ORIGINAL RESEEARCH

Reducing the use of antipsychotics in dementia care through staff education and family participation

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Abstract

Background: The widespread use of antipsychotic medication to treat the behavioural and psychological symptoms of dementia in residential aged care facilities is a world wide concern. Despite evidence of the numerous adverse effects of antipsychotic drugs, and the efficacy of non-pharmacological approaches, prescription rates are increasing in aged care.

Methods: This controlled before and after study aimed to investigate if an education intervention with family participation in dementia care improved the use of antipsychotic drugs. Antipsychotic use was measured by audit of residents' clinical records. Three similar rural residential aged care facilities (RACF's) participated in the study. At site 1 and 2 staff undertook training in dementia care using an on-line learning tool and peer reviewed literature on the use of antipsychotic drugs in dementia. Additionally, family members participated in 'resident life story telling' at site 2. Site 3 acted as the control.

Results: At sites 1 and 2, twenty five staff (25%) volunteered to participate in training. No training was provided at the control site. Across the three sites 47 residents had a clinical diagnosis of dementia with 30 of this group prescribed antipsychotic medication at baseline. At the intervention sites the use of antipsychotic medication reduced from 85% to 69% at site 1 and from 50% to 38% at site 2. At the control site medication use increased from 61% from 69%.

Conclusion: Dementia education for staff, especially with family participation in resident life story telling, may reduce antipsychotic medication use in residential aged care. Additionally, positive clinical implications such as reduction in falls were observed. The encouraging findings of this small study support further investigation in a larger sample.

Key words

Antipsychotic, Dementia, Residential aged care

1 Introduction

Currently in Australia 85,200 residents in aged care facilities have a cognitive impairment related to dementia [1]. This figure is predicted to increase [2], which will inflict a tremendous burden on resources within institutionalised care [3].

The use of antipsychotic medication in the aged care settings for behavioural problems associated with dementia is widespread, and the practice frequently questioned [4-6]. Prescription and administration of antipsychotic drugs frequently results from aggressive resident behaviours, such as hitting, kicking, swearing and physically non aggressive behaviours,

such as pacing, restlessness and calling out [2, 7]. Agitated behaviours among elderly persons with dementia are hypothesised as resulting from an interaction among lifelong habits and personality, current physical and mental conditions, and environmental factors [8].

The adverse affects of antipsychotics in this population are well documented [4, 9-11] and include an increased risk of falls, over sedation, decreased cognition and increased morbitity. The reason for adverse effects in this population are multifactorial and include the pharmacokinetic changes that occur with ageing (changes in drug absorption, distribution, metabolism and elimination), as well as drug-disease interactions due to multiple comorbidities and drug-drug interactions because of polypharmacy [12]. Despite these risks, there is expert opinion that antipsychotics are increasingly being used as a first line treatment [6].

Many studies worldwide have focused on interventions aimed at limiting antipsychotic use in dementia care [9, 13-15]. An Australian literature review [16] identified that interventions tailored to the individual's background and preferences was beneficial in reducing unmet needs behaviours for people with dementia.

Person-centred care has emerged as the most promising trend for dementia care and has been described as the gold-standard model for care of people with dementia [17]. Person-centred care shifts the focus from the behaviour of the person with dementia to a holistic view of what may be causing or contributing to the behaviour. The seminal work of Tom Kitwood [18] in person centred care in dementia, is defined as "An approach to care that conciously adopts the patient's perspective" [19]. Kitwood [18] went on to propose that caregiving for a person with dementia must involve some understanding of their life experience. In the last decade, there has been a core of consensus that person-centered care involves valuing and using people's subjective experience regardless of cognitive ability, and acknowledging that the person should be the focus of care delivery and not the disease or illness [20]. Focusing care delivery on patient needs and preferences is a useful way to define person-centred care [21]. Literature identifies that respect for patients needs and preferences as the most consistent element of definitions of person-centred care [22]. In addition, increasing research supports the utility of developing partnerships with patients and families to deliver person-centred care [23]. Family participation is an essential component of person-centred care, and enables interventions to be tailored to residents with dementia. This is particularly important, as those affected are frequently unable to communicate their life history, needs and preferences. Previous research [18, 24] identified that working with families, and collaboration with the sufferer were essential aspects of good dementia care. In addition, life story work has been shown to be an effective intervention in dementia [25] and an essential component of person-centred care.

Lifestory telling is also commonly referred to as narrative medicine, memoir writing and biographical work, and is the intentional or planned effort to encourage people to think about, remember, share and record information about themselves [25]. Lifestory telling involves recording relevant aspects of a person's past and present life with the aim of using this life story to benefit them in their present situation [26]. Training in person-centred care practices and the promotion of good practice in the care of patients with dementia with behavioural symptoms, has been shown to reduce the need for antipsychotic medications in residential aged care settings [9] .

Previous research and quality improvement activities conducted locally at several rural residential aged care facilities [27] revealed high rates of antipsychotic drug use. Anecdotally nurses in these facilities reported high rates of serious behavioural and psychological symptoms of dementia (BPSD). Given the evidence of the adverse affects of antipsychotics and the success of person-centred care practices [9, 17, 28], this study introduced an intervention aimed at addressing both.

Aim

The aim of this research was to evaluate if an intensive staff education program, including family participation, improved clinical outcomes for residents with dementia who had been prescribed antipsychotics. The primary outcomes presented include drug usage evaluation of antipsychotics for residents with a diagnosis of dementia. After the intitial data collection

of residents with a diagnosis of dementia, the study focussed only on residents prescribed antipsychotics to treat BPSD, the type and dose of the antipsychotic prescribed, the exclusion of reversible causes of BPSD, documented evidence of response and adverse effects of antipsychotics, review or withdrawal of treatment, concurrent drugs and the presence of other diseases which may be a contraindication to use of antipsychotics.

2 Method

2.1 Setting

This was a multi site controlled before and after exploratory study. Three residential aged care facilities (RACF's) were invited to participate in the study. All three RACF's were thirty bed publicly funded high care facilities in rural settings in Victoria, Australia. The facilities were located within 70km of each other, but no staff members were employed at more than one site. Additionally each facility was serviced by different prescribers. None of the facilities were dementia specific, but on average at least half of the residents had a clinical diagnosis of dementia. This was a convenience sample of RACF's known to the researchers through the Rural Health Academic Network. The network embeds researchers in rural health care facilities for the purpose of researching local issues, and providing education and mentoring.

2.2 Participants

Participants in this study were residents of aged care facilities with a clinical diagnosis of dementia who were prescribed antipsychotic drugs. In addition, staff of the residential aged care facilities who consented to participate in this study undertook an education package. Residents with dementia were identified by a nominated representative at each of the facilities. Consent to participate was obtained from the legally responsible representative of each participant. All staff who consented to undertake education were also included in the study.

2.3 Intervention delivery

Following initial data collection, two of the residential aged care facilities were randomly assigned to receive an educational intervention, known as Site 1 and Site 2. At both sites 1 and 2 staff were invited by email and poster display to participate in a three day program of dementia education. Site 1 staff also underwent one additional day of training targeted to work with residents families to collect and collate resident's life stories to facilitate person-centred practices. It was hypothesized that family pasrticipation would result in more positive outcomes than just education alone. The final RACF was assigned to be the control site where no education or life story intervention was undertaken.

2.4 Intervention component - Dementia education

Consenting staff were introduced to an online learning tool – TIME for dementia. The TIME for dementia (an acronym for training, innovation, mentoring and education) website was developed by a collaboration of experts in dementia care and consists of ten core modules that are accredited by the Royal Australian College of Nursing [29]. Users read the materials and gain dementia specific knowledge. This was a facilitated group learning process, with participating staff attending a dedicated learning venue one day per week as a group, with supervision by an expert teacher in dementia care. Participants were asked to answer a series of questions intended to test knowledge in each module. The modules relate to the aetiology of common types of dementia, diagnostic processes, treatment and intervention options, lifestyle issues, impact of diagnosis, person centred care and key issues and controversies of dementia and dementia care. There is also an online discussion forum in which participants are able to discuss issues with other users and ask experts for advice. The discussion forum is an enduring resource which staff can voluntarily use at any time. Although staff were encouraged to undertake discussion with other TIME for dementia users, this was purely voluntary both during and after the project and not an integrated strategy of the educational intervention.

The online learning tool was also supplemented with literature from the National Prescribing Service (NPS). Participants were provided with five publications [30-34] related to the role of antipsychotics in managing BPSD, common adverse effects and contraindications. All aspects of best practice in dementia care were outlined in the publications, including exclusion of underlying causes or contributing factors and differentiation of delirium. The NPS literature undergoes expert review by individuals or panels to ensure the content is current and within best practice guidelines. The literature was distributed to participants, by the expert teacher, while in the group learning setting. Each publication theme and the contents were discussed with participants in relation to their own experience and practice.

2.5 Intervention component - Life story telling

Twelve participating staff members (of a possible 44 staff) at site 1 also undertook a one day training course in lifestory work and its benefits. An experienced palliative care nurse who trains and oversees a memoir writer's service facilitated this training, focussing on life story telling for residents. The education session included information on barriers and enablers to collecting life stories.

Staff were encouraged to employ the 'Discovery Tool' a document developed by the Australian Aged Care Standards and Accreditation Agency Limited [35] intended to collect resident's preferences, background social and lifestyle information. Staff were then supported to collate and present the information in a user friendly format in consultation with and approved by the resident or their responsible person.

2.6 Outcomes

The major outcome for this study was a reduction in and improved therapeutic prescribing of antipsychotic medication for residents diagnosed with dementia. Audits of resident's medical and nursing notes demonstrated evidence of cessation of antipsychotics, reduced dosage of antipsychotics, with greater compliance to specified therapeutic guidelines for anti-psychotics, documented response and possible adverse effects of antipsychotics and improved review of therapy.

2.7 Measures

Although many tools exist to measure the effects of interventions on the wellbeing of residents with dementia, proxy measures, such as antipsychotic prescribing rates are frequently employed [20]. The Australian National Prescribing Service (NPS), in an effort to promote rational use of medicines, has developed Drug Usage Evaluation (DUE) for a number of medications commonly used in residential aged care settings [36], including antipsychotic medications. The DUE tool was utilised in this study.

DUE is an evidence-based quality improvement methodology, designed to improve the quality, safety and cost-effectiveness of drug use [37, 38]. DUE involves an initial four step process of: 1. identification of a quality use of medicine problem e.g. low concordance with an accepted prescribing guideline, 2. collection of baseline data to quantify the problem, 3. feedback of results (evaluated data) to prescribers and other stakeholders, and 4. implementation of an intervention to improve practice [39]. DUE practitioners in Australia formed state-based special interest groups that carried out multisite audits of drug use. Based on an assessment of the achievements, barriers and enablers of state-based projects, the NPS in 2003 funded and coordinated the state Therapeutic Advisory/DUE groups to work collaboratively to address quality use of medicine issues at a national level for hospitals in Australia [39].

DUE of antipsychotics, facilitates collection of information by audit of resident's clinical records. The information collected relates to the type of drug and dosage prescribed as well as evidence of individual contraindications to prescribing (such as pre existing medical conditions and concurrent drugs) and the response to treatment. The tool also seeks to verify that staff has excluded other reversible causes of behavioural and psychological symptoms of dementia (such as pain, constipation or infection) and evidence of adverse drug effects by examination of resident's medical and nursing records. Other evidence of best practice in relation to prescribing (such as frequent review or withdrawal of therapy) is also sought by the same method. A DUE of antipsychotics was undertaken at each of the participating facilities

prior to the education intervention and was repeated 14 weeks after the final education sessions. The DUE audit of residents medical and nursing records was undertaken by the principal researcher and a nursing staff member designated by each facility manager. All residents with a diagnosis of dementia and prescribed antipsychotics to treat BPSD were included in the DUE audit at all three sites. All 3 sites used an electronic patient history known as Management Advantage to record residents data.

2.8 Ethics

The research project was approved by the University of Melbourne Human Research and Ethics Committee (Project No 1033333.1). All research was conducted in accordance with the Declaration of Helsinki Ethical Principles for Medical Research Involving Human Subjects.

2.9 Statistical analysis

Statistical analysis was undertaken using SPSS Version 17. Given the small sample size univariate descriptive statistics are presented.

3 Results

3.1 Staff participants

Twelve staff from site 1 and 13 staff from site 2 (approximately 25% of the intervention sites workforce) volunteered to undertake the training offered. Of the 25 staff who undertook the training, 24 were enrolled nurses with basic 12 month undergraduate training and one activities co ordinator who had undertaken a 6 month training certificate to practice. There was one male staff member at site 2, all others female.

All staff (100%) from both sites who volunteered to participate completed the training and achieved the required certificate indicating a good knowledge of the material presented in the TIME for dementia learning tool. All staff participating received the NPS literature related to antipsychotic use and discussed the content in relation to their own practice in a group setting. The same staff from site 1 (100%) who had undertaken training in lifestory work, collected and presented one residents life story in collaboration with the resident's family member(s). The resident's legally responsible person nominated who the staff should work with to collate the life stories, and this varied for each resident. The collaborators for the life story work are shown in table 1. All staff reported collecting the resident information by utilising the 'Discovery Tool' with the nominated story teller. There was frequently additional material supplied by the story tellers to supplement the information collected. The resident's legally responsible person then approved the content to be included and the method of presentation. Presentation varied from posters, booklets and quilts depicting the residents life. These were then displayed in the resident's aged care facility with the aim of informing other staff, volunteers and visitors of the residents life history with a 'human' perspective. The small size of the facilities and resident allocation practices meant that all staff work with all residents daily when on duty.

Staff who participated were paid at their usual hourly rate of pay for all education undertaken and were allowed 8 hours in total to independently collect and collate life stories. There was no staff attrition for the life of the project.

3.2 Resident participants

Residents with a clinical diagnosis of dementia were recorded at the three sites. There was 100% participation rate for inclusion in the study by the resident's legally responsible person. Site 1 recorded an overall rate of 13 residents, both pre and post the intervention. At site 2 there were 16 residents pre the intervention and 13 post the intervention. The control site had 18 residents' pre intervention and 16 post intervention. Of the 47 residents diagnosed with dementia, 30 were identified as having currently prescribed antipsychotic drugs at time 1 data collection, and 24 of a possible 42 residents at

time 2. The results for each of the three sites are shown in table 1. Antipsychotic drug use was reduced at both sites where an education intervention was introduced, but increased slightly at the control site where no staff education occurred. The largest decrease (16%) was at site 1 where families were invited to participate in resident life story telling.

Table 1. Demographics of residents with dementia across all sites

	Time 1			**Time 2**			
	Antipsychotics prescribed			**Antipsychotics prescribed**			
Residents diagnosed with dementia		**YES**	**NO**	**YES**	**YES but reduced dose**	**NO**	**Life story work undertaken and the collaborators (site 1 only)**
Site 1							
Gender	>75yrs of age						
M	●	●				●	Enrolled nurse, residents wife
M	●	●		●			Enrolled nurse, residents wife, daughter and 2 former business associates
F	●	●			●		Enrolled nurse, residents husband
F		●			●		Enrolled nurse, residents husband and 3 daughters
F	●	●				●	Activities coordinator, residents husband
F	●	●		●			
F		●			●		Enrolled nurse, residents husband and daughter
M	●	●		●			Enrolled nurse, residents daughter and residents friend
F		●		●			Enrolled nurse, residents son
F	●	●		●			Enrolled nurse, residents husband
M	●	●			●		Enrolled nurse, residents brother and niece
F			●			●	Enrolled nurse, residents wife
M			●			Deceased	Enrolled nurse, residents wife and son
Site 2							
Gender	>75yrs of age						
M	●	●		●			
F	●	●			●		
F	●	●		●			
F	●	●		●			
F	●	●		●			
M	●	●				●	
M	●	●				Deceased	
F	●	●				Deceased	
			●			●	
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			●			●	
			●			●	
			●			●	
			●			Deceased	
			●			Deceased	
			●			Deceased	

(Table 1 continued on page 76)

Table 1. (continued)

	Time 1			**Time 2**			
	Antipsychotics prescribed			**Antipsychotics prescribed**			
Residents diagnosed with dementia		**YES**	**NO**	**YES**	**YES but reduced dose**	**NO**	**Life story work undertaken and the collaborators (site 1 only)**
Site 3							
Gender	>75yrs of age						
M	●	●		●			
F	●	●		●			
F	●	●			●		
M	●	●		●			
M	●	●		●			
F	●	●			●		
F	●	●		●			
F	●	●		●			
M	●	●		●			
F		●				Deceased	
F	●	●					
			●			●	
			●			●	
			●			●	
			●			●	
F	●		●	●			
			●			Deceased	
			●			Deceased	

After the initial data collection, all future data related only to those residents prescribed antipsychotics. All residents with a diagnosis of dementia who were not prescribed antipsychotics were further excluded from the study. The majority of residents prescribed antipsychotic drugs were females more than 75 years of age, and the results are shown in table1.

The majority of residents prescribed antipsychotic drugs across all three sites were prescribed atypical antipsychotic agents both before and after the intervention. The most common atypical antipsychotic prescribed was Risperidone. Of the 23-30% prescribed conventional antipsychotics, the most common was Haloperidol.

The DUE specifies whether the antipsychotics prescribed comply with current therapeutic guidelines. To achieve compliance Risperidone dosages are recommended to be 0.5-2mg orally, daily in 1 or 2 divided doses or, Olanzapine should be prescribed at dosages between 2.5 – 10mg orally, daily in 1 or 2 divided doses or, Haloperidol 0.5mg orally at night up to 2mg twice a day. All other antipsychotic drugs or in doses other than those recommended are considered to be outside the therapeutic guidelines for treatment of BPSD.

Compliance with therapeutic guidelines for medication treatment of BPSD increased post intervention from a baseline of 37%, increasing compliance to 67%. When the data were stratified, the greatest increases in compliance were observed at the intervention sites. This data are shown in Figure 1.

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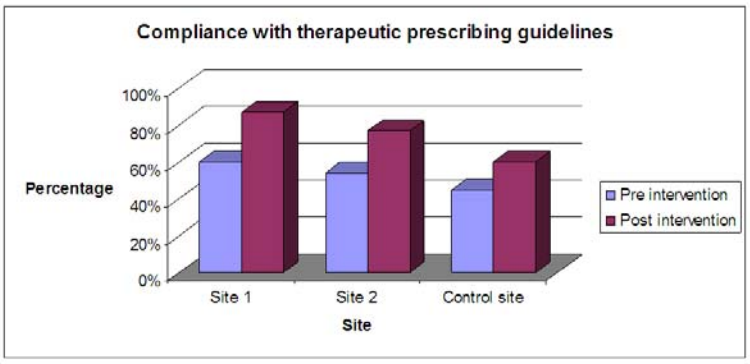

Figure 1. Pre and post compliance with medication order therapeutic guidelines at all 3 research sites.

The Antipsychotic DUE tool measured actual practices against best practice criteria, such as documented evidence of excluding reversible causes of BPSD, evidence of resident's response to antipsychotic drugs, evidence of adverse effects of antipsychotic drugs, documented review of antipsychotic therapy in the previous 6 months and attempted withdrawal of antipsychotics. The results for all practices pre and post the education intervention are shown in table 2. A comparison of results shows that while evidence of increased best practice occurred at sites 1 and 2 across most domains, it remained steady or with only slight improvements at the control site.

Table 2. Comparison of best practice results for antipsychotic use across 3 sites

	Site 1		**Site 2**		**Control**	
	Pre % n 11	**Post % n 9**	**Pre % n 8**	**Post % n 5**	**Pre % n 11**	**Post % n 10**
Reversible causes of BPSD excluded	22 n= 2	87.5 n=8	80 n=6	100 n=5	89 n=10	90 n=9
Documented evidence of response to antipsychotic	0 n= 0	9 n= 1	12.5 n= 1	20 n= 1	37 n= 4	40 n= 4
Documented evidence of adverse effects of antipsychotic	33 n= 4	82 n= 7	20 n= 2	60 n= 3	36 n= 4	20 n= 2
Documented review of antipsychotic therapy	11 n= 1	66.5 n= 6	40 n= 3	75 n= 4	40 n=4	40 n= 4
Withdrawal of antipsychotic has been attempted in the past 6 months	0 n= 0	0 n= 0	12.5 n= 1	20 n= 1	0 n= 0	0 n= 0

Data collected and collated on falls rates across the 3 research study sites are demonstrated in Table 3. All facilities participating have mandatory reporting of falls, and there is also a falls data base in each resident's electronic history. As with all other data presented only residents prescribed antipsychotics for BPSD are included, not the falls rate per facility overall. In addition, the data only reflect how many residents prescribed antipsychotics experienced at least one fall. It does not report the number or frequency of falls for each resident, only the incidence related to residents prescribed antipsychotics, thus the total could be much higher. While the rate of falls for residents prescribed antipsychotics at both sites 1 and 2 decreased, they increased at the control site.

Concurrent prescription of benzodiazepines for residents prescribed antipsychotics was also measured. Overall benzodiazepine prescription rates increased from 37% to 46%. There was not a corresponding increase at site 1 however, instead benzodiazepine use decreased. The results for the 3 sites are shown in Figure 2.

Table 3. Reported falls rate for residents prescribed antipsychotic drugs

	Pre Intervention		Post Intervention	
	n	%	n	%
Site 1	10	91	5	55
Site 2	6	75	3	60
Control Site	7	64	8	80

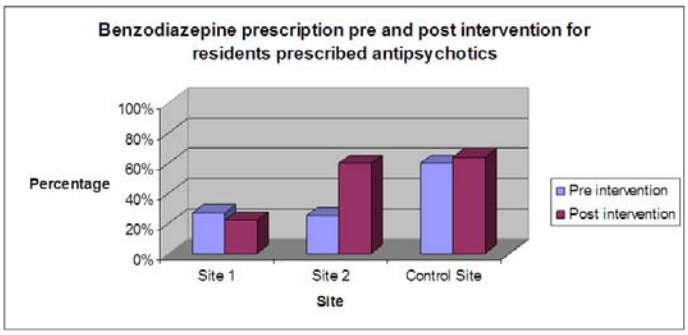

Figure 2. Concurrent prescription of benzodiazepines for residents taking antipsychotic drugs pre and post intervention.

4 Discussion

The results of this study suggest that education of staff in the care and treatment of people with dementia may improve practices related to antipsychotic use; furthermore this is enhanced when families are invited to participate in care. The eductation intervention (TIME for dementia and NPS literature) at sites one and two resulted in a reduction of antipsychotic use and improved therapeutic compliance. The addition of family participation at site one, through resident lifestory telling, suggests that this intervention increases effectiveness, rather than education of staff alone. Lifestory telling as a sole intervention was limited by the absence of a demographically similar RACF in the rural location.

This finding is in keeping with other studies [8, 40, 41]. It is proposed that family participation results in more individualised, or tailored care for people with dementia, with needs and preferences better identified and meaning attributed to various behaviours. This has been demonstrated as especially beneficial by other studies [8, 16]. The office of the Inspector General to the Department of Health and Human Services in the United States recently released a report that called on families to support their loved ones with dementia in nursing homes, in order to advocate on their behalf [42]. This report, purporting the benefits of family participation, related specifically to the use of antipsychotic drugs in elderly people with dementia.

Given the widespread concern on the use of antipsychotics for people with dementia [4] disappointingly this study confirms that high proportions of those diagnosed with dementia are prescribed and administered such drugs in rural RACF's in Australia. Notably, concerns have been voiced at the increased risk of adverse effects in aged populations [42, 43]. This study also found that more than 75% of residents prescribed antipsychotics were more than 75 years of age, and therefore at greater risk of adverse effects due to the physiological changes of ageing, high rates of concurrent prescribing of drugs and multiple comorbidities.

Use of antipsychotics has been strongly linked to a risk of falls for elderly people [44], especially when doses exceed the recommended therapeutic prescribing guidelines [36, 45, 46]. The results of this study support this existing evidence. At site 1 where there was greatest reduction in overall antipsychotic use, and greater compliance with therapeutic guidelines and best practice, the falls rate reduced from 91% to 55%, a 36% reduction. Similarly, there was a 15% reduction in falls at site 2, where antipsychotic use was also reduced. However, at the control site where antipsychotic use increased falls increased

by 16%. These data pertain only to residents with a diagnosis of dementia who are prescribed antipsychotics, not the overall resident's population.

Most residents in this study were also prescribed atypical antipsychotics, such as Respiridone and Olanzapine, despite long standing evidence in literature which concludes that the adverse effects of atypical antipsychotics offset their advantages in older adults with dementia [43, 47, 48]. The high rate of deaths in this population group related to antipsychotic drugs has prompted "black box warnings" in the U.S., cautioning about the risk of death when taken by elderly people with dementia [42]. Similar cautionary advice has been circulated in Australia, through the National Prescribing Service [33]. Olanzapine is not approved in Australia by the Therapeutic Goods Administration for prescription in patients with BPSD, and such prescribing is considered "off-label" or not indicated for use.

Therapeutic guidelines for antipsychotic drug use recommend that the lowest dose possible be used for balancing efficacy and side effects. Studies suggest there is a very narrow effective dose range for antipsychotics, above which efficacy does not increase but side effects do [49, 50]. In this study, it was demonstrated that compliance with therapeutic guidelines increased where education was delivered. Although compliance increased also at the control site, greater levels of compliance was observed at the education sites, with a 27% increase at site 1, 22% increase at site 2 and 15% increase at the control site. Increased compliance at the control site may be attributable to increased general awareness, a factor found in another study associated with therapeutic prescribing guideline compliance [51]. There are no published studies on the influence of education and subsequent compliance with prescribing guidelines of antipsychotic drugs, but similar studies on the influence of antibiotic prescribing guidelines has been shown to have an effect [52]. Most studies describing compliance with prescribing guidelines, focused on education for the prescribers themselves. This study differed in that the focus of the education intervention was nurses in the aged care setting. Nurses were targeted due to literature suggesting that nurses influence prescribing in aged care settings by requesting medications to treat and manage various conditions, including BPSD [53] and confirmation of this practice has been obtained from the results of a previous research study within the same settings [27].

There were positive changes to the best practice criteria at both intervention sites, while the control site remained stable across most domains. Guidelines recommend that staff in aged care facilities should exclude other possible causes of behavioural disturbance as a first step [36, 54]. Auditing through DUE showed there was a 65% increase in evidence that staff had actively excluded other causes of behaviour at site 1 and a 20% increase at site 2 (making site 2 100% compliant). There was a 1% change at the control site. Medical conditions which could present as, or worsen, BPSD commonly include infection, pain and constipation [55]. Unfortunately, people with dementia often cannot communicate these conditions. Experts in dementia care have recently voiced concern that these simple measures are being neglected as standard care, with antipsychotics being prescribed as a first line treatment [6]. This study appears to support evidence of this practice. At site 1, which originally recorded an 85% prescribing rate for psychotropics, dropped to 69% when staff excluded possible reversible causes for 87% of the residents following education to support and promote this practice.

There was also an increase in nursing staff recording evidence of response to psychotropic drugs and evidence of adverse effects at both intervention sites, which remained stable or decreased at the control site. In order to review antipsychotic therapy effectively it is crucial this information is available. Accordingly there was a large increase in the review of antipsychotic therapy at the corresponding sites. Review of therapy increased 55% at site 1 and 35% at site 2, but remained unchanged at the control site. Guidelines advocate that antipsychotics should be reviewed after a specified period [56] to ascertain if there has been a response or clinical improvement of BPSD [48].

Trial discontinuation of antipsychotic drugs is indicated for most residents with dementia, as studies have shown that some BPSD are self limiting [57] and withdrawal of antipsychotics does not result in worsening behavior [58]. Only site 2 demonstrated evidence of these best practice criteria, either pre or post the intervention. Staff at site 1 articulated during interviews that barriers existed where they were reliant on others to undertake practices such as this, that withdrawal of

medications was beyond their scope of practice and they had little influence in facilitating this. This barrier to educational interventions has also been identified by another recent study which found numerous barriers to implementing learning such as issues with GPs and other colleagues [59].

Despite good evidence that prescribing benzodiazepines for this age group is just as much, or more harmful than antipsychotics, concurrent prescribing is widespread [60] further increasing risks of adverse reactions [61]. Residents prescribed antipsychotics, who were also prescribed benzodiazepines were recorded at all sites, with only site 1 showing a reduction in concurrent prescribing. Both the control site and site 2 had an increase in benzodiazepine prescription.

There is also evidence that reduction in antipsychotics frequently results in increased prescribing of other drugs such as benzodiazepines [62] and although this occurred at site 2, it appears that family participation may have influenced better management overall at site 1, excluding the need for alternative medication.

The study is limited to reporting trends and highlighting differences of clinical importance due to its small size. The numbers do not reach statistical significance; however, it seems reasonable that there is theoretical generalizability as the results obtained here support other empirical findings. Attrition through death of residents would have further decreased the sample size if those participants data were removed. As most of the attrition was at site 2 and the control site for residents prescribed antipsychotics, and none at site one for residents prescribed antipsychotics, removal of this data for participants deaths would have biased the results more favourably to site one. Reduction in antipsychotic use may be attributed to deaths at site two and the control site, but not at site one. Although removing data of residents who died would have strengthened the research results, statistical power would have been further decreased, and the study would not have been a true reflection of this common confounder in these setting.

Staff participation in the educational intervention was voluntary, so only small numbers received the training at each site. Furthermore, no senior nursing staff members participated in the training at either site, increasing the chance of barriers to translating the training into practice. Previous research does however suggest that nurses at all levels influence prescribing patterns in aged care settings [27]. Further research in this setting demonstrated sustained reductions in antipsychotic use [28] which continued to decrease with education aimed at this specific cohort.

Due to the barriers related to translating training and education into practice identified by both this study and others [59] a whole staff approach to education would be more useful. Numerous other studies [61, 63] identified that involvement of a pharmacist in the intervention was beneficial for outcomes and sustainability. Targeting the GP prescribers alone appears to have little effect [7] as does single education visits.

Use of the National Prescribing Service literature regarding best practice in antipsychotic use seems to be an effective tool, which could be supplemented with pharmacist involvement and feedback in conjunction with GP's, which has proven successful and cost effective [63]. Teaching non pharmacological management of BPSD, especially through person-centred care has proven to have positive outcomes [9].

Overuse and inappropriate use of antipsychotics in aged care settings may most effectively be addressed by government regulation for prescribing of these drugs, as has taken place in overseas settings [6, 42]. At a minimum, aged care facilities should be required to provide evidence of robust person-centred behaviour management strategies and investigation of other possible underlying causes of BPSD prior to prescription of antipsychotic drugs.

Antipsychotic medications are not a substitute for behavioural management strategies and have limited efficacy in reducing BPSD. Overuse of antipsychotics is multifactorial, with cascade effects throughout whole organisations and as such only a whole organisation approach is likely to be effective. Residents and their families are essential collaborators and participants in this process.

This study suggests that there is evidence that a dementia education intervention may influence the prescribing of antipsychotics in small rural aged care facilities, and this is enhanced by person-centred practices. The influence extended to not only the prescribing rates, but the practices of nursing staff in delivering evidenced based best care for residents prescribed antipsychotics.

No other confounding influences have been identified for the 14 week period of the study. Specifically no other staff education was provided, there were no major changes to the facility environment and the prescribers at time 1 and time 2 were the same at each site.

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