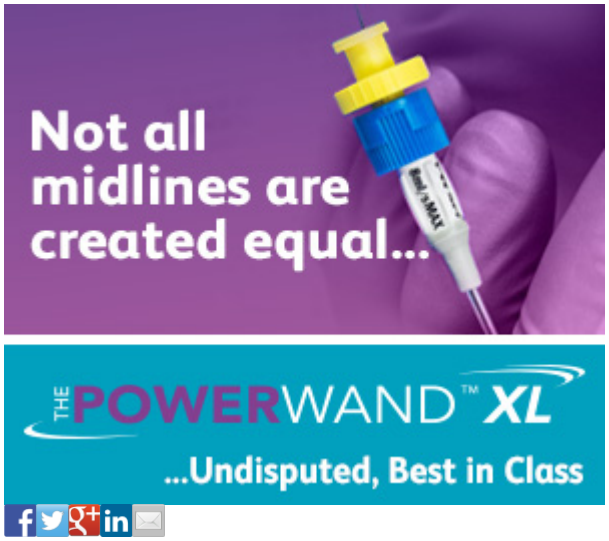

We developed a mobile device application (app) as a step-by-step guide for the preparation to delivery of drugs requiring continuous infusion. The app has been previously tested during simulation-based resuscitations in a previous single-centre trial. In this trial, our aim was to assess this app in various hospital settings" Siebert et al (2019).

Abstract:

BACKGROUND: Vasoactive drug preparation for continuous infusion in children is both complex and time consuming and places the paediatric population at higher risk than adults for medication errors. We developed a mobile device application (app) as a step-by-step guide for the preparation to delivery of drugs requiring continuous infusion. The app has been previously tested during simulation-based resuscitations in a previous single-centre trial. In this trial, our aim was to assess this app in various hospital settings.

METHODS: We did a prospective, multicentre, randomised, controlled, crossover trial to compare this app with an internationally used drug-infusion-rates table for the preparation of continuous drug infusion during standardised, simulation-based, paediatric post-cardiac arrest scenarios using a high-fidelity manikin. The scenarios were split into two study periods to assess the two preparation methods consecutively, separated by a washout distraction manoeuvre. Nurses in six paediatric emergency centres in Switzerland were randomly

assigned (1:1) to start the scenario with either the app or the infusion-rates table and then complete the scenario using the other preparation method. The primary endpoint was the proportion of participants committing a medication error, which was defined as a deviation from the correct weight dose of more than 10%, miscalculation of the infusion rate, misprogramming of the infusion pump, or the inability to calculate drug dosage without calculation and guidance help from the study team. The medication error proportions observed with both preparation methods were compared by pooling both study periods, with paired data analysed using the unconditional exact McNemar test for dependent groups with a two-sided α level of 0·05. We did sensitivity analyses to investigate the carryover effect. This trial is registered with ClinicalTrials.gov, number NCT03021122.

FINDINGS: From March 1 to Dec 31, 2017, we randomly assigned 128 nurses to start the scenario using the app (n=64) or the infusion-rates table (n=64). Among the 128 drug preparations associated with each of the two methods, 96 (75%, 95% CI 67-82) delivered using the infusion-rates table were associated with medication errors compared with nine (7%, 3-13) delivered using the mobile app. Medication errors were reduced by 68% (95% CI 59-76%; p<0·0001) with the app compared with the table, as was the mean time to drug preparation (difference 148·2 s [95% CI 124·2-172·1], a 45% reduction; p<0·0001) and mean time to drug delivery (168·5 s [146·1-190·8], a 40% reduction; p<0·0001). Hospital size and nurses' experience did not modify the intervention effect. We detected no carryover effect. INTERPRETATION: Critically ill children are particularly vulnerable to medication errors. A mobile app designed to help paediatric drug preparation during resuscitation with the aim to significantly reduce the occurrence of medication errors, drug preparation time, and delivery time could have the potential to change paediatric clinical practice in the area of emergency medicine. FUNDING: Swiss National Science Foundation.

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Reference:
Siebert, J.N., Ehrler, F., Combescure, C., Lovis, C., Haddad, K., Hugon, F., Luterbacher, F., Lacroix, L., Gervaix, A. and Manzano, S. (2019) A mobile device application to reduce medication errors and time to drug delivery during simulated paediatric cardiopulmonary resuscitation: a multicentre, randomised, controlled, crossover trial. The Lancet. Child & Adolescent Health. February 20th. .

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