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

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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’s¹ 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 al¹ 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...
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 con-
current 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.3 Prescribing
information about IV meropenem requires that the drug is
cann not be used in patients taking valproate. Routine pro-
spective 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 al4 approach that advocated apply-
ing 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, phar-
macotherapeutic 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, compe-
tent pharmacists review each prescription newly prescribed, or
when the dosage or other factors change, for appropriateness.
When questions arise, the individual who prescribed the med-
cation 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 hospi-
tal also appear beneficial in terms of reducing inappropriate
prescribing and DRPs. Our experience in clinical interven-
tions during the journey to JCI accreditation strongly suggests
that JCI accreditation helps to improve medical quality and
patient safety in health care organizations.

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Disclosure
The authors declare no conflicts of interest in this work.

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