Therapeutics and Clinical Risk Management

Dovepress
open access to scientific and medical research

Open Access Full Text Article

LETTER

Intervention for improving the appropriateness of physician orders for oral medications in geriatric VIP patients during the journey to JCI accreditation

This article was published in the following Dove Press journal:
Therapeutics and Clinical Risk Management
27 May 2013
Number of times this article has been viewed

Ling-ling Zhu[1]
Quan Zhou[2]

[1]Geriatric VIP Ward, Division of Nursing, [2]Department of Pharmacy, the Second Affiliated Hospital, School of Medicine, Zhejiang University, Hangzhou, Zhejiang Province, People's Republic of China

Dear editor

We read with great interest the study by Fadare et al,[1] who assessed the prescribing pattern for elderly Nigerian outpatients and concluded that polypharmacy and the prescription of potentially inappropriate medications are major therapeutic issues in Nigeria, and there is a need for prescriber training and retraining with emphasis on the geriatric population. We completely agree with Fadare et al's[1] point of view that a low proportion of patients with potentially inappropriate medications highlights the importance of information technology in medication management. We discuss and share our perspectives in the following paragraphs.

Geriatric patients may suffer from multiple chronic diseases and receive more medications compared to younger patients. Medication therapy management (MTM) services provide essential reviews of drug regimens and are increasingly recognized as beneficial to patient safety, improved health outcomes, and cost savings. Undoubtedly, the elderly patients especially need MTM services.[2] The Joint Commission International (JCI) accreditation standard has strict requirements for rational drug use. Irrational drug use includes inappropriateness of the drug, dose, frequency and route of administration, real or potential drug–drug interactions (DDIs), allergies, therapeutic duplications, and variation from organization criteria for use.[3] The study of Fadare et al[1] indicates that irrational drug use is still a major issue internationally. Our hospital successfully passed JCI accreditation on Feb 24, 2013 and became the first accredited academic medical center hospital, globally. Very recently, we randomly evaluated the physician orders for oral medications in geriatric very important person (VIP) wards of our hospital before and after JCI accreditation so as to illustrate the effectiveness of clinical interventions during the journey to JCI accreditation. Geriatric patient information and indicators of rational drug use are presented in Table 1.

The results of our survey show that the proportion of drug-related problems (DRPs) decreased significantly from 13.0% (before JCI accreditation) to 3.5% (after JCI accreditation) ($P < 0.01$). Statistically significant changes (as decreasing) in five indicators demonstrated statistically significant changes ($P < 0.01$ or $P < 0.05$), ie, DDIs with potential adverse consequences, therapeutic duplication or combination use of two drugs within the same therapeutic or structurally similar class, and inappropriate dosing time, dosing frequency and dosing route. Seven DDIs with potential adverse consequences occurred before JCI accreditation whereas no adverse DDIs

Correspondence: Quan Zhou
Department of Pharmacy,
The Second Affiliated Hospital,
School of Medicine, Zhejiang University,
Zhejiang 310009, China
Tel +86 571 8778 4615
Fax +86 571-8702 2776
Email zhouquan142602@zju.edu.cn

submit your manuscript | www.dovepress.com
Dovepress
http://dx.doi.org/10.2147/TCRM.S46733

Table 1 Geriatric patients information and indicators of rational drug use

Indicators	Before JCI accreditation (April 1, 2012)	After JCI accreditation (April 1, 2013)
Number of patients receiving oral medications	36	42
Male	27	36
Female	9	6
Age (years) (mean ± SD)	83.5 ± 5.8	82.5 ± 8.7
Number of oral medications per patient (mean ± SD)	12.6 ± 5.8	12.8 ± 6.1
Number of patients receiving oral medications		
≥20	4	7
10–19	23	24
<10	9	12
Number of diagnoses (mean ± SD)	10.5 ± 3.5	9.2 ± 4.1
Number of patients with allergy history	7	10
Number of physician orders for oral medications	486	601
Percentage of use of generic names	100%	100%
Number of drug-related problems (DRPs)	63	21
Proportion of DRPs[#]	13.0%	3.5%
Detailed information for DRPs		
Drug–drug interactions (DDIs) with potential adverse consequences[#]	7	0
Therapeutic duplication or combination use of two drugs within the same therapeutic or structurally similar class[Δ]	10	4
Lack of therapeutic drug monitoring	8	5
Inappropriate dosing time[Δ]	12	5
Inappropriate dosing frequency[Δ]	14	5
Inappropriate dosing route[#]	10	1
Too large a dose	2	1
Beyond approved indications	2	0
Proportion of combination use of gastrointestinal protective medications for patients taking aspirin	50.0% (4/8)	77.8% (7/9)

Notes: [#]$P < 0.01$, [Δ]$P < 0.05$ (first phase vs second phase). Differences between the two phases were tested for statistical significance using Pearson's Chi-square test. A *P*-value < 0.05 was considered to be statistically significant. A *P*-value < 0.01 was considered to be highly significant. Proportion of DRPs was calculated as the value of number of DRPs divided by number of physician orders for oral medications.
Abbreviation: SD, standard deviation.

were detected after JCI accreditation. Geriatric patients in our study received an average of 12.6 drugs daily, before JCI accreditation and about 75% patients received more than 10 drugs, which obviously differs to the data from the study by Fadare et al[1] where an average of 3.8 drugs were given to an elderly patient and 29.5% of patients were prescribed ≥5 drugs. The difference in mean age between the two studies may explain the difference in number of drugs prescribed for geriatric patients (72.8 years ± 7.2 years versus 83.5 years ± 5.8 years). Geriatric patients aged over 80 years are classified as super- elderly patients. A relationship between increasing age and an increased number of medications seems to be explained by the prevalence of chronic conditions seen in the elderly population (average ten diagnoses per person). We did not find the association between the increasing number of medications and higher risk for inpatients with DRPs ($P > 0.05$), similar with the finding of Koh et al.[4] As indicated in the study by Fadare et al[1], 25.5% of the patients suffered at least one potentially DRP. The very low proportion of patients with DRPs (3.5%) in our hospital after JCI accreditation may be owing to successful clinical interventions during the journey to JCI accreditation.

In the beginning of 2012, the president of our hospital (The Second Affiliated Hospital of Zhejiang University School of Medicine) decided to lead us in preparation for JCI accreditation. An online embedded software for prescription screening was already installed, but it embedded software for prescription screening, but the software did not perform well due to lack of update on an appropriate schedule. Although unit-dose dispensing service (UDDS) towards oral or intravenous medications has been achieved by pharmacists, prospective prescription auditing in accordance with JCI requirements still has not yet been fulfilled due to design defects in the hospital information system (HIS) and electronic medical record (EMR). Pharmacists only knew patient name, identification number, age, diagnosis, medication name, dose, administration route, and dose frequency, with the aid of the interface of the pharmacy management information system. Pharmacists could not know the patients' other key information (eg, allergy history, body weight,

body surface area, nutrition status, and clinical laboratory test results such as hepatic and renal function, international normalized ratio, blood routine examination, and serum drug levels), and current medications information.

A typical medication error occurred with a super-elderly patient on April 1, 2012 due to absence of appropriateness review toward current medications. The patient received concurrent therapy with valproate sustained-release tablet and intravenous (IV) meropenem. Comedicated meropenem can significantly decrease the plasma concentrations of valproate and thus result in antiepileptic treatment failure.[5] Prescribing information about IV meropenem requires that the drug is contraindicated for patients taking valproate. Routine prospective prescription auditing of IV physician orders have been conducted by pharmacists from the Center of Pharmacy Intravenous Admixture Service (PIVAS), however, they only checked the appropriateness of IV medications and did not know the oral medications prescribed to the patient. Indeed, if pharmacists knew all current medications, they could perform clinical management, including therapeutic drug monitoring of serum valproate concentration when concurrent therapy with valproate and meropenem is not avoidable, or therapeutic switch from meropenem to imipenem/cilastatin sodium.

We followed the Koh et al[4] approach that advocated applying the 20/80 principle in business management into clinical risk management to minimize or prevent most of the DRPs related with the small percentage of high risk patients (eg, geriatric patients). A PDCA (Plan-Do-Check-Act) cycle was used for continuous quality improvement.[6] A pharmacist-led multi-disciplinary team, containing Division of Medical Affairs, Division of Nursing, Office of Medical Quality Management, Information Technology center, was established. We tried to improve the interface of the pharmacy management information system for prescription auditing, and strengthen training for physicians with lectures, which provided key opportunities for physicians to learn about the topics of MTM, DDIs, medication errors, adverse drug reactions, pharmacotherapeutic monitoring, and typical cases of irrational physician orders. Patient-oriented tracing methodology was also applied. Through 10 months of team cooperation and effort, a sophisticated interface for the pharmacy management information system for prescription auditing was successfully established. Since the integration of the audit system, competent pharmacists review each prescription newly prescribed, or when the dosage or other factors change, for appropriateness. When questions arise, the individual who prescribed the medication must be contacted. Communication now runs smoothly among pharmacists, nurses, and physicians.

Pharmaceutical care service is capable of reducing DRPs.[7] Interventions to improve rational polypharmacy in our hospital also appear beneficial in terms of reducing inappropriate prescribing and DRPs. Our experience in clinical interventions during the journey to JCI accreditation strongly suggests that JCI accreditation helps to improve medical quality and patient safety in health care organizations.

Acknowledgment

This work was supported by Zhejiang Provincial Bureau of Health (No2012KYA090), and Zhejiang Provincial Bureau of Traditional Chinese Medicine (No2011ZB075).

Disclosure

The authors declare no conflicts of interest in this work.

References

1. Fadare JO, Agboola SM, Opeke OA, Alabi RA. Prescription pattern and prevalence of potentially inappropriate medications among elderly patients in a Nigerian rural tertiary hospital. *Ther Clin Risk Manag*. 2013;6:115–120.
2. Cook DM, Moulton PV, Sacks TM, Yang W. Self-reported responses to medication therapy management services for older adults: analysis of a 5-year program. *Res Social Adm Pharm*. 2012;8:217–227.
3. Joint Commission International. *JCI Accreditation Standards for Hospitals*. 4th ed, 2010. Available from: http://www.jointcommissioninternational.org/common/pdfs/jcia/IAS400_Standards_Lists_Only.pdf. Accessed March 20, 2013.
4. Koh Y, Kutty FB, Li SC. Drug-related problems in hospitalized patients on polypharmacy: the influence of age and gender. *Ther Clin Risk Manag*. 2005;1:39–48.
5. Spriet I, Goyens J, Meersseman W, Wilmer A, Willems L, Van Paesschen W. Interaction between valproate and meropenem: a retrospective study.*Ann Pharmacother*. 2007;41:1130–1136.
6. Carter J. Small-scale study using the PDCA cycle. In: Gift R, Kinney C, editors. *Today's Management Methods: A Guide for the Health Care Executive*. New York, NY: Wiley, John and Sons Inc; 1996, 209–222.
7. de Lyra DP, Kheir N, Abriata JP, da Rocha CE, Dos Santos CB, Pelá IR. Impact of pharmaceutical care interventions in the identification and resolution of drug-related problems and on quality of life in a group of elderly outpatients in Ribeirão Preto (SP), Brazil. *Ther Clin Risk Manag*. 2007;3:989–998.