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Review Article

Residential Aged Care Medication Review to Improve the Quality of Medication Use: A Systematic Review

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A B S T R A C T

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Background: Aging is often associated with various underlying comorbidities that warrant the use of multiple medications. Various interventions, including medication reviews, to optimize pharmacotherapy in older people residing in aged care facilities have been described and evaluated. Previous systematic reviews support the positive impact of various medication-related interventions but are not conclusive because of several factors.

Objectives: The current study aimed to assess the impact of medication reviews in aged care facilities, with additional focus on the types of medication reviews, using randomized controlled trials (RCTs) and observational studies.

Methods: A systematic searching of English articles that examined the medication reviews conducted in aged care facilities was performed using the following databases: PubMed, CINAHL, IPA, TRiP, and the Cochrane Library, with the last update in December 2015. Extraction of articles and quality assessment of included articles were performed independently by 2 authors. Data on interventions and outcomes were extracted from the included studies. The SIGN checklist for observational studies and the Cochrane Collaboration's tool for assessing risk of bias in RCTs were applied. Outcomes assessed were related to medications, reviews, and adverse events.

Results: Because of the heterogeneity of the measurements, it was deemed inappropriate to conduct a meta-analysis and thus a narrative approach was employed. Twenty-two studies (10 observational studies and 12 controlled trials) were included from 1141 evaluated references. Of the 12 trials, 8 studies reported findings of pharmacist-led medication reviews and 4 reported findings of multidisciplinary team-based reviews. The medication reviews performed in the included trials were prescription reviews (n = 8) and clinical medication reviews (n = 4). In the case of the observational studies, the majority of the studies (8/12 studies) reported findings of pharmacist-led medication reviews, and only 2 studies reported findings of multidisciplinary team-based reviews. Similarly, 6 studies employed prescription reviews, whereas 4 studies employed clinical medication reviews. The majority of the recommendations put forward by the pharmacist or a multidisciplinary team were accepted by physicians. The number of prescribed medications, inappropriate medications, and adverse outcomes (eg, number of deaths, frequency of hospitalizations) were reduced in the intervention group.

Conclusion: Medication reviews conducted by pharmacists, either working independently or with other health care professionals, appear to improve the quality of medication use in aged care settings. However, robust conclusions cannot be drawn because of significant heterogeneity in measurements and potential risk for biases.

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All authors contributed equally to this work.

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Aging is inevitable, and the global proportion of older people is escalating. People aged 60 years and older constituted 11% of the world's population in 2009, and the figure will double by midcentury.¹ Developed countries are expected to experience a steep rise in the number of senior citizens as people are living longer given improved living conditions, medical advances, and implementation of health

care programs. Although this phenomenon is the outcome of successful health care, the aging society poses a reign of challenges for any health care model.²

Aging is often related to chronic diseases, typically cerebrovascular, cardiovascular, and musculoskeletal conditions. These underlying comorbidities warrant the use of multiple medications, which are often recommended in respective clinical guidelines, leading to polypharmacy. Polypharmacy refers to the use of multiple medications and may affect people of any age³; however, it is more prevalent among older people, especially those residing in aged care facilities where the medications have been increasing over the past decade.⁴

“Multiple prescribing clinicians” contribute to polypharmacy and may be practicing in primary care as community-based or family physicians, or in secondary care; secondary care can be defined as treatment provided by a specialist after referral of the patient from a primary care family physician.⁵ Polypharmacy may result in suboptimal management of a disease: multiple medications and the prescribing of medications within similar drug classes. Furthermore, patients may receive subtherapeutic or toxic dosages, or misdiagnoses; and in some cases, suboptimal management may be associated with nonadherence or nontreatment (treatment deprivation).⁶ Although not unique to long-term care settings, a frequently encountered predicament is the drug prescribing cascade: the prescribed medication causes an adverse drug reaction that is mistakenly diagnosed as a new condition resulting in the prescribing of new medications.⁷

Various interventions to optimize pharmacotherapy in older people residing in aged care facilities have been described and evaluated. They include medication reviews, pharmacist interventions, multidisciplinary team interventions, geriatric evaluation, computerized decision support systems, management teams, and educational approaches. Medication review is defined as “a structured, critical examination of a patient’s medicines with the objective of reaching an agreement with the patient about treatment, optimizing the impact of medicines, minimizing the number of medication-relation problems and reducing waste.”⁸ The definition of medication review was simplified in 2008 to 3 levels from its previous 4-level definition of ad hoc, prescription, treatment, and clinical medication review. The latest definition of a medication review comprises prescription review (type 1), concordance and compliance review (type 2), and clinical medication review (type 3).⁹

Pharmacist-led medication reviews have formed the foundation of numerous intervention studies in Australia, the United States, and Europe.¹⁰ They are known as Residential Medication Management Review (RMMR) in Australia, Medication Therapy Management in the United States, Medicines Use Review in the United Kingdom and New Zealand, and MedsCheck in Canada.^{9,11–14} Medication review services were implemented in the United States as early as 1974 with a quarterly medication regimen review¹⁵; the Omnibus Budget Reconciliation Act (OBRA-87) was legislated that necessitated national minimum standards of care for residents of certified nursing facilities, and it became mandatory for clinical pharmacists to conduct monthly medication regimen reviews.¹⁶ In Australia, the RMMR is a service offered to government-funded aged care home residents. The RMMR services may be provided by an accredited pharmacist (pharmacist RMRR) or in partnership with a pharmacist and general practitioner (collaborative RMMR).¹⁷

Previous systematic reviews support the positive impact of various medication-related interventions; however, they are not conclusive owing to several factors. For instance, although some reviews aimed to reduce inappropriate prescribing, optimize pharmacotherapy, and improve the appropriate use of polypharmacy, the reviews included studies that were conducted in various care settings without specifications about study design; some had mixed interventions that may or may not have included pharmacists (Kaur et al,¹⁸ Patterson et al,¹⁹

Spinewine et al,²⁰ Spinewine et al,¹⁰ and Tjia et al²¹). Although other reviews have focused on studies conducted in aged care facilities, the interventions were of various types without the compulsory involvement of a pharmacist and study designs were not specified (Alldred et al,⁴ Nishtala et al,¹⁷ Forsetlund et al,²² Kröger et al,²³ Loganathan et al,²⁴ and Marcum et al²⁵). Two other reviews focused on studies that did include pharmacists, either working independently or with other health care professionals; however, the studies used various designs and methodologies (Cooper et al²⁶ and Geurts et al²⁷) or included a variety of care settings (Cooper et al,²⁶ Geurts et al,²⁷ Holland et al,²⁸ and Zermansky and Silcock²⁹). Furthermore, the study population in the review by Holland et al included randomized controlled trials (Holland et al²⁸) but may not have restricted the study population to “only” older people as the selection criteria included “mainly older people.” A review by Castelino et al³⁰ included randomized controlled trials and the compulsory involvement of pharmacists, but the studies were conducted in a variety of settings and used mixed interventions. A review by Verrue et al³¹ included 8 randomized controlled trials, did not focus on medication-review interventions, and did not include longitudinal studies. Da Silva et al³² published findings in the form of a “Letter to the Editor,” which was very brief and included 7 studies without a focus on medication reviews.

For the reasons discussed above, a comprehensive critique of current literature is essential to determine the impact of medication reviews in aged care facilities. The gap in current evidence should be addressed to identify the impact of medication reviews conducted by pharmacists, either working independently or with other health care professionals in aged care facilities. The aim of the current study was to assess the impact of medication reviews in aged care facilities, with additional focus on the types of medication reviews (prescription and/or clinical medication reviews) in a single care setting (aged care homes) using a specific study design (randomized controlled trials and prospective studies).

Methods

Scope of Review: Eligibility Criteria

The systematic review process was conducted in line with the PRISMA guidelines. The primary investigators (KT and SSH) screened abstracts for articles published in English (a) addressing medication reviews, (b) reporting pharmacist-led or multidisciplinary team reviews in aged care facilities, and (c) reporting outcome measures and impact of interventions on medication usage. Studies focusing on cognitive, behavioral, and educational approaches or interventions, and evaluations of cross-sectional or case series data were excluded, whereas randomized controlled trials, longitudinal studies, and those measuring pre and post medication review interventions were included. The publication period was from January 1998 to December 2015 and included studies on people older than 60 years living in aged care facilities, which assessed medication review and its impact on medication use and patient safety. Studies focusing on medication reviews performed by other health care professionals or by a multidisciplinary team without pharmacist involvement were excluded.

Information Sources

The following databases were searched: MEDLINE, Cumulative index to Nursing and Allied Health Literature (CINAHL), Turning Research into Practice (TRiP), International Pharmaceutical Abstracts (IPA), and Cochrane Database of Systematic Reviews, with the last update in December 31, 2015. Reference lists of articles identified in the search and relevant review articles were included and were subject to the same eligibility evaluation.

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