

Parenteral medication preparation by pharmacy technicians improves medication safety

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Introduction

Preparation of parenteral medications is associated with medication errors and risk of microbiological contamination.

Therefore, Dutch hospital pharmacies centrally prepare an increasing number of parenteral medications under well-controlled conditions. Nevertheless, a substantial number of parenteral medications is still being prepared by nurses on wards. However, nurses experience shortage of time for specific nursing tasks, and nursing care is relatively expensive.

In order to reduce costs and to substitute nursing tasks, we hypothesized that the risk of medication errors and microbiological contamination would substantially decrease when pharmacy technicians would prepare parenteral medications on wards.

Objectives

To evaluate the frequency of medication errors or microbiological contamination among pharmacy technicians and nurses who prepared parenteral medications on wards.

Methods

Study population

The study was carried out on two wards of the Maastricht University Medical Centre+ (MUMC+), Netherlands, in 2009 and 2010

Medication errors

A disguised observer randomly observed 200 preparations of parenteral medications that were each manufactured by nurses or pharmacy technicians. Medication errors were scored.

Risk of microbiological contamination

Nurses and pharmacy technicians prepared 200 broth simulation preparations each. Microbiological contamination based on turbidity was measured.

Statistical analysis

A chisquared test was used to detect differences between both groups using SPSS software.

Results

Medication errors

The risk of medication errors with nurses was 40-fold higher (40%) versus pharmacy technicians (1%, $p < 0.0001$), during the preparation of parenteral medication. Further details are shown in Table 1. The number of double checks was 2.5-fold higher among pharmacy technicians (100%) as compared to nurses (40%, $p < 0.0001$).

Risk of microbiological contamination

The risk of microbiological contamination decreased as the percentage of contaminated broth simulations was significantly lower among pharmacy technicians (0%) as compared to nurses (8%, $p < 0.0001$).

Table 1. Frequency of medication errors among nurses and pharmacy technicians

Medication errors	Nurses (n=200)	Pharmacy technicians (n=200)
Incomplete dose	55 (68%)	0 (0%)
Wrong dose	17 (21%)	0 (0%)
Wrong drug	1 (1%)	0 (0%)
Omission	6 (7,5%)	1 (50%)
Miscellaneous	2 (2,5%)	1 (50%)
Total	81 (40%)	2 (1%)

Conclusions

The risk of medication errors and microbiological contamination was substantially lower when pharmacy technicians instead of nurses prepared parenteral medications on hospital wards. As a result, pharmacy technicians now prepare parenteral medication on various wards in the MUMC+ on a daily basis.



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<http://heritage.azm.nl/albeelden/mumc/projecten/feniks.html>



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