

Quality use of antipsychotic medicines in residential aged care facilities in New Zealand

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ABSTRACT

INTRODUCTION: Antipsychotic medicines are used regularly or when required in residential aged care facilities to treat symptoms of dementia, but have been associated with several adverse effects.

AIM: The aim of this study was to examine 'quality use' of antipsychotic medicines in residential aged care facilities in New Zealand, by surveying nurse managers.

METHODS: A cross-sectional survey was mailed to 318 nurse managers working in a nationally representative sample of aged care facilities. A purpose-developed, pre-tested, 22-item structured questionnaire was used to explore practice related to the quality use of antipsychotic medicines.

RESULTS: Overall, 31.4% of nurse managers responded to the survey. They mostly (88%) had ≥ 1 year's relevant work experience and 83% of facilities provided care for those within the range of 21 to 100 residents. Respondents reported that staff education on dementia management occurred early in employment. Two-thirds of participants reported non-pharmacological interventions were commonly used for managing challenging behaviours, while less than half (45%) cited administering antipsychotic medicine. Respondents reported 'managing behavioural symptoms' (81%) as one of the main indications for antipsychotic use. Frequently identified adverse effects of antipsychotic medicines were drowsiness or sedation (64%) and falls (61%). Over 90% reported general practitioners reviewed antipsychotic use with respect to residents' target behaviour 3-monthly, and two-thirds used an assessment tool to appraise residents' behaviour.

DISCUSSION: Staff education on dementia management soon after employment and resident 3-monthly antipsychotic medicine reviews were positive findings. However, a wider use of behavioural assessment tools might improve the care of residents with dementia and the quality use of antipsychotic medicines.

KEYWORDS: Quality use; antipsychotic medicines; non-pharmacologic interventions; challenging behaviour; adverse effects; residential aged care facilities

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Introduction

Behavioural and psychological symptoms of dementia are usually managed with both non-pharmacological and pharmacological interventions.¹ The use of antipsychotic medicines may provide short-term benefits for some

neuropsychiatric symptoms (eg aggression), but remains unproven for other behaviours (eg wandering).^{2,3} Risperidone is the only antipsychotic approved for neuropsychiatric symptoms of dementia.^{4–6} Antipsychotic medicines, although beneficial in the treatment of psychotic symptoms, with frequent and prolonged

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WHAT GAP THIS FILLS

What is already known: Antipsychotic medicines are used regularly and when required in residential aged care facilities to manage some symptoms of dementia. This is a concern, as adverse effects have been associated with regular long-term use.

What this study adds: The study found non-pharmacological methods were commonly used for managing the challenging behaviour of aged care residents with dementia, but antipsychotic medicines were also used. Education on dementia management takes place early in staff members' employment and respondents were aware of the potential sequelae of using antipsychotic medicines. However, wider use of standard behavioural assessment tools might improve the care of residents with dementia and the quality use of antipsychotic medicines.

use can increase risk of cerebrovascular (strokes), extrapyramidal, cardiovascular, metabolic or endocrine adverse effects and death in people with dementia.⁷⁻⁹ Nishtala *et al.* found that 23% of older people living in care facilities were prescribed one or more antipsychotic medicines in Australia in 2008,¹⁰ while Tordoff *et al.* found 36.5% of residents in dementia or psychogeriatric units in New Zealand were prescribed a regular (or when required (prn)) antipsychotic in 2013.¹¹ Furthermore, overall antipsychotic use by older people increased ~28% between 2005 and 2013 in New Zealand.^{12,13}

Antipsychotic medicines use can be influenced by nurses' opinions and routine care practices, including the selection of pharmacological or non-pharmacological measures and audit requirements. A recent study¹⁴ highlighted the role of registered nurses and the positive influence their skills have had in residential aged care. Nursing staff provide care to improve residents' health and wellbeing through processes that can affect the safe use of antipsychotic medicines.¹⁵ Ministry of Health-accredited auditors regularly assess providers' compliance with medicines management against the Standards New Zealand (NZS) 8134 HDSS (Health and Disability Services (Safety) Standards 2008).^{16,17} These Standards include legislation and accreditation matters, policy implementation, staffing and staff competencies, documentation of allergies and sensitivities, self-medication and medication management practices (for controlled and other medicines), and

security or safety measures in place.¹⁶⁻²⁰ Managers and staff are informed of the findings and address any concerns. Although the New Zealand Ministry of Health promotes better use of antipsychotic medicines by stipulating regular medicine reviews, auditing antipsychotic use in each facility and nationally might be more effective.

Quality use of medicines involves the appropriate decisions and practice norms about health maintenance, disease prevention and cure, made by individuals, or on behalf of the population.²¹ The Best Practice Advocacy Centre in New Zealand (bpac^{nz}) has outlined specific indicators for monitoring prescribed antipsychotic medicines. These include monitoring response to target behaviour for any antipsychotic administered, adverse events monitoring, regular (3-monthly) medicine reviews and trialled withdrawals of antipsychotic medicines.²² This current study intends to provide cross-sectional feedback on antipsychotic use against the background of bpac^{nz} quality use indicators, and to help identify contributory nursing education and care processes that influence antipsychotic use in residential aged care facilities. The findings are pertinent in the light of recent implementation of a national integrated assessment tool to aid nurses' evaluation of residents' specific needs.^{18,23}

The aim of this study, therefore, was to examine quality use of antipsychotic medicines in older people in residential aged care facilities in New Zealand, from practices reported by nurse managers. Specific objectives included identifying: (i) severity of dementia in residential aged care facilities; (ii) common non-pharmacological therapies for dementia symptoms; (iii) availability of staff education about dementia management; (iv) types of antipsychotic medicines used; (v) monitoring for specific targets and challenging behaviours in people prescribed antipsychotic medicines; (vi) common adverse effects; and (vii) people conducting antipsychotic reviews.

Methods

A 3-month cross-sectional survey of nurse managers about practices related to the quality use of antipsychotic medicines was conducted in residential aged care facilities across New Zealand. Accredited residential aged care facilities were

identified (by types of care and geographical location) through available data from the Ministry of Health. Facility contact addresses were identified from the Ministry of Health and ElderNet websites.^{24–26}

Survey instrument

The questionnaire comprised 22 items with closed- and open-ended questions. The instrument was purpose-developed and piloted by four volunteer nursing staff who had experience of working for at least 1 year in residential aged care. The volunteers took no further part in the study. Three researchers with expertise in quality use of antipsychotic medicines developed the survey around known themes about antipsychotic use for dementia. Initially, a literature review was conducted and three group meetings were held to identify core areas of interest. For each stage, consensus was reached on the inclusion of each item by consent of a fourth researcher with a lay view on the subject. This ensured a balance on decisions or modifications made after the instrument had been piloted.

Study participants and ethics

Potential participants were registered nurses working as managers of accredited residential aged care facilities; one from each of the 318 facilities in a stratified sample (refer to sampling). Service types provided by residential aged care facilities included four levels of care: (i) rest home; (ii) hospital-level; (iii) dementia unit; or (iii) psychogeriatric care. Strict information confidentiality and anonymity was followed for nurse managers agreeing to participate in the survey, and they had the option of withdrawing from the study at any point in time. Returning a filled and completed questionnaire was regarded as an indication of consent to participate. The Human Ethics Committee, University of Otago approved the study (reference: D15/129).

Questionnaires were sent out in batches to selected facilities along with a covering letter, an information sheet and consent form. Follow-up reminders were sent fortnightly in three successive cycles via mail to ensure proper management of questionnaire returns, as recommended by Fowler.²⁷

Sample and sampling technique

The selected facilities were chosen by proportionate stratified sampling. A value of 0.1 margin of error requires a sample size of 97 and because we have a finite population of 636 facilities as at May 2015,²⁶ under sampling without replacement, the adjusted sample size was calculated as:

$$n = \frac{97}{1 + \frac{97}{636}} \approx 85$$

where, n = sample size of facilities

The response rate for questionnaires administered to health professionals is generally between 25 and 30%.²⁸ To ensure at least 85 responses were obtained, we needed to send the questionnaires to between 284 and 340 facilities. Therefore, a total of 318 facilities (half of the nationally accredited residential aged care facilities in New Zealand) were sent the survey instrument.

Registered nurses working as clinical managers, departmental or unit heads in residential aged care facilities were included in the study.

Data analysis

Descriptive statistics were used to summarise survey findings. Odds ratios between groups of different dementia types (based on the nurses' opinions) and their confidence intervals were also determined. Dementia type was defined as no dementia, mild, and moderate-to-severe dementia. The odds ratio for the survey outcome of each question was calculated by using no dementia as the reference group. Only returned and completed surveys were included in the analysis. All data analyses were performed using IBM SPSS 22.0.²⁹

Results

Overall, 31.4% (100/318) of nurse managers responded to the survey. The return rate was balanced between North Island 31.4% (70/223) and South Island 31.6% (30/95). Most respondents (88.0%) had > 1 year of work experience in residential aged care facilities, and 83% of facilities were estimated to be home to those within the range of 21 to 100 residents. Thirty-seven percent

of respondents indicated 1–30% of residents in their facilities experienced dementia; 32% indicated 31–50% and 29% indicated 81–100%. Besides, three-quarters of respondents indicated that most residents had mild (37%) or moderate

dementia (37%), and 8% indicated that most had severe dementia.

Non-pharmacological interventions

The five most common non-pharmacological therapies used in residential aged care facilities were: music therapy (91%), exercise therapy (89%), pet therapy (74%), environmental modification (61%) and gardening (61%). These were ranked identically for residents with or without dementia. Non-pharmacological interventions were more commonly reported for residents with moderate-to-severe or mild dementia compared to residents without dementia. For example, environmental modification was more common for residents with moderate-to-severe dementia (OR 5.13 (95% CI 1.41–18.66)) than for residents with no dementia. Interventions that were less common for residents with moderate-to-severe dementia included aromatherapy (OR 0.31 (95% CI 0.06–1.56)), restraint (OR 0.97 (95% CI 0.08–11.48)) and one-on-one interventions (OR 0.29 (95% CI 0.08–1.01)).

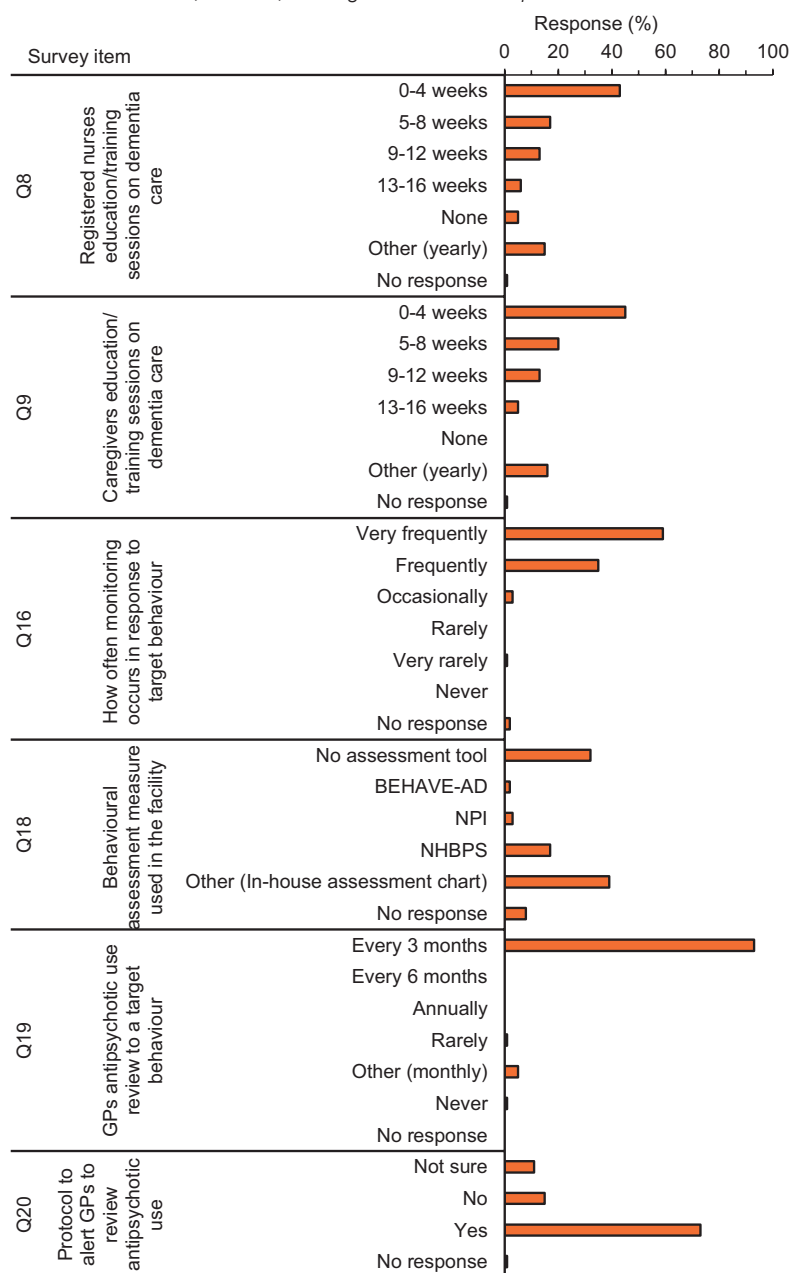
Staff education

According to respondents, staff were mostly educated about dementia in the first 4 weeks of employment, with a 43% and 45% modal frequency for both nurses and caregivers, respectively. Further textual analysis confirmed ‘Nurse Assessor’, ‘Clinical Manager’, ‘Career Force’ and ‘ACE training’ as the main providers of aged care education.

Behavioural monitoring

The nurse managers reported that specific target behaviour monitoring occurred very frequently (59%) or frequently (35%) for residents prescribed antipsychotic medicines (Figure 1). Behaviour appeared to be monitored by in-house assessment tools (39%) and the Nursing Home Behaviour Problem Scale (17%). For challenging behaviours, in addition to non-pharmacological interventions, antipsychotic administration and one-on-one counselling were the fourth and fifth most preferred methods to manage challenging behaviour of residents. In Figure 2, the most challenging behaviours to manage were presented against

Figure 1. Distribution of nurse managers' responses to antipsychotic medicines use in residential aged care facilities ($n = 100$) Survey items Q19 and Q20 were developed to serve as checks for later responses. Code, behaviour tool description; NPI, neuropsychiatric inventory scale; BEHAVE-AD, behavioural pathology in Alzheimer's disease; NHBPS, nursing home behaviour problem scale



the background of usual behavioural symptoms expected from demented residents. The most commonly identified challenging behaviours, as reported by over 60% of respondents, were restlessness, anxiety, agitation and sundowning (episodes of confusion that begin late in the day or evening). The most challenging to manage (identified by over 20% of nurse managers) were physical and verbal aggression, sundowning, shouting, punching, being resistive, and a neuropsychiatric symptom (agitation). Agitation was more common in residents with moderate-to-severe dementia (OR 4.13 (95% CI 1.15–14.81)) than in those with no dementia, while physical aggression (OR 4.00 (95% CI 1.25–12.75)), disorientation (OR 3.48 (95% CI 1.11–10.86)), being resistive (OR 5.76 (95% CI 1.63–20.41)) were more common in residents with mild dementia than in those with no dementia.

Antipsychotic use and adverse effects

Commonly prescribed antipsychotic medicines were risperidone (by 83% of respondents), olanzapine (37%), quetiapine (84%), clozapine (21%) and haloperidol (39%) (Figure 3). The main indications intended for antipsychotic medicine use included behavioural symptoms (81%), psychiatric illnesses (42%) and mood disorders (36%). Frequently identified adverse effects of antipsychotic medicines included drowsiness or sedation (64%), falls (61%) and weight gain (27%). Most nurse managers (73%) reported that a facility-instituted protocol existed to alert residents' general practitioners (GPs) to review antipsychotic medicines use in residents (particularly if there was no response to target behaviour); 26% were either not sure or had no protocol in place (Figure 1). Respondents indicated that weight gain, tardive dyskinesia and hypotension were less common in residents with mild dementia than in those with no dementia.

Antipsychotic use reviews

Figure 1 shows that 93% of respondents reported that GPs reviewed the use of antipsychotic medicines on a 3-monthly basis to assess a resident's target behaviour response. Antipsychotic medicine use was most commonly reviewed by a multidisciplinary team (specified as 'other') or by

pharmacists supplying the medicines, or a nurse practitioner.

Discussion

This study provides an overview of practices and opinions relating to quality use of anti-

Figure 2. Distribution of nurse managers' responses about behavioural symptoms and challenging behaviours in residential aged care facilities (n = 100)

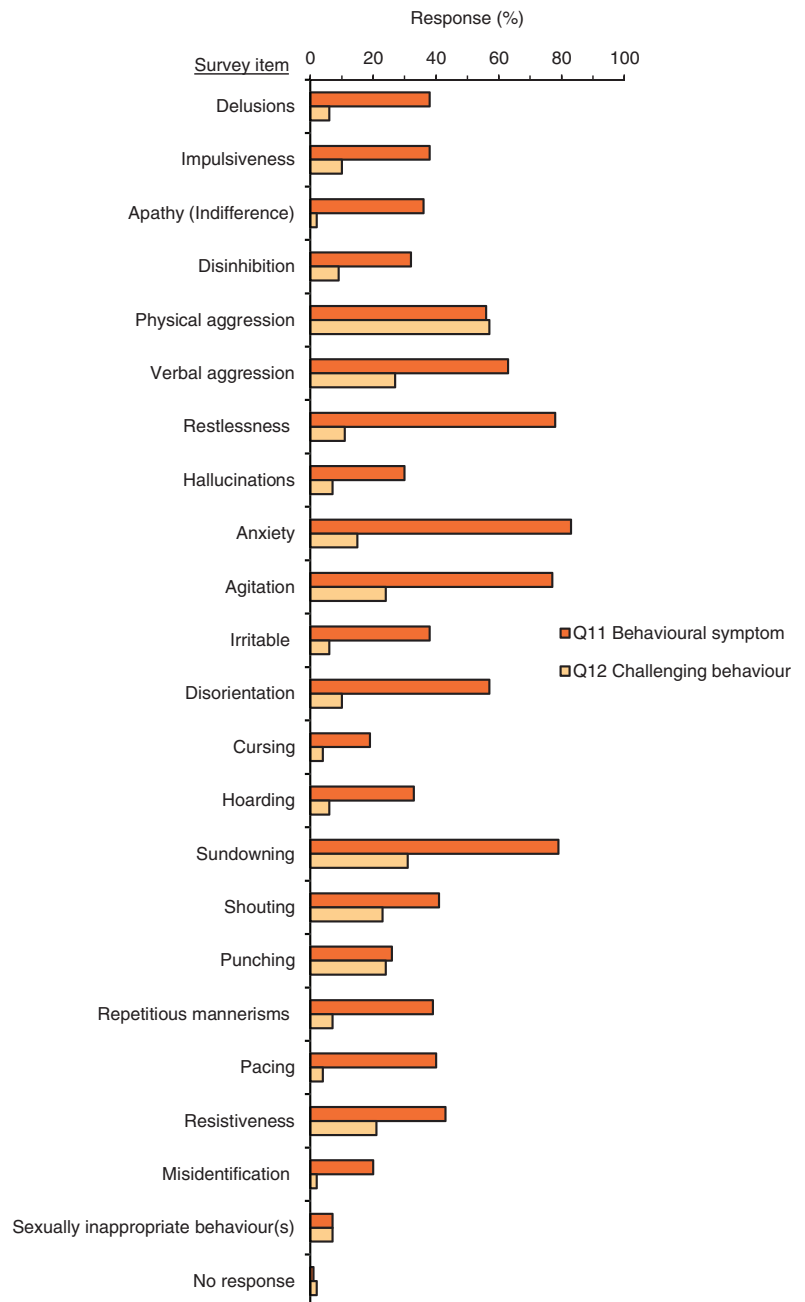
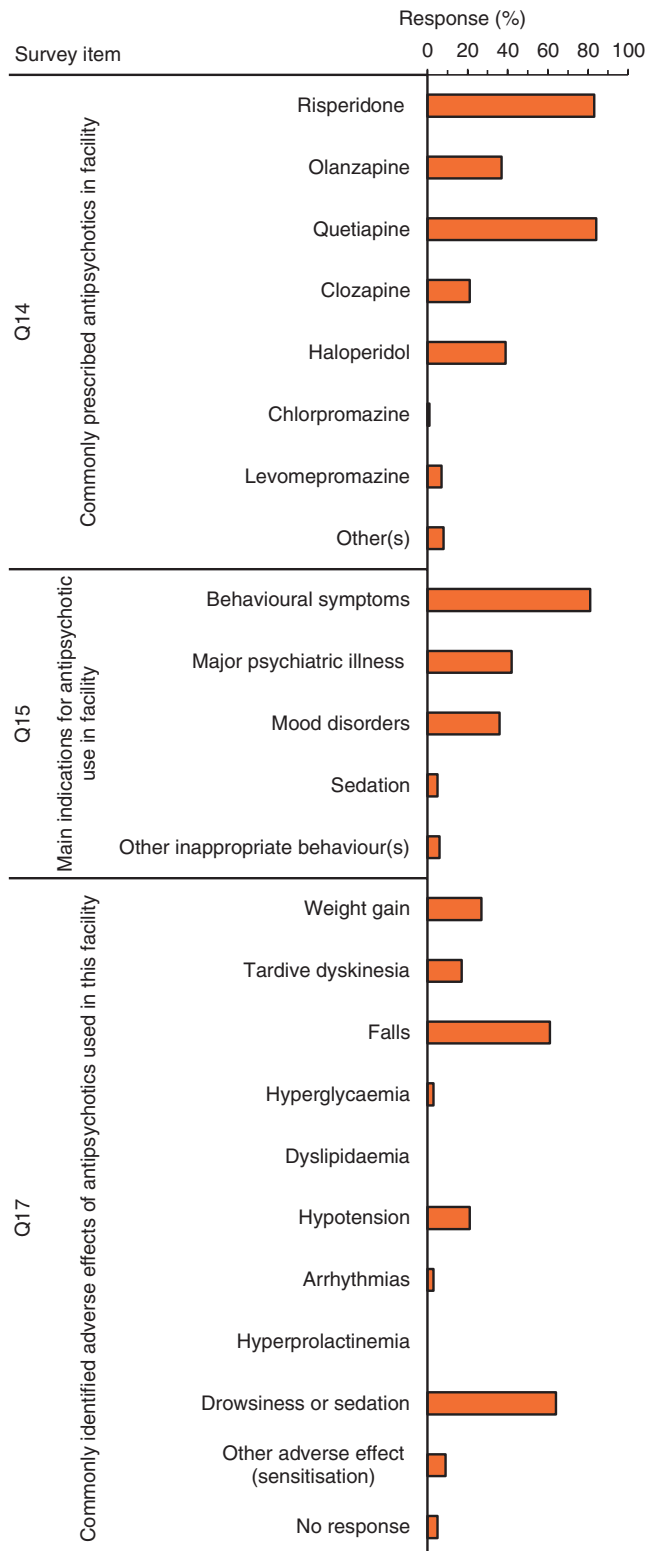


Figure 3. Distribution of nurse managers' responses to common antipsychotic medicines used, main indications and antipsychotic medicines adverse effects in residential aged care facilities (n = 100)



psychotic medicines and dementia care in a sample of nurse managers from residential aged care facilities in New Zealand. The managers reported some positive findings: staff education on dementia and its management occurred mostly early after commencing employment and non-pharmacological therapies were widely used for residents with dementia. Where indicated, antipsychotic medicines were second-generation agents (perhaps less likely to cause extrapyramidal effects). Prescribers conducted antipsychotic use reviews on a 3-monthly basis, and protocols and behaviour tools were quite commonly used to alert GPs to review these medicines, or to help staff monitor behaviour in response to therapy. In contrast, some facilities did not use such protocols or tools. For example, 32% of respondents were unaware of the use of a behavioural assessment tool in their facilities, which suggests they might benefit from training in this area. The nurse managers highlighted challenging behaviours that increased the stress burden on staff members, endorsing the need for appropriate education for staff and therapies for residents.

Firstly, education for staff on dementia care and its management occurred in the initial weeks after commencing employment. Education and training is essential to help new staff working in a potentially stressful setting.³⁰ The 2013 New Zealand Framework on Dementia Care recommends focused strategies that support residents' independence while ensuring safety by using a people-centred approach.³¹ Respondents indicated these non-pharmacological therapies were commonly used in these facilities (eg exercise), as part of first-line therapy for people experiencing behavioural and psychological symptoms of dementia.²² Ongoing training is needed to improve dementia care for residents and appropriate use of antipsychotic medicines because 'best-practice' changes over time. This could be organised by facility managers and be a Ministry of Health accreditation requirement.

Secondly, respondents highlighted the adverse effects frequently seen in residents taking antipsychotic medicines, including weight gain, falls, drowsiness or sedation. The bpac^{nz} recommends monitoring for these effects.⁴ The same guidelines recommend monitoring behavioural symptoms,

and most facilities in this study used in-house tools for this process. About one-quarter of facilities, however, were not using any particular measure.

General practitioner review of antipsychotic medicines to target symptoms at regular intervals was mostly conducted three-monthly. Whether this actually happens or is influenced by the need to follow ideal expectations, needs to be further explored. Registered nurses administer some medicines under 'standing orders' for residents; the orders are signed by a GP.³² These medicines are most commonly creams, laxatives and analgesics, but in theory, antipsychotic medicines could be administered in this way. To our knowledge, this is not the case, and prescribed antipsychotic medicines are administered only 'when required' or regularly.¹¹ The national picture on this is unknown and would need future research.

The bpac^{nz} guide to antipsychotic medicines in dementia recommends the use of antipsychotic medicines only '*...as a last resort if aggression, agitation or psychotic symptoms cause severe distress or an immediate risk of harm to the patient or others.*'²² In addition, target behaviour(s) should be identified before prescribing an antipsychotic, the response to treatment monitored, and the antipsychotic withdrawn if there is no response. Protocols to prompt antipsychotic review may serve as quality checks and should be considered in facilities not using them. Three-monthly reviews are consistent with bpac^{nz} guidelines²² and may result in many facilities having protocols to alert GPs to do this. However, regular internal and national audits of antipsychotic use may be more effective at improving their use.¹¹

The nurse managers indicated behaviours that staff found particularly challenging were physical or verbal aggression, sundowning, shouting, punching, being resistive and agitation, which are usually associated with increased nursing staff burden or distress. Similarly, in a recent English survey, 37% of rest home managers reported aggression as being the most frequent type of challenging behaviour.³³ Daily care for residents with dementia and related behavioural symptoms, including the administration of

antipsychotic medicines, can be stressful at times for caregivers and nurses.^{30,33}

Risperidone was the most commonly recalled antipsychotic medicine by nurse managers working in residential aged care. This was expected, as it is the only antipsychotic approved in New Zealand for behavioural and psychological symptoms of dementia.⁴ Other second-generation antipsychotic agents like olanzapine and quetiapine were common, but may have had other off-label uses (eg anxiety, insomnia, delirium). Off-label use for many indications has been reported locally and internationally.³⁴⁻³⁶ The current study reports that haloperidol (a first-generation antipsychotic indicated for agitation) is used in several residential aged care facilities. However, duration of use was not ascertained and use may have possibly been consistent with bpac^{nz} guidelines.⁴ These guidelines recommend haloperidol for '*short-term treatment of delirium and psychoses associated with dementia*'.²² Long-term use is not advocated because of its propensity to cause extrapyramidal side-effects like tardive dyskinesia.³⁷

Respondents indicated that a multidisciplinary team approach was commonly used to review antipsychotic medicine use. This strategy is advocated by several experts in quality use of medicines.^{31,38} In Australia, comprehensive clinical medication reviews by specially trained pharmacists have been shown to be effective in reducing inappropriate prescribing.³⁹

To our knowledge, this is the first study to examine practice related to antipsychotic medicine use for dementia aged care residents in New Zealand by surveying a nationally representative sample of nurse managers of residential aged care facilities. Robust statistical sampling methods were used to reduce selection bias among the participants. The survey instrument was developed by a research team, and was piloted by people with appropriate experience.

A study limitation was modest survey returns, possibly missing some interesting findings and reducing the generalisability of results. Nevertheless, the response rate was similar to surveys of other health care professionals that have reported

rates of 13–32%.^{28,40} Another limitation included the response type, which was mainly subjective; that is, based on the nurse managers' estimates and opinions. Therefore, responses could be a source of bias. A 'socially desirable response' to some questions given by nurse managers was mitigated by including survey items that 'check' previous responses (eg availability of a protocol to prompt antipsychotic review served as a check for GPs review of antipsychotic medicines used in response to target symptoms). The study did not investigate how often staff received ongoing medicine use training, or examine the specific content of the training; for example, the extent of information provided about antipsychotic medicines. Individual data for residents with dementia were not obtained in this study, so responses were and should be interpreted cautiously.

In conclusion, non-pharmacological therapies were widely used based on survey data. Staff dementia education occurred mostly within the first few weeks of employment. Risperidone, olanzapine and quetiapine were the most commonly used antipsychotic medicines. Responses indicated prescribers conducted antipsychotic use reviews on a 3-monthly basis, but protocols to alert GPs to conduct reviews could be more widely implemented, including tools to monitor for adverse effects. Nurse managers highlighted challenging behaviours that increased the stress burden of staff. A multidisciplinary approach to antipsychotic medicines reviews and monitoring specific target behaviours soon after prescribing would improve care for dementia residents.⁴¹ We anticipate this national survey will help inform decision-makers, policy planners and health strategists on processes that influence and improve quality use of antipsychotic medicines in residential aged care.

References

- Kalapatapu RK, Schimming C. Update on neuropsychiatric symptoms of dementia: antipsychotic use. *Geriatrics*. 2009;64:10–8.
- Croucher M, Duncan C, Fisher M, et al. The use of antipsychotics in residential aged care: clinical recommendations developed by the RANZCP Faculty of Psychiatry of Old Age (New Zealand). Wellington, New Zealand: Best Practice Advocacy Centre; 2008.
- Kalapatapu RK, Neugroschl JA. Update on neuropsychiatric symptoms of dementia: evaluation and management. *Geriatrics*. 2009;64:20–6.
- Best Practice Advocacy Centre. Prescribing atypical antipsychotics in general practice. *Best Practice Journal*. 2011;40:14–23.
- Jeste DV, Blazer D, Casey D, et al. ACNP White Paper: update on use of antipsychotic drugs in elderly persons with dementia. *Neuropsychopharmacology*. 2008;33:957–70. doi:10.1038/sj.npp.1301492
- MEDSAFE (New Zealand Medicines and Medical Devices Safety Authority). Datasheet risperidone tablets: Risperidone 0.5 mg, 1 mg, 2 mg, 3 mg, 4 mg, 6 mg. Wellington: Medsafe; 2015.
- Hilmer SN, McLachlan AJ, Le Couteur DG. Clinical pharmacology in the geriatric patient. *Fundam Clin Pharmacol*. 2007;21:217–30. doi:10.1111/j.1472-8206.2007.00473.x
- Muench J, Hamer AM. Adverse effects of antipsychotic medications. *Am Fam Physician*. 2010;81:617–22.
- Schneider LS, Dagerman KS, Insel P. Risk of death with atypical antipsychotic drug treatment for dementia: meta-analysis of randomized placebo-controlled trials. *JAMA*. 2005;294:1934–43. doi:10.1001/jama.294.15.1934
- 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. doi:10.1002/gps.2359
- Tordoff JM, Ailabouni NJ, Browne DP, et al. Improvements in the prescribing of antipsychotics in dementia and psychogeriatric units in New Zealand. *Int J Clin Pharm*. 2016;38:941–9. doi:10.1007/s11096-016-0318-1
- Ndukwe HC, Tordoff JM, Wang T, Nishtala PS. Psychotropic medicine utilization in older people in New Zealand from 2005 to 2013. *Drugs Aging*. 2014;31:755–68. doi:10.1007/s40266-014-0205-1
- Ndukwe HC, Wang T, Tordoff JM, et al. Geographic variation in psychotropic drug utilisation among older people in New Zealand. *Aust J Ageing*. 2016. doi:10.1111/ajag.12298
- Dellefield ME, Castle NG, McGilton KS, Spilsbury K. The relationship between registered nurses and nursing home quality: an integrative review (2008–2014). *Nurs Econ*. 2015;33:95–116.
- Broad JB, Boyd M, Kerse N, et al. Residential aged care in Auckland, New Zealand 1988–2008: do real trends over time match predictions? *Age Ageing*. 2011;40:487–94. doi:10.1093/ageing/afr056
- Standards New Zealand (SNZ). Recovery. In: *Health and Disability Services (Core) Standards*. Wellington: Ministry of Health; 2008. p. 5–19.
- Standards New Zealand (SNZ). Health and Disability Services (Restraint Minimisation and Safe Practice) Standards. In: *Restraint minimisation and safe practice*. Wellington: Ministry of Health; 2008. p. 5–8.
- Ministry of Health. *interRAI. HealthCERT Bulletin*. Wellington: New Zealand Ministry of Health; 2015.
- New Zealand Legislation. Medicines regulations. Wellington: New Zealand Parliamentary Counsel Office; 1984.
- Standards New Zealand (SNZ). Health and disability services pharmacy services standard. In: *Quality management*. Wellington: Ministry of Health; 2010. p. 53–5.
- Department of Health. Quality Use of Medicines (QUM). Canberra: Australian Government, Department of Health. Updated 15 September 2011. [cited 2015 November 5] Available from: www.health.gov.au/internet/main/publishing.nsf/Content/hmp-quality.htm-copy2
- Best Practice Advocacy Centre. Antipsychotics in dementia: Best Practice Guide. *Best Practice Journal*

- 2008; 2014: 2–8. [cited 2015 May 2] Available from: www.bpac.org.nz/a4d/resources/docs/bpac_A4D_best_practice_guide.pdf
23. Barback J. Advancing interRAI. In: Aged care & retirement - INsite. Wellington: NZME Educational Media NZ Ltd; 2013. p. 1–5.
 24. Dovey S, Loh LW, Cunningham WK. Leveraging information from New Zealand statistical data: a first step to wisdom in transforming unmet need for general practice services. *N Z Med J*. 2011;124:15–7.
 25. ElderNet. New Zealand Directory of Residential Care. [cited 2015 February 2] Available from: www.eldernet.co.nz/Home
 26. Ministry of Health. Rest home certification and audits. [cited 2016 February 11]. Available from: www.health.govt.nz/your-health/services-and-support/health-care-services/services-older-people/rest-home-certification-and-audits
 27. Fowler FJ. Survey research methods, 4th edn. Thousand Oaks: Sage Publications; 2009.
 28. Marshall B, Clark J, Sheward K, Allan S. Staff perceptions of end-of-life care in aged residential care: a New Zealand perspective. *J Palliat Med*. 2011;14:688–95. doi:10.1089/jpm.2010.0471
 29. IBM Corp. IBM SPSS Statistics for Windows. Armonk, NY, USA: IBM Corp.; 2013.
 30. Brodaty H, Draper B, Low L-F. Nursing home staff attitudes towards residents with dementia: strain and satisfaction with work. *J Adv Nurs*. 2003;44:583–90. doi:10.1046/j.0309-2402.2003.02848.x
 31. Ministry of Health. New Zealand framework for dementia care. In: Principles of the framework. Wellington: Ministry of Health; 2013. p. 7–11.
 32. Ministry of Health. Standing order guidelines, 2nd edn. Wellington, New Zealand: Ministry of Health. updated 01 August 2016. [cited 2016 September 2]. Available from: www.health.govt.nz/system/files/documents/publications/standing-order-guidelines-aug16_0.pdf
 33. Backhouse T, Killest A, Penhale B, et al. Behavioural and psychological symptoms of dementia and their management in care homes within the East of England: a postal survey. *Aging Ment Health*. 2014;18:187–93. doi:10.1080/13607863.2013.819834
 34. Glue P, Gale C. Off-label use of quetiapine in New Zealand—a cause for concern? *N Z Med J*. 2011;124(1335):10–3.
 35. Monasterio E, McKean A. Off-label use of atypical anti-psychotic medications in Canterbury, New Zealand. *N Z Med J*. 2011;124:24–9.
 36. Kamble P, Sherer J, Chen H, Aparasu R. Off-label use of second-generation antipsychotic agents among elderly nursing home residents. *Psychiatr Serv*. 2010;61:130–6. doi:10.1176/ps.2010.61.2.130
 37. Verhey FRJ, Verkaaik M, Lousberg R. Olanzapine versus haloperidol in the treatment of agitation in elderly patients with dementia: results of a randomized controlled double-blind trial. *Dement Geriatr Cogn Disord*. 2006;21:1–8. doi:10.1159/000089136
 38. Hope T, Pitt B. Management of dementia. In: Seminars in old age psychiatry. London: The Royal College of Psychiatrists; 1998. p. 87–101.
 39. Nishtala PS, Hillmer SN, McLachlan AJ, et al. Impact of residential medication management reviews on drug burden index in aged-care homes: a retrospective analysis. *Drugs Aging*. 2009;26:677–86. doi:10.2165/11316440-000000000-00000
 40. Clark J, Marshall B, Sheward K, Allan S. Staff perceptions of the impact of the Liverpool Care Pathway in aged residential care in New Zealand. *Int J Palliat Nurs*. 2012;18:171–8. doi:10.12968/ijpn.2012.18.4.171
 41. Ruths S, Straand J, Nygaard HA. Multidisciplinary medication review in nursing home residents: what are the most significant drug-related problems? The Bergen District Nursing Home (BEDNURS) study. *Qual Saf Health Care*. 2003;12:176–80. doi:10.1136/qhc.12.3.176

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AUTHOR CONTRIBUTIONS

Henry C. Ndukwe developed the study concept, designed the survey, collated, analysed and interpreted the data, and wrote the manuscript. June Tordoff, Prasad Nishtala and Ting Wang developed the study concept, contributed to the survey design, data analysis and interpretation, and revised the manuscript.

DISCLOSURES

The academic institution had no role in the study design, data collection, data analysis or interpretation.

COMPETING INTERESTS

All the authors of this study have no potential conflicts to declare.