Prototype of a High-Alert Medications Decision Support System

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Abstract

High-alert medications (HAMs) are associated with serious harmful events. Comprehensive medication safety improving strategy is needed to reduce adverse events related to HAMs, including limitation of access to drugs, standardization of orders, alert system for high doses and critical events, etc. Process analysis with activity diagram and error matrix regarding selected five HAMs was done. Clinical knowledgebase was made by pharmacists, nurses, PI experts, and IT experts. HAMs clinical knowledgebase composed of core message, adverse event type happened, drug interactions, monitoring items, similar drugs information, hospital clinical guidelines, and routine drug information. Prototype of HAMs decision support system was designed to use in computerized physician order entry system. HAM icons, core messages, and alert for overdose services included to this system.

Keywords:

High-alert medication, Patient safety, Adverse drug event, Decision support, Clinical guideline

Introduction

Institute for Healthcare Improvement (IHI) defined high-alert medications (HAMs) as medications that are most likely to cause significant harm to the patient, even when used as intended. The Joint Commission International (JCI) emphasizes improvement of the safety HAMs. But HAMs are not the only cause but one of the causes related to patient safety events. Thus comprehensive medication safety improving strategy is needed to handle this matter.

Since Feb, 2008 the *HARMLESS* (*H*igh *A*lert-medication *R*ecognition & *M*anagement System to *L*ower *E*rrors and to *S*ecure *S*afety) project started to make solutions to HAMs related harmful events at Asan Medical Center, the Korea's largest referral hospital with about 2,700 inpatient beds. This study is the interim report of one of HARMLESS project, focused on computerized decision support system to HAMs.

Methods

HARMLESS projected team was composed with a clinical champion, pharmacists, nurses, experts of performance improvement (PI), and experts of information technology. *HARMLESS* solution lists were suggested by the products of error types and contributing factors analysis and clinical process analysis with activity diagrams related HAMs. Items -core messages, adverse drug events, drug interactions, post-medication monitoring items, similar drugs information, hospital clinical guidelines, and routine drug information- which can be implementable to computerized physician order entry system (CPOE) were selected. HAMs decision support system prototype was developed for selected five drugs- insulin, heparin, warfarin, urokinase, potassium chloride.

Results

Distinctive red-colored round HAM icon was developed and displayed prior to HAM name on CPOE screen. The prototype was designed core messages to be displayed if a mouse indicator was located above the HAM icon and detailed information to be displayed if indicator was located above 'Detailed information' button. Core messages for each drug (e.g. "Caution to high dose") were selected mostly by nurses. In detailed information, adverse drug event types previously happened (PI experts), hospital clinical guidelines with detailed dose and protocols, and routine drug information (pharmacists) were provided. Alert and maximum doses for prescription were established with actual hospital data.

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