Medication Incidents Involving Insulin: A Multi-Incident Analysis

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Objectives

- Insulin is a life-saving pharmacological therapy used in the management of blood glucose for many diabetic patients. However, insulin has been identified as a high alert medication[1] as it has the potential to cause detrimental patient harm when used in error; particularly an excessive dose can lead to life-threatening hypoglycemia.
- Medication incident reporting can be used to enhance understanding of factors that may contribute to insulin-related medication incidents.
- The objective of this multi-incident analysis was to examine insulin-related medication incidents and determine potential system-based improvements that may be customized in pharmacy practice to enhance medication safety.

Methodology

- Reports of medication incidents involving insulin were extracted from the Institute for Safe Medication Practices Canada (ISMP Canada) Community Pharmacy Incident Reporting (CPhIR) Program[2] between January and December 2014.
- CPhIR provides users with a secure online interface to document medication incidents, export data for analysis, and view comparisons of individual pharmacy and aggregate data. CPhIR program depends on voluntary reporting of medication incidents.
- After a review of 226 incidents, 81 were included in this qualitative, multi-incident analysis. The incidents were then analyzed and categorized into main themes and subthemes.

Results

- The four main themes identified were presented in Table 1.
- Sample cases, potential contributing factors, and potential system-based solutions are provided in Tables 2, 3, 4, and 5. Incident examples provided were limited to what was inputted by pharmacy practitioners to the “Incident Description” field of the CPhIR program.

Table 1.

Main Themes and Subthemes

Product Selection

Subthemes:
Prescribing
Order Entry
Dispensing

Therapeutic Regimen Change

Dosage Calculations

Storage Requirements

Table 2.

Theme 1 – Product Selection (related to unique insulin properties)

The patient noticed his insulin box was different than [what] he had before. He should have received Novolin® ge NPH and had been given Novolin® ge 30/70 in error.

Potential contributing factors:
- Variety of dosage forms (i.e. rapid-acting, short-acting, long-acting, premixed, vials, cartridges, preloaded pens) available
- Look-alike, sound-alike names and packaging
- Proximity of storage of look-alike, sound-alike insulin products
- Lack of independent double checks
- Environmental distractions
- Confirmation bias

Potential system-based solutions:
- Consider programming pharmacy software to include both generic and brand names for insulin at pharmacy order entry and incorporate warning flags in pharmacy software to alert for potential mix-up.[3,4]
- Perform independent double checks throughout the entire pharmacy workflow. When a patient picks up his/her insulin, include a physical review (i.e. packages, labels, insulin product) as they are provided to the patient.[3,5,6]
- Segregate insulin products by storing them according to their onset of action in well-differentiated areas of the refrigerator.[3,6,7]

Table 3.

Theme 2 – Therapeutic Regimen Change

Prescription had specific instructions for use and was copied over by an old one with just “use as directed” on it.

Potential contributing factors:
- Frequent dose changes
- Copying previous prescriptions

Potential system-based solutions:
- Consider programming the pharmacy software or developing policies to restrict the process of copying from previous prescriptions for all insulin prescriptions.[3]
- Perform independent double checks throughout the entire pharmacy workflow. Encourage patients to actively participate in conversation when providing medication counselling.[3,5,8]
- Consider performing a comprehensive diabetes-focused medication review when a patient has a significant change in insulin usage.

Table 4.

Theme 3 – Dosage Calculations

Prescription for 4-10 units of insulin a day x 90 days [was] entered as 45 mLs. Only 15 mLs were required.

Potential contributing factors:
- Knowledge deficit on how to calculate insulin units to millilitres and days supply

Potential system-based solutions:
- Develop policies for pharmacy staff to document calculations for insulin quantity at order entry and dispensing as an independent double check to enhance accuracy.[9]
- Highlight information related to insulin dosing calculations (e.g. extra units required for priming insulin pens) as a part of pharmacy staff training.

Table 5.

Theme 4 – Storage Requirements

The prescription was entered early morning, [the] pharmacist [saw the] patient walking in assuming [the] patient was in to pick up prescription. Patient walked around the store, said she would return, and [the] insulin was put in [the] drawer instead of [the] fridge.

Potential contributing factors:
- Environmental distractions
- Confirmation bias

Potential system-based solution:
- Develop or reinforce existing policies and procedures with regards to dispensing refrigerated products. Refrigerated products should always be returned to the fridge immediately after filling.

Conclusions

- Medication incidents involving insulin in pharmacy practice are common and have the potential to cause serious patient harm.
- Findings from this analysis are intended to educate health care professionals on the vulnerabilities in the medication-use process that may contribute to insulin-specific medication incidents and offer recommendations to prevent such events from recurring.
- Creating a culture of patient safety with the support of a non-punitive reporting system needs to be encouraged within all areas of pharmacy practice.

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ISMP Canada
Institute for Safe Medication Practices Canada
www.ismp-canada.org

CMIRPS
Canadian Medication Incident Reporting and Prevention System
www.ismp-canada.org/cmirps/

CPhIR
Community Pharmacy Incident Reporting Program
www.cphir.ca

Disclosures

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