

# Prescribing and Administration of Opioid Analgesics in Residents of Aged Care Facilities

Areej Numan Hussein<sup>1</sup>, Lynne Emmerton<sup>1</sup>

<sup>1</sup>School of Pharmacy and Biomedical Sciences, Curtin University, Perth, Australia

ABSTRACT

**Objective:** Optimal pain management in residents requires an understanding of prescribing and administration of opioid analgesics. This study aimed to describe opioid administration for elderly residents in a selection of aged care facilities. **Methods:** A cross-sectional audit of analgesics administration was conducted for all 458 residents of three-aged care facilities on May 1, 2017. The facilities (each ~160 beds) represented a geographically diverse area in Perth, Australia, and varying service levels by nurse practitioners. Data were accessed using the iCare<sup>®</sup> platform and transcribed into a customized database. Data were reported descriptively, with relationships between categorical variables examined using the Chi-square analysis. Main outcome measures in the study were the prevalence of administration of opioids compared to that of nonopioid analgesics and no analgesics on the audit date, and characteristics of the opioid prescriptions (the type of prescriber and nursing/care staff involved in the dose administration). **Findings:** Of 458 residents, 95 (20.7%) received an opioid analgesic on the audit date; 231 had also received a nonopioid analgesic. The most common opioid (34 residents) was a brand of oxycodone hydrochloride and naloxone hydrochloride as 10/5 mg tablets. There was no significant tendency for opioid prescribing by classification of the prescriber, nor for any category of nursing/care staff to administer the particular types of analgesics. **Conclusion:** The tendency for prescribing of opioids showed no significant among the prescribers. Finally, the administration of opioids was predominantly by caregivers. This represents the first step in a program of activity to ensure the quality use of potent analgesics in an aged care provider network.

**KEYWORDS:** Administration, aged care facilities, opioid, pain, prescribing

Received: July 2018.  
Accepted: December 2018.

## INTRODUCTION

Pain is common in residents of aged care facilities, with 45%–80% of residents experiencing persistent pain.<sup>[1]</sup> Consistent with a higher prevalence rate of chronic medical comorbidities in later adulthood, the prevalence of pain in this population has also increased due to inadequate control or management of pain.<sup>[2]</sup> Managing pain in the elderly can be challenging, as the physical and physiological consequences of aging can increase the possibility of drug interactions and the risk of adverse effects.<sup>[3]</sup>

The prescribing of analgesic medications paracetamol, nonsteroidal anti-inflammatory drugs (NSAIDs), or

opioids for the treatment of pain in older patients should consider the patient's response and tolerability of the medication.<sup>[4,5]</sup> Clinical guidelines recommend the use of opioid analgesics for the management of neuropathic and nociceptive pain if other nonopioids fail to provide adequate analgesia, or if anticipated improvements in function outweigh the potential adverse events of opioids.<sup>[6-9]</sup>

### Address for correspondence:

Mrs. Areej Numan Hussein, E-mail: a.hussein1@postgrad.curtin.edu.au

This is an open access journal, and articles are distributed under the terms of the Creative Commons Attribution-NonCommercial-ShareAlike 4.0 License, which allows others to remix, tweak, and build upon the work non-commercially, as long as appropriate credit is given and the new creations are licensed under the identical terms.

For reprints contact: reprints@medknow.com

**How to cite this article:** Hussein AN, Emmerton L. Prescribing and administration of opioid analgesics in residents of aged care facilities. J Res Pharm Pract 2019;8:1-6.

Access this article online	
Quick Response Code: 	Website: www.jrpp.net
	DOI: 10.4103/jrpp.JRPP_18_56

There is a wealth of literature comparing the efficacy and side effect profiles of opioid medicines. The approach to prescribing opioid analgesics is to commence at a low dose, usually of a short-acting opioid, and titrate gradually to control pain while monitoring tolerability.<sup>[10]</sup> Weak opioids (e.g., codeine and tramadol) are first-line pain management that can be administered regularly.<sup>[8]</sup> Codeine can be used in the elderly, but there must be recognition of its variable efficacy<sup>[8]</sup> and high incidence of constipation.<sup>[11]</sup> Tramadol is poorly tolerated in the elderly and interacts with many drugs commonly used in older patients.<sup>[11]</sup> Severe noncancer pain may be managed with oxycodone and/or morphine, ideally at lower doses and with controlled-release formulations.<sup>[12]</sup> In general, opioids are not recommended for longer than 6–8 weeks of use.<sup>[2,7]</sup> Some studies have suggested that transdermal fentanyl and tapentadol are associated with less constipation than oral oxycodone and tramadol.<sup>[13]</sup> Overall, there is little evidence to currently recommend the preferential use of opioids in vulnerable elderly or other elderly patients.<sup>[14]</sup>

Although Australia's consumption of opioid analgesics is ranked 10<sup>th</sup> internationally, there is evidence of underutilization of opioids in aged care facilities.<sup>[15]</sup> As a result, undertreated pain is a significant burden in aged care residents, particularly those with cognitive impairment.<sup>[15,16]</sup>

The prescribing and administration of opioids in aged care residents can be affected by inadequate training or fear of adverse effects<sup>[17]</sup> and the ratio of staff to patients.<sup>[18]</sup> Doctors and nursing staff can also share a reluctance to use opioids in older adults.<sup>[17,18]</sup>

With limited options for opioid analgesics in the elderly, this study aimed to describe the prescribing and administration of opioid analgesics for the treatment of any pain in residents of aged care facilities. The objectives of this study were as follows:

1. Describe the prevalence and characteristics of opioid administration for elderly residents in a selection of aged care facilities in Western Australia
2. Compare prescribing of opioid analgesics between nurse practitioners (NPs) in collaboration with general practitioners (GPs) versus GPs alone
3. Compare the administration of opioid analgesics between categories of nursing/care staff.

## METHODS

The study protocol was reviewed and approved by The Bethanie Group Inc., and ethical approval was granted by the Human Research Ethics Committee (ethics approval number, HRE2017-0186). As there was no personal contact with aged care residents because the study was a quality assurance activity, consent from residents was not required.

This study was a cross-sectional audit using residents' records from The Bethanie Group Inc., one of Western

Australia's prominent aged care and retirement village providers that manage 12 facilities in Perth and regional areas. The data were sourced from three-aged care facilities (referred to here as B1, B2, and B3), each ~160 beds, geographically diverse, and selected to represent no (B1), medium (B2), and high (B3) levels of service by NPs. This selection was identified by The Bethanie Group Inc., management, as service levels were unable to be quantified.

Date of May 1, 2017, was identified with advice from The Bethanie Group Inc., management as a point-in-time reference at which data were collected from the electronic records of all residents of the three facilities of interest. The date was chosen to reflect practice as current as possible, with regular staffing and medical services. Administration of analgesic medications on the audit date was identifiable by access to real-time medication records in the iCare<sup>®</sup> platform. iCare<sup>®</sup> is a secure portal that comprises all resident details, medical history, observations, care plans, and medication administration, and is used for various quality assurance activities. Access was granted to relevant sections of the platform for this research, enabling validation of medication administration with the original medication order. Data were transcribed into a customized Excel<sup>®</sup> spreadsheet for screening and analysis.<sup>[19]</sup>

The denominator for analysis was each resident. No exclusion criteria were applied. Data documented was the administration of any analgesic (opioid, NSAID, or paracetamol; aspirin was not included due to its predominant use as an antiplatelet agent<sup>[19]</sup> on the audit date, and for opioids, the name(s), dose(s), prescriber(s), and nursing/care staff who administered the dose(s). This audit focused on 'new' administration of opioids. For oral therapy, the administration was the swallowing of a dose. Transdermal opioid patches that were replaced or affixed on the audit date were included, instead of an estimate of the proportion of the sustained-release dose received at the time of the audit.

Statistical analysis was performed using the SPSS<sup>®</sup> V23 (IBM) for Windows. Descriptive statistics were used to summarize the study participants (frequencies and percentages for categorical variables, means, and standard deviations for variables measured on a continuous scale).

Figure 1 illustrates the populations of interest. The prevalence of prescribing of opioids was determined as follows:  $(B + C)/(A + B + C + D)$ . For those residents who were receiving an opioid (B + C), descriptive statistics were used to summarize the drug name, dose, route, and the frequency of administration. Comparisons were made between GPs and GPs/NPs, and where relevant, between ENs and RNs. Bivariate analysis (Chi-square test) was used to explore the relationships with relevant combinations of nominal and binary variables.

## RESULTS

Data were collected for 458 residents. The majority of residents ( $n = 293$ , 64.0%) were women, and the average age of the residents was 84 ( $\pm 8.5$ ) years. Of the sample ( $n = 458$ ), 326 [71.2%; B + C + D in Figure 1] had been administered an analgesic 95 of whom [B + C in Figure 1] received an opioid (20.7% of the total sample). Of those residents receiving an opioid, 76 [C in Figure 1] also received a nonopioid analgesic on the audit date. A nonopioid analgesic alone [D in Figure 1] had been administered to 231 residents (50.4%).

Table 1 shows the most common opioids prescribed. Of 119 brands of opioid medicines prescribed to 95 people, the most commonly prescribed was Targin® (oxycodone hydrochloride and naloxone hydrochloride; Mundipharma, Sydney, NSW,

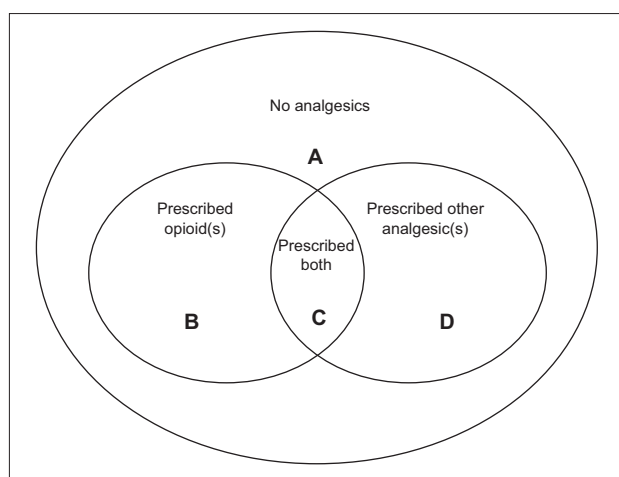


Figure 1: Populations of interest (A = 132; B = 19; C = 76; D = 231)

Australia)<sup>[20]</sup> (34 cases), followed by various brands of oxycodone hydrochloride (totaling 25 cases) and Norspan® (buprenorphine; Mundipharma, Sydney, NSW, Australia)<sup>[20]</sup> patches (17 cases). The most common dose of Targin® was 10/5 mg twice daily (14 cases). The 34 Targin® cases also constituted 41% of the 83-oral opioid (tablet) preparations prescribed [Table 2].

The most frequently prescribed nonopioid analgesic was paracetamol, administered to 300 of 326 (65.5%) residents who received an analgesic on the study date. Seventy-six (80%) of those taking opioids (regular or as required) also received regular paracetamol. Other NSAIDs were also given in different dosage forms 35/326 (10.7%). Oral preparations of NSAIDs were given in 13/35, whereas topical forms were applied for 22/35 of residents.

When a resident had been administered an opioid on the audit date, the prescription had been written by a GP alone in 55% of cases (53/95), and an NP in collaboration with a GP in the remaining cases. There was no significant tendency for prescribing of an opioid by GP/NP prescribers compared to GPs alone ( $P = 0.866$ ). When this was analyzed by each facility, it was confirmed that facility B1 had a significant NP involvement in analgesics prescribing, while B2 had no NP involvement, and B3 had moderate involvement. Accordingly, the incidence of opioid prescribing between the three facilities (B1, B2, and B3) was a statistically significant ( $P = 0.048$ ).

The “as needed” administration of opioid analgesics was uncommon, with only nine cases; this was insufficient to compare “as needed” dose administration patterns between the categories of nursing/care staff

Table 1: Types of opioids administered for aged care residents ( $n=95$ )

Generic name	Australian Brand name	Manufacturer's name (city, state, country)	Frequency	Percent
Oxycodone hydrochlorid/naloxone hydrochloride	Targin®*	Mundipharma (Sydney, NSW, Australia) <sup>[20]</sup>	34	29
Oxycodone hydrochloride	OxyContin®*	Mundipharma (Sydney, NSW, Australia) <sup>[20]</sup>	4	21
	OxyNorm®	Mundipharma (Sydney, NSW, Australia) <sup>[20]</sup>	3	
	Endone®*	Aspen (St Leonards, NSW, Australia) <sup>[20]</sup>	18	
Buprenorphine	Norspan®	Mundipharma (Sydney, NSW, Australia) <sup>[20]</sup>	17	15
Tapentadol	Palexia®	Seqirus (Parkville, VIC, Australia) <sup>[20]</sup>	13	11
Tramadol	Zydol®	Arrow Pharma (Cremorne, VIC, Australia) <sup>[20]</sup>	7	11
	Zydol®*	Arrow Pharma (Cremorne, VIC, Australia) <sup>[20]</sup>	6	
Morphine hydrochloride	Ordine®	Mundipharma (Sydney, NSW, Australia) <sup>[20]</sup>	5	4.0
Paracetamol; codeine phosphate	CM strong pain relief®	Chemmart (Melbourne, VIC, Australia) <sup>[20]</sup>	1	3
	Panadeine®	GlaxoSmithKline (Ermington, NSW, Australia) <sup>[20]</sup>	3	
Hydromorphone hydrochloride	Dilaudid®	Mundipharma (Sydney, NSW, Australia) <sup>[20]</sup>	3	3
	Jurnista®*	Janssen-Cilag (Macquarie Park, NSW, Australia) <sup>[20]</sup>	1	
Fentanyl	Durogesic®	Janssen-Cilag (Macquarie Park, NSW, Australia) <sup>[20]</sup>	4	3
	Total		119	100

\*Sustained-release formulations

(Objective 3). “Caregivers” (non-nursing support staff) were the staff most commonly involved in opioid administration, representing 39.0% of all 213 [Table 3]. There was no significant tendency for opioid or nonopioid medications to be administered by a particular category of nursing/care staff ( $P = 0.029$ ).

## DISCUSSION

This study demonstrates a substantial prevalence of use of analgesics of 71% among the 458 residents of the three study facilities on the audit date. A higher trend was documented in a recent study in Australian aged care facilities, where 76.0% of residents ( $n = 383$ ) were administered an analgesic in the previous 24 h.<sup>[21]</sup> The prevalence of analgesic use was also higher where retrospective analysis of 7309 medicine reviews conducted on Australian ACF residents was undertaken, and an analgesic had been prescribed for nearly 91% of residents.<sup>[9]</sup> No data were reported from that study on the involvement of NPs in prescribing.

The prevalence of opioid prescribing was low in comparison with other co-prescribed analgesics, consistent with previous studies.<sup>[9,15,22]</sup> Despite widespread clinical guidelines about pain management in older people, factors such as inadequate training and concerns about tolerability, adverse effects, and dependence may complicate the pharmacological treatment of pain.<sup>[17,18]</sup>

The oral combination of oxycodone hydrochloride and naloxone hydrochloride (Targin<sup>®</sup>) was the most commonly prescribed. In contrast, the 2014 study in Australian aged care facilities reported that oxycodone alone (immediate-release oxycodone) was the most commonly prescribed.<sup>[9]</sup> The difference may be related to the advancement of practice over time, as prescribing naloxone with oxycodone may help reduce constipation

with opioids and not impair analgesic efficacy in the majority of patients.<sup>[23]</sup>

Regular, rather than as-needed, dosing of opioids was documented in the majority of residents who received an opioid which is consistent with previous research.<sup>[9]</sup> The present study recognizes that prescribing preferences may be geographic, habitual, influenced by educational interventions, and may change over time. This study was not designed to explore such differences and trends.

Doses were only documented to determine the most common patterns, and for brevity, were only reported here for the most commonly prescribed opioid, Targin<sup>®</sup>. According to the Australian Medicines Handbook, the maximum dose of Targin<sup>®</sup> could reach 40/20 mg every 12 h (i.e., oxycodone 80 mg/naloxone 40 mg daily), depending on tolerability and response.<sup>[19]</sup> Despite recommendations for conservative doses in the elderly,<sup>[19,24]</sup> the effective dose needs to be individually titrated according to the response and sedation score.<sup>[12,19]</sup> It was not an intention of this study to determine the appropriateness of medicine choice and dose for individual residents; this assessment can be performed by pharmacists providing clinical review services to aged care facilities.

Paracetamol is the first and safest option for pain management in the elderly, as recommended by Australian guidelines.<sup>[12,24]</sup> The present findings that paracetamol was the most commonly prescribed ‘around-the-clock’ analgesic in residents taking an opioid were higher than in other Australian reports.<sup>[3,9]</sup> NSAIDs were also given in a proportion of cases (35/326 and 10.7%), and this finding was consistent with a previous Australian study.<sup>[3]</sup> The limited use of NSAIDs with opioids in the older population could be due to the high risk of adverse events associated with this combination, and thus is in line with clinical guidelines.<sup>[25]</sup>

This study found that opioids were more commonly prescribed by a GP than an NP in collaboration with a GP. However, this was confounded by the extent of engagement of NPs in the three facilities. In the facility with a high service level by NPs, most of the opioid prescriptions had been written by an NP/GP partnership. According to the Australian Nursing and Midwifery Council, all Australian NPs have the legal right to prescribe Schedule 2, 3, 4, and eight medicines.<sup>[26]</sup> The collaborative link between GPs and NPs has been found to reduce GP workloads with daily complex clinical issues.<sup>[27]</sup>

Most of the opioid doses were prescribed on a regular basis, compared with as-needed administration. This was also demonstrated in a study where all residents were taking regular opioids.<sup>[9]</sup> As stated earlier, this study did not assess the appropriateness of medicine or dosage choices, although the dominance of regular dosing is by prescribing guidelines for chronic pain management.<sup>[5]</sup>

**Table 2: Dosage forms of opioids administered on the audit date (95 residents)**

Dosage form	Frequency (%)
Capsule	8 (7)
Patch	21 (18)
Syrup	7 (6)
Tablet	83 (69)
Total	119 (100)

**Table 3: Nursing/care staff involved in opioid and other analgesic administration (95 residents)**

Nurse type	Other analgesic, n (%)	Opioid, n (%)	Total
Caregiver	164 (36.4)	83 (39.0)	247
Enrolled nurse	172 (38.1)	66 (31.0)	238
Registered nurse	67 (14.9)	37 (17.4)	104
Other	48 (10.6)	27 (12.7)	75
Total	451 (100.0)	213 (100.0)	664

An interesting finding relating to the administration of opioids was that the total number of registered (degree-qualified) and enrolled nurses involved in the administration of opioids was 103, whereas the caregivers alone accounted for 83 of the total nursing/caregiver staff involved in opioid administration. A large number of staff involved in this sample of 326 residents who received an analgesic on the study date, while required to provide timely and quality care for residents, can increase the risk of error. The iCare® platform, therefore, becomes a critical source of documentation and communication between staff to ensure the optimal care.

Although these unregistered workers have a minimal education regarding pain assessment and management, the involvement of personal caregivers in analgesic dose administration and documentation of the doses was more common than for nursing staff. Qualifications required of caregivers in Australia are a Certificate III or IV in Aged Care. Other authors have proposed that effective pain management could be hindered by reliance on personal caregivers beyond their scope of practice and that medication-related tasks are increasingly delegated to these workers.<sup>[28]</sup> This is presumed to be for economical use of more highly qualified staff. A recent snapshot of residential aged care determined that the number of nursing staff reduced by 13% between 2003 and 2016, with more resident contact provided by caregivers and less by nurses.<sup>[29]</sup> However, a study confirmed that nursing assistants (caregivers) played a pivotal role in pain management in aged care facilities.<sup>[28]</sup> Future audits could assess the accuracy of dose administration by caregivers compared to nurses, with a focus on high-risk medicines and compliance with medicines-management procedures.

There are several limitations associated with this study. The study drew on data entered into the iCare® platform by aged care staff, rather than collected directly from primary sources by the researcher. Dose administration records were verified against the original medication order wherever possible; a small proportion of missing data for some patients and administrator classification was noted. Second, the clinical indications for the analgesics were not apparent from the dose administration data, so no assumptions about the appropriateness of dosing were feasible. Third, while this was an audit of all residents of the three facilities, these residents may not be representative of the elderly population of Australia. Compared with national data for residential aged care (59% of residents aged 85 and over and women comprising 64%),<sup>[30]</sup> our study sample was very close (69% aged 80 and over and women comprising 68%). Maximizing the sample size to include all facilities within this group could reduce this limitation. Fourth, comparison with other studies of opioid prescribing requires consideration of government subsidy

and prescribing guidelines for particular medicines at the time of each study.

This study highlights several key findings of the prevalence of opioid administration and staff involved and presents an audit method that may be replicated and extended to include all residents of a group of aged care facilities. The findings can be used to guide prescribing and administration of opioid and other analgesics. While the study did not aim to identify individual prescribers or nurses, it provided information on the classification of staff involved in general patterns in prescribing and dose administration. Thus, this study provided evidence on the current use of opioid analgesics, and the outcomes can be used to improve the use of these analgesics for the management of chronic pain in aged care facilities.

Future professional initiatives may focus on training and education for aged care staff, particularly personal care workers, in the area of analgesics administration, documentation practices relating to the administration of analgesics, and an expanded role for pharmacists in improving medication administration practices within aged care facilities. Future research is recommended to focus on the longer-term use of opioid analgesics in aged care residents, and the role and knowledge of nursing staff and caregivers regarding administering of opioids in this population.

This study investigated the patterns in the prescribing and administering of opioid analgesics for the pain management in residents of a selection of aged care facilities. The prevalence of opioid prescribing was low compared with other prescribed analgesics, consistent with previous studies. The oral combination of oxycodone hydrochloride and naloxone hydrochloride (Targin®) was the most prescribed among these residents of aged care facilities. Surprisingly, the tendency for prescribing of opioids showed no significant among the prescribers (NPs in collaboration with general). Finally, the administration of opioids was predominantly by caregivers. This represents the first step in a program of activity to ensure the quality use of potent analgesics in an aged care provider network.

## AUTHORS' CONTRIBUTION

Areej Numan Hussein Design, literature search, data acquisition, data analysis, statistical analysis, manuscript preparation, final approval of the article. Lynne Emmerton (Guarantor) concept, design, the definition of the intellectual concept, data analysis, statistical analysis, manuscript editing, and review.

## Acknowledgments

The authors acknowledge Jillian Pieper and SinaMesiti, former Research and Report Coordinators of The Bethanie Group Inc., for facilitation of this research.

Special thanks also go to Mustafa Atee for his assistance in preparing the manuscript.

### Financial support and sponsorship

Nil.

### Conflicts of interest

There are no conflicts of interest.

## REFERENCES

- Hanlon JT, Perera S, Sevic MA, Rodriguez KL, Jaffe EJ. Pain and its treatment in older nursing home hospice/palliative care residents. *J Am Med Dir Assoc* 2010;11:579-83.
- Hall T. Management of persistent pain in older people. *J Pharm Pract Res* 2016;46:60-7.
- Veal FC, Bereznicki LR, Thompson AJ, Peterson GM. Use of opioid analgesics in older Australians. *Pain Med* 2015;16:1519-27.
- Abdulla A, Adams N, Bone M, Elliott AM, Gaffin J, Jones D, *et al.* Guidance on the management of pain in older people. *Age Ageing* 2013;42 Suppl 1:i1-57.
- The State of Queensland (Queensland Health). Quick Clinical Guideline for the Use of Opioids Inchroninc Non-Malignant Pain. Queensland (Australia): State Government of Queensland; 2012. Available from: <https://www.health.qld.gov.au>. [Last updated on 2012 May 28; Last accessed on 2017 Jun 06].
- Manchikanti L, Abdi S, Atluri S, Balog CC, Benyamin RM, Boswell MV, *et al.* American society of interventional pain physicians (ASIPP) guidelines for responsible opioid prescribing in chronic non-cancer pain: Part I – Evidence assessment. *Pain Physician* 2012;15:S1-65.
- Nissen LM, Tett SE, Cramond T, Williams B, Smith MT. Opioid analgesic prescribing and use – An audit of analgesic prescribing by general practitioners and the multidisciplinary pain center at Royal Brisbane Hospital. *Br J Clin Pharmacol* 2001;52:693-8.
- Savvas S, Gibson S. Pain management in residential aged care facilities. *Aust Fam Physician* 2015;44:198-203.
- Veal FC, Bereznicki LR, Thompson AJ, Peterson GM. Pharmacological management of pain in Australian aged care facilities. *Age Ageing* 2014;43:851-6.
- Gibson SJ. IASP global year against pain in older persons: Highlighting the current status and future perspectives in geriatric pain. *Expert Rev Neurother* 2007;7:627-35.
- Peterson G. Pain in the elderly. *Aust Pharm* 2010;29:28.
- The Australian Pain Society. Pain in Residential Aged Care Facilities Management Strategies. Sydney (Australia): The Australian Pain Society; 2005. Available from: [https://www.apsoc.org.au/PDF/Publications/Pain\\_in\\_Residential\\_Aged\\_Care\\_Facilities\\_Management\\_Strategies.pdf](https://www.apsoc.org.au/PDF/Publications/Pain_in_Residential_Aged_Care_Facilities_Management_Strategies.pdf). [Last accessed on 2017 Jun 06].
- Ackerman SJ, Knight T, Schein J, Carter C, Staats P. Risk of constipation in patients prescribed fentanyl transdermal system or oxycodone hydrochloride controlled-release in a California Medicaid population. *Consult Pharm* 2004;19:118-32.
- Atkinson TJ, Fudin J, Pandula A, Mirza M. Medication pain management in the elderly: Unique and underutilized analgesic treatment options. *Clin Ther* 2013;35:1669-89.
- Auret K, Schug SA. Underutilisation of opioids in elderly patients with chronic pain: Approaches to correcting the problem. *Drugs Aging* 2005;22:641-54.
- de Souto Barreto P, Lapeyre-Mestre M, Vellas B, Rolland Y. Potential underuse of analgesics for recognized pain in nursing home residents with dementia: A cross-sectional study. *Pain* 2013;154:2427-31.
- Jamison RN, Scanlan E, Matthews ML, Jurcik DC, Ross EL. Attitudes of primary care practitioners in managing chronic pain patients prescribed opioids for pain: A Prospective longitudinal controlled trial. *Pain Med* 2016;17:99-113.
- Kaasalainen S, Coker E, Dolovich L, Papaioannou A, Hadjistavropoulos T, Emili A, *et al.* Pain management decision making among long-term care physicians and nurses. *West J Nurs Res* 2007;29:561-80.
- Buckley N. Australian Medicines Handbook. Adelaide: Australian Medicines Handbook Pty Ltd.; 2016.
- MIMS Online. Australia; MIMS Australia; 2016. Available from: <https://www.mimsonline-com-au.dbgw.lis.curtin.edu.au>. [Last updated on 2016 Nov; Last accessed on 2019 Jan 30].
- Tan EC, Visvanathan R, Hilmer SN, Vitry A, Emery T, Robson L, *et al.* Analgesic use and pain in residents with and without dementia in aged care facilities: A cross-sectional study. *Australas J Ageing* 2016;35:180-7.
- Won AB, Lapane KL, Vallow S, Schein J, Morris JN, Lipsitz LA, *et al.* Persistent nonmalignant pain and analgesic prescribing patterns in elderly nursing home residents. *J Am Geriatr Soc* 2004;52:867-74.
- DePriest AZ, Miller K. Oxycodone/naloxone: Role in chronic pain management, opioid-induced constipation, and abuse deterrence. *Pain Ther* 2014;3:1-5.
- Analgesics for Chronic Nonmalignant Pain Management. Melbourne (Australia): Therapeutic Guidelines Limited; 2011. Available from: <https://www.tgldcdp-tg-org-au.dbgw.lis.curtin.edu.au>. [Last accessed on 2017 Jun 06].
- Abdulla A, Bone M, Adams N, Elliott AM, Jones D, Knaggs R, *et al.* Evidence-based clinical practice guidelines on management of pain in older people. *Br Geriatrics Soc* 2013;42:151-153.
- Nursing and Midwifery Board of Australia. Nurse Practitioner Standards for Practice. Melbourne (Australia): Nursing and Midwifery Board of Australia; 2006. Available from: <https://www.nursingmidwiferyboard.gov.au/Codes-Guidelines-Statements/Professional-standards/nurse-practitioner-standards-of-practice.aspx>. [Last updated on 2018 Mar; Last accessed on 2019 Jan 30].
- Van Der Biezen M, Adang E, Van Der Burgt R, Wensing M, Laurant M. The impact of substituting general practitioners with nurse practitioners on resource use, production and health-care costs during out-of-hours: A quasi-experimental study. *BMC Fam Pract* 2016;17:132.
- Holloway K. Understanding Personal Carers' Experiences of Caring for Older People in Pain. Perth, Australia: Edith Cowan University; 2007.
- Australian Nursing & Midwifery Federation. Snapshot of Residential Aged Care: Fact Sheet. Canberra (Australia): Australian Nursing & Midwifery Federation; 2017. Available from: [http://www.anmf.org.au/documents/reports/Fact\\_Sheet\\_Snap\\_Shot\\_Aged\\_Care.pdf](http://www.anmf.org.au/documents/reports/Fact_Sheet_Snap_Shot_Aged_Care.pdf). [Last accessed on 2017 Jun 01].
- Australian Institute of Health and Welfare. Characteristics of People in Aged Care. Canberra (Australia): Australian Institute of Health and Welfare; 2015. Available from: <https://www.aihw.gov.au/reports-statistics/health-welfare-services/aged-care/overview>. [Last accessed on 2017 Jun 06].