contraindicated medications include: unadministered contraindicated medications (220 cases, 42.8%); drugs taken intermittently or pro re nata (PRN) (147, 28.6%); administered by a clinical decision (79, 15.4%); local administration (21, 4.1%); meaningless words(44, 8.6%); and emergency medication (three, 0.6%). The reasons for prescribing contraindicated medications with drug-drug interaction in cases of anti-diabetic agents with CT contrast medium were as follows: unadministered contraindicated medications(95 cases, 76.0%), meaningless words (22, 17.6%) and administered by a clinical decision (eight, 6.4%). Reasons for other genitourinary organ and rectal agents with vasodilator were PRN (54 cases, 38.3%), administered by a clinical decision (42, 29.8%), unadministered contraindicated medications (29, 20.6%) and meaningless words (16, 11.3%). Reasons for NSAID with other cardiovascular drugs were PRN (65 cases, 69.9%), unadministered contraindicated medications (16, 17.2%) and local administration (13, 28.9%).

Conclusion We confirmed that certain medications were sometimes prescribed using an incorrect reason. Some clinicians input a reason that was something other than a PRN drug use, or entered a meaningless words. It is necessary to improve the system of entering the reasons why clinicians prescribe contraindicated drugs.

REFERENCES AND/OR ACKNOWLEDGEMENTS

We acknowledge the assistance of Soojeong Yoon.

No conflict of interest.

4CPS-234 PHARMACIST INTERVENTIONS IN NEONATAL INTENSIVE CARE UNIT AND ASSOCIATED COST AVOIDANCE AND COST SAVINGS

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10.1136/ejhpharm-2019-eahpconf.383

Background In neonates, frequent changes in dosing intervals and dosage can increase the risk of medication errors. In addition, patients in the Neonatal Intensive Care Unit (NICU) are highly dependent on total parenteral nutrition (TPN), which is one of the most important interventions made by pharmacists. Although the role of ICU pharmacists in improving clinical outcomes has been documented, there are currently few reports on the economic impact of such interventions in this country.

Purpose The purpose of this study was to analyse interventions made by a NICU pharmacist and describe the economic impact by calculating cost avoidance and cost savings associated with accepted interventions.

Material and methods From 1 March to 31 August 2016, a retrospective evaluation was conducted by analysing clinical intervention records from prescription review, TPN consults and Clinical Pharmacokinetic Consultation Service reports delivered by pharmacists in a tertiary hospital. Interventions were graded based on probable outcome severity by three independent pharmacist evaluators. This grade was used to calculate cost avoidance. Cost avoidance and cost saving from accepted clinical interventions were calculated to show the economic impact of NICU pharmacists.

Results During the study period, a total of 608 clinical interventions were performed, TPN was involved in 482 (79.3%) interventions and the number of intervention activities related to prescription review was 81 (13.3%). The most frequent interventions related to prescription review were 'incorrect dose and interval (46.1%)', followed by 'incorrect administration schedule' and 'consult for medication information and treatment plan'. The prescriber's acceptance rate of pharmacist recommendations was 95.2%. Over the 6 months, total cost avoidance was 175,863,624 won and total cost saving was 75 033 won.

Conclusion This study showed the impact of a NICU pharmacist on medication safety and costs in a tertiary hospital. However, further study is needed to demonstrate the clinical pharmacist's contribution to the improvement of clinical and economic outcomes more comprehensively.

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No conflict of interest.

4CPS-235 PARENTERAL NUTRITION-ASSOCIATED CHOLESTASIS AS AN EARLY-ONSET ADVERSE EFFECT IN ADULT PATIENTS

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10.1136/ejhpharm-2019-eahpconf.384

Background Parenteral nutrition-associated cholestasis (PNAC) may occur in 25–100% of adult patients receiving long-term parenteral nutrition (PN).

Purpose To analyse the onset of PNAC in hospitalised adult patients and the possible risk factor associated.

Material and methods Observational, retrospective and longitudinal study that included adult patients who received PN for at least 5 days from January 2017 to September 2018 with normal serum level of alkaline phosphatase (AP), gamma-glutamyl traspeptidase (GGT) and total bilirrubin before starting PN. The primary endpoint was defined as time to the onset of cholestasis established as elevation in GGT (>106.6 U/L) or total bilirubin (>1.8 mg/dL) or AP (193.5 U/L) + (GGT or bilirrubin) that could not be explained by other causes. Possible risk factors were collected: gender, age and sepsis at initiation of PN, cyclic PN infusion, kcal/kg, balance between dextrose and fat and fat >1 g/kg/d at the onset of cholestasis or at the end of PN treatment in those patients who did not develop cholestasis. Statistical analysis was performed by Chi-square test for qualitative variables and student's *t*-test for quantitative variables using STATA.

Results One-hundred and fifty-six patients were included. 48.7% of patients developed cholestasis within a median of 6 (IQR=4) days. The results of possible risk factors were:

Conclusion PNAC is an adverse effect that not only happens in patients receiving long-term-PN, but also occurs in a high

Abstract 4CPS-235 Table 1

	With cholestasis	Without cholestasis
% males	60.0%	72.4%
Median age	69.5 (IQR=18.3)	69 (IQR=15.3)
% sepsis	6.6%	13.7%
% cyclic PN infusion	27.6%	60.0%
Median kcal/kg	23.9 (IQR=6.5)	24.9 (IQR=7.6)
Median balance dextrosa/fat (g/g)	4 (IQR=0.7)	3.6 (IQR=0.7)

Statistical significant differences were only obtained for males ($p<0.05$) and for cyclic PN ($p<0.01$).

percentage of hospitalised adult patients receiving PN over the first week. In addition, males are associated with an increased likelihood for the development of PNAC, while cyclic PN infusion may be a protector factor for its onset.

REFERENCES AND/OR ACKNOWLEDGEMENTS

No conflict of interest.

4CPS-236 THE IMPACT OF A WARD-BASED PHARMACY TECHNICIAN SERVICE

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10.1136/ejhpharm-2019-eahpconf.385

Background Pharmacy technicians have been employed in hospital settings for many years but only recently has the potential for service expansion been explored. There is a paucity of research on the impact of a ward-based pharmacy technician service (WBPTS) in this country.

Purpose To determine the impact of a WBPTS on medicine management systems, patient safety and healthcare costs.

Material and methods Sixteen wards were studied over 8 weeks: four 'intervention' wards (assigned a WBPTS prior to the study) and 12 'control' wards (technicians providing a stock 'top-up' service). The 'intervention' wards comprised mainly medical patients, a WBPTS had been assigned to these wards as they were considered high-activity wards. The control wards comprised both medical and surgical patients. The medication management systems were inspected by the researchers for the presence of excess non-stock medicines and expired medication. Nurses were observed to calculate time taken to complete drug rounds. Patient drug charts were analysed to calculate the duration to pharmacist review of high-risk medications. Nursing staff were surveyed on their opinions of the service.

Results The total value of excess non-stock on intervention wards was € 97.51 (mean cost/ward: € 24.38) compared with € 13,767.76 on control wards (mean cost/ward: € 1,147.31). Eight expired medications were found on control wards, none were present on intervention wards. The mean time to complete drug rounds on a per-patient basis was 28% lower on intervention wards. The median time to pharmacist review of high-risk medications was shorter on intervention wards (0.67 vs 4.2 days). One-hundred per cent of respondents agreed that the WBPTS should continue.

Conclusion More widespread investment in the WBPTS has the potential to reduce healthcare expenditure due to excess medicines, increase nursing time spent on direct care of patients and reduce the potential for patient harm from high-risk medicines. The current study did not consider the costs associated with WBPTS (e.g. personnel costs, additional time spent by technicians/time saved by nurses) and so further studies should consider the full economic costing of the service.

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No conflict of interest.

4CPS-237 STUDY OF PATIENT SATISFACTION WITH PHARMACEUTICAL INTERVIEW IN AN OUTPATIENT ONCOLOGY MEDICAL UNIT

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10.1136/ejhpharm-2019-eahpconf.386

Background From 2017 a clinical pharmacy programme provides pharmaceutical interviews to patients of the outpatient oncology unit of the university hospital. At the end of each interview, patients receive a personalised pharmaceutical plan, including a summarised table of their medicines to help them manage drug intake and adverse events.

Purpose The purpose of this study was to assess patient satisfaction regarding pharmaceutical interviews, and aimed at improving the quality of our patient interviews.

Material and methods The 80 consecutives patients who received a first pharmaceutical interview in the outpatient oncology unit between June and September 2018 were included. After the pharmaceutical interview and oral consent, patients completed an 8-item satisfaction questionnaire in the absence of the pharmacist. The questionnaire also included a free-text response section as well as a general assessment of the interview. The topics covered were: confidentiality, interview duration, professionalism, empathy and scientific knowledge of the pharmacist. The patients could choose between three answers: completely satisfied, somewhat satisfied and unsatisfied. The recorded responses for the general assessment varied from 1 (not satisfied) to 5 (completely satisfied).

Results Regarding the environment of the interview, 97% of patients were satisfied with the duration, 90% were satisfied with confidentiality and 89% were satisfied with the location. Regarding the content of the interview, 99% of patients were satisfied with the pharmacist's responses and 98% were satisfied with the personalised pharmaceutical plan. Ninety-four per cent were satisfied with the treatment explanations.

In the free-text, the main points relayed by patients were:

- Key strengths: clear explanations, well–designed documents, quality of listening, answers to questions, availability, attention given to patients.
- Weak points: improve privacy, develop alternative medicines.

Regarding the general assessment of patients' satisfaction, 1% gave a score of 3/5, 30% gave a score of 4/5% and 69% gave a score of 5/5.

Conclusion This study shows that the majority of patients were satisfied with the pharmaceutical interview. Another study is ongoing which assesses both the clinical and economical impacts of the pharmaceutical interventions carried out during these interviews.