Medication reconciliation as a tool for reducing polypharmacy at hospital discharge in Internal Medicine Wards

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ABSTRACT

Medication reconciliation is a fundamental process of high-quality and safe medical care. An accurate current medication list is essential in all patient care settings. The process of medication reconciliation aims to promote patient safety by providing a structured process for physicians and other healthcare providers to acquire and transfer accurate detailed information about current prescribed medications, non-prescription and over-the-counter drugs. Nevertheless, medication reconciliation is not yet sufficiently spread in the clinical practice. The barriers to the construction of an accurate medication list and to the development of a reliable and enduring method of communication are mostly cultural gaps, lack of time and staff.

Introduction

Medication reconciliation (MR) is a useful tool to reduce polypharmacy and to prevent the risk of clinical error such as medicine duplication or therapy interruption after discharge. This process may be of help especially in Internal Medicine wards where elderly and no sufficient patients, taking multiple drugs for co-morbidities, are commonly admitted (Figure 1).

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At the admission a detailed home therapy checking should be a crucial part of the initial evaluation of the patient. Nevertheless, not infrequently, clinicians mostly focus on the drugs that are directly related to the pathology responsible for the current admission rather than investigating the full list of medicines. This frequently occurs for cultural reasons, lack of time and absence of informatics system and standardized methods for bidirectional transmission of patient clinical information between hospital and territory. Given the potential of MR, a structured process, compatible with the current restricted resources, is desirable.

Rationale for medication reconciliation process

MR is an evidence-based process, which has been demonstrated to significantly reduce medication errors caused by incomplete or insufficient documentation of medicine related information.[1] Thus, an accurate communication, either verbal or written, of medicine related information between healthcare practitioners is mandatory for a successful process.

Results from several multicenter studies showed that from 10% to 67% of medication histories have at least one error[2] and up to one-third of these errors have the potential to cause patient harm.[3] More than 50% of medication errors occur at transfers of care[4] and an incomplete medical history taking may cause up to 85% of discrepancies in medication treatment.[5] Patients with one or more medicines missing from their discharge information are 2.3 times more likely to be readmitted to hospital than those with correct information at discharge.[6,7]

MR aims, firstly, to obtain the most accurate list possible of patient medicines, allergies and adverse drug reactions (recognition phase) and, secondly, to use such information within and across the continuum of care to ensure safe and effective medicine use. It is expected that the process, whether it is paper supported or electronic, will facilitate the optimal use of medicines and reduce discrepancies that have the potential to cause an error and/or harm to the patient.[8] Of note, up to 46% of medication errors occurs at admission or discharge from a clinical unit/hospital when patient orders are written.[9] MR process, by means of comparing the patient medication orders to all of the medications that the patient has been taking, aspires to minimize medication errors such as omissions, duplications, dosing errors or drug interactions. MR should be done at every transition of care in which new medications are ordered or existing orders are rewritten. Finally, this process, by reducing the number of medicines and frequency of administration, should also improve patient adherence to therapy and safety.

Starting points of medication reconciliation

According to the Joint Commission,[10] MR process should be articulated through five steps: i) to develop a list of current medications; ii) to develop a list of medications to be prescribed; iii) to compare medications between the two lists; iv) to make clinical decision based on the comparison; v) to communicate the new list to the appropriate caregivers and to the patient.

List of medications

A comprehensive list of medications should include all prescription medications, herbals, vitamins, nutritional supplements, over-the-counter (OTC) drugs, vaccines, diagnostic and contrast agents, radioactive medications, parenteral nutrition, blood derivatives, and intravenous solutions with specific dosage, frequency and route of administration. OTC drugs and dietary supplements are often missed during the medication recording process since most clinicians do not consider those as medications. However, since interactions can occur between prescribed medication and OTC drugs or dietary supplements, all the aforementioned medications and supplements should be included in the MR process. On-line drugs database (*i.e.* MICROMEDEX)[11] are useful tools that may facilitate the comparison between drugs in terms of bioavibility and interactions and the clinical judgments about complementary and alternative medication. Finally the list of medications should be done within 24 h from admission declaring the information sources.[12]

Education of patients and family members

Patient education is a major concern in MR process. Patients may not be accurate historians[13] and

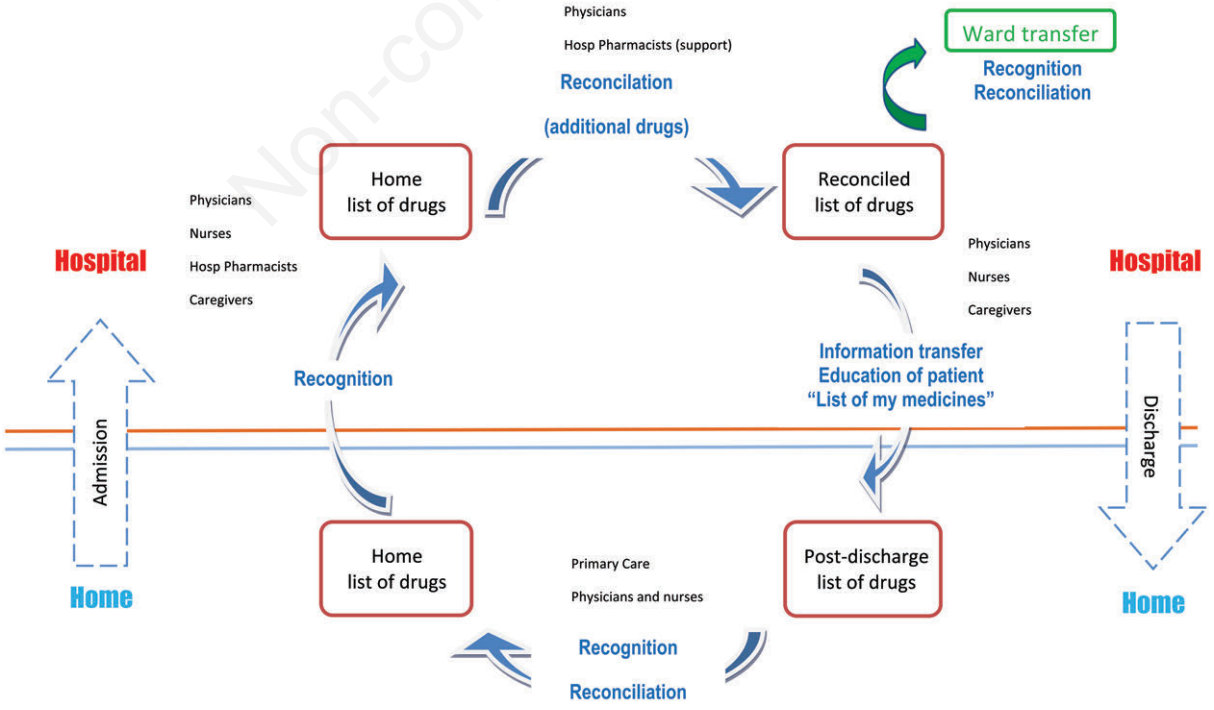

Figure 1. Medication reconciliation process.

often they omit to declare the use of OTC drugs or dietary supplements since not considered to be medication. A standard format titled *List of my medicine* has been proposed as integrant document of the patient clinical fascicle[14] to be reconciled at every health care encounter.[15,16] At discharge from hospital and during ambulatory visit, nurses have an important role to sensitize patients for an accurate and complete maintenance of the list. Primary care physicians and other clinicians should help patients to utilize and maintain a complete, accurate and understandable medication list. Indeed it is not unusual for patients to misunderstand their condition or to be unfamiliar with their medications and multiple drug regimens.[17] Moreover, generic substitutions can produce patient confusion, mismanagement and poor outcomes.[18] A newly reconciled list should include the date and time of the reconciliation, identify the person making the reconciliation and his contact information. List may be used as a personal reference and should be submitted to all physicians or providers.

Physician role

Given the unique competence in the clinical setting, physicians have a central role in MR process. After a comprehensive recognition of medications, physicians should verify for each drug the original indication and confirm or not the prescription according to the current clinical status. In case of insertion of additional drugs in the list, physicians should care about possible new interactions and evaluate alternatives. Since different doctors may approach the same patient during hospitalization, the MR process should be stated as a standard and mandatory part of the clinical evaluation, with defined responsibility,[17] that should redo at any transition of care in order to avoid the missing of reconciled information to the next point of care. This is a crucial point and when disregarded it may impair the subsequence reliability of MR process. Finally, physicians should concur to educate and encourage patients to keep an accurate *List of my medicines*.

Nurse role

Nurses play a main role in advocating for quality and safety by monitoring the whole MR process. At the admission nurses may support the doctor on medication recognition phase searching for help from family members in case of unreliable patients. During hospitalization nurses monitor the propriety of drug transcription and at discharge verify possible gaps between what patients are currently receiving and what they are prescribed in discharge orders. Moreover, nursing staff concurs to assist and educate patients in using drugs and maintaining the list of medicines.[9]

Finally, home care nurses may guarantee continuity between hospital and territory by monitoring and updating the list of medicine and checking the correctness of drug taking.

Pharmacist role

Reconciliation process should be thought as a multidisciplinary approach involving physicians, nurses, patients and their family members, and hospital pharmacist. The latter, although not directly involved on patient assistance, is uniquely positioned to lead and support patients, inter-professional teams and primary care physicians in MR process.[19] When performed by pharmacist, MR process can reduce the frequency and severity of hospital medication errors.[20] These also translated into better clinical and economic outcomes.[2,19,21-23] The pharmacist-led reconciliation yielded the highest expected net benefits and probably of being cost-effective of more than 60% by a quality-adjusted life year value of 10,000 GB pounds.[24] The American Society of Health-System Pharmacists (ASHP) and the American Pharmacists Association (APhA) began a collaborative effort in 2007 and 2008 to create a shared vision for the role of the pharmacist in MR processes.[25]

All the sanitary figures involved in the MR process have an active role in terms of pharmacovigilance since they must report on a form, as required by a specific normative of our country, any suspect adverse drug reactions due to the use of, or interaction between, medicines.[26,27] This represents an easily accessible, continuously updated, on-line registry for all sanitary figures. Additionally, the availability of an on-line programme that automatically checks any drugs interactions may facilitate the avoidance of side effects due to pharmacological interaction**.**

Several strategies of the MR process can be planned according to ward's number of people involved, technological support available, absence or presence of pharmacist on ward or in the hospital. These range from an entry level, based on medication history with reconciliation at admission and discharge by prescriber only,[28-30] to an ideal method based on an inter-professional approach (*e.g.* prescribing physician and pharmacist collaboration)[31,32] for broader medication management finalized to assess appropriateness, safety and effectiveness of agents with an electronically generated discharge prescription and a pre-discharge medication counseling held by physicians or nurses combined with provision of patient-friendly reconciliated medication schedules upon discharge.[33-35] Finally a post-discharge follow up phone call to patient by hospital clinicians (nurses or pharmacist)[36,37] would allow a periodical home monitoring of medication changes and the subsequent communication of the updated medication list to the community pharmacist and primary care physicians.[38,39]

Critical points of medication reconciliation process

Some aspects may hinder the adoption of the MR process in the current clinical practice.

Time needed

More than 60% of nurses interviewed declared that determining the medications a patient was taking at home, clarifying medication orders at transfer and ensuring accurate discharge medication orders was a time-consuming process. However, although implementing MR will likely consume more health care provider time initially, the process may become more efficient once in place.[40]

Transmission

Transition of patient from a ward to another or the discharge to home has a potential loss in transmission of clinical data and documents especially in the absence of shared methods and format.

Admission

Over one third of the patients have a medication error at admission and 85% of them have errors originated from their medication histories.[41] A common database about patient therapy between primary care physicians and hospital medical teams might better guarantee that any previous treatment will be correctly reported in the medical record especially in case of elderly, unconscious or insufficient patients. Otherwise, in such patients maximal effort should be made in order to improve the accuracy of medication histories.

Discharge

Up to 42% of the patients have one or more errors in the discharge medication order.[42] These failures may result from incomplete gathering of the home medication regimen at admission combined with rushed discharges.[6] Commonly medications that should be restarted are not and this frequently involves cardiovascular (36.4%), gastrointestinal (27.3%) and pulmonary (13.6%) drugs.[43] Over 59% of discrepancies not corrected at discharge can result in patient harm.[4] At discharge nurses or other health care providers should clearly explain medication management and encourage patients to keep an accurate medication list.

Information technology

Since patients may experience multiple care setting, maintaining a timely information flow between physicians is difficult especially when systems for communication among providers are poor or ineffective. Frequently if electronic information systems exist in two locations, they are not compatible or do not interface with systems in other locations where patients receive their care or medications. An information technology system may solve the aforementioned problems by ensuring an uniform and standard process and linking information within different settings of care. Ideally, an electronic health record system would display a patient's medication history, other essential information such as allergies and laboratory values and all medications prescribed by any provider, anywhere, at any time.

Since 2011 the Italian Health Service has adopted the National Service Card provided with a chip that allows citizens to consult their personal electronic fascicle; however, such electronic fascicle contains only laboratory exams and clinical booking available on *SOLE project* (*Sanità On LinE*: https://www.progetto-sole.it/pubblica/). In the future, it might contain other information such as the medication list and will be available for the clinicians authorized by patients.[44]

Conclusions

Currently, our patients, given their clinical complexity, are becoming more and more frequently shared between many specialists and, as a consequence, it should be mandatory for their safety that the mode of transmission of medicine information is standardized as much as possible and, moreover, during each transition of care the list of drugs should be reviewed in a critical manner.

Several studies demonstrated that MR process is essential to optimize the safe and the effective use of medicines and to prevent the risk of clinical error. However, it is still underused for cultural gaps, lack of time and staff, and restricted resources. Its inclusion in the process of computerization of medical records could improve its performance supporting all the professionals involved. Furthermore, creation of patient electronic fascicle as the only health reference, could contribute to the creation of a database of therapies where every prescriber (whether hospital or community) has the ability to retrieve the current therapy of the patient and make/record any changes. In the meanwhile, training of patients and their care givers for the maintenance and updating of *The list of my medicine* remains crucial for communication in every transition of care. Promoting patients understanding of their medication regimen is an important strategy for patient safety. Although the patient is the owner of the medication list, the physician is the steward of the patient's medication information (*i.e.*, medication history, current drugs, allergies) and MR process falls under the responsibility of all physicians involved. MR process is part of a *safety culture*

and must be structured within each team or staff according to the local human and technological resources but referring to a more standard model of MR in order to reduce differences and variation of approach among providers.

Key messages

i) Medication reconciliation process is a tool to promote a *safety culture* in healthcare;

ii) Medication reconciliation process should be stated as a standard and mandatory part of the clinical evaluation;

iii) A comprehensive list of drugs should include all prescription medications, herbals, vitamins, nutritional supplements, over the counter drugs, vaccines, diagnostics and contrast agents, radioactive medications, parenteral nutritions, blood derivates;

iv) Medication reconciliation is a multidisciplinary process involving hospital and primary care physicians, nurses and hospital pharmacists;

v) The education of patients and family members is fundamental to avoid the failure of the process;

vi) Medication reconciliation process contributes to guarantee the continuity of care between hospital and territory;

vii) Information technology will support a more standardized and uniform process by linking different setting of care.

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