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PRESCRIBING ERRORS IN CHILDREN: WHAT IS THE IMPACT OF A COMPUTERISED PHYSICIAN ORDER ENTRY?

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Background and Importance

Medication safety and the reduction of harm due to medication errors is an ongoing issue in health care. Prescribing errors represent a safety risk for hospitalized patients, especially in pediatrics [1]. 17.6% of orders are estimated to contain a prescribing error [2]. The most frequent errors in pediatrics are dosing errors. Computerised physician order entry (CPOE) seems to reduce prescribing errors, although its effect has not yet been thoroughly studied, especially on pediatric general wards.

Conclusion and Relevance

In this retrospective observational study, we found that patient safety increased **by reducing the overall rate of prescribing errors after the introduction of a CPOE.** Nevertheless, an increase in medication reconciliation problems was observed, which occurred due to a hybrid system of CPOE and paper chart prescriptions. Dosing errors (most frequent prescribing errors in pediatrics) were not reduced by the introduction of the CPOE. This finding might be explained by the fact that a web application clinical decision support system (CDS) covering dosing recommendations (PEDeDose) was already in use before implementation of the CPOE.
Further investigations should focus on eliminating hybrid systems, interventions on how to increase the usability of the CPOE, and the full integration of CDS tools like for example dosing support and notably automated dose check into the CPOE, to further increase medication safety.

Aim and Objectives

In this study we investigated the impact of the introduction of a CPOE on prescribing errors in children on general wards at the University Children's Hospital in Zurich, Switzerland. Prevalence, type, and severity of prescribing errors were studied with retrospective medication review. Our findings were validated by calculating the interrater reliability between two reviewers.

Materials and Methods

We performed medication reviews on 1000 patients from 0 – 18 years on pediatric general wards (surgical and medical wards), that were prescribed at least one medication. 500 patients from each study period were included: Before implementation of a CPOE (pre-CPOE) from Oct – Dec 2018 and after implementation (post-CPOE) from Oct – Dec 2019. The CPOE included limited clinical decision support (CDS) such as a drug-drug interaction check and checks for duplicates. Prescribing errors, their type according to the PCNE classification [3] and their severity (adapted NCC MERP index [4]) were analysed. All prescriptions were reviewed by a clinical pharmacist. Additionally, 5% of the patients were reviewed by a second pharmacist and the interrater reliability (Cohen's Kappa) was calculated.

Results

Pre- and post-CPOE patients did not differ in their demographic characteristics, except for length of stay. Post-CPOE patients stayed longer on the wards (2.5 days vs. 2.1 days, p = 0.005). **The overall rate of errors was significantly reduced from 78 errors / 100 prescriptions** (95% CI: 76 – 81) **pre-CPOE to 25 errors / 100 prescriptions** (95% CI: 23 – 27) **post-CPOE** (p < 0.001). Most of the errors were of minor severity (NCC MERP A-D) and non-harmful errors were less frequent post-CPOE. Therefore, severity of errors increased relatively post-CPOE (p < 0.001) (figure 2). **Potentially harmful errors (NCC MERP E-I) decreased significantly from 18 errors / 100 prescriptions** (95% CI: 17 – 20) **pre-CPOE to 11 errors / 100 prescriptions** (95% CI: 9 – 12) **post-CPOE.** Particularly the prescribing quality was improved by reducing PCNE error 5.2 "missing information" (e.g. lacking drug form or maximum possible number of doses for reserve medication) (figure 1). Medication reconciliation problems (PCNE error 8), such as drugs prescribed on paper as well as electronically, were significantly increased after introduction of the CPOE. The most common pediatric prescribing errors, the dosing errors (PCNE errors 3), were not statistically significantly altered after introduction of the CPOE. Interrater reliability showed moderate agreement (K = 0.48).

Figure 1: PCNE errors with potential harm (NCC MERP E-I)

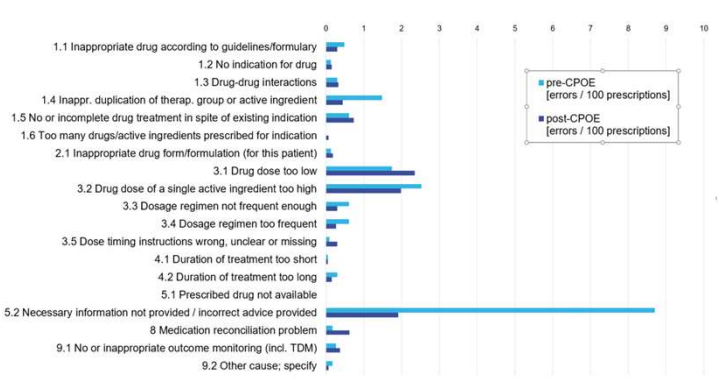
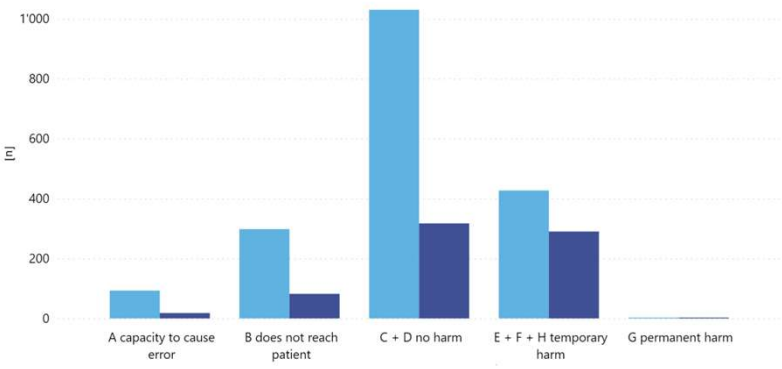


Figure 2: Severity of errors (NCC MERP) pre-CPOE (left) and post-CPOE (right)



Note: The results displayed on this poster differ from the intitially submitted abstract due to revision of the data analysis.

References

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