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A QUANTITATIVE AND QUALITATIVE EVALUATION OF THE INTRODUCTION OF 'SMART' SYRINGE PUMPS INTO A PAEDIATRIC INTENSIVE CARE UNIT

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Aim Infusion pumps are commonly used to administer medicines by intravenous infusion. Traditionally, pumps are programmed by simply entering the required number of millilitres (mL) per hour, and there has been no mechanism whereby the pump can alert the operator to a programming error e.g. the wrong mL/hour rate being entered.

More recently, 'smart' infusion pumps have become available which have in-built drug libraries. For each drug, defined dosing limits are set. Users are required to reconfirm the selected infusion rate when 'soft' limits are overridden and the infusion cannot be commenced if 'hard' limits are exceeded. Soft and hard limits can also be set for the administration of boluses from continuous infusions. This study aimed to evaluate the introduction of smart syringe pumps into a UK PICU by objective assessment of compliance with drug library use, and by obtaining direct feedback from nursing staff.

Methods Data was collected over a 4 week period, immediately following the introduction of new Alaris CC smart syringe pumps. Objective assessment of drug library use utilised a piloted data collection form. One form was completed for each infusion running at the time of daily data collection. The prescription, syringe label, and programmed pump parameters were checked for each infusion and any discrepancies noted. Where the drug library was not being used, reasons for non-use were recorded. Nursing views on the benefits and potential risks of the new smart syringe pumps were determined through individual and group interviews, each following the same pre-prepared format.

Results 79 individual drug infusions were observed. 4 (5%) were being given without using the drug library, i.e. just in terms of mL/hour; in all cases, the explanation was the fact that the drug was not included in the library. 73 (92%) of the infusions observed were continuous, the remainder intermittent. 13 nurses were interviewed: the unanimous view was that the new smart pumps improved patient safety. One nurse described a situation where the smart pump had prevented a 10-fold paracetamol overdose. Many nurses commented that pre-defined sedation boluses were a definite patient-safety benefit, both in terms of preventing incorrect dosing or the bolusing of the wrong drug. Nurses, in general, felt that the safety benefits of smart pumps applied equally to intermittent and continuous infusions. Nurses found the drug libraries easy to use, and whilst infusion set-up may take marginally longer with the drug libraries than without, this was offset by patient safety benefits. It was noted that the longer time taken to programme the pumps may diminish as familiarity increases. A small number of minor issues with the drug library were identified through nursing feedback, though none of them were patient-safety critical. This has allowed the drug library to be modified before the same pumps are also introduced to general wards across the Children's Hospital.

Conclusion The drug libraries in the new smart syringe pumps were being routinely and correctly used throughout the study period. Nursing staff had embraced the new technology, seeing clear patient safety benefits.

P001

CREATING ACCEPTABLE TABLETS (CAT) – A FEASIBILITY STUDY TO ASSESS THE SWALLOWABILITY AND ACCEPTABILITY OF DIFFERENT SIZED PLACEBO TABLETS IN CHILDREN AND YOUNG PEOPLE: AN INTERIM ANALYSIS

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Aim To determine the feasibility of investigating the swallowability and acceptability of different sized placebo tablets in children and young people (CYP) aged 4–12 years and estimate consent/recruitment rates for a future study.

Methods Participants were asked to swallow three different sized placebo tablets; 6mm, 8mm and 10mm in a standardised order, smallest to largest. The recruitment target is 50 children, including both healthy children and NHS inpatients/outpatients. Following informed consent participants were shown a short video demonstrating how a tablet can be swallowed. The researcher observed and recorded the child's facial expressions as they swallowed the tablet.¹ Any tablet chewing, signs of choking and/or coughing during and after swallowing were recorded. After each administration, an internal inspection of the mouth was conducted by the researcher to identify any residue or non-swallowed tablet.² The participants assessed the swallowability and acceptability of the samples using a questionnaire that included a 5-point hedonic facial scale and voluntary feedback was provided. Faces 1-3 on the hedonic scale were deemed acceptable to the participant. The process described above was repeated for swallowing the 8mm and 10mm tablets. Participants were offered all three different sized placebo tablets and were given the option to stop or continue at each stage. Children who successfully swallowed all three samples were asked if they would be willing to take part in the study again if the tablet administration order was randomised rather than in order of increasing size.

Results To date, 32 participants aged between 4-12 years have taken part in the study (mean age 7.7 years). Twelve children were aged 6 or under. All 32 participants attempted to swallow the 6mm tablet, 27 attempted the 8mm and 25 children attempted the 10mm tablet. 78.1% successfully swallowed the 6mm tablet and 85.2% successfully swallowed the 8mm and 10mm tablets. Participants were also asked about the most important factors when taking a tablet, data were available for 30/32 participants and the most important factor was deemed tablet size (17/30), followed by taste (7/30) responses. 87% of children who swallowed all three samples reported that they would be willing to take part in the study again if the tablet size order was randomised.

Conclusion The preliminary results show that tablets may be an acceptable dosage form for children from 4 years old. Tablet size was deemed to be the most important factor of swallowability/acceptability of tablets in children. The full data set should give further information about optimal tablet size for CYP which is currently unknown. This feasibility study will collate data on key variables which will inform the design of a larger, definitive study including the sample size based on observed recruitment/consent rates.

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P002 MEDICINE USE AND OPTIMISATION FOR CHILDREN AND YOUNG ADULTS AGED 0–18 YEARS OLD – MEDICATION ADMINISTRATION AND ADHERENCE OF PARENT/CAREGIVER AND CHILD

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Aim To systematically review all published evidence related to medication administration accuracy and its relation to improving medication adherence among paediatric population. The objectives are to identify, the main issues and challenges that the patients or their parents, caregivers or healthcare professionals face when administering or taking a medication any published methods or tools that improves medication administration accuracy and adherence among the paediatric population; and the health literacy and knowledge of parents/caregivers/healthcare professionals concerning medication administration.

Methods A systematic search of the literature to identify any related studies to medication administration among paediatrics was performed using the following bibliographic databases: PubMed, Scopus and Cochrane Library. The list of various synonyms of the keywords was defined following the PICOC model and a discussion between the authors. An information specialist was contacted to ensure the accuracy of the developed search terms. Search terms included a list of synonyms relating to i) paediatric ii) medication administration accuracy iii) medication adherence and iv) medication error. The search was limited to studies published in English. Only studies that report paediatric patients aged from 0 up to 18 years of age who are prescribed medication that requires administration by the parent, caregiver or themselves were included. Studies including mixed paediatric and adults were further investigated and data related to paediatric were extracted. Quality assessment will be integrated into the review process using 'CASP' checklist at the data extraction stage.¹ The study protocol was registered on PROSPERO.

Results All databases were systematically searched (in April 2018). Overall, 1,018 citations were found; of which 994 remained after removal of duplicates. After screening of titles and abstracts, 46 studies were considered eligible for inclusion in this review. At data extraction stage, 12 studies were excluded, owing to the lack of paediatric specific information or medication-related errors. 34 studies were further investigated, among which, 30 (30/34, 88.2%) studies reported that dosing errors are the most common type of medication errors and are associated with parents or caregivers with inadequate health literacy. Over-the-counter liquid medications and antibiotics are commonly associated with dosing errors among parents and caregivers. Two (2/26, 7.7%) experimental studies indicated that both droppers and cups are the prime causes of dosing errors that occur via parents. Two (2/34, 5.9%) review studies indicated that medication administration errors are common among children with prescribed inhalers. Finally, two (2/34, 5.9%) observational studies identified that labels and information sheets of the medication contribute to medication administration errors.

Conclusion The preliminary findings of this review suggest that further integrated education strategies between healthcare-professionals and parents or caregivers is a priority to reduce medication administration and dosing errors among children and young adults. To our knowledge, limited studies were conducted in the UK about this topic, hence, further work is required to highlight the issue of medication errors among children and its association with parents or caregivers health literacy in the UK.

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P003 INTERMITTENT VANCOMYCIN IN PAEDIATRICS: IMPLEMENTATION AND AUDIT OF A NEW GUIDELINE

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Aim A guideline for the use of intermittent intravenous vancomycin in children was designed and implemented in our Trust in 2016. This introduced the use of a loading dose, increased dosing and increased frequency compared to the BNFC recommendations. The changes were based on the outcomes of a national NPPG project and local focus groups. The aim of this audit was assess compliance with the guideline and to establish if the time taken to reach target vancomycin levels had been reduced as a result of using the new guidance.

Methods 30 paediatric patients (≥ 1 month old) prescribed intermittent intravenous infusions of vancomycin were identified by ward pharmacists over a 2 month data collection period. 4 patients required treatment with adult dosing due to their weight. 2 patients were switched onto continuous infusion following pharmacist intervention. The results of the remaining 24 patients were compiled into an excel spreadsheet for analysis.

Results Audit pre-implementation of the guideline had highlighted the lack of a support for staff to use appropriate dosing and monitoring.¹ Overall, usage of the new guideline was positive. The loading dose was used appropriately in 83% patients. Levels were taken at appropriate times in 90% patients. The percentage of levels in therapeutic range at 48 hours increased from 7% to 40%. 100% of patient had a review at this time. Half of the patients out of range at 48 hours had treatment stopped or changed to a more appropriate treatment, reducing the need for unnecessary complex dose adjustment/monitoring plans. At 48 hours, there remained 30% of the total patient group requiring dose adjustment in order continue vancomycin treatment. The main area of concern was that review of these out of range levels was only carried out in accordance with the guideline in 40% of cases. This was improved to 80% with pharmacist intervention. A limitation of this data was the small patient group size. One patient had the level taken at the wrong time so could not be interpreted properly.

Conclusion Compliance with the new guideline was good overall. This audit has shown that the use of the new guideline improved the percentage of patients with vancomycin levels in range at 48 hours from 7 to 40%. The main theme from this audit was that pharmacist intervention was the key to directing the medical teams towards prescribing the most appropriate form of treatment. Education can only improve