

Technology and the Prevention of Medication Errors

Ruba Haddadin¹, M.Sc., Mohammad Alsadi, RN, M.Sc¹, Zeid Abu Ghosh¹.MD, JBU, HSU, FEBU

1. Electronic Health Solutions, Amman, Jordan

Introduction

A medication error is “any preventable event that may cause or lead to inappropriate medication use or patient harm while the medication is in the control of the health care professional, patient, or consumer”.¹ As part of the report “To Err Is Human”, the Institute of Medicine (IOM) estimated that in the United States, 7,000 deaths a year are due to preventable medication errors.² The high cost of medication errors is alarming. In the United States alone, it is estimated that inpatient preventable medication errors cost approximately \$16.4 billion annually while outpatient preventable medication errors cost approximately \$4.2 billion annually.³

Why Do Medication Errors Occur?

Medication errors occur for a number of reasons. (33%) of preventable medication errors result from dosing errors, while (11%) result from drug allergies or harmful drug interactions.⁴ Medication errors may occur at any stage of a patient’s journey through a healthcare system. Errors may occur during admissions (22%), transitions in care (66%), and even during discharge (12%).⁵ In pharmacies where the majority of medications are dispensed, the high volume of medication transactions leads to medication errors. It is estimated that approximately 100 undetected dispensing errors can occur each day at any one pharmacy location. Fragmentation of care is considered to be one of the main reasons for medication errors.⁶

Technology as a Proposed Solution

EHRs offer an excellent platform to allow such multidisciplinary collaborative efforts, ultimately reducing medication errors. These systems often have built-in decision support tools that automatically check for duplicate orders or incorrect medication doses. They also provide alerts to let the prescriber know that a dose is too high or may interact with other medications, or highlight the latest clinical guidelines to improve evidence-based treatment. One study reported that the use of EHR systems reduced medication errors by up to 85%.⁷

In Jordan

Jordan’s nationwide EHR ‘Hakeem®’ is currently implemented at more than 15 hospitals, 21 comprehensive clinics and 49 primary clinics.⁸ At the sites where Hakeem® is implemented, physicians are able to order medications and various patient care orders electronically. Pharmacists are also supported with a system that provides alerts in case of drug duplication, interaction or allergy. A study of BCMA implementation in an academic medical center demonstrated a 41.1% relative reduction in non-timing errors in medication administration, resulting in a 50.8% relative reduction in potential adverse drug events due to such errors.⁹

Conclusion

The use of electronic health record systems offers a promising solution to reduce medication errors locally and internationally, ultimately improving patient safety as patients’ transition through the multiple parts of a healthcare system.

References

- 1- The National Coordinating Council for Medication Error Reporting and Prevention (NCC MERP)
- 2- Kohn, L. T., Corrigan, J., & Donaldson, M. S. (2000). **To err is human: Building a safer health system**. Washington, D.C: National Academy Press.
- 3- Massachusetts Technology Collaborative (MTC) and NEHI, 2008. **Saving Lives, Saving Money: The Imperative for CPOE in Massachusetts**. Cambridge, MA: NEHI, 2008.
- 4- Bobb A, Gleason K, Husch M, et al., The epidemiology of prescribing errors, **Arch Intern Med.**, 2004;164(7):785- 792.
- 5- Santell JP. Reconciliation failures lead to medication errors. **Jt Comm J Qual Patient Saf.** 2006; 32: 225-229
- 6- Ranelli PL, Biss J. Physicians' perception of communication with and responsibilities of pharmacists. **J Am Pharm Assoc.** 2000;40(5):625-630
- 7- Kaushal R, Kern LM, Barrón Y, et al., Electronic prescribing improves medication safety in community-based office practices, **J Gen Intern Med**, 2010: 25(6):530-536.
- 8- Electronic Health solutions. (2016). Hakeem program. Retrieved Feb23, 2016 from: <http://www.ehs.com.jo/en/content/hakeem-1>
- 9- Bonkowski, J., Carnes, C., Melucci, J., Mirtallo, J., *et al.* (2013). Effect of barcode-assisted medication administration on emergency department medication errors. **Academic Emergency Medicine**, 20, 801-806.