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ORIGINAL ARTICLE

Monitoring polymedicated elderly patients in a health care unit ☆

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Abstract
Objective: To implement a coordinated strategy for the family care unit and the pharmacy division in order to enable revising treatment in polymedicated patients. To this end, we have developed a software tool permitting the patient's primary doctor to have a quick, summarised description of the patient's updated pharmacological treatments, and detect iatrogenic risks and/or dosage adjustments and pharmacotherapy advice.
Methods: In this study, polymedicated patients are defined as those taking 10 or more medications during at least one month.
Development phases:
Designing a guide form to assist the family doctor in reviewing treatments.
Developing a drug treatment report (DTR) as a complementary document to assist the doctor in reviewing treatments.
Introducing a coordinated communication system between the family doctor and the pharmacist.
Reviewing work instructions and distributing them to staff members involved.
Results: The target population of the study consists of 1897 polymedicated patients.
We issued 1897 reports, containing the following: 8530 recommendations (10% alerts from regulatory authorities, 31% recommendations regarding high-risk drugs in elderly patients, 7% gave information about new treatments and 52% recommendations on proper drug use); 399 had high clinically relevant drug interactions; and 5036 dose adjustment recommendations. These pharmacotherapy reports allow treatment to be revised for nearly 100% of the selected population.
Conclusion: The development and implementation of software tools for monitoring polymedicated patients enables us to create DTRs that facilitate routine medical reviews of pharmacological treatment in a fairly wide range of patients.
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PALABRAS CLAVE
Polimedicado;
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Revisión medicación;
Seguimiento
farmacoterapéutico

Seguimiento del paciente anciano polimedicado en un área de salud

Resumen

Objetivo: Implantar una estrategia coordinada entre la unidad de atención familiar y el servicio de farmacia que posibilite la revisión del tratamiento en pacientes polimedicados. Para ello se ha desarrollado una herramienta informática que permite al médico responsable del paciente visualizar de forma rápida y resumida la descripción del tratamiento farmacológico actualizado, así como la detección de riesgos de iatrogenias y/o ajuste de dosis y consejo farmacoterapéutico.

Métodos: Para el estudio se ha considerado paciente polimedicado aquel que toma 10 o más medicamentos durante, al menos, un mes.

Fases de desarrollo:

Diseño de un formulario guía para revisión de tratamientos por el médico de familia.

Desarrollo de un informe farmacoterapéutico (IFT) como documento de apoyo al médico para la revisión del tratamiento.

Puesta en marcha del circuito coordinado médico de familia-farmacéutico: redacción de instrucciones de trabajo y difusión entre los profesionales implicados.

Resultados: La población diana del estudio corresponde a 1.897 pacientes polimedicados.

Se han emitido 1.897 informes, en los que se recogen: 8.530 recomendaciones (10% alertas de agencias reguladoras, 31% recomendaciones sobre medicación de alto riesgo en paciente anciano, 7% información sobre novedades terapéuticas y 52% recomendaciones sobre uso adecuado del medicamento); 399 interacciones de alta relevancia clínica y 5.036 recomendaciones de ajuste posológico. Estos informes farmacoterapéuticos están permitiendo la revisión del tratamiento de prácticamente el 100% de la población seleccionada.

Conclusión: El desarrollo e implantación de herramientas informáticas en el seguimiento de pacientes polimedicados permite la elaboración de IFT que facilitan la revisión médica rutinaria del tratamiento farmacológico en un censo de pacientes relativamente amplio.

Introduction

The multitude of concomitant diseases in patients over 65 years of age produces a polypharmacy that is very difficult to manage and is susceptible to numerous medication errors and medication-related problems, causing hospital readmissions to increase.[1]

The risk of suffering an adverse reaction to medication is around 5%, a rate that rises to almost 100% when a patient takes 10 or more drugs.[2]

According to Plenary Agreement No. 714 of 25 March 2009, Act No. 85 of the Inter-Territorial Council of the National Health System, related to rational drug use, those individuals with chronic diseases who are taking more than 6 drugs on a continuous basis for 6 or more months are considered polymedicated.

In order to ensure quality care for polymedicated patients over 65 years of age, their treatment must be reviewed at least once a year, as recommended in the ACOVE[3] project that establishes a set of minimum standards for quality care.

Doctors need to be able to quickly see a summary of their patients' current drug treatment, iatrogenic risks, and/or dose adjustments and drug treatment recommendations. The development of a strategy to address this need came about in response to the ACOVE quality drug treatment criteria in elderly patients.

This publication describes the software tool and, more importantly, the design of a communication system between the family care unit and the pharmacy department that effectively adjusts drug treatments to the clinical conditions of polymedicated elderly patients.

Method

The project was developed in a health care area with a population of 106 756 inhabitants, of which 18% were over 65 years of age. The health care area had a total of 70 family doctors who provided care for four basic widely dispersed health districts.

The project was started in the last quarter of 2008 using the design from the reference documents: Review Form and Drug Treatment Report (DTR). In January 2009 the communication system between family doctors and the pharmacy department was started. Area family doctors are currently (May 2009) in the process of reviewing the treatment of their polymedicated patients, and we are reaching nearly 100% of the initial population.

In order to make the sample size of the target population acceptable, for this project we defined 'polymedicated patient' as any patient older than 65 years of age and who was taking 10 or more drugs over a period of a month or more.

The first phase of the project was to design a form for reviewing treatment. The objective of this document was to serve as a guide for family doctors for rationally reviewing drug treatment.

The Hamdy[4] questionnaire was used as a reference for creating this form, and it includes patient characteristics, risk factors for adverse effects, appropriate medication use and type of intervention.

After the form was approved by the area's pharmacy committee it was made available for download on the intranet.

We then proceeded to create a DTR (Figure) to serve as a support document for family doctors during the treatment review procedure.

This report was designed using the ACCESS version 2003 software application and included the following sections:

1. Patient identification data obtained through the MicroStrategy prescription billing programme, the corporate application used by the *Servicio Andaluz de Salud* (Andalusian Health Department, [SAS]) merged with the unique database of Andalusia, from which names, ages and doctor identification data were extracted.
2. Drug treatment: contains the medications collected by the pharmacy's patient during the past month through the MicroStrategy SAS prescription database programme. Active ingredient, dosage, administration route and therapeutic group are given for medications.
3. Clinically relevant drug interactions. The Peral Aguirregoitia J et al[5] publication served as the main source of information on the drugs involved, the degree of clinical relevance of drug interactions according to

Hansten,[6] Micromedex,[7] Lexi-Comp[8] and observations on the management of interactions.
4. Recommendations on dosage adjustment in kidney failure obtained from the Drug Therapy Guidelines of the Alicante General University Hospital Pharmacy Department,[9] from the Spanish General Council of Pharmaceutical Colleges[10] and from the David McAuley database.[11]
5. Standard Drug Therapy Recommendations.
   5.1. Selection of potentially inappropriate drugs for the elderly. We used the Beers criteria[12] as a reference and included three additional groups: insulin, oral anticoagulants and digitalic drugs as they cause adverse events that lead to a high incidence of emergency department visits.[13]
   5.2. Quality indicators of appropriate use of medications. We used three sources of information:
      A. Recommendations for follow-up and monitoring of treatments with anticoagulants, diuretics, anticholinergics, oral anti-diabetic drugs, barbiturates, opioid analgesics and angiotensin enzyme converter inhibitors, and angiotensin receptor antagonists.
      B. Recommendations related to the medication selection objectives contained in the programme contract and the SAS clinical management agreement. These recommendations were developed by the expert group on rational medication use from the Pharmacy and Benefits Section.
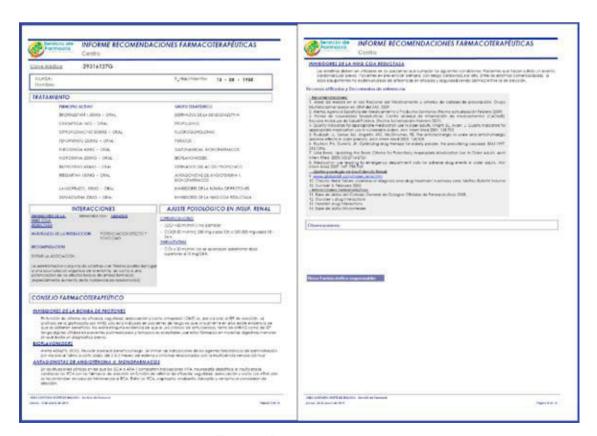

Figure 1 Drug treatment report.

Table Drug treatment recommendations

Drug	Interactions		High risk medication		Regulatory agency warnings	
	No.	%	No.	%	No.	%
Acetylsalicylic acid+propionic acid derivatives	126	31.58				
Macrolides+HMG CoA reductase inhibitors	88	22.06				
HMG CoA reductase inhibitors+phenylalkylamines derivatives	44	11.03				
HMG CoA reductase inhibitors+fibrates	22	5.51				
Theophylline+fluoroquinolones	22	5.51				
Acetylsalicylic acid			963	36.42		
Lorazepam			244	9.23		
Acenocoumarol			222	8.40		
Zolpidem			198	7.49		
Dipotassium clorazepate			190	7.19		
Bioflavonoids					196	22.98
Amoxicillin/clavulanic acid					158	18.52
Antipsychotics					152	17.82
Alpha-adrenergic blockers					137	16.06
Moxifloxacin					95	11.14

C. Warning about the risk of anticholinergic effects with certain drugs using the Rudolph JL et al anticholinergic risk scale.[14]

5.3. Information on drugs classified by the Andalusian centre for drug information[15] such as new treatments not recommended for use (NTNR) and new combinations not recommended for use (NCNR).

5.4. Information on warnings issued by regulatory agencies. These include those issued by the Spanish agency for medications and health products,[16] the Food and Drug Administration (FDA)[17] and the Drug Safety Update.[18]

6. Bibliography.

7. Comments. Open text that includes observations on non-standardised treatment.

8. Pharmacist's signature.

Lastly, the study instructions were edited and distributed among medical and pharmaceutical professionals with the backing of the hospital and primary care directors involved. In this way the communication system between family doctors and pharmacy departments was put into action.

The family doctor received a list from the pharmacy department with a list of all of their polymedicated patients and an personalised DTR for each patient.

The review form and the DTR are used as guidelines for treatment review.

The procedure was completed with the registration of the patient's electronic medical history, creating a clinical health episode, including all interventions that result from the treatment review.

Results

The prevalence of polymedicated patients in our area amounts to 10% of the over 65s population; 19% take more than 8 drugs and 34% take more than 6.

The target population ranges in age from 65 to 101 years, of which 30% are between 75 and 79 years and 60% are women.

We have reported data from the first 8 months after introducing the strategy (October 2008 to May 2009).

The pharmacy department issued 1897 DTR in which 399 had high clinically relevant drug interactions, 5036 dosage adjustment recommendations for kidney failure and 8530 drug therapy recommendations. Of the latter, 52% of recommendations were related to the appropriate use of medication, 31% provided information on high-risk medications, 10% covered regulatory agency alerts and 7% gave information about new drugs.

Table shows the main drug treatment or medications involved in the previous recommendations.

Discussion

Pharmaceutical intervention can adopt various pharmaceutical strategies for assessing drug treatment in polymedicated patients.[19] One of the most effective strategies involves the pharmacist reviewing the patient's treatment plan, filling out a DTR and then contacting the doctor in charge.[20] Reports must be prepared quickly and communication streamlined with the family doctor, as it ensures that patient drug data and information reflected in the DTR, is as up-to-date as possible. This method is even more effective when the intervention is carried out on the current prescription and not retrospectively.[21]

There are few publications on this type of pharmaceutical intervention on large populations. Hanlon[22] applied this intervention to 208 patients (DTR, recommendations for the doctor, interview and patient information programme). In similar studies, the number of patients does not differ much with respect to the previous sample and in all cases the therapeutic plan was reviewed by a pharmacist, interviews were conducted with the actual patients, DTR

were filled out and agreement reached with the doctors in charge.[23,24]

In 2005, Zarowitz et al[25] published their intervention with 6693 patients where pharmacists reviewed the therapeutic plan and presented a range of learning activities for both the patient and prescribing doctor, with truly surprising results in the initial phase of the study.

We would also like to point out an observational descriptive study carried out in our area using a telephone survey on 73 patients to detect possible errors in medication and to determine treatment adherence.[26]

At the institutional level, we note the initiatives carried out by the Andalusian health service, whose clinical management contract with primary care for 2008 aims towards reviewing the medication of individuals older than 65 years who use 10 or more drugs. The role of the pharmacist in this case consists of obtaining lists of patients who meet these requirements and sending the lists to the various units. The family care units (medical and nursing staff) of these departments will then review the treatment.

A final example is the initiative carried out in the Community of Madrid, which even gives legal status to the review of treatments for polymedicated patients, as cited in Article 3 of Decree 6/2006 legislated in Madrid.[27] Similar initiatives can be found in other communities.[28]

We conclude that this type of strategy, where the pharmacist assessing polymedicated patients' drug treatment plans, regardless of the level of care they are receiving, is crucial. As we have seen, if the assessment is followed by filling out a DTR, the intervention results even more effective. However, in most cases the pharmacy departments' structure is incapable of supporting this workload. It is therefore essential that software tools be developed such as those proposed in this study in order to encompass the entire target population of the intervention.

In 2008, Yourman et al[29] reviewed the impact of using electronic prescription systems on the quality of drug therapy plans in elderly patients. The aspect that interests us in this section is that the patient sample evaluated with this strategy increases significantly. Some authors focus their attention on the use of certain drug groups that are of particular risk for the elderly, such as hypnotics/sedatives, on samples sizes of more than 12 000 patients.[30] Along the same lines, electronic assistance has been designed for prescribing psychotropic medication in Brigham Hospital[31] to reduce the risks of falls and avoid over-sedation and cognitive damage in elderly patients. The sample size was 3718 patients and 7456 medical prescriptions.

Another item worth noting is the controversy surrounding the transfer of lists of medications that are potentially inappropriate for use in elderly patients from one country to another. As such, within the Beers criteria almost half of the drugs are not marketed or in use within Europe. We must therefore supplement these criteria with literature sources that reflect our social context. We are not aware of any initiative at European level and which is therefore adapted to our environment. This point is central for the development of databases with explicit criteria, which would then allow us to make DTR automated.

The form designed for the doctor to review and assess treatment is based on the form proposed by Hamdy et al. It is simpler than others that are more complete but more difficult to fill out, such as the Medication Appropriateness Index (MAI).[32]

In our literature review we did not find any publications that describe in detail the databases used (when used) or the scientific technical sources employed. Nor did we find a detailed description of a DTR obtained from the previously mentioned databases. This study aims to provide professionals with a software tool that allows them to contribute their knowledge to the multidisciplinary assessment of the polymedicated patient in those environments where there are no electronic prescription systems.

In the second phase we must determine the impact of pharmaceutical intervention on medical prescriptions and on the actual patient.

In conclusion, the review of the therapeutic plan for polymedicated patients constitutes an effective strategy since chronic diseases and complex treatments are the norm for this type of patient. Its effectiveness increases if the intervention is carried out on the entire target population. To this end, we must develop technical assistance methods for prescriptions in community care similar to those used in hospital care.

Conflict of interest

The authors affirm that they have no conflicts of interest.

References

1. Fernández LC, Barón B, Vázquez B, Martínez T, Urendes JJ, Pujol E. Errores de medicación e incumplimiento terapéutico en ancianos polimedicados. Farm Hosp. 2006;30:280-3.

2. Baena JM, Martínez MA, Tomás J. Selección de medicamentos en el anciano (I). Características diferenciales y criterios genéricos de selección. FMC. 2003;10:501-7.

3. Knight EL, Avorn J. Quality indicators for appropriate medication use in vulnerable elders. Ann Intern Med. 2001; 135:703-10.

4. Hamdy RC, Moore SW, Whalen K, Donnelly JP, Compton R, Testerman F, et al. Reducing polypharmacy in extended care. South Med J. 1995;88:534-8.

5. Peral Aguirregoitia J, Lertxundi Etxebarria U, Martinez Bengoechea MJ, Mora Atorrasagasti O, Franco lamella E, Gabilondo Zelaia I. Evaluación prospectiva de interacciones entre medicamentos en pacientes ingresados mediante una aplicación informática. Farm Hosp. 2007;31:93-100.

6. Hansten PD, Horn JR. Hansten and Hom's drug interactions analysis and management. St. Louis, MO: Facts and Comparitions; 2001 and updates.

7. Micromedex Healthcare Series (electronic version). Thomson Micromedex, Greenwood Village, Colorado, USA [accessed 11/9/2006]. Available from: http://www.thomsonhc.com

8. Bachmann KA. Drug interactions handbook. 2 ed. Ohio: Lexi-comp; 2004.

9. Guía farmacoterapéutica Servicio de farmacia Hospital general Universitario de Alicante [accessed 3/7/2009]. Available from: http://www.dep19.san.gva.es/intranet/servicios/Farmacia/New_eGFT.htm

10. Base de datos de medicamentos del Consejo General de Colegios Farmacéuticos [accessed 3/7/2009]. Available from: Portalfarma.com. Portal de farmacia. Información para farmacéuticos.

11. Base de datos de ajuste posológico en insuficiencia renal D. McAuley [accessed 3/7/2009]. Available from: http://www.globalrph.com/index_renal.htm

12. Fick DM, Cooper JW, Wade WE, Waller JL, Ross-Maclean J, Beers MH. Updating the Beers criteria for potentially inappropriate medication use in older adults: results of a US Consensus Panel of Experts. Arch Intern Med. 2003;163:2716-24.

13. Budnitz DS, Shelab N, Kegler SR, Richards CL. Medication use leading to emergency department visits for adverse drugs events in older adults. Ann Intern Med. 2007;147:755-65.

14. Rudolph JL, Salow MJ, Angelini MC, McGlinchey RE. The anticholinergic risk scale and anticholinergic adverse effects in older persons. Arch Intern Med. 2008;168:508.

15. Centro Andaluz de Información de Medicamentos, Escuela Andaluza de Salud Pública [accessed 3/7/2009]. Available from: http://www.easp.es/web/cadime/index.asp?idSub=303&idSec=303&idCab=303

16. Agencia Española de medicamentos y productos sanitarios [accessed 3/7/2009]. Available from: http://www.aemps.es/actividad/alertas/usoHumano/seguridad/home.htm

17. Food and drug administration [accessed 3/7/2009]. Available from: http://www.fda.gov/Safety/MedWatch/default.htm

18. Drug safety up date [accessed 3/7/2009]. Available from: http://www.mhra.gov.uk/Publications/Safetyguidance/DrugSafetyUpdate/index.htm

19. Chumney EC, Robinson LC. Efectos de las intervenciones del farmacéutico en pacientes polimedicados. Pharmacy Practice. 2006;4:103-9.

20. Gorard DA. Escalating polypharmacy. Q J Med. 2006;99:797-800.

21. Spinewine A, Schmader KE, Barber N, Hughes C, Lapane KL, Swine C, et al. Appropriate prescribing in elderly people: how well can it be measured and optimised? Lancet. 2007;370:173-84.

22. Hanlon JT, Weinberger M, Samsa GP, Schmader KE, Uttech KM, Lewis IK, et al. A randomized controlled trial of a clinical pharmacist intervention to improve inappropriate prescribing in elderly outpatients with polypharmacy. Am J Med. 1996;100:428-37.

23. Krska J, Cromarty JA, Arris F, Jamieson D, Handsford ID, Duffus P, et al. Pharmacist-led medication review in patients over 65:

a randomized, controlled trial in primary care. Age Ageing. 2001;30:205-11.

24. Crotty M, Rowett D, Spurling L, Giles LC, Philips PA. Does the addition of a pharmacist transition coordinator improve evidence based medication management and health outcomes in older adults moving from the hospital to a long-term care facility? Results of a randomized, controlled trial. Am J Geriatr Pharmacother. 2004;2:257-64.

25. Zarowitz BJ, Stebelsky LA, Muma BK, Romain TM, Peterson EL. Reduction of high-risk polypharmacy drug combinations in patients in a managed care setting. Pharmacotherapy. 2005;25:1636-45.

26. Fernández Lisón LC, Barón Franco B, Vázquez Domínguez B, Martínez García T, Urendes Haro JJ, Pujol de la Llave E. Errores de medicación e incumplimiento terapéutico en ancianos polimedicados. Farm Hosp. 2006;30:280-3.

27. Servicio de Coordinación Legislativa y Relaciones Institucionales. Subdirección General de Régimen Jurídico y Desarrollo Normativo S.G.T de Vicepresidencia Primera y Portavocía del Gobierno. Comunidad de Madrid. Decreto 6/2006, de 19 de enero, del Consejo de Gobierno, por el que se aprueban medidas para la mejora de la prestación farmacéutica a los pacientes crónicos.

28. BORM. Boletín Oficial de la Región de Murcia, 03 de Enero 2009 (núm. 2). Decreto número 585/2008 de 29 de diciembre, por el que se regula la concesión directa de una Subvención a la Fundación para la Formación e Investigación Sanitarias de la Región de Murcia, para la mejora de la Atención al Paciente con Enfermedades Crónicas y Polimedicado, a través de la realización de un 'Programa de Intervención Poblacional para mejorar el uso de Fármacos en Pacientes Polimedicados'.

29. Yourman L, Concato J, Agostini JV. Use of computer decision support interventions to improve medication prescribing in older adults: a systematic review. Am J Geriatr Pharmacother. 2008;6:119-29.

30. Agostini JV, Zhang Y, Inouye SK. Use of a computer-based reminder to improve sedative–hypnotic prescribing in older hospitalized patients. J Am Geriatr Soc. 2007;55:43-8.

31. Peterson JF, Kuperman GJ, Shek C. Guided prescription of psychotropic medications for geriatric inpatients. Arch Intern Med. 2005;165:802-7.

32. Hanlon JT, Schmader KE, Samsa GP, Weinberger M, Uttech KM, Lewis IK, et al. A method for assessing drug therapy appropriateness. J Clin Epidemiol. 1992;45:1045-51.