematic, as exposure to anticholinergic and sedative medications is associated with functional impairment in older people; additionally, the use of antipsychotic medicines in older people frequently leads to adverse effects, including the risk of cerebrovascular events (increased risk of stroke), extrapyramidal side effects, tardive dyskinesia (movement disorders) and mortality [9]. Consequently, the use of antipsychotic medicine to control BPSD in older people with dementia has become controversial [5, 10–13].

A recent study of Scottish nursing homes reported that three-quarters of all residents received at least one antipsychotic medicine to manage behavioural symptoms, and over 70 % of 1715 people admitted to aged care homes during this study commenced the medication prior to their admission [14]. Rattinger et al. [15] similarly reported a high use of psychotropic medicines in older people with dementia, both in residential care facilities and in those living in the community in the USA. Currently, in Australia there is also evidence of an increase in the prescribing of psychotropic medicines for older people living in aged care homes [6, 16–18]. This apparent preference for pharmaceutical management rather than behavioural therapy to control BPSD in older people is concerning [3] and recently led to the Australian Federal Government establishing a Senate Inquiry on 'the care and management of younger and older Australians living with dementia and behavioural and psychiatric symptoms of dementia' [19].

There is anecdotal evidence of the use of psychotropic medicines in older people living in the community; however, the extent of the use and/or appropriateness remains unknown [20]. We undertook a retrospective analysis of psychotropic medicine use by people receiving support from a home care nursing service provider who were documented as having a diagnosis of dementia, Alzheimer's disease, cognitive impairment or short-term memory loss to establish how prolific is the use of psychotropic medicines in older people with cognitive impairment living within the community setting, which psychotropic medicines are being prescribed, and for what reasons are these medicines being prescribed?

2 Methods

2.1 Study Design

We retrospectively reviewed the medical records of people receiving support from a home care nursing service provider in Victoria, Australia.

2.2 Participants

Participants were clients who were documented as having a diagnosis of either Alzheimer's disease, dementia, short-term memory loss or cognitive impairment and were discharged from the home care nursing service provider between 1 January and 30 June 2013.

2.3 Data Collection

A list of the 412 older people identified as having a diagnosis of dementia, cognitive impairment or short-term memory loss (including Alzheimer's, vascular dementia) who were discharged during the study period was produced from the home care nursing service database. Medical records for this group were retrieved, and those found to have been prescribed psychotropic medicines were further examined to ascertain the reason psychotropic medicine was prescribed, as well as the reason for discharge. Data were collected using a pre-piloted audit form developed by the research team, which included an expert consultant pharmacist. The audit form collected information on participant's age and sex, diagnoses of cognitive impairment and use of psychotropic medicines, including active

ingredient, dose and timing of the dose. Data collected on the use of psychotropic medicines were reviewed by both a practising and a research pharmacist to ascertain whether the indication for use of these medicines coincided with current clinical guidelines (i.e. prescribed in accordance with therapeutic guidelines for older people's diagnosis as documented in the medical record) [13].

2.4 Outcome Measures/Study Endpoints

2.4.1 Primary

The primary outcome measure was the prevalence of the use of psychotropic medicines among the study population; and those who had no history of a mental illness or apparent therapeutic reason for use of a psychotropic medicine [13].

2.4.2 Secondary

The secondary outcome measure was the medication use pattern for each class of psychotropic medicines among the study population (number of psychotropic medicines prescribed and dosage).

2.5 Data Analysis

Data were entered into the Statistical Package for Social Sciences (SPSS) version 21 (IBM, Armonk, NY, USA) for descriptive analysis. Categorical variables were presented as frequency and proportion, and continuous variables were presented as mean and standard deviation (SD) for non-skewed data, or median and interquartile range (IQR) for skewed data.

3 Results

A total of 412 people documented as having a diagnosis of Alzheimer's disease, dementia, short-term memory loss or cognitive impairment were discharged from the home care nursing service provider during the 6-month study period. Of these, 251 (61 %) were recorded as having been prescribed one or more psychotropic medicines. Medical records for 30 of the 251 people were unavailable at the time of the audit, due to the person being re-admitted to the home nursing service and their medical records being located at their home. Therefore, our analysis focused on the remaining 221 cases.

3.1 Characteristics of the Study Population

The mean age of the 221 people using psychotropic medicines was 84 ± 7.7 years (range 43–98) with the mode being 86 years of age (20 cases). A total of 45 individuals (20 %) were aged over 90 years, and 172 (78 %) were aged over 80 years. A higher number of those identified as using psychotropic medicines were female: 148 women (67 %) had been prescribed a psychotropic medicine compared with 77 (34.8 %) men.

Those identified as using psychotropic medicines had been admitted to receive home nursing care from one of the 13 care provider sites. The percentage of those with a diagnosis of dementia, Alzheimer's, cognitive impairment or short-term memory loss, who had been prescribed psychotropic medicines from across the sites, ranged between 35 and 69 %. The highest percentage of those using psychotropic medicines were receiving home nursing care in the metropolitan areas of Caulfield (69 %), Diamond Valley (62 %) and Heidelberg (62 %).

3.2 Cognition Screening

Of those identified as taking psychotropic medicines, 144 (65 %) had dementia screening details recorded. Of these, 128 had been screened using the Mini-Mental Status Examination (MMSE) [21] and 16 using the Rowland Universal Dementia Assessment Scale (RUDAS) [22]. The remaining 77 (35 %) had no evidence of cognition screening in their record.

3.3 Diagnosed with a Condition of Cognitive Impairment and/or Mental Illness

Of the 221 individuals whose medical records were checked for use of psychotropic medicines, 64 (29 %) had a diagnosis of dementia and 66 (30 %) had Alzheimer's disease; 47 (21 %) had a diagnosis of cognitive impairment and 44 (20 %) were diagnosed with short-term memory loss.

Of those identified as having either dementia, Alzheimer's disease, cognitive impairment or short-term memory loss who were using one or more psychotropic medicines, 54 (24 %) had a co-existing diagnosis of mental illness. Of these, 38 were documented as having a diagnosis of depression, five bi-polar affective disorder, one schizophrenia and 22 anxiety (13 were documented as having more than one mental illness). The remaining 167 (76 %) of those using psychotropic medicines had no co-existing mental illness recorded.

Table 1 Antidepressant drug indications, recommended daily dosage, number of clients using antidepressant medicines and prescribed dose ranges

Antidepressants, indication and maximum recommended dose according to indication	$n = 103$ (46.6 %)	Prescribed dose as documented in health record (range)
Amitriptyline	11 (5.0)	10–50 mg at night
Depression: maximum dose 300 mg per day		
Neuropathic pain: 150 mg per day		
Migraine: 75 mg per day		
Urge incontinence: 75 mg per day		
Citalopram (Maximum 40 mg per day)	18 (8.1)	10–40 mg per day
Major depression		
Anxiety disorders, e.g. panic disorder, OCD		
Bulimia nervosa		
Premenstrual dysphoric disorder		
Desvenlafaxine	4 (1.8)	50–100 mg mornings
Major depression: 200 mg per day		
Duloxetine	6 (2.7)	30–120 mg per day
Depression: 60 mg per day		
Generalised anxiety disorder: 120 mg per day		
Diabetic neuropathy: 60 mg per day		
Escitalopram (20 mg per day for all)	21 (9.5)	10–20 mg per day usually mornings
Major depression		
Generalised anxiety disorder		
Social phobia		
OCD		
Fluoxetine	2 (0.9)	20 mg morning
Major depression: 60 mg		
OCD: 80 mg		
Premenstrual dysphoric disorder: 20 mg		
Fluvoxamine	2 (0.9)	100–200 mg at night
Major depression: 300 mg		
OCD: 300 mg per day		
Mirtazapine	17 (7.7)	10–45 mg per day
Major depression: 60 mg per day		
Paroxetine	6 (2.7)	20 mg per day
Depression: 50 mg		
Generalised anxiety disorder: 20 mg		
OCD/panic disorder: 50 mg per day		
Sertraline	28 (12.7)	50–100 mg per day
Depression: 200 mg per day		
OCD: 200 mg per day		
Panic disorder: 50 mg per day		
Venlafaxine	9 (4.1)	75–300 mg per day
Major depression: 225 mg		
Generalised anxiety disorder: 225 mg		
Panic disorder: 225 mg		
Social phobia: 225 mg		
Using two or more antidepressants	5 (2.3)	

Source: Australian Medicines Handbook 2015, http://www.amh.net.au

OCD obsessive compulsive disorder

Table 2 Antipsychotics, indication for use and recommended dosage, number of clients using antipsychotic medicines and prescribed dose

Antipsychotic, indication and recommended maximum dosage	$n = 39$ (17.6 %)	Prescribed dose as documented in health record (range)
Haloperidol	n = 4 (1.8)	0.5 mg per day
Acute and chronic psychosis: 1–5 mg, 2–3 times per day		
Acute mania in bipolar: 5–10 mg, 2 hourly when required		
Not recommended for BPSD		
Long-acting injection: 50–300 mg every 4 weeks		
In elderly, use low doses: 0.5–10 mg/day		
Olanzapine	$n = 5$ (2.3)	1.25–2.5 mg at night ($n = 4$)
Schizophrenia: 20 mg per day		15 mg morning ($n = 1$)
Bipolar: 20 mg per day		
BPSD: no listing		
Paliperidone	$n = 1$ (0.5)	75 mg monthly
Schizophrenia: 25–150 mg once a month		
BPSD: no listing		
Pericyazine	$n = 2$ (0.9)	10 mg at night ($n = 1$)
Schizophrenia: 30 mg per day		2.5 mg three times per day ($n = 1$)
Not recommended for BPSD		
Quetiapine	$n = 9$ (4.1)	25 mg–600 mg per day
Schizophrenia: 800 mg per day		
Bipolar: 800 mg per day		
General anxiety disorder: 150 mg per day		
Adjunct in depression: 300 mg per day		
Not recommend for BPSD		
Risperidone	$n = 18$ (8.1)	0.5 mg ($n = 12$)
Schizophrenia and related psychoses: 4–6 mg per day		0.5 mg as needed ($n = 1$)
Bipolar disorder: 2–6 mg/day		1 mg ($n = 3$)
BPSD: 0.25–2 mg per day after non-drug strategies have been unsuccessful		3 mg ($n = 1$)
Conduct and other disruptive behaviour disorders in people with sub-average intellectual functioning or mental retardation: 0.5–1.5 mg (lower doses if <50 kg		5 mg ($n = 1$)
Behavioural disorders in autism: 0.5–2.5 mg per day		
Prescribed more than one antipsychotic	$n = 0$	

Source: Australian Medicines Handbook 2015, http://www.amh.net.au

BPSD Behavioural and psychological symptoms of dementia

3.4 Prevalence of Psychotropic Medicine Usage

Although 126 (57 %) consumers were prescribed one psychotropic medicine, the use of more than one psychotropic medicine was not unusual. The number of prescribed psychotropic medicines ranged between one and five. A total of 67 (30 %) consumers were receiving two psychotropic medicines and 24 (11 %) were receiving three (median number of psychotropic medicines 1.0; IQR 1–2).

3.5 Cholinesterase Inhibitors

In total, 91 persons had been prescribed cholinesterase inhibitors, 64 (29 %) were prescribed donepezil, 18 (8 %) were prescribed galantamine and nine (4.1 %) were prescribed rivastigmine. Three people—two women aged 81 and 91 years and one male aged 95 years—who had been prescribed rivastigmine were receiving doses above the therapeutic range 18 μg. Two participants were co-prescribed donepezil and memantine and galantamine and memantine. Of those prescribed cholinesterase inhibitors, 51 (56.0 %) were documented as having a specific diagnosis of Alzheimer's disease and 27 (30 %) were documented as having dementia. The remaining 12 (13 %) people were recorded as having cognitive impairment or short-term memory loss but no formal diagnosis of dementia.

3.6 Antidepressants

A total of 103 persons had been prescribed antidepressant(s); 38 of them had a diagnosis of depression

Table 3 Benzodiazepines, indication for use and recommended dosage, number of clients using Benzodiazepines and prescribed dose range

Benzodiazepines Indication and recommended dosage	$n = 69$ (31.2 %)	Prescribed dose as documented in person's health record (range)
Alprazolam	5 (2.3)	0.25–3 mg per day
Anxiety/panic disorder: 10 mg per day		
Clonazepam	10 (4.5)	0.5–0.8 mg every 4 h
Epilepsy: 8 mg per day		0.3–0.5 mg as needed
		2–30 mg as needed/at night
Diazepam	13 (5.9)	2–5 mg per day
Anxiety: 30 mg per day		
Muscle spasm: 60 mg per day		
Nitrazepam	2 (0.9)	5 mg per day
Hypnotic: 10 mg per day		
Oxazepam	12 (5.4)	15–30 mg at night
Severe anxiety: 120 mg per day		
Hypnotic: 30 mg per day		
Temazepam	25 (11.3)	10–20 mg at night/as needed
Hypnotic: 20 mg per day		
Lower doses recommended in elderly		
Midazolam	2 (0.9)	1–2 mg every 2–4 h ($n = 1$)
Palliative care: 2.5–5 mg hourly		2 mg intravenously as needed ($n = 1$)
Total	69 (31.2)	

Source: Australian Medicines Handbook 2015, http://www.amh.net.au

Table 4 Number of clients using other psychotropic medicines

Indication and recommended dosage	$n = 23$ (10.4 %)	Prescribed dose as documented in health record (range)
Memantine	7 (3.2)	10–20 mg per day
Moderate to severe AD: 20 mg once daily		
Carbamazepine	4 (1.8)	100-300 mg twice a day
Epilepsy: 2 g daily		
Bipolar disorder: 1.6 g daily		
Neuralgia: 1.2 g daily		
Lithium	2 (0.9)	250 mg twice a day
Bipolar disorder: 2500 mg daily		
Sodium valproate	9 (4.1)	100–1200 mg per day
Epilepsy: 2500 mg daily		
Bipolar disorder: 1000–2000 mg daily		
Zolpidem	1 (0.5)	10 mg at night
Insomnia: 10 mg daily (conventional tablet), 12.5 mg daily (controlled-release tablet)		
Using two or more other psychotropic medicines	12 (5.4)	

Source: Australian Medicines Handbook 2015, http://www.amh.net.au

AD Alzheimer's disease

documented in their case record (see Table 1). Five persons had been prescribed two antidepressants: amitriptyline 10 mg once daily in combination with either (1) mirtazapine 30 mg once daily ($n = 2$); (2) escitalopram 10 mg/20 mg once daily ($n = 2$); or (3) citalopram 10 mg once daily ($n = 1$). None of these five cases had a diagnosis of depression, insomnia or chronic neuropathic pain documented in their records.

3.7 Antipsychotics

Antipsychotic medicines were prescribed to 39 persons (see Table 2). Five had a diagnosis of bi-polar affective disorder and one had a diagnosis of schizophrenia, which were indications for a prescription of antipsychotics. The most common antipsychotic prescribed, risperidone, was prescribed for 18 persons, 15 of whom were aged over 80 years. Of the nine people prescribed quetiapine, seven were aged 80 years or over.

3.8 Benzodiazepines

Benzodiazepines were prescribed for 69 (31.2 %) persons in the study sample. The most common—temazepam—was prescribed for 25 persons, 22 of whom were aged over 80 years (see Table 3). Ten persons (4.5 %) were prescribed two or more benzodiazepines. These included alprazolam, oxazepam and temazepam, alprazolam and clonazepam, temazepam and midazolam, clonazepam and midazolam, and diazepam and clonazepam.

3.9 Other Psychotropic Medicines

In our cohort of clients, use of other psychotropic medicines such as memantine, carbamazepine, lithium, sodium valproate and zolpidem was low (see Table 4).

3.10 Reasons for Discharge from Home Nursing Service

Over 127 (57.5 %) of the people in our study were discharged to short- or long-term institutional or residential care services: 52 (23.5 %) to acute care, 47 (21.3 %) to permanent or supported care and 28 (12.7 %) to respite care. Persons (27 %) were discharged from home nursing services due to problem resolution (16.7 %) or ability to self-care (10.9 %). The remainder of the study population (2.7 %) were discharged to palliative care services or deceased.

4 Discussion

This study identified a high prevalence of psychotropic medicine use in the study sample, with more than half of those with a documented diagnosis of dementia, Alzheimer's disease, cognitive impairment or short-term memory loss prescribed one or more psychotropic medicines. While psychotropic medicine use in people with dementia or memory problems ranged between 35 and 69 % across the 13 sites delivering home nursing services, use at more than half of the sites exceeded 50 %; at three sites, the percentage of those who had been prescribed psychotropic medicines exceeded 60 %. This may reflect the prescribing practices of health professionals in the various geographic areas. As is the case in other studies, a higher number of females than males had been prescribed psychotropic medicine [7, 10]. This may partially be explained by the higher proportion of older females in the overall population [18].

Use of psychotropic medicines is a potential risk factor for medication-related problems, adverse effects, hospitalisations and increased risk of mortality [16, 23–34], and in older people the use of antipsychotic medication is associated with an increased risk of stroke and death, with the risk being greatest early in the treatment and with higher doses [15, 16, 23–34]. Therefore, the finding that 78 % of those prescribed psychotropic medicines were aged over 80 years was unexpected. This is despite evidence of a link between adverse outcomes from these medications and increasing age [28–30]. Regardless of the potential adverse effects, use of antidepressants, antipsychotics and benzodiazepines was high in the population we studied, and prescribed cholinesterase inhibitors, indicated for those with a diagnosis of Alzheimer's disease, exceeded the number of people with a formal diagnosis.

Cholinesterase inhibitors may only be prescribed on the Australian Pharmaceutical Benefits Scheme (PBS) once a set of criteria are met, including results of the MMSE (or similar) with a score of <9, and a diagnosis of Alzheimer's disease confirmed with a specialist consultant physician (including a psychiatrist). Although the use of cholinesterase inhibitors in our population was low, two women aged 81 and 91 years and one man aged 95 years, who had been prescribed a cholinesterase inhibitor (rivastigmine) were receiving doses above the therapeutic range (18 μg). Additionally, 13 % of patients who had been prescribed a cholinesterase inhibitor had no formal diagnosis of Alzheimer's disease recorded in their medical records.

A total of 103 persons had been prescribed antidepressant(s), but only 38 had a diagnosis of depression documented in their medical record. The most common antidepressants prescribed to older people in our sample were selective serotonin re-uptake inhibitors such as Cipramil (citalopram), Zoloft (sertraline) and Lexapro (escitalopram). Use of mirtazapine, a noradrenaline and specific serotonin agonist was also common. Although all doses of antidepressants were within ranges recommended in the *Australian Medicines Handbook* therapeutic guidelines, five persons who had been prescribed antidepressant(s) were at risk of potential drug interactions (serotonin syndrome) from using two antidepressants.

Antipsychotics were prescribed to 39 persons; however, only five were documented as having a history of bi-polar affective disorder and one of schizophrenia, indications for

the prescription of antipsychotics. More specifically, haloperidol, olanzapine, paliperidone, pericyazine and quetiapine are indicated for use in schizophrenia and bipolar affective disorder; however, these medicines were prescribed to 21 persons without these diagnoses. This raises the possibility that the use of these antipsychotics in 15 cases may have been for purposes other than therapeutic, particularly BPSD. For example, in Australia, quetiapine is not registered for treating BPSD; however, nine clients were prescribed quetiapine, only six of whom had a condition for which quetiapine is indicated. Equally concerning was that although risperidone, the most commonly prescribed antipsychotic in our study, is licensed for use in BPSD, in some cases it was prescribed above the therapeutic range [13]. Despite being less well tolerated in older people, the doses of risperidone prescribed for the study sample ranged between 0.5 and 5 mg per day. Although recommendations from the *Australian Therapeutic Guidelines* cite risperidone 5 mg for treatment of schizophrenia, doses above 2 mg per day in people with dementia do not lead to an increased response in BPSD [13]. In one case it was documented that the introduction of haloperidol had commenced during a respite placement, and a note on the medication chart directed that it be continued after returning home.

Antipsychotic use is associated with a number of adverse effects, including sedation, exacerbation of existing cognitive impairment and confusion, falls with subsequent fractures, urinary tract infections, gait disturbances, increased risk of diabetes, and peripheral oedema. Anticholinergic side effects are also common and include delirium, constipation, xerostomia, urinary retention and blurred vision. Extrapyramidal side effects, including akathisia, dystonia, parkinsonism and tardive dyskinesia (abnormal movements of the tongue), can also occur. Whilst all antipsychotics can cause extrapyramidal side effects, they are more common in higher doses and with conventional agents such as haloperidol [23–34]. Studies have also demonstrated an increased risk of stroke and mortality when antipsychotics are used in older people with dementia [23, 24, 27].

Benzodiazepines are frequently used to treat anxiety and sleeping disorders. All guidelines recommend only short-term use of up to 2–4 weeks due to the risk of tolerance and dependence developing and the risk of adverse effects such as increased falls and confusion. In our study sample, benzodiazepines were used by more than double the number of people who had a documented diagnosis of anxiety. Clonazepam is often used as a palliative care treatment; however, while it is likely this may be the indication for use of this drug in some cases, it does not explain fully the use of this medicine as the reason given for discharge in the study period indicated that only a small number of discharges from home nursing care were for palliative care or due to the death of the care recipient. A majority of the study population discharged from home nursing care were transferred to either acute care, permanent care or to respite care facilities. As institutionalisation has been attributed to caregiver burden resulting from BPSD [1–4], a possible explanation for the high use of psychotropic medicines in our study population may have been associated with managing agitation and/or aggression.

Benzodiazepines (hypnotics and anxiolytics) are also frequently used to manage sleep disturbance and anxiety problems despite no benefit in their long-term use as the effect diminishes with prolonged use [12].

Similarly to other psychotropic medicines, side effects in older people are common due to age-related physiological changes such as receptors in the brain becoming more sensitive to the benzodiazepines and leading to slowed reflexes, changes in absorption, metabolism, elimination, muscle mass, impaired motor and visual co-ordination, impaired cognition and confusion [12].

Our findings add support to two recently published studies. Marston et al. [35] concluded that less than half of the people prescribed first-generation antipsychotics in the UK had a diagnosis of psychosis or bipolar disorder, and antipsychotic agents were more commonly prescribed to older people despite the propensity for side effects and that anti-psychotics are still commonly prescribed to people with dementia, contrary to clinical guidelines. Similarly, Hungerford et al. [36] reported that only a small proportion of clients living in a major urban area of Australia who had been referred for Dementia Behaviour Management Advisory Services (DBMAS) had a psychotic co-morbidity, but almost one-quarter had been prescribed antipsychotic medicines.

While management of BPSD through the use of psychotropic medicine is acknowledged as prevalent in residential care facilities [12–14], there is little recognition of management of these behaviours in the community setting and the impact it has on caregivers. Similarly, acknowledgement is increasing of the need to implement educational support programmes for care workers in residential care facilities in terms of inappropriate use of psychotropic medicines and strategies to improve communication with residents [37]; however, there has been little discussion in this regard in the community setting.

4.1 Limitations

Due to resourcing constraints, we did not examine documentation for the duration of treatment, psychotropic interactions or possible adverse effects associated with the use of psychotropic medicines, whether there were multiple prescribers or the development of care plans for all of our

study population and thus we are not able to comment on these. The MMSE score in our population was part of a home nursing service assessment and not a general practitioner or geriatrician assessment; therefore, we cannot make inferences with regard to its use in the prescribing of cholinesterase inhibitors. Additionally, as the MMSE was not consistently performed, we cannot make inferences with regard to the severity of dementia/cognitive impairment.

5 Conclusion

Cholinesterase inhibitor dosage exceeded the therapeutic range, and in many cases no formal diagnosis of Alzheimer's disease was recorded among those prescribed this medication. Antidepressants were used by more than double the number of people who were documented as having a history of depression or anxiety disorders. Antipsychotic medicines appear to have been more frequently prescribed for BPSD or an undocumented purpose than to treat schizophrenia or affective bi-polar disorder. Additionally, risperidone—the most commonly prescribed antipsychotic—was in some cases prescribed above levels that achieve maximum response in people with dementia and who had no documented diagnosis of schizophrenia, and multiple benzodiazepines were prescribed despite no evidence that use of more than one benzodiazepine is beneficial.

We believe that, to date, our study is the first to undertake an investigation into the use of psychotropic medicines by people living in the Australian community with a cognitive impairment. As such, our findings provide an opportunity for quality improvement. While further research is needed into the extent of psychotropic medicines in the wider community setting, we believe we have found sufficient evidence to make the following conclusions:

- There is a need to continue to raise awareness of the risks of adverse outcomes associated with the use of psychotropic medicines in older people.
- There is a need for the implementation of support programmes that include education on appropriate behavioural interventions for those who support people with dementia, Alzheimer's disease, short-term memory loss and cognitive impairment.
- There is a need for regular review of medicines for this group to ensure quality use of medicines for older people with dementia living in the community.
- There is a need for improved documentation by health professionals on the recording of diagnoses and the indications for the prescribing of psychotropic medicines.

Authors and contributors DG and SK initiated the study and KH, CL, CB, NP and CC contributed to the study design. DG and KH participated in the searching and retrieval of consumer records and medication charts. DG and KH coded the data into SPSS. CL and DG analysed the data. DG prepared the manuscript, and all authors contributed to the final version. All authors have read and approved the final manuscript. DG acts as guarantor for the paper.

Compliance with Ethical Standards

Funding No specific funding was received for this research.

Conflict of interest Dr Dianne Goeman, Ms Kira Harvey, Dr Cik Yin Lee, Dr Christine Beanland, Mr Neil Petrie, Ms Christine Culhane and Dr Susan Koch all declare that they have no conflicts of interest.

Ethical approval The study was approved by The Royal District Nursing Service Human Research Ethics Committee.

References

1. Mittal V, Lekshminarayana K, Williamson D, Muralee S, Tampi R. Risk of cerebrovascular adverse events and death in elderly patients with dementia when treated with antipyschotic medications: a literature review of evidence. Am J Alzheimers Dis Other Demen. 2011;26:10–28.
2. Edward K, Alderman C. Psychopharmacology: practice and contexts. Oxford University Press ANZ; 2013.
3. Ballard C, Gautheier S, Cummings J, Brodaty H, Grossberg G, Robert P, et al. Management of agitation and aggression associated with Alzheimer disease. Nat Rev Neurol. 2009;5:245–55.
4. Gauthier S, Cummings J, Ballard C, Brodaty H, Grossberg G, Robert P, et al. Management of behavioural problems in Alzheimer's disease. Int Psychogeriatr. 2010;22:346–72.
5. Restifo S, Lemon V, Waters F. Pharmacological treatment of behavioural and psychological symptoms of dementia in psychogeriatric inpatient units. Australas Psychiatry. 2011;19:59–63.
6. Westbury J, Peterson G. Rethinking psychotropics in nursing homes. Med J Aust. 2013;198:98.
7. Carrasco-Garrido P, López de Andrés A, Hernández Barrera V, Jiménez-Trujillo I, Jiménez-García R. National trends (2003–2009) and factors related to psychotropic medication use in community-dwelling elderly population. Int Psychogeriatr. 2013;25:328–38.
8. Cornege-Blokland E, Kleijer B, Hertogh C, van Marum R. Reasons to prescribe antipsychotics for the behavioural symptoms of dementia: a survey in Dutch nursing homes among physicians, nurses and family caregivers. J Am Med Dir Assoc. 2012;13:80.e1–6.

9. Castelino R, Hilmer S, Bajorek B, Nishtala P, Chen T. Drug Burden Index and potentially inappropriate medications in community-dwelling older people: the impact of home medicines review. Drugs Aging. 2010;27:135–48.
10. Guthrie B, Clark SA, McCowan C. The burden of psychotropic drug prescribing in people with dementia: a population database study. Age Ageing. 2010;39:637–42.
11. Hollingworth S, Siskind D, Nissen L, Robinson M, Hall W. Patterns of antipsychotic medication use in Australia 2002–2007. Aust N Z J Psychiatry. 2010;44:372–7.
12. Ray W, Chung C, Murray K, Hall K, Stein M. Atypical antipsychotic drugs and the risk of sudden cardiac death. N Engl J Med. 2009;360:225–35.
13. Therapeutic Guidelines. Psychotropic Expert Group. Therapeutic guidelines: psychotropic Version 7. Melbourne: Therapeutic Guidelines Limited; 2013.
14. McCowan C, Magin P, Clark SA, Guthrie B. An observational study of psychotropic drug use and initiation in older patients resident in their own home or in care. Age Ageing. 2013;42:51–6.
15. Rattinger GB, Burcu M, Dutcher SK, Chhabra PT, Rosenberg PB, Simoni-Wastila L, et al. Pharmacotherapeutic management of dementia across settings of care. J Am Geriatr Soc. 2013;61:723–33.
16. Nishtala PS, McLachlan AJ, Bell JS, Chen TF. Determinants of antipsychotic medication use among older people living in aged care homes in Australia. Int J Geriatr Psychiatry. 2010;25:449–57.
17. Westbury J, Tichelaar L, Peterson G, et al. A 12 month follow up study of 'RedUSe': a trial aimed at reducing antipsychotic and benzodiazepine use in nursing homes. Int Psychogeriatr. 2011;(8)1260–9. doi:10.1017/S1041610211000421.
18. Snowden J, Galanos D, Vaswani D. A 2009 survey of psychotropic medication use in Sydney nursing homes. Med J Aust. 2011;194:270–1.
19. Community Affairs References Committee, Commonwealth of Australia, March 2014. Care and management of younger and older Australians living with dementia and behavioural and psychiatric symptoms of dementia (BPSD).
20. Nishtala PS, Bagge ML, Campbell AJ, Tordoff JM. Potentially inappropriate medicines in a cohort of community-dwelling older people in New Zealand. Geriatr Gerontol Int. 2014;14:89–93.
21. Folstein MF, Folstein SE, McHugh PR. "Mini-mental state": a practical method for grading the cognitive state of patients for the clinician. J Psychiatr Res. 1975;11(12):189–98.
22. Storey JE, Rowland JT, Basic D, Conforti DA, Dickson HG. The Rowland Universal Dementia Assessment Scale (RUDAS): a multicultural cognitive assessment scale. Int Psychogeriatr. 2004;16:13–31.
23. Hien LTT, Cumming RG, Cameron ID, Chen JS, Lord SR, March LM, et al. Atypical antipsychotic medications and risks of falls in residents of aged care facilities. J Am Geriatr Soc. 2005;53:1290–5.
24. Katz I, Rupnow M, Kozma C, Sneider L. Risperidone and falls in ambulatory nursing home residents with dementia and psychosis or agitation; secondary analysis of a double blind, placebo-controlled trial. Am J Geriatr Psychiatry. 2004;12:499–508.
25. Hedges D, Jeppson K, Whitehead P. Antipsychotic medication and seizures: a review. Drugs Today (Barc). 2003;39:551–7.
26. Byerly M, Weber M, Brooks DL, Snow LR, Worley MA, Lescouflair E. Antipsychotic medications and the elderly: effects on cognition and implications for use. Drugs Aging. 2001;18:45–61.
27. Schnieder L, Dagerman K, Insel P. Risk of death with atypical antipsychotic drug treatment for dementia: meta-analysis of randomised placebo-controlled trials. JAMA. 2005;294:1934–43.
28. Carriere I, Fourrier-Reglat A, Dartiques J, Rouaud O, Pasquier F, Ritchie K, et al. Drugs with anticholinergic properties, cogntive decline and dementia in an elderly general population: the 3-city study. Arch Intern Med. 2009;169:1317–24.
29. Hollis J, Forrester L, Brodaty H, Touyz S, Cumming R, Grayson D. Risk of death associated with antipsychotic drug dispensing in residential aged care facilities. Aust N Z J Psychiatry. 2007;41:751–8.
30. Zhang M, Holman CD, Preen DB, Brameld K. Repeat adverse drug reactions causing hospitalization in older Australians: a population-based longitudinal study 1980–2003. Br J Clin Pharmacol. 2007;63:163–70.
31. Easton K, Morgan T, Williamson M. Medication safety in the community: a review of the literature. Sydney: National Prescribing Service; 2009.
32. Widagdo IS, Nyfort-Hansen K, Kowalski SR. Prevalence of potentially inappropriate medication use in elderly hospitalised patients. J Pharm Pract Res. 2011;41:122–5.
33. Burgess CL, Holma CD, Satti AG. Adverse drug reactions in older Australians, 1981–2002. Med J Aust. 2005;182:267–70.
34. National Prescribing Service (NPS). Prescribing practice review 7: what is a medication review? (February 2000). Retrieved 20 March 2009, from http://www.nps.org.au/__data/assets/pdf_file/0019/16921/ppr07.pdf.
35. Marston L, Nazareth I, Peterson I, Walters K, Osborn DPJ. Prescribing of antipsychotics in UK primary care: a cohort study. BMJ Open. 2014;4:e006135. doi:10.1136/bmjopen-2014-006135.
36. Hungerford C, Doyle K, Schumaker-Jones T, Domaschenz M, Messent P, Cleary M. The use of antipsychotic medication by community-dwelling people with dementia: an exploratory statistical analysis. J Clin Nurs. 2015;24:872–5.
37. Spector A, Orrell M, Goyder J. A systematic review of staff training interventions to reduce the behavioural and psychological symptoms of dementia. Ageing Res Rev. 2013;12:354–64.