Feasibility of a multidisciplinary approach for medical review among elderly patients in four Italian long-term nursing homes

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ABSTRACT

Objectives To establish the feasibility and the specific tasks of a multidisciplinary team approach for medical review in four nursing homes for the elderly in Italy.

Methods Prospective study conducted between November 2012 and September 2013. Review of therapies was performed by seven clinical pharmacists and four nurses using composite criteria for drug discrepancy evaluation with subsequent submission to 31 physicians.

Results The rate of prevalence of drug discrepancies recorded for 2556 medications reviewed in 333 patients was 34.1% (871/2556). Of these, only 35.5% (309/871) were accepted by clinicians. The highest clinician acceptance rates were observed for drug substitutions (91.3%, 211/231) and dosing regimen modifications (96.4%, 53/55). A significant decrease in the mean number of medications prescribed per patient (from 7.7 ± 2.8 to 7.3 ± 2.7 , $p < 0.05$) was observed.

Conclusions Interventions aimed at improving interactions between pharmacists and physicians and awareness among physicians of major pharmacological interactions should be encouraged.

INTRODUCTION

Optimisation of drug treatment in elderly patients has been increasingly advocated in the most advanced healthcare systems,¹ but it often represents a clinical challenge for caregivers. Suboptimal therapy is commonplace in elderly patients, who often present with comorbidities, polypharmacy and frailty, especially if resident in long-term nursing homes. In particular, a prospective study conducted among 256 elderly residents recruited in 55 care homes in the UK, who were prescribed a mean number of 8.0 drugs per patient, revealed that two-thirds of them were exposed to at least one medication error.² In fact, one of the most important hazards of polypharmacy is the increased risk of inappropriate prescriptions, which might lead to medication errors, adverse drug events and a higher risk of hospitalisation.³

Medical review of pharmacological therapies has been implemented to decrease medication errors and inappropriate prescribing, and has been successfully applied for years.⁴ It involves evaluation of all patient medications in order to identify any inappropriate prescriptions according to international recommendations such as the Beers criteria⁵ or other. Following this, decisions can be made to optimise the prescription. Therefore, medical review usually requires a team-based

approach involving at least some clinical pharmacists and the prescribing physician acting together to be effective.⁴ Moreover, this approach could also offer the opportunity to withdraw unnecessary medications according to the principles of therapy minimisation.⁶

However, few studies have characterised the specific tasks of a multidisciplinary team involved in medical review of therapies in long-term nursing homes for the elderly. The aim of this study was to evaluate the feasibility of medical review conducted by cooperating clinical pharmacists and physicians in four Italian long-term nursing homes and to assess the specific clinical tasks of intervention and the respective areas of improvement pertaining to each professional.

METHODS

The present study was prospectively conducted among elderly residents of four long-term nursing homes of the Azienda Sanitaria Locale 'Medio Friuli' in North-East Italy, between November 2012 and September 2013. This investigation represented a pilot study of a more extensive clinical trial on 19 nursing homes in the same geographical area. The study was approved by the ethics committee of the Friuli-Venezia-Giulia Region, and signed patient consent to use clinical data for scientific purposes was also obtained.

Study design

The process of medical review was conducted in two subsequent phases, the first consisting of evaluation of drug discrepancies, and the second of clinical implementation of the suggested drug modifications. Briefly, in the first phase, seven clinical pharmacists with the assistance of four local nurses examined all drug prescriptions from clinical records and assessed the total number of discrepancies according to the defined criteria for inappropriateness. Pharmacists reviewed each drug regimen, evaluated specific risks for potential adverse drug reactions and major interactions, and also examined the drug dispensation process (ie, timing and route of administration, crushing of tablets). Written suggestions for drug withdrawal, new drug introduction, drug substitution, and dosing regimen modifications were then formulated and submitted to the prescribing physician. In the second phase, pharmacists' suggestions were either accepted or rejected at physician discretion. A total of 31 physicians were involved in this process. One month later, a reassessment of current prescriptions

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was performed by the same clinical pharmacists in order to determine the rate of physician adherence to clinical pharmacists' advice.

Assessment of inappropriate prescriptions

Inappropriate prescriptions were defined according to the following composite criteria: (1) Beers⁵ and screening tool to alert doctors to right treatment (START)/screening tool of older person's prescriptions (STOPP) criteria;⁷ (2) adherence to the drug formulary for outpatients; (3) adherence to product information; (4) Micromedex database of pharmacological interactions,⁸ which classifies pharmacological interactions as major, moderate, minor, and of unknown clinical relevance. Only major interactions were considered in this study.

Statistical analysis

The Kolmogorov–Smirnov test was used to assess whether data were normally or non-normally distributed. Accordingly, mean $\pm$ SD or median (IQR) was used in descriptive statistics. Continuous variables were compared using Student's *t* test or the Mann–Whitney test. A *p* value <0.05 was required to achieve statistical significance. All statistical analyses were performed using Systat V13.

RESULTS

A total of 2556 therapy courses were reviewed in 333 patients. The mean $\pm$ SD age of the population was 84.54 ± 10.04 years, and women accounted for 72.1% (240/333) of the patients. The median number of drugs per patient was 8.0 (5.5–10.0). Polypharmacy, defined as the prescription of five or more different medications, was present in 85.9% (286/333) of patients, while 25.2% (84/333) of patients received more than 10 drugs concomitantly.

The prevalence rate of drug discrepancies detected by clinical pharmacists was 34.1% (871/2556) in 92.2% (307/333) of patients. In particular, the prevalence rate of inappropriate prescriptions was 27.4% (239/871) based on Beers and START/STOPP criteria, 35.5% (309/871) based on drug formulary non-adherence, 9.2% (80/871) based on non-adherence to product information, and 27.9% (243/871) based on major pharmacological interactions.

Physicians accepted 35.5% (309/871) of drug discrepancies ascertained by clinical pharmacists and a subsequent clinical modification was made to patients' drug schedules. Moreover, they autonomously introduced 96 other drug modifications, not previously detected by clinical pharmacists. Overall, 405 drug modifications were implemented, of which drug substitutions and drug withdrawals were the most common, accounting for 84.7% (343/405) of the total, as reported in table 1. Clinician rate of acceptance of pharmacist's suggestions was very high for advice related to drug substitutions (91.3%, 211/231) and dosing regimen modifications (96.4%, 53/55), while for drug withdrawal and drug introduction it was only 36.7% (41/112) and 57.1% (4/7), respectively. Among the 243 major pharmacological interactions detected by clinical pharmacists, drug modifications were implemented in only 13.6% (33/243) of the cases.

Overall, the multidisciplinary intervention affected 15.8% (405/2556) of the prescribed drugs and led to a 4.01% (105/2556) reduction in the total number of medications (from 2556 to 2451), with a significant decrease in the mean number of medications prescribed per patient (from 7.7 ± 2.8 to 7.3 ± 2.7 , $p < 0.05$). There was no significant decrease in the number of patients prescribed more than five drugs (from 286 to 279

Table 1 Characteristics of patient population and the two phases of medical review

Demographics	
Total number of patients	333
Age (years), mean $\pm$ SD	84.54 $\pm$ 10.04
Sex (M/F)	93/240
Medical review and the role of clinical pharmacist	
Total number of prescribed drugs	2556
Number of drugs per patient, median (IQR)	8 (5.5–10)
Total number of inappropriate medications, n (%)	871/2556 (34.1)
According to Beers and START/STOPP criteria	239/871 (27.4)
According to drug formulary criteria	309/871 (35.5)
According to drug label sheet	80/871 (9.2)
Major pharmacological interactions	243/871 (27.9)
Number of inappropriate medications per patient, median (IQR)	2.0 (1.0–2.0)
Medical review and role of prescribing physician	
Total number of therapeutic modifications, n (%)	405
Drug withdrawal	112/405 (27.7)
of which suggested by pharmacist	41/112 (36.7)
Drug introduction	7/405 (1.7)
of which suggested by pharmacist	4/7 (57.1)
Drug substitution	231/405 (57.0)
of which suggested by pharmacist	211/231 (91.3)
Dosing regimen modification	55/405 (13.6)
of which suggested by pharmacist	53/55 (96.4)

START, screening tool to alert doctors to right treatment; STOPP, screening tool of older person's prescriptions.

patients, $p=0.52$) or more than 10 drugs (from 84 to 76 patients, $p=0.53$).

DISCUSSION

This study showed that clinical pharmacists played an important role in the medical review process of therapies conducted in four Italian nursing homes, in particular in the initial assessment of drug discrepancies and in supporting physicians in drug substitutions and dosing regimen modifications. The multidisciplinary approach proved effective, and a significant post-interventional decrease in the mean number of medications per patient was observed.

Although the participation of consultant pharmacists in nursing homes is increasing and established in numerous countries,^{9–10} there are very few examples of this in Italy. From our analysis, clinical pharmacists were fundamental in reviewing patients' therapies as well as in the subsequent phase supporting prescribing physicians. By adopting composite criteria for detecting drug discrepancy, clinical pharmacists identified a total of 34.1% discrepancies, with more than 90% of patients having at least one inappropriately prescribed drug. Although the rate of unintentional discrepancies has been reported to vary greatly in different patient populations,⁴ our observation is similar to that reported in a study conducted among 215 geriatric patients, in which a 24.2% rate of medication discrepancies was identified.¹¹

In contrast, our results of a 35.5% physician acceptance rate of pharmacists' suggestions is significantly different from other findings of acceptance rates ranging from 75.6%¹² to 93%¹³ in similar population settings. This could be explained by a reluctance of prescribing physicians to accept clinical pharmacists' advice. In particular, the lack of any previous experience of

cooperation on both parts, the presence of discrepancies not ultimately deemed of clinical relevance by prescribing physicians, and the possibility that the physician had already tried the proposed suggestions may represent some relevant drawbacks. In any case, the role of the clinical pharmacists was fundamental in advice related to drug substitution and dosing regimen modifications, with acceptance rates higher than 90%, whereas drug introduction and drug withdrawal appeared to be the tasks in which physicians played the major role. In particular, the fact that physicians were responsible for the majority of drug withdrawals could be the result of a physicians' attempt to simplify unnecessary therapies not highlighted as inappropriate by international recommendations (and thus not detected by clinical pharmacists) but of questionable utility in the elderly, such as redundant medications and/or drugs used for primary prevention in very elderly patients.

It is worth noting the low physician acceptance rate (13.6%) of advice related to major pharmacological interactions. This could be interpreted as an area of weakness in clinical knowledge in which the implementation of educational interventions should be fostered.

We are aware that our study has several limitations. The small sample size and the lack of evaluation of either clinical outcomes or potential cost savings are probably the most relevant.

In conclusion, our strategy was effective in reducing the mean number of medications per patient but still not sufficient to reduce the total number of patients prescribed ≥ 5 drugs. Better results may be obtained by implementing interventions directed at improving pharmacist–physician cooperation as well as the perception of major pharmacological interactions by prescribing physicians.

Contributors CC, NL, LM and MT conceptualised the study. LC, AA, BG and BR retrieved all clinical data. CC wrote the manuscript.

Competing interests None declared.

Patient consent Obtained.

Ethics approval Ethics committee of the Friuli-Venezia-Giulia Region, Italy.

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