International Journal of Clinical Pharmacy (2019) 41:1256–1261
https://doi.org/10.1007/s11096-019-00890-8

RESEARCH ARTICLE

Using telehealth to enable collaboration of pharmacists and geriatricians in residential medication management reviews

Leila Shafiee Hanjani[1] · Nancye M. Peel[1] · Christopher R. Freeman[2] · Leonard C. Gray[1]

Received: 18 April 2019 / Accepted: 2 August 2019 / Published online: 10 August 2019

Abstract

Background Practical issues impede optimum collaboration between pharmacists and other clinical specialists in the current Australian residential medication review services which potentially affect efficiency, timeliness and quality of outcomes. *Objective* This mixed methods study aimed to explore the potential value of an existing telehealth platform to enable collaboration of pharmacists and geriatricians in residential medication reviews. *Setting* Long term care facilities in Australia. *Method* Twenty vignettes of aged care residents were prepared and independently reviewed by five pharmacists and five geriatricians using a telehealth platform to record their recommendations for medications. The geriatricians were subsequently asked to re-consider their recommendations after being provided with a pharmacist's report. *Main outcome measure* The level of agreement between pharmacists and between geriatricians, changes in the mean number of medications after pharmacists' and geriatricians' reviews, number of changes in geriatricians' recommendations after viewing a pharmacist's report, and pharmacists' and geriatricians' feedback. *Results* Both pharmacists and geriatricians had fair agreement about their recommendations for medications (kappa of 0.30 and 0.31 respectively). The mean number of medications over 20 cases was significantly reduced from a baseline of 14.9 to 13.4 by pharmacists, and to 12.3 by geriatricians after their reviews. There was disagreement between geriatricians and pharmacists on 430/1485 (29%) recommendations on medications; after viewing a pharmacist's report, geriatricians changed their mind in 51 occasions. Geriatricians found the pharmacist report useful in 72% of the cases. The majority of the pharmacists (4/5) were prepared to use the online system routinely. *Conclusion* The tested telehealth platform has the potential of being used as a part of routine practice to improve accessibility of the service and to enable synchronous collaboration among healthcare professionals.

Keywords Australia · Medication review · Nursing home · Telehealth

Impacts on practice

- Telehealth can be an alternative way of delivering pharmacists' residential medication reviews to other health care professionals to overcome the issues of accessibility and timeliness.
- Enabling synchronous collaboration among health professionals and minimising duplication of effort can be other potential benefits of the telehealth residential medication reviews.

Introduction

The high prevalence of co-morbid conditions in long term care residents often leads to prescription of multiple medications. Polypharmacy, commonly defined as the use of nine or more drugs in residential care setting [1], is prevalent in this group of older adults and is associated with poorer outcomes [1, 2]. Prescribing of potentially inappropriate medications, which has been reported to occur in almost half of aged care residents [3], adds to the risk of adverse outcomes related to their medication regimen.

Effective interventions to optimise prescribing, such as medication review services, are essential for caring for older

✉ Leila Shafiee Hanjani
leila.shafieehanjani@uq.net.au

[1] Centre for Health Services Research, Faculty of Medicine, The University of Queensland, Brisbane, QLD, Australia

[2] Centre for Optimising Pharmacy Practice-based Excellence in Research, School of Pharmacy, The University of Queensland, Brisbane, QLD, Australia

individuals living in aged care facilities [3]. In Australia, Residential Medication Management Reviews (RMMRs), delivered by accredited pharmacists, are available to residents of residential aged care facilities (RACFs) [4], defined as long term care facilities providing 24-h nursing services. Interviews with resident and staff, review of medical records, clinical assessment and preparing a report for the GP on medication recommendations are the steps involved in a RMMR service [5]. The medication reviews have been shown to have positive effects on medication appropriateness and identification and resolution of drug-related problems in aged care residents [6–11]. Residents are entitled to receive a RMMR, on referral from a general practitioner (GP), every 2 years or more frequently if clinically required, as determined by the GP [5]. However, in practice, logistic issues, such as the need for travel, impede timely delivery of the service. This is particularly a problem for the residents living in regional or remote areas, which constitute about 31% of Australian aged care residents [12–14]. These issues can be overcome with the use of alternative methods of healthcare delivery, such as telehealth, which has been proposed as a solution to the issues of accessibility and timeliness of medical services [15]. Telehealth also provides a platform for collaboration of different healthcare professionals caring for a patient. In RACFs, such collaborations might include nursing staff, GPs and specialists, such as geriatricians. A collaborative approach to medication review services may produce the best results in optimising prescribing of long term care residents, especially those with cognitive impairment who might be at higher risk of having inaccurate medical histories [16]. However, studies reporting systems delivering multidisciplinary telehealth medication review services to aged care residents are lacking in the literature.

Aim of the study

'RES-e-CARE' (see http://resecare.com.au/) is a telehealth platform and service developed to deliver geriatrician-led comprehensive geriatric assessment (CGA) to aged care residents in Queensland, Australia. Geriatricians have online access to a complete clinical profile of residents prepared by an experienced nurse at the residential aged care facility using the interRAI long-term care facility (LTCF) assessment instrument and conduct weekly video conference consultations to any new or existing resident in need [17, 18]. In this study, we aimed to test the potential value and acceptability of a telehealth system to deliver coordinated medication review services to residents of aged care facilities, through collaboration of pharmacists and geriatricians. Specifically, we aimed to identify the potential efficiency of the system through:

1. Understanding the level of agreement on medication recommendations between pharmacists and geriatricians.
2. Assessing the added value of a collaborative approach to medication reviews in RACFs.
3. Exploring the acceptability of online medication reviews from pharmacists' perspectives.
4. Examining pharmacists' usual practice travel time, time taken to complete a RMMR, and time taken for the completed report to be available to compare with online medication reviews.

Ethics approval

Ethics approval to conduct the study was obtained from the University of Queensland Human Research Ethics Committee (Clearance Number: 2016-SOMILRE-0182).

Method

Study design, participants and data collection

The protocol for this mixed methods study has previously been published [17]. Briefly, five RMMR accredited pharmacists were recruited. To test the telehealth platform, 20 de-identified RES-e-CARE cases previously referred for geriatric consultation were prepared. After suitable training to navigate the telehealth system and access the resident's clinical profile online, including medications, the pharmacists conducted medication reviews on these 'virtual' cases and generated reports, as they would have done in routine practice. Additionally, they were asked to make a recommendation for each medication: 1- no change; 2- stop; 3- increase dose; 4- decrease dose; or 5- decrease dose with view to stop. They also recorded any new medications they were recommending for each case. Time taken to complete the review was recorded. Lastly, their opinions on their experience with the telehealth modality were sought in a questionnaire.

Subsequently, five geriatricians were recruited to perform CGA on the same 20 cases, record their recommendations for each medication using the same format and record any new medication they were recommending. After completing each assessment, they were provided with a pharmacist's medication review report, with each geriatrician seeing the same pharmacist's report for that case. Geriatricians were then asked to re-consider recommendations on medications and report whether they confirmed or changed their original decisions. In addition, for each case, geriatricians were asked

whether they found the pharmacist's report helpful and if yes, did it help to confirm and/or change their decisions. The process of online reviews for both pharmacists and geriatricians is shown in Fig. 1.

A 'usual practice' survey was conducted to assess, for each pharmacist, details of their last five visits to conduct RMMRs at five different aged care facilities. Data were collected on time taken to complete the review, including locating and reviewing resident records and writing the report; travel distance and time; and reporting time lag (time from completing the RMMR to availability of the report).

Outcome measures

Measures included:

- The level of agreement among any two pharmacists and among any two geriatricians determined by using a dichotomised outcome (change/no change) for each medication.
- Changes in the mean number of medications from baseline after reviews by pharmacists and by geriatricians and also after geriatricians viewed a pharmacist's report and re-considered their recommendations.
- Number of changes in geriatricians' original decisions on medications after viewing a pharmacist's report.
- Geriatricians' feedback on 'value-added' of having pharmacists' reviews available.
- Pharmacist feedback on telehealth platform for comparison with usual practice including time taken to complete reviews using online versus face-to-face RMMRs.

Analysis

Quantitative data were analysed using descriptive statistics. The level of agreement on medication recommendations was assessed using Cohen's Kappa statistics and reported according to Landis and Koch interpretations [poor (< 0.00), slight (0.00–0.20), fair (0.21–0.40), moderate (0.41–0.60), substantial (0.61–0.80), and almost perfect (0.81–1.00)] [19]. Stata, version 15.0 (StataCorp., College Station, TX) was used for this analysis. Paired t-tests were used to compare baseline mean number of medications with the mean number of medications after pharmacists' and geriatricians' reviews, and also to compare mean number of medications recommended by geriatricians before and after viewing a pharmacist's report. This analysis was performed using the Statistical Package for Social Science 25.0 (IBM Corp., Armonk, NY). A significance level was set at $p \leq 0.05$.

Results

In the 20 cases prepared for online reviews, the residents were prescribed an average ($\pm$ SD) of 14.9 ± 5.1 medications. A total of 297 medications were reviewed, generating 1485 recommendations (5×297 medications) per group. The recommendations of pharmacists and geriatricians for medications are shown in Fig. 2. 'No change' was the most frequent recommendation among both pharmacists and geriatricians comprising 79.7% and 73.9% of recommendations respectively. Recommendations to stop or decrease dose with a view to stop the medication were also common among both groups and included 15.5% of pharmacists' and 21.1% of geriatricians' recommendations. Pharmacists recommended a new medication should be added to a patient's medication regimen on 87 occasions, of which 38 (43.7%) were to replace a medication the resident was using. For geriatricians, the number of times they recommended a new medication was 63, of which 30 (47.6%) were to replace an existing medication.

"Fair" agreement was seen between any two of the pharmacists for their recommendations for medications (agreement 78.1%; kappa 0.30). The result was similar for

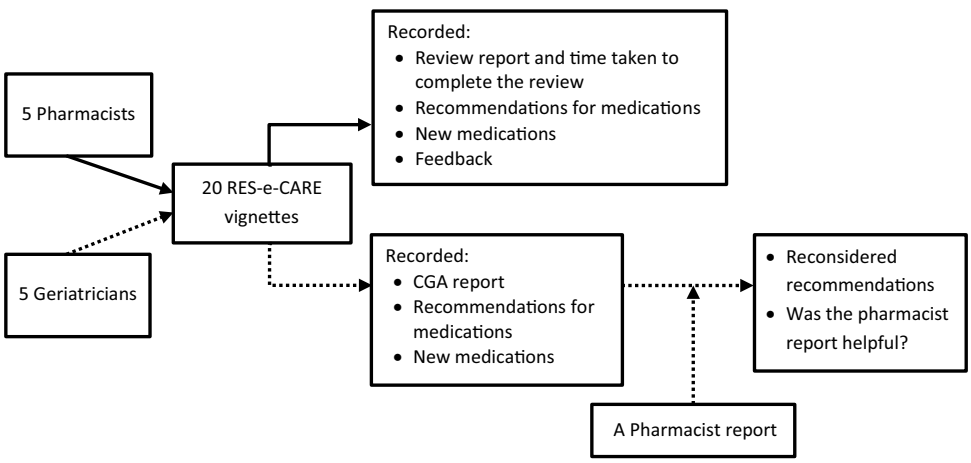

Fig. 1 Online review process for pharmacists and geriatricians

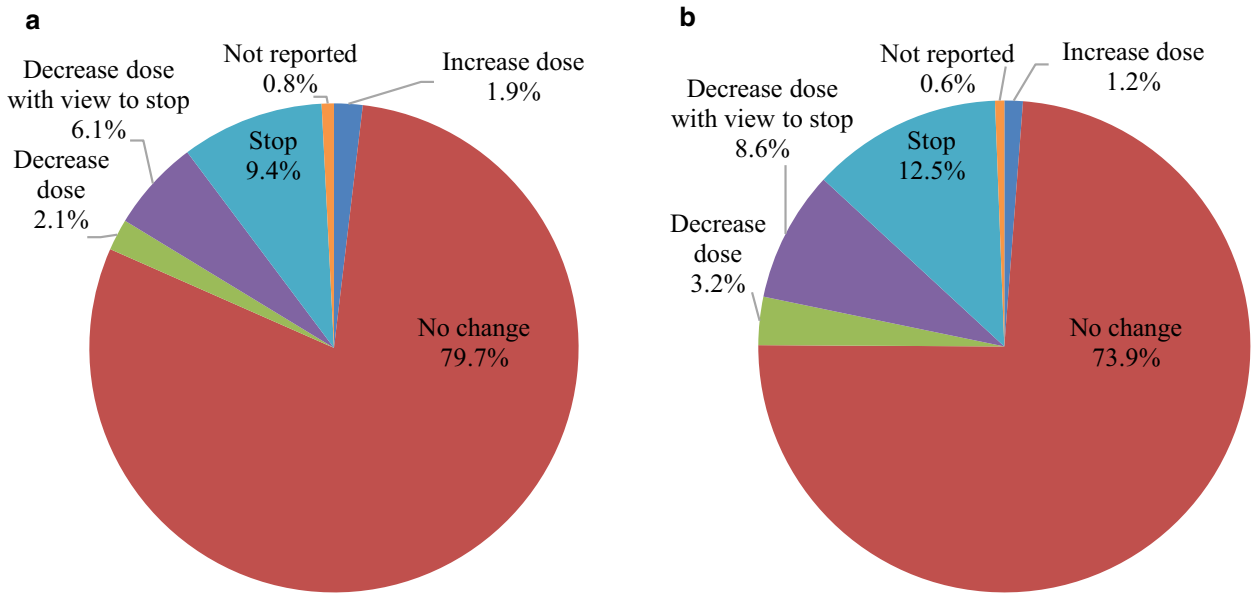

Fig. 2 Recommendations for medications by **a** pharmacists; and **b** geriatricians

geriatricians with any two having fair agreement (agreement 73.6%; kappa 0.31).

Review by pharmacists significantly reduced the mean number of medications over 20 cases from 14.9 to 13.4 ($p < 0.001$). Review by geriatricians also significantly reduced this number from 14.9 to 12.3 ($p < 0.001$). The reduction made by geriatricians was significantly more than the reductions made by pharmacists ($p = 0.005$). Geriatricians reduced the number of medications even further after viewing pharmacists' reports (12.3–12.2), however, this reduction was not significant.

Of 1485 recommendations on medications, there were 430 (29.0%) occasions of disagreement between geriatricians and pharmacists. After viewing pharmacists' reports, geriatricians changed their decisions on medications on 51 occasions and indicated that they found the pharmacist report helpful in 72.0% of the reviews. This was through helping them to confirm and/or prompt them to change at least one of their original decisions in 68.0% and 45.0% of the reviews, respectively.

Pharmacists reported the advantages of the online system to be the convenience of having all the information in one place, including the availability of a complete functional profile of the resident, without the need to travel. The main disadvantage they reported was not being able to discuss with staff or observe the resident, as well as finding the clinical information inadequate in a minority of cases. The challenges pharmacists reported were mainly of a technical nature. For example, they expressed issues around the navigation of the telehealth portal and finding the required information. To overcome these, they stated experience, spending extra time on the portal, and adjusting to the system to be helpful. The majority of pharmacists (4/5) reported they would be prepared to use the system as part of their routine practice.

Comparison with usual practice

Over the visits to 24 facilities, the five pharmacists completed a total of 243 reviews, at an average (±SD) of 10±6 reviews per visit. Median return travel time to these 24 facilities was 65 min (range 20 min–25 h 30 min), travelling a median of 61 km (range 10–1774 km). In only one of the 24 visits, the report writing was completed onsite. On most occasions (17/24), the reports were made available to the facility more than 48 h after the visit. In 8 out of 24 visits, pharmacists reported an issue or barrier affecting their capacity to conduct RMMRs during that visit. Those issues included nurses not being available to discuss the case, computer and login issues, being new to the facility, and doctors' rounds which limited access to residents' files. Each onsite RMMR took a median of 55 min (interquartile range (IQR) 45–71 min). In comparison, the 100 online medication reviews completed by pharmacists (5 pharmacists × 20 cases) took a median of 42 min (IQR 30–60 min) per review. Both these median times included the time spent writing of the reports.

Discussion

This study tested a telehealth platform to deliver collaborative pharmacist-led medication review services to aged care residents. Compared to onsite RMMRs, this study has

shown that, for pharmacists, online medication reviews can be less time consuming, as well as reducing travel time. It is also possible that telehealth can improve the timeliness of reports, and eliminate the need for 'batching', that is delaying visits to the aged care facilities until sufficient cases have been accumulated. The average number of RMMRs completed per site visit in this study was 10. The feedback from geriatricians and pharmacists demonstrated a potential for the new system to be used as a part of routine practice.

Pharmacists and geriatricians share expertise in medication management. Studies of their involvement in medication management interventions have shown improvement in clinical and medication-related outcomes across different settings [18, 20–24]. Evidence also supports interventions for optimising prescribing, including medication reviews that involve collaboration between healthcare professionals [18, 24–26]. In our study, geriatricians found the availability of a pharmacist review helpful in the majority of occasions, which was mainly through helping them to confirm their own decisions. Other studies have reported similar results showing that although clinicians hold positive opinions toward pharmacists' evidence-based recommendations, these recommendations do not always result in change in therapy [20, 27]. This has been reported to be influenced by different factors specific to clinicians as well as each individual patient and their circumstances [28]. The measured agreements among both groups of healthcare professionals in our study show that discrepancies in opinions can be present in both inter- and intra-disciplines. By enabling sharing information and discussion between all health professionals caring for a patient, the proposed telehealth platform can potentially help to develop a consensus approach for making more precise therapeutic decisions for patients.

The pharmacists' overall feedback on the system was positive with four of the five pharmacists willing to use the platform routinely. However, they also identified some challenges in the process and disadvantages with the system. There were some issues around accessibility and adequacy of provided clinical information. In terms of the difficulty of access, pharmacists reported improvement after gaining experience with the system. Nevertheless, this issue should not be overlooked and some modifications on the telehealth platform might be required to make it more user-friendly. Although not part of this study, the telehealth platform is also routinely used for case conferencing with staff, resident and carers, thus giving greater access to more information [29].

Strengths and limitations

The current trial was designed primarily to ascertain the feasibility of the process and did not measure appropriateness of medication recommendations nor the reliability of online versus onsite (face-to-face) medication reviews by pharmacists. However, a previous study demonstrated that geriatric assessment performed online using a structured assessment system was no less reliable than conventional face-to-face assessment in making clinical decisions [30]. This study did not include GPs, who in usual practice make the final decisions on aged care residents' medications. Because the cases were virtual, it was outside the scope of the study to examine the potential of telehealth medication reviews, conducted in the context of the full CGA process involving geriatricians and pharmacists, to impact prescribing decisions of GPs. Such study would be required before the system could be considered as part of routine practice.

Conclusion

While the telehealth platform tested here is not proposed as a substitute for the current conventional model of conducting RMMRs or the proposal to have onsite pharmacist in residential aged care facilities [31], it is an alternative way of delivering the service to overcome the issues of accessibility and timeliness. It has the additional potential benefits of enabling synchronous collaboration among health professionals, minimising duplication of effort and optimising prescribing for the vulnerable population in long term care. It is necessary to show the online approach produces clinical outcomes at least as good as and with at least the same cost as the face-to-face model before it can be used routinely. Ideally, the online system would increase the access to specialists, i.e. pharmacists and geriatricians, for the long term care residents who currently have poor access to these services.

Acknowledgements The authors would like to thank the pharmacists and geriatricians who took part in the study. Mr Mark Chatfield (The University of Queensland Centre for Health Services Research) provided statistical help with analysing the level of agreement between pharmacists and geriatricians.

Funding This work was supported by the National Health and Medical Research Council (NHMRC) Partnership Centre for Dealing with Cognitive and Related Functional Decline in Older People (Grant No. GNT9100000). Leila Shafiee Hanjani is supported by an Australian Government Research Training Program (RTP). No other sources of funding were used to assist in the preparation of this article.

Conflicts of interest The authors declare that they have no conflicts of interest.

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