Evaluation of Clinical Pharmacist Interventions in Surgical Patients

Ngige G[1], Carton E[2], Zaborowski A[2] , Brown A[3], Gaskin J[1] , Conyard E[1]
[1] Pharmacy Department and [2] Department of Surgery, Our Lady of Lourdes Hospital, Drogheda, Co. Louth, Ireland.
[3] School of Pharmacy and Life Sciences, Robert Gordon University, Aberdeen, Scotland.

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Objectives

Surgical patients are at risk of medication-related adverse events, causing morbidity and mortality. This may be due to the fact that some of these surgical patients have other medical conditions and thus are on medications prior to surgery[1,2]. Some regular medications may need to be withheld prior to surgery and restarted post-surgery. The longer the patients are without these medications, the more likely they are to suffer from non-surgical complications. However, there is limited published research on the role and impact of clinical pharmacy services in surgery in Ireland.

The aim of the study is to evaluate the effect of clinical pharmacist service on medication safety in surgical patients by answering the following research questions (RQ):
RQ1. What are the types and frequency of the interventions made by a clinical pharmacist in surgical patients?
RQ2. What number of clinical pharmacist interventions carried out on patients in surgical wards prevented a potential or actual adverse drug events (ADE)?
RQ3. What number of clinical pharmacist interventions carried out on patients in surgical wards is associated with prescribers' (non)-compliance to hospital guidelines?

Study Design

What?
The study was a prospective, uncontrolled, observational study of all clinical pharmacists' interventions undertaken in surgical patients over a consecutive five week period, (Monday to Friday from 09:00 to 12:30).

Where?
The study was conducted in two surgical wards of a 339 bed, Acute General hospital that provides both medical and surgical services as well as maternity and paediatric services to a population of over 300,000. The hospital is a Regional Trauma Centre[3]. Annual surgical admissions for both wards for the year ending 2016 were 586 and 404 respectively. The wards cover mainly general surgery and urology.

Who?
Inclusion Criteria: Surgical patients ≥ 18 years admitted for longer than 24 hours to either surgical wards.
Exclusion criteria : Surgical patients with palliative-care pharmacist input.

How?
Medication reconciliation and clinical review interventions were recorded on a structured form. A brief summary of the patient admission details (presenting complaint, medical and surgical history, significant clinical parameters) and the completed form were retained as data collected.

A comparison of patient characteristics (age, gender, speciality) was carried out between the study group (100% of study population) and mean monthly data from the preceding 12 months.

The drug-related problems (DRPs) were classified using a modified version of the Pharmaceutical Care Network Europe classification system for drug related problems[4] by the clinical pharmacist and independently by a senior clinical pharmacist with consensus reached.

Interventions were graded for associated extent of harm by two surgeons (consultant and specialist registrar) by consensus and independently by the clinical pharmacist using the National Coordinating Council for Medication Error Reporting and Prevention (NCCMERP) Index for categorising medication error[5]. The number of interventions that prevented a potential or actual ADE was determined.

Prescriptions were reviewed to assess prescribers' adherence to local guidelines using the following guidelines: VTE prophylaxis guideline[6], Antimicrobial guideline[7], Diabetic Glucose Potassium Insulin (GKI) infusion guideline[8] and recognised guideline on prescribing medicines perioperatively[9].

Results

There were no significant differences between the study group (n=122) and mean monthly data from preceding 12 months in terms of mean age, number of patients under, over and equal to 65 years, gender and specialities.

The number of patients with at least one intervention were highest in the male, ≥ 65 years and general surgery categories.

One hundred and fifty-two interventions were completed on 71 patients with a prescriber acceptance and action rate of 75%. 51 patients required no intervention. The DRP with highest frequency was omission of regular medication on admission and discharge (24%), new indication for drug treatment (10%) and weight-based dose adjustment (5%).

Table 1. Simplified version of NCC MERP Index category definitions

Category	Severity of Adverse drug event (ADE)
A	No adverse drug event
B C D	Potential adverse drug event
E F G H I	Actual adverse drug event

Interventions categorised by two surgeons and clinical pharmacist

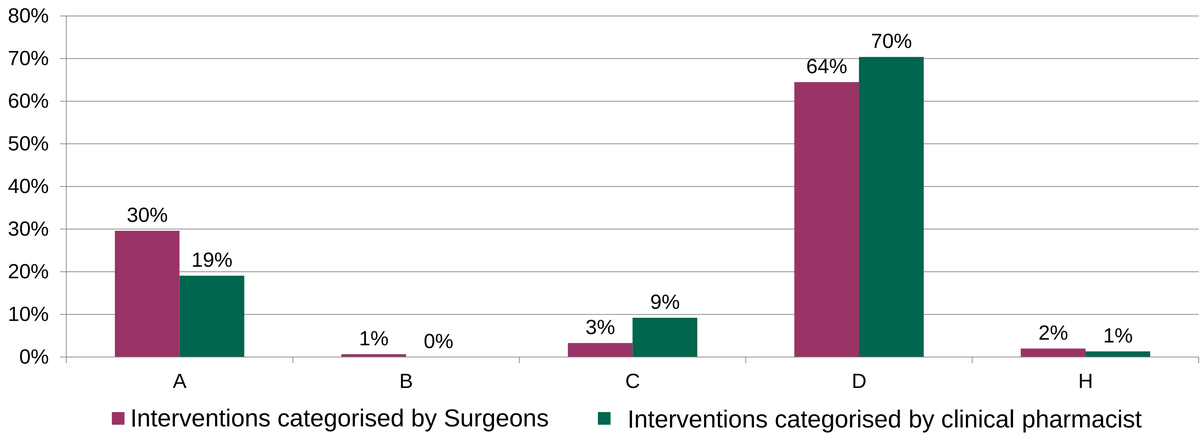

Figure 1. Clinical pharmacist interventions categorised by two surgeons and clinical pharmacist using the NCC MERP Index

Category E, F, G and I were not identified in the study. Inter-Rater reliability[10] between the consensus rating of two surgeons and the clinical pharmacist in evaluation of interventions as per NCC MERP Index was found to be substantial (IRR=85%, Cohen's Kappa= 0.69).

Table 2. Total number of prescriptions in relation to the different guidelines and prescribers compliance

Guideline category	Total number of prescriptions	Compliance with guidelines	Non-compliance with guidelines
Antimicrobial	79	65 (82%)	14(18%)
VTE prophylaxis	89	79 (89%)	10 (11%)
Diabetic GKI Infusion	6	6 (100%)	0 (0%)
Perioperative	39	39 (100%)	0 (0%)

***Data are given as number (percentage).**

Discussion

Three-fifths of the study population required at least one clinical pharmacist intervention. 39% of male patients that were 65 years or older and on 4 or more regular medications at time of admission were shown to have at least one intervention completed on them by the clinical pharmacist. Omission of regular medication at admission or discharge was the most frequent type of DRP.

The acceptance rate of interventions was 75%, similar to the findings of two comparable studies, 80%[11], 83%[12].

Two-thirds of the clinical pharmacist interventions (68%) prevented a potential ADE and 3% prevented an actual ADE as categorised by two surgeons by consensus using the NCC MERP Index.

The clinical pharmacist undertook interventions on 11% and 18% of the VTE prophylaxis and Antimicrobial prescribing respectively. There was 100% compliance to perioperative guidelines and guidelines related to diabetics requiring GKI infusion.

Further work to support these findings would require the introduction of a control group with no pharmacist involvement and evaluation of the impact of clinical pharmacist service on surgical in-patient length of stay.

Conclusion

There was a high level of medication-related intervention in this study, which if left undetected could have led to harm. The clinical pharmacists' identification and prevention of potential and actual ADEs as well as support of prescribers' adherence to local guidelines demonstrated a positive impact on patient safety.

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