Prospective Study on Conciliation of Medication in Orthopaedic Patients

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Abstract

Objective: To identify and resolve discrepancies between the medications prescribed when patients are admitted to hospital and the medication usually taken by selected patients, adapting the prescriptions to the pharmacotherapeutic guidelines and the clinical condition of the patient.

Method: A prospective study in which patients over the age of 65 with at least one chronic disease in addition to the reason for hospitalisation in the orthopaedic department were selected. Pharmacists reviewed the treatments 24-48 hours after hospitalisation, comparing the order for medication sent to the pharmacy with the clinical history and patient interview. The following data were collected : patient name, age, gender, reason for hospitalisation, comorbidities, drugs, discrepancies, recommendation, and acceptance.

Results: During a 4-month period, 84 patients were included (23.5% of all the patients admitted to the orthopaedic service), aged 75.40 (10.63) years. 47.6% presented 3 or more chronic diseases and took 8.14 (2.95) drugs.

A total of 120 discrepancies were detected in 60 patients (71.43% of those selected): 71 unjustified discrepancies and 49 justified discrepancies.

Among the unjustified discrepancies, the majority were due to the omission of a drug followed by dosing errors, frequency, timetables, route or method of administration. The acceptance of the pharmaceutical recommendation was 88.73%.

Conclusions: The action of the pharmacist, as part of the multidisciplinary team, resolved the discrepancies in the medication on admitting the patients selected.

Key words: Chronic medication. Continuity of patient care. Medical records. Medication errors. Patient admission. Pharmacists. Hospital. Prescriptions. Drug.

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Estudio prospectivo de conciliación de medicación en pacientes de traumatología

Objetivo: Identificar y solucionar las discrepancias existentes entre la medicación prescrita al ingreso hospitalario y la medicación habitual de pacientes seleccionados, adecuando las prescripciones a la guía farmacoterapéutica y a la situación clínica del paciente.

Método: Estudio prospectivo en el que se seleccionaron todos los pacientes mayores de 65 años, con al menos una patología crónica además del motivo de ingreso en el servicio de traumatología. Los farmacéuticos revisaron los tratamientos a las 24-48 h del ingreso comparando la orden médica enviada a farmacia con la historia clínica y entrevistando al paciente. Se recogieron los siguientes datos: nombre del paciente, edad, sexo, motivo de ingreso, comorbilidades, medicamentos, discrepancias, recomendación y aceptación.

Resultados: Durante 4 meses se incluyeron 84 pacientes (el 23,5% de todos los pacientes ingresados en el servicio de traumatología), con una edad de 75,40 ± 10,63 años. El 47,6% presentaban tres o más patologías crónicas y tomaban 8,14 ± 2,95 medicamentos. Se encontraron 120 discrepancias en 60 pacientes (71,43% de los seleccionados): 71 discrepancias no justificadas y 49 justificadas. Entre las discrepancias no justificadas, la mayoría se debieron a omisión de un medicamento seguido de error en la dosis, frecuencia, horario, vía o método de administración. La aceptación de la recomendación farmacéutica fue del 88,73%.

Conclusiones: La actuación del farmacéutico, como parte del equipo multidisciplinar, ha resuelto las discrepancias de medicación al ingreso en los pacientes seleccionados.

Palabras clave: Medicación crónica. Continuidad de la asistencia. Historia clínica. Errores de medicación. Ingreso hospitalario. Farmacéuticos de hospital. Prescripción de medicamentos.

INTRODUCTION

Treatment conciliation can be defined as the formal process which consists of assessing the complete, exact list of drugs the patient was taking before, together with the pharmacotherapeutic prescription after a healthcare transition, whether this be hospitalisation, a change in prescribing physician or release from hospital. If discrepancies are found between the chronic treatment and the hospital, this must be discussed with the doctor, and if necessary, the prescription must be adjusted.[1] All discrepancies not justified by the doctor are considered conciliation errors.[2]

In the United States, the Joint Commission on Accreditation of Healthcare Organizations (JCAHO) acknowledges that conciliation errors compromise the safety of the use of drugs and demands that hospitals develop a system for obtaining the complete pharmacotherapeutic history of the patients, to ensure they receive the necessary medications suitable for the new situation.[3]

In Spain, the National Study of Adverse Effects (ENEAS) shows that 8.4% of patients admitted present some kind of adverse effect, half of which are preventable and which are mainly caused by the inappropriate use of the medications.[4] The Quality Plan for the National Health System from the Spanish Ministry of Health[5] is based on this study, and in its objective 8.3 requires the introduction of safe practices to prevent medication errors and the adverse effects of drugs related to the care provided to chronic patients. Furthermore, in the Autonomous Region of Madrid, the Strategic Objectives of Pharmacy from the Management Contract 2007[6] include, from the patients' perspective, working to better adapt pharmacotherapeutic treatments in terms of efficacy and safety, paying particular attention to elderly patients.

Conciliation errors occurring on hospitalisation account for 46% of all medication errors[7] and it is estimated that between 60%-67% of the patients experience at least one omission or addition error affecting their medication when their pharmacotherapeutic history is taken on hospitalisation.[8] Additionally, these discrepancies between the medication on hospitalisation and the habitual treatment taken by the patients can cause moderate or even serious harm in 39% of patients,[9] as the errors not detected during the initial stage of the hospitalisation are usually continued throughout the stay in hospital.

The medication conciliation process has been shown to be an important strategy for reducing medication errors, the cost of the treatments and the potential risk to the patients (2.8-14) provided the pharmacological treatments are reviewed during the first 24-48 hours after admission. The person responsible for doing this must have sufficient knowledge and experience in handling medication and is generally a member of the nursing staff,[15] but also the doctor or the pharmacist,[16] although in many cases the responsibility is shared.[17]

The pharmacist has seen an opportunity to improve pharmaceutical care in this activity[14] which inevitably fosters communication with the patient and the multi-disciplinary team. This person must also have the necessary knowledge and training to identify the dose, routes of administration and incorrect frequencies, as well as therapeutic duplicates[18] and some studies show that the pharmacotherapeutic history taken is more exhaustive when carried out by pharmacists rather when done by doctors[19] or nursing staff.[18,20]

However, one of the main barriers to the conciliation of the medication is the time available for reviewing the clinical history and conducting the interview with the patient. In this sense, the previous selection of patients based on age, number of medications prescribed or the number of diseases would seem appropriate to increase the efficacy of the intervention.[21,22] On the other hand, it is possible to start or prioritise the surgical services where the healthcare personnel are not familiar with the drugs usually taken by the patient, more related to the comorbidities than the reason for the hospitalisation. There is also a period of time from surgery to restarting the oral therapy during which it is difficult to gather the information about the treatment taken at home, which delays its establishment.

The purpose of this study is to identify and resolve the discrepancies existing between the medication prescribed when admitted to hospital and the usual medication taken by selected patients, adapting the prescriptions to the pharmacotherapeutic guidelines and the clinical condition of the patient.

METHOD

A prospective study was performed in a general hospital with 400 beds over 4 months, between January and April 2007, selecting patients over the age of 65 admitted to the orthopaedic service with at least one chronic disease in addition to the reason for hospitalisation.

Initially the programme was presented to doctors in the department who saw the need for the pharmacist to prepare the pharmacotherapeutic history when the patient was admitted, providing substitute treatment if necessary, notifying any unjustified discrepancies for evaluation and informing the patient of changes to the treatment.

Every day the pharmacist reviewed the treatments on admission using the medical order sent to the pharmacy department, and within 24-48 hours compared with the clinical history, conducting an interview with the patient to identify discrepancies. The patient or carer was asked what medication the patient was taking, confirming this with the usual "bag of drugs" and asked to explain how and when these were taken.

Any possible discrepancies were identified according to the Delgado et al classification that makes a joint assessment of chronic medication and that prescribed on entering the hospital, differentiating between those requiring clarification and those not requiring it[14]:

– *The justified discrepancies were*: medication started justified by the clinical situation; medical decision not to prescribe a drug or to change the dose, frequency, or route according to

the clinical decision; therapeutic replacement according to the hospital pharmacotherapeutic guidelines

– *The unjustified discrepancies requiring clarification were*: omission of a necessary drug; addition of a drug not justified by the patient's clinical situation; different dose, route of administration, frequency, timetable, or method of administration; different medication. A different medication in the same class is prescribed without clinical justification for the replacement or availability reasons in the pharmacotherapeutic guide; duplication; interaction; medication not available in the hospital without therapeutic exchange; incomplete prescription

The seriousness was evaluated using the National Coordinating Council for Medication Error Reporting and Prevention´s (NCCMERP's)[23] which classifies them in: *a)* no potential harm (categories A-C); *b)* requires control or intervention to prevent the harm (category D); and *c)* potential harm (categories E-I).

Once the discrepancies were assessed, if they were not justified a recommendation was offered to the professional responsible either verbally or in writing and the acceptance or refusal of the recommendation was evaluated by a later evaluation of the treatment order. The patient was also informed of any changes made to his usual treatment.

For each patient selected, the following information was gathered: patient name, age, gender, reason for hospitalisation, comorbilities, medications before and after hospitalisation, discrepancies, recommendation and acceptance, and entered on an ACCESS database.

RESULTS

During this period a total of 358 patients were admitted to the Orthopaedic Department, including 84 meeting the inclusion criteria for the study (23.5% of all those admitted). Table 1 sets out the most important characteristics of these patients.

A total of 120 discrepancies were found in 60 of the 84 patients, comprising 71.4% of the patients included presenting some kind of discrepancy, with an average of 2 discrepancies per patient. The percentage of patients in relation to the number of discrepancies is shown in Table 2 and the therapeutic groups of most frequent drugs are set out in Figure 1.

With regard to the type of discrepancies between the usual medication and that prescribed on hospitalisation, 71 (59%) are unjustified discrepancies and require clarification, and 49 (41%) were justified and therapeutic replacement was made according to the therapeutic exchange guidelines.

The discrepancies with the usual treatment requiring clarification are shown in Figure 2. The recommendations proposed were accepted in 88.7% of the cases by doctors who changed the treatment within a maximum period of 24 hours. The recommendations that were not accepted are related to drugs omitted that were not essential to the patient, and the doctor

Table 1. Characteristics of the 84 Patients Selected

Characteristics	Value
Gender	
Male	28%
Female	72%
Age, mean (SD), y	75.4 (10.6)
Diagnosis on hospitalisation	
Gonarthrosis	20%
Hip fracture	18%
Coxarthrosis	10%
Other	52%
Comorbidities	
Arterial hypertension	67%
Neurological changes	25%
Diabetes Mellitus	17%
Number of medications on admission, mean (SD)	8.1 (2.9)

Table 2. Number of Patients and Discrepancies

No. Discrepancies	No. Patients (n=84)	% Patients
0	24	28.6
1	27	32.1
2	16	19.0
3	10	11.9
4	4	4.8
5	3	3.6

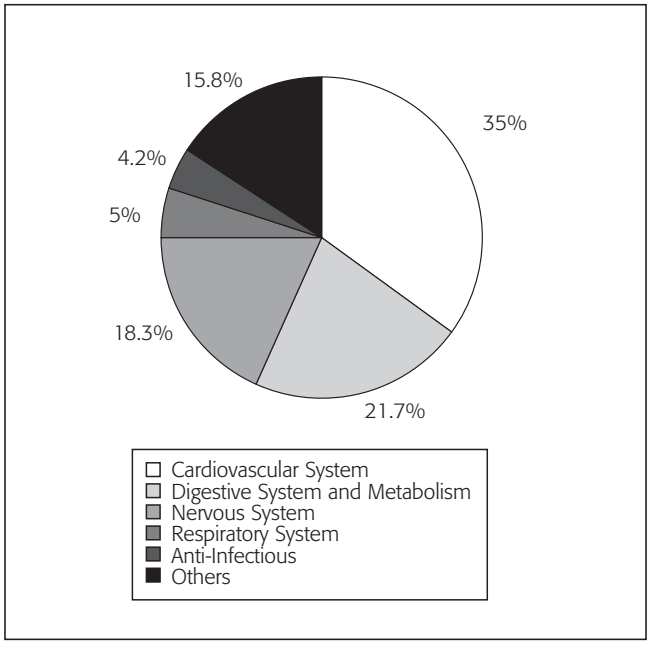

Figure 1. *Therapeutic groups of the most frequent drugs in terms of discrepancies.*

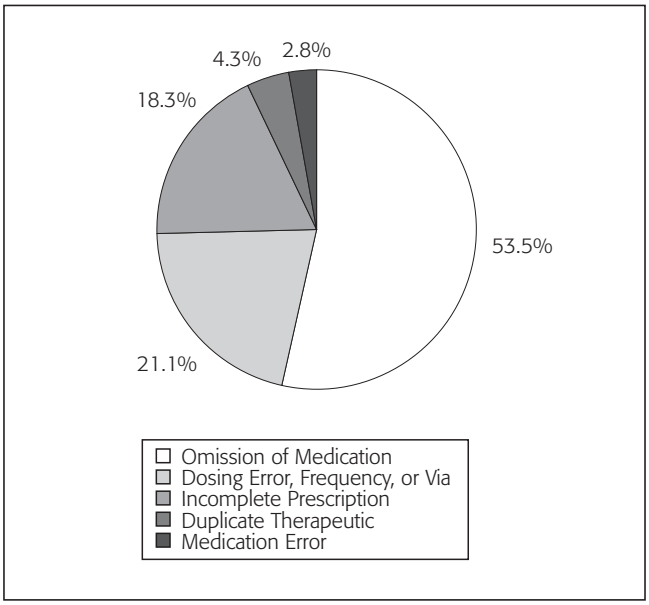

Figure 2. *Types of unjustified discrepancies.*

responsible considered it was not necessary for the patient to receive them.

The discrepancies accepted needing clarification were classified, according to seriousness, using the NCCMERP scale,[23] that assessed their potential to cause harm to the patient if the patient's medication had not been reconciled within 24-48 hours. The majority were included in categories A-C (67.6%), for example omission of oral calcium during the hospitalisation. However, there were 21 discrepancies (28.2%) were classified in category D, for example Adalat 10 mg every 12 hours instead of Adalat Oros 30 mg every 12 hours. Lastly, 4.2% of the errors could have caused serious harm or clinical deterioration (category E-F) as is the case of omitting Tacrolimus in one patient with a renal transplant on chronic immunosuppressant treatment.

DISCUSSION

Since 2006, the JCAHO demands that certified hospitals obtain the complete information regarding patients' pharmacotherapeutic history and that they conciliate their medication to guarantee the continuity of pharmacological treatment.[3] Numerous works have been published in which the pharmacist conciliates a sample of patients selected or in certain hospital departments, given the impossibility of covering all the patients coming to the hospital.

In this article it is shown that patient selection is an essential element for increasing the efficacy of treatment conciliation, as of all the patients admitted during the study period to the Orthopaedic Service, only 23.5% were candidates for intervention and of these more than 70% had a discrepancy at the time they were admitted.

With regard to the selection, in our study patients over the age of 65 were included with different chronic diseases, which means that the percentage of patients evaluated was slightly lower than in other works selecting patients, such as those published by Lessard et al (patients over the age of 55) and Cornish et al (if they were taking four or more drugs before they were admitted) that includes 29% of patients admitted.[9,10] The average age is similar to that in earlier works, with an average of 75 years.[9,10] Logically, elderly patients are susceptible to suffering from numerous health problems leading to polymedication, which does not mean they have to interrupt their chronic medications during hospitalisation. In fact these patients were often evaluated by an internist or geriatrician when their chronic diseases became uncontrolled caused by hospitalisation or the surgical intervention.

In our study, 47.6% of elderly people had 3 or more chronic diseases, more than the 36% stated by Baena et al.[22] Specifically, the most common were arterial hypertension, neurological changes (depression, Alzheimer disease, Parkinson's disease), and diabetes mellitus, which agrees with the WHO study in 1998.[24] These diseases are also more prevalent in elderly people in Spain and are also the most frequent causes of hospitalisation.[25,26] This translates, in general, into a multiple drug treatments which are very difficult for patients with cognitive, psychological, or even eye-sight problems[27] to handle, meaning they are at risk of suffering numerous medication errors.[27,28] In effect, the patients studied took an average of 8 drugs, which coincides with the data from Lessard et al and Cornish et al in elderly patients taking multiple drugs, a larger change in the national average oscillating between 2-3 drugs per elderly person and more than 5 drugs if self-medication is taken into account.[29]

With regard to the discrepancies, published studies differ in that they cover the justified discrepancies or not, such as therapeutic replacement. In our study both types were included, in the same way as that by Gleason et al, getting to the conclusion that the percentage of patients with discrepancies with regard to those selected was much higher in our case, 71.43% in comparison to 54.41% as a consequence of the patient selection criteria and the surgical service, who did not systematically review the patients' chronic medication.

The larger percentage of drugs involved in the discrepancies corresponded to the cardiovascular system group (35%), in the same way as Cornish et al and Pickrel et al, but unlike Lessard et al and Gleason et al who obtain larger discrepancies in the vitamins and electrolytes group, due to the larger proportion of patients who self medicate with multivitamin products.

The relationship between the type of discrepancies requiring clarification coincides with the majority of published studies[2,9,10-13] that found that the larger percentage was mainly due to the omission of a drug, followed by errors in dosing, frequency, timetables, route or method of administration. Omitted drugs for diseases unrelated to the reason for the hospitalisation show that healthcare personnel are not involved in an effective way in the

treatment, leaving the responsibility for the usual drug treatment in the hands of the patient.

From the recommendations proposed for unjustified discrepancies, 88.73% were accepted by the doctor, higher than that seen by Lessard et al and Vira et al (40% and 46%) and similar to Gleason et al, who obtained an acceptance of 71.13%. With regard to justified discrepancies, these were due to adaptation to the pharmacotherapeutic guidelines and the acceptance was 100%.

With regard to the seriousness of the unjustified discrepancies, this coincides with other published studies where no harm was caused by the majority 55%-85%,[2,9-13] around 14%-33% had needed monitoring or intervention and about 5% had caused serious damage or clinical deterioration, in contrast to the work of Gleason et al, in which the potential harm increases to 22%. This could be due to the criteria used in the classification of seriousness, as probably a mistake made with an antidiabetic or an antihypertensive can be corrected during the follow up of a patient when an increase in glycaemia or blood pressure is observed and would be catalogued as D instead of E-F.

The results found reveal that the process for collecting information about the clinical history is inadequate and it is necessary to systematically record the medication which is taken by patients at the time of admission to hospital. This problem requires a multi-disciplinary approach, as a meticulous review of the patients' usual treatment is required and the doctor must record on the clinical history, without forgetting the work of the professionals who in contact with the patient, gather their comments and medication requirements. The pharmacist, in the meantime, can evaluate the treatment when the patient is admitted, taking into account the chronic treatment as part of the professional group caring for the patient,[30] advising other professionals and preventing medication errors, particularly, in patients more susceptible to presenting them, such as elderly patients taking several drugs.

This process must be completed by giving information to the patient when released, given that both the healthcare episode and the conciliation on hospitalisation mean changes to the medication to be taken at home. It is also fundamental that the patients should receive sufficient, appropriate, effective information to ensure good adherence to the treatments, as only 3 in 10 elderly patients taking multiple medications can confirm they take their medication correctly.[31]

One important limitation of the study is that the patient is the main source of information on the therapy itself, which can lead to errors as the elderly patients can have eye-sight, cognitive, cultural beliefs, polymedication, incorrect use of drugs, non-referred self-medication, and often the main carer can present the same limitations.[32]

It is a problem that there is no quick and completely reliable connection of the clinical history between the different professionals or levels of caring for the patient. The new clinical history and electronic prescription applications can contribute to these hospitals in order to systematically collect information on the medication that a patient is taking and improve safety. In this sense, an initiative being developed in the Autonomous Region of Andalusia is the digital health history using the Diraya computer application integrating all the health information about each citizen, personal non-transferable information, on digital media, with telematic transmission and confidentiality guarantees. This enables the clinical histories currently existing in hospitals and health centres to be replaced by a single digital medical history, which makes it possible for the different healthcare professionals looking after a patient to have access to independent clinical information regardless of where the patient is being cared for.[33]

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