LETTER TO THE EDITOR

The checking methods before medication administration: A perspective from a Joint Commission International–accredited academic medical center hospital in China

To the Editor

We read with great interest the study by Hewitt et al1 which concentrated on weaknesses in double checking and alternative ways to view the practice based on semistructured interviews of health care practitioners. We especially appreciate the research methodology and design of this creative work. We are from the Second Affiliated Hospital of Zhejiang University (SAHZU), a Joint Commission International (JCI)–accredited academic medical center hospital with 3200 beds in China. We would like to share our perspectives in the following paragraphs.

First, the study by Hewitt et al1 confirmed the variability in interpretations and ideas of what constitutes a double check among frontline health care practitioners, and this finding indicated that practitioners should need to clarify what is meant by double checking. Actually, there are four expressions of checking strategies in clinical practice, including single checking, single-person double checking, double-person checking, and independent double checking (IDC). An institution should specify the scope of implementing each checking method. According to the Institute for Safe Medication Practices, IDC means that the second practitioner independently verifies whether the item (e.g., dosage) is correct and the answer is then compared with the first practitioner’s results. The lack of collaboration is intended to eliminate the bias that would be generated if the two practitioners jointly arrived at an answer. When conducted properly, IDC could catch 95% of errors, leaving only a 5% chance of an error being missed.2

Second, IDC should only be used for very selective high-alert medications because of workload issues looming heavily over practitioners. JCI implementation on managing the safe use of concentrated electrolytes recommends IDC policy for correct product, dosage, method of delivery, dilution, and patient before intravenous administration.3 Barras et al4 described the implementation of safety systems for the use of intravenous potassium chloride. After the introduction of intervention measures that included IDC at point of administration, the number of incidents significantly reduced from 23 to 9 in the 12 months ($P < .001$). Since January 2013, our hospital has required a standardized IDC before barcode-assisted medication administration of special high-alert medications (e.g., intravenous insulin, intravenous heparin, chemotherapy medications, and narcotics), i.e., before administering medication, two licensed healthcare professionals independently go through the steps (e.g., patient name, medical record number, drug name, dose, concentration, time of administration, route, infusion rate, frequency, expiration date of medication, and allergy history) at bedside of the patient, confirm the information, and document the process. If any questionable point is identified, the staff should make it clear promptly before further implementation. On-site inspection results and retrospective review of nursing record system showed a 100% implementation rate of IDC for narcotics administration.5 The number of medication administration errors (MAEs) related to high-alert medications decreased from 32 (the second half-year of 2011) to 16 (the first half-year of 2014), with a decrease in occurrence rate by 57.9% ($0.0787\%$ vs $0.0331\%$, $P < .05$).6

Third, we agree with the viewpoint of Hewitt et al1 that training on how best to perform an IDC could well improve its effectiveness. Developing tools could help nurses follow IDC policy and procedure without having to rely on memory or vigilance.2,7 White et al8 redesigned checklist for performing double checks of chemotherapy administration at the bedside and found that the new checklist helped nurses to detect more errors than the old checklist (55% vs 38%, $P < .01$). Simulations, video, and simplified approach may be valuable in training staff members to carry out IDC effectively.9,10

Fourth, we strongly agree with the finding of Hewitt et al1 that eliminating the need for human intervention when a computer could do the job more efficiently and reliably is a positive aspect to the double-checking process. Massachusetts General Hospital applied visible reminders through electronic medication administration records to do an IDC whenever high-risk patient-controlled analgesia (PCA) medicines are ordered and successfully prevented medication errors with high-risk PCA drugs.9 In our hospital, an intelligent dialog box (i.e., warning of IDC by another practitioner) will automatically jump out on the screen of personal digital assistant when one nurse performs barcode scanning before the administration of medications that require IDC procedure. Such mechanism has been applied since January 2013 and has facilitated the implementation of IDC policy.6 However, we would like to give an example to make some addition for the idea of Hewitt et al. In August 2016, we astonishingly found a systematic error before the medication administration of oral anticancer medicines. An adverse event associated with identification error occurred, i.e., a laparoscopic surgeon intended to prescribe
combination of tegafur-gimeracil-oteracil potassium capsules (S-1) with oxaliplatin for a gastric cancer patient in her ward, but she mistakenly prescribed these agents for another gastric cancer patient in another ward who should not receive chemotherapy due to an abnormal hemogram levels at that time despite that he also needed the same chemotherapeutic regimen. A general surgery nurse who completed oral medication administration without implementation of IDC did not identify the error, whereas two other nurses implemented IDC policy and successfully intercepted the potentially fatal error before the intravenous administration of oxaliplatin infusion. The director of pharmacy raised a question, that is, why there was no intelligent warning for IDC before barcoding-assisted oral administration. A root cause analysis indicated that an intelligent dialog box warning of IDC was only valid for parenteral anticancer agents rather than oral anticancer formulations because of the negligence of information technology department. This case reminds us of the need for regular review of the accuracy and integrity of information system and intensive pharmacological knowledge training among clinical nurses.

Lastly, as Hewitt et al conclude that double checking deserves more questioning, it is very necessary to conduct head-to-head randomized controlled study of different checking methods. A study using a randomized controlled intention-to-treat methodology showed that the double-checking intervention was effective in reducing omission errors but not effective in wrong time, wrong preparation, and wrong dose. We do not require double-checking policy for subcutaneous insulin administration, but we have taken continuous quality improvements in safe medication management and use of insulin. A retrospective longitudinal analysis showed that the incidence rate of subcutaneous insulin-related MAEs (i.e., the total number of relevant MAEs divided by total discharged patients) significantly decreased from 2011 to 2015 (0.0235% [9/120,590] vs 0.0075% [9/120,000], Pearson chi-square test, P < .01). Without unit-dose dispensing system, centralized intravenous admixing pharmacy service, final check of the medications before releasing them to the inpatient units by staff pharmacists, and barcode-assisted medication administration system, ward nurses undoubtedly will be faced with greater risk of errors if they implement single-person checking. The decision of the optimal checking mechanism should not only be patient safety-oriented but also be based on situation of human resources and level of pharmaceutical care and hospital information infrastructure.

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CONTRIBUTORS

FXQ and ZQ selected the topic. ZLL and ZQ conducted literature retrieval. FXQ and ZLL collected data and ZQ performed data analysis. FXQ and ZQ wrote the draft. All authors approved the manuscript.

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COMPETING INTERESTS

None declared.

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