

Medication Administration Issues in Residential Aged Care – Four Cases

Elizabeth D. Hotham, Renae A. Lloyd, Emilio S. Petito and Vijayaprakash Suppiah*

School of Pharmacy and Medical Sciences and Sansom Institute for Health Research, University of South Australia, Australia

ARTICLE INFO

Article history:

Received: 14 July 2017
Accepted: 12 September 2017
Published: 18 September 2017

Keywords:

Four cases;
Residents;
PRN

Copyright: © 2017 Suppiah V et al.,
Gerontol Geriatr Res

This is an open access article distributed under the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.

Citation this article: Hotham ED, Lloyd RA, Petito ES, Suppiah V. Medication Administration Issues in Residential Aged Care – Four Cases. *Gerontol Geriatr Res*. 2017; 1(1):111.

ABSTRACT

Multiple morbidities with concomitant use of multiple medications are common in the elderly and the challenges of polypharmacy are recognized. An audit was undertaken over a 4 week period to identify any administration issues related to medications taken by residents at two aged care facilities. Polypharmacy was common amongst the 232 residents. The majority of residents were female (approximately 75%), with a mean age of 85, and taking nine regular medications (both prescription and over-the-counter). In those taking regular medications, three administration issues were identified for four residents: off-label drug use; exceeding maximum daily doses by supplementary medications PRN (“as required”); and modification of dosage form (two residents). Nursing staff were advised of concerns and given suggestions for alternative approaches regarding the lack of evidence of efficacy of topical antimicrobials for chronic venous leg ulcers, the combination of two different paracetamol formulations resulting in a daily dose 990 mg greater than recommended (4 grams), and the inappropriateness of crushing controlled release medications. To the credit of busy staff in a challenging care environment, the percentage of administration related issues identified was very low (less than 1%). Investigation of other potential medication-related issues such as drug doses, dosing frequency, indication for use, and drug interactions were outside the scope of this study. These findings serve as a reminder of the role for pharmacists in identifying medications for which rationality of use could be questioned. They also highlight the need for ongoing education of health practitioners on a range of medication issues.

Introduction

Multiple morbidities with the concomitant use of multiple medications are common in the elderly [1]. Also recognized is that the polypharmacy poses risks and challenges [2]. Although the term polypharmacy has numerous definitions and several tools have been devised to assess its risks [3,4], it is, of itself, not problematic if the prescribing is rational and the medications are administered carefully [2]. Various factor that complicate the use of multiple medications in any patient; in this cohort, risks can be amplified.

1. Both drug-drug interactions and drug-disease interactions [5] may occur when patients use multiple medications. This can result in a poor drug response

Correspondence:

Vijayaprakash Suppiah,
Senior Lecturer, School of
Pharmacy and Medical Sciences
and Sansom Institute for Health
Research, University of South
Australia, Australia,
Email: vijay.suppiah@unisa.edu.au

or increased risk of toxicity, and for either scenario, the worsening of an underlying medical condition.

2. Renal and hepatic functions generally decline with increasing age. This is important as renal and hepatic clearance can affect the plasma concentration of some drugs or their active metabolites; hence a dose adjustment may be required. Decline in these functions should also be considered when medications that are known to cause hepatic or renal toxicity are prescribed for this vulnerable group [6].

3. Dysphagia is more likely to be encountered with increasing age and can also be attributed to disorders, such as post-stroke, or to medications that induce hypo-salivation. Swallowing difficulties are often a prompt for carers to crush oral solid dosage forms for patients and this can be problematic if a modified release such as an enteric-coated tablet is involved [7].

4. Genetic factors can also influence a patient's response to a medication and there is a growing body of knowledge in this field of pharmacogenomics [8]. Genetic polymorphisms in specific drug receptor targets, metabolic enzymes or transporters may influence the way a patient reacts to certain medications. Patients with known polymorphisms are candidates for individualized dosing regimens to optimize their response to treatment or to avoid toxicity [9].

Aims of this study

The researchers aimed to undertake an audit of medication use by all residents in two aged care facilities and to identify any issues with the administration of medications.

Method

Ethics approval was granted to collect medication data on residents at two aged care facilities by both the University of South Australia's Human Ethics Committee (approval number 0000031911) and the institutional ethics committee of the aged care organization.

Two researchers, RAL and ESP, conducted an audit of residents' medication records over a period of 4 weeks in 2015. All of the medication records were paper-based and kept within secure areas in the facilities. The researchers were able to access these data with the

cooperation of the registered nurses at both facilities. All data were entered into Microsoft Excel® on a password-protected laptop.

Results

Polypharmacy was common amongst the 232 residents. The majority of residents were female (almost three-quarters) with a mean age of 85. On average, residents were taking nine regular medications (both prescription and over-the-counter). However, one resident had all medication ceased prior to the date of audit, another was only taking regular herbal and vitamin supplements and a third was only prescribed PRN medications. These data are shown in Table 1.

No. of female residents (%)	171 (73.7)
No. of male residents (%)	61 (26.3)
Total number of residents	232
Mean age of residents (years)	85 (55 - 104)
Mean number of regular medications prescribed per resident	9 (3-40)
Total number of regular medications administered daily	2195
Number of regular medications with administration issues	4
% regular medications with administration issues out of total number of regular medications administered daily	0.18
% of residents affected by a medication administration issue per day	1.7

In those taking regular medications, three administration issues were identified as of concern for four residents. These were related to the modification of dosage form (two residents), off-label drug use and exceeding maximum daily doses by supplementary PRN ("as required") medications. These issues are detailed below.

Resident 1, a 67 year old female, and **Resident 2**, a 92 year old male, both had administration notes on their respective drug charts indicating that all of their medications needed to be crushed. Resident 1 was prescribed Eflexor XR® 75 mg (venlafaxine) daily and Resident 2 was prescribed Palexia SR® (tapentadol) 50 mg at night.

Resident 3, an 85 year old female, was prescribed Panadol Osteo® at full dose (1330 mg of paracetamol three times a day) as part of her regular medication. At

the time the audit was carried out, she was also prescribed 1000 mg of paracetamol at night “as required” for treatment of pain.

Resident 4, an 89 year old female, was prescribed the regular daily topical administration of a crushed oral sulfamethoxazole (800mg)/ trimethoprim (160 mg) rubbed into her venous leg ulcer(s).

Discussion and Follow-Up Recommendations for Identified Patients

Given the occurrence of polypharmacy is common in the elderly; it is unsurprising that this situation occurred at the two aged care facilities at which these data were collected. Overall, considering the number of regular medications prescribed and administered at the facilities, the percentage of administration related issues identified was very low (less than 1%). This is to the credit of busy staff in an often challenging care environment.

Recommendations to address these administration issues identified were relayed to the registered nurse/s in the relevant facilities and were as follows.

Residents 1 and 2: It is well recognized that controlled release medication should not be crushed. Doing so could lead to rapid release of the medication, thereby altering its pharmacokinetics [10], and potentially leading to toxicity or prolonged periods of sub-therapeutic drug concentrations prior to the next dose [11].

Resident 1: Venlafaxine (Efexor XR®) 75mg capsule may be either opened and the coated pellets sprinkled on pureed food (for example, fruit or yoghurt) or dispersed in a small volume of water for administration [10]. This modification of dosage form would not affect the medication delivery because the pellets are not crushed [7]. Hence, advice was given that a suitable note be added to the resident’s medication chart to ensure that the medication is consistently administered appropriately.

Resident 2: Tapentadol (Palexia SR®)50mg should not be crushed and the prescriber should be advised on the use of an alternative medication from the same therapeutic drug class as a replacement, to remove the

risk of dose “dumping” and sub-therapeutic effects after administration [11]. Tramadol, available in an immediate release formulation, presents itself as a good alternative to the use of sustained release tapentadol for this resident. However, this adds to nursing administration times.

Resident 3: This combination of two different paracetamol formulations results in 990 mg greater than recommended daily dosing (maximum dose for paracetamol is 4 g every 24 hours). This is of particular concern considering the age of the resident, as hepatic function is usually compromised in the elderly. A greater propensity for acute liver damage leading to liver failure due to paracetamol overdose has been documented within this population [12].

Resident 3: For this patient and many others who take paracetamol regularly, extra care must be taken to avoid inadvertent over-use due to introduction of “as required” paracetamol.

Resident 4: No available data could be located to determine the systemic absorption, toxicity, effect on wound healing and efficacy of oral sulfamethoxazole/ trimethoprim administered topically. Furthermore, a Cochrane review has established that there is insufficient evidence for efficacy of topical antimicrobials for healing chronic venous leg ulcers [13] and reservations had also been expressed earlier [14]. Hence, with no evidence available, the off-label use of this treatment could not be supported [15].

Resident 4: Cadexomer iodine could be recommended as a topical preparation for chronic leg ulcer healing [13,14]. However, the healing rates with cadexomer iodine were no different to a paraffin gauze dressing or silver-impregnated dressing. Hence, one of these latter options was advised for this resident.

Limitations

Other medication related issues can potentially occur with such a significant cohort of patients with multimorbidity and polypharmacy. However, it was outside the scope of this study to investigate any of: drug doses, dosing frequency, indication for use, drug

interactions or other clinical factors that relate to the appropriateness of the medication/s for any resident.

As this medication audit data was collected over a 4 weeks period, it is possible that we might have missed other potential medication issues before and after the period of this audit.

Future Directions

In this study, administration issues were determined by pharmacy students working with pharmacy academics and the value of pharmacist oversight of medication use in health care is highlighted. In Western countries, patients with multiple morbidities including complex medication regimes are often resident in aged care facilities, suggesting that pharmacist involvement in this setting is essential. This study also confirms the extent of polypharmacy amongst aged care residents, and serves as a reminder of the role for pharmacists in identifying medications for which the rationality of use could be questioned.

Education of health practitioners on crushing medications has been validated to improve the proportion of medications given safely, with the Society of Hospital Pharmacists Australia publication 'Don't rush to crush' now incorporated into MIMS Online [10]. This education should be further pursued in the aged care setting, given the vulnerability of the patient cohort.

Issues raised in this study have broader ramifications. General education on evidence-based wound care is urgently needed, not least to protect the value of antibiotics amid fears of a "post-antibiotic era" [16]. Overuse of a medication due to co-administration of two dosage forms has been highlighted here with paracetamol. However, there is a broader societal issue with transition from hospital to home (or aged care facility), augmented by the large number of drug formulations, both generic and branded, on the market. Throughout the world in more affluent societies, the ageing of the population is well-documented [17,18]. Whether older citizens are cared for by family or in residential aged care as in this study, there is a need for their health professionals to be vigilant with medications for this growing cohort. As in healthcare more generally,

prescribing and administration of medications is a highly fraught area of practice [19].

References

1. Vrdoljak D, Borovac JA. (2015). Medication in the elderly - considerations and therapy prescription guidelines, *ActaMedicaAcademica*. 44: 159-168.
2. Wallis KA, Andrews A, Henderson M. (2017). Swimming Against the Tide: Primary Care Physicians' Views on Deprescribing in Everyday Practice, *Annals of Family Medicine*. 15: 341-346.
3. Price M, Davies I, Rusk R, Lesperance M, Weber J. (2017). Applying STOPP Guidelines in Primary Care Through Electronic Medical Record Decision Support: Randomized Control Trial Highlighting the Importance of Data Quality, *JMIR Med Inform*. 5: e15.
4. Ong GJ, Page A, Caughey G, Johns S, Reeve E, et al. (2017). Clinician agreement and influence of medication-related characteristics on assessment of polypharmacy, *Pharmacology Research and Perspectives*. 5: e00321.
5. Claire LP. (2016). *Stockley's Drug Interactions* ed. Pharmaceutical Press, 1840pp.
6. Mangoni AA and Jackson SHD. (2004). Age-related changes in pharmacokinetics and pharmacodynamics: basic principles and practical applications. *British Journal of Clinical Pharmacology*. 57: 6-14.
7. Gowan J. (2010). Crushing medications: dose delivery challenges for people with impaired swallowing. *Australian Journal of Pharmacy*. 91: 50-54.
8. Manson LEN, van der Wouden CH, Swen JJ, Guchelaar HJ. (2017). The Ubiquitous Pharmacogenomics consortium: making effective treatment optimization accessible to every European citizen, *Pharmacogenomics Editorial*. 18: 1041-1045.
9. Lee JW, Aminkeng F, Bhavsar AP, Shaw K, Carleton BC, et al. (2014). The emerging era of pharmacogenomics: Current successes, future potential, and challenges. *Clinical Genetics*. 86: 21-28.
10. MIMS Online. (2013). Integration of Don't Rush to Crush Content into MIMS Online4.

11. Downey CE, Thakerar A, Kirsa S. (2015). Don't rush to crush: audit of modification to oral medicines for patients with swallowing difficulties. *Journal of Pharmacy Practice and Research*. 45: 146-151.
12. Schmidt LE. (2005). Age and paracetamol self-poisoning, *Gut*. 54: 686–690.
13. O'Meara S, Al-Kurdi D, Ologun Y, Ovington LG, Martyn-St James M, et al. (2014). Antibiotics and antiseptics for venous leg ulcers, *Cochrane Database of Systematic Reviews*, Issue 1.
14. Lipsky BA, Hoey C. (2009). Topical Antimicrobial Therapy for Treating Chronic Wounds, *Clinical Infectious Diseases*. 49: 1541–1549.
15. Gazarian M, Kelly M, McPhee JR, Gaudins LV, Ward RI, et al. (2006). Off-label use of medicines: consensus recommendations for evaluating appropriateness. *Medical Journal of Australia*. 185: 544-548.
16. World Health Organization. (2014). WHO's first global report on antibiotic resistance reveals serious, worldwide threat to public health.
17. World Health Organization. (2014). Facts about ageing.
18. Andrews GR. (2001). Promoting health and function in an ageing population. *British Medical Journal*. 322: 728-729.
19. Wallis KA. (2015). Learning From No-Fault Treatment Injury Claims to Improve the Safety of Older Patients, *Annals of Family Medicine*. 13: 472-474.