Medication fall risk in old hospitalized patients: A retrospective study[☆],[☆☆],[★]

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SUMMARY

Background: While the causes of falls in old hospitalized patients are multifactorial, medication has been considered as one of the most significant factors. Given the large impact that this phenomenon has on the lives of the elderly and organizations, it is important to explore such phenomenon in greater depth.
Objective: The objective of this study was to explore the association between medication and falls and the recurrent falls (n ≥ 2), and identify medication related risk for fall in hospitalized patients, in a large acute hospital.
Design: Retrospective and quantitative study from June 2008 to December 2010.
Setting: The study was conducted in a private hospital for acute patients in Lisbon, Portugal.
Participants: The study included a sample of 214 episodes of fall event notifications which occurred in 193 patients.
Methods: The current study was conducted through the "face to face consensus" technique which emerged the treatment groups to investigate. Regarding the data analysis we used Student's t test, ANOVA and Odds Ratio. In the violation of the premises for the use of parametric statistics we used the Kruskal–Wallis test. To assess the fall risk, and the medication-related fall risk, we used the Morse Fall Risk Scale, and the Medication Fall Risk Score.
Results: Patients who received drugs from the therapy group of "Central Nervous System", are 10 times more likely to have fall risk (OR 9. 90, 95% CI 1.6–60.63). Association was found between falls (OR 6.09, 95% CI 1.30–28.54) and its recurrence (OR 3.32, 95% CI 1.61–6.85), among patients receiving haloperidol and receiving tramadol for recurrent falls (OR 3.10, 95% CI 1.59–6.07). In 34% of the patients the medication fall risk score was 6 or higher.
Conclusions: This current study allowed identifying medication-related risk factors for falls, that nurses should consider when prescribing interventions to prevent falls and its recurrence, when patients are admitted to acute care hospitals.

Introduction

Patient falls in hospital context are the most reported incident (Healey and Scobie, 2007; Liu et al., 2012; Perell et al., 2001), worrying a great number of health institutions, mainly due to the extra cost of additional interventions, increase in the average length of hospital stay and litigation between patients/families and health organizations/professionals (Cumming et al., 2008; Healey and Scobie, 2007; Perell et al., 2001). Furthermore, patient falls may result in direct negative impacts on the patients themselves, varying from anxiety, and loss of confidence, to lesions that may cause pain and suffering, independence loss and occasionally even death (Healey and Scobie, 2007).

Background

The causes of falls are multifactorial and may range from age, sex, length of hospital stay, debilitating conditions, previous fall history, confusion/disorientation, incontinence among others (Evans et al.,

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1999; Gluck et al., 1996) and the risk of serious injury in a fall increases with the age of the patient.

The use of certain drugs, due to their accessory side effects (such as sedation, dizziness, postural disturbances, altered gait and balance, or impaired cognition) may have a significant contribution in the occurrence of this phenomenon (Cumming et al., 2008; Healey and Scobie, 2007; Oliver et al., 1997; Perell et al., 2001).

Studies in the field has shown evidence, that polypharmacy (n ≥ 5) (Secoli, 2010) is associated with fall risk (Gallagher and O'Mahony, 2008), and drug interactions may contribute to falls. The results of such studies, also point out that certain specific drug groups, such as anxiolytics, sedatives and hypnotics, are important factors contributing to fall risk, especially in the hospital setting (Oliver et al., 1997, 2004; Perell et al., 2001).

Two of the first most relevant studies associating fall and drugs were conducted in the community setting, with the main objective of clarifying this relation in old non-hospitalized population (Leipzig et al., 1999a, 1999b).

The results of the first study show a strong association between the use of psychotropic drugs and fall recurrence, indicating an increase about 50% of its incidence among patients medicated with these drugs when compared to those who were not prescribed with any at all. It was also found that those who consumed higher doses or multiple psychotropic drugs had a superior fall risk. In the light of the results concluded by the authors mentioned above, it is suggested that these drugs should be used under caution (Leipzig et al., 1999a). In the second study, the authors found an association between falls and Class Ia antiarrhythmics, digoxin and diuretics, but not with analgesic drugs (Leipzig et al., 1999b).

Their conclusions were, therefore, that the use of psychiatric drugs has a stronger association with falls when compared with the cardiovascular system drugs and analgesics.

In the literature review by Oliver et al. (2004) which investigated the risk of falls in hospitalized patients, five risk factors for falling were identified, including being treated with sedative and hypnotics.

In a report published in 2007 by the *National Patient Safety Agency*, that documented and analyzed patients falls in UK health institutions, 600 patient fall registered by free text notifications were analyzed. The fall risk factors identified by the authors mentioned in the previous paragraph are present as well and among those is the use of sedatives and benzodiazepines, findings that are fairly similar to studies carried out in the community setting (Healey and Scobie, 2007).

Shuto et al. (2010) carried out a retrospective study based on 349 fall incident recorded in hospitalized patients. One of the most noticeable findings was that there seemed to be a higher risk of falls when drugs that act upon the central nervous system, such as antihypertensive, antiparkinsonian, anxiolytic and hypnotic drugs, were prescribed to the patients.

Other prospective *cohort* studies, also carried in the community setting, add anticonvulsants to the drug classes already pointed out (Ensured et al., 2002).

The most common approach to patients fall prevention is the implementation of a comprehensive fall intervention program, which studies and evaluates factors contributing to fall risk and employs risk reducing interventions (Evans et al., 1999; Teresi et al., 2011). In the community setting, some of these intervention programs advocate a drug review as an important approach of fall and recurrent fall prevention (Leipzig et al., 1999b).

In terms of assessing the risk of falling, various scales include items related to the consumption of particular drugs, namely the Schmid Scale (1990) (anticonvulsants, tranquilizers, psychotropic drugs, hypnotics), the Downton Fall Risk Index (Nyberg and Gustafson, 1996) (tranquilizers/sedatives, antihypertensive drugs, antiparkinsonians, antidepressants), and the Hendrich II Fall Risk Scale (Hendrich and Bender, 2003) (antiepileptic drugs, benzodiazepines). There are also other scales that do not explicitly include medication; nonetheless,

this factor still remains as part of the evaluation in the item referring to the presence of a secondary diagnosis, as it happens in the Morse Fall Scale (Chow et al., 2007; Morse, 2009).

The risk for patient falls due to medication may be evaluated separately from the Morse's Fall Risk assessment with a fall risk scoring system (Beasley and Patatanian, 2009). When combining these two scores, we may prompt to determine if a patient is at risk for falls in order to plan appropriate care.

Objective

The falls/medication association seems to be one of the contributing factors to patient falls. The objective of this study is to recognize the relevance of the falls/medication association and therefore to gain a wider knowledge of the different associated patient falls' factors.

Methods

The present retrospective study intends to explore the association between medication and falls which occurred in patients of the studied hospital. This study, conducted a private hospital, had a sample of 193 adult patients with 214 fall notification incidents, between the period of the 1st July 2008 and the 31st December 2011.

In this study the analysis of patient records regarding fall incidents and the falls notified by six inpatient wards was also included. From these records, five of them were from acute wards and another one was from chronic patients identified in this study by the letters A, B, C, D, E and F.

Beyond all the enunciated variables included in the fall notification document (such as age, sex, ward, evaluation on of fall risk through the Morse Fall Scale before the fall), all patient files were consulted in order to gather information regarding medical diagnosis and medication initiated by the patients until 24 h prior the fall incident, in order to access the Medication Fall Risk Scoring (the classes are based in the American Hospital Formulary Service Classification).

Through a literature review supported by articles that evaluate the association between medication and falls, the classes of drugs associated with patient falls were selected more consistently.

A panel of five professionals (three nurses and two pharmacists) delimited the classes of drugs/therapeutic groups analyzed in this study (Table 1).

All of the drugs contemplated in the studied hospital form were listed by the pharmaceutical services of the hospital and inserted in the identified therapeutic groups. Afterwards, a systematic search in the patients' records was then performed in order to identify the prescribed drugs to the patients who were object of fall notification throughout the studied time frame. During this study 1523 types of drugs were identified and studied.

Subsequently, all data information was then transported to an evaluation grid using the *Microsoft Office Excel 2007* spread sheet, and analyzed through the statistical program *SPSS® — Statistical Package for*

Table 1
Therapeutic groups of drugs associated with fall.

Therapeutic group (TG)	Identification
Central Nervous System (CNS)	Antiepileptics and anticonvulsants
	Psychotropic drugs
	Anxiolytic, sedatives and hypnotic drugs
	Antipsychotic drugs
	Antidepressants
	Lithium
	Opioid analgesic drugs
Cardiovascular System (CVS)	Digitalis
	Antihypertensive drugs
Hormones and Drugs used in the Treatment of Endocrinal Diseases (HDTED)	Insulins
	Oral antidiabetic drugs