4CPS-170

N02 - Analgesics

ESTIMATING THE ECONOMIC IMPACT OF PHARMACIST-LED PRESCRIPTION ORDER VALIDATION OF OPIOID PRESCRIPTIONS IN A TERTIARY UNIVERSITY HOSPITAL

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BACKGROUND AND OBJECTIVE

Opioids easily cause adverse drug events (ADEs) or therapeutic failure in case of prescribing errors, resulting in increased costs for the hospital, patient and healthcare system. The clinical pharmacist can detect and resolve these errors by performing prescription order validation (POV). Little data is available on the economic impact of this service.

OBJECTIVE: To evaluate the cost-outcome of pharmacist-initiated interventions on opioid prescriptions during POV, in terms of **cost savings** and **cost avoidance** for the hospital.

METHODS

- Setting: **retrospective study** in UZ Brussel, a tertiary university hospital of 721 beds in Belgium.
- Electronic opioid prescriptions (fentanyl, methadone, morphine, oxycodone, piritramide) reviewed and validated by clinical pharmacist during centralized pharmacy-based POV (Period: 1/2/2017 – 31/1/2018) – exclusion of palliative patients.

- Cost analysis using methodology by Nesbit et al[1]; per patient, the following evaluation was made:

1 DRUG COST (OR SAVING): Drug cost of **initial** therapy (without intervention) – Drug cost of **recommended** treatment (with intervention)

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2 ADE COST AVOIDANCE: **Probability** of ADE occurence x average **hospital cost** of opioid related ADE per patient

Assessment of ADE probability estimate (PE) and hospital costs by expert panel (two trained clinical pharmacists, WS and CPJ).

In case of disagreement: discussion until consensus.

PE:
- No effect (0.0)
- Very low (0.01)
- Low (0.1)
- Medium (0.4)
- High (0.6)

Cost calculation (~ Belgian Healthcare Knowledge Center Report[2]):
Costs of non-medical staff
+ Physician related costs
+ Drug costs
+ Investment costs (equipment and devices)
+ Costs of supporting services
+ Overhead costs

3 POV COST: Personnel expenses of clinical pharmacist and software engineer

RESULTS AND DISCUSSION

3040 validated opioid prescriptions; 137 pharmacist interventions (4.5%) – 94 implemented interventions (acceptance rate 68.6%) for 86 patients

Table 1: Type of drug related problem (DRP)

Type of DRP	Number (%)
Administration mode	4 (4%)
Contraindication	2 (2%)
Dose too high	4 (4%)
Duplication	13 (14%)
Interaction	2 (2%)
No indication	13 (14%)
Time or frequency of administration	55 (59%)
Undesirable effect	1 (1%)

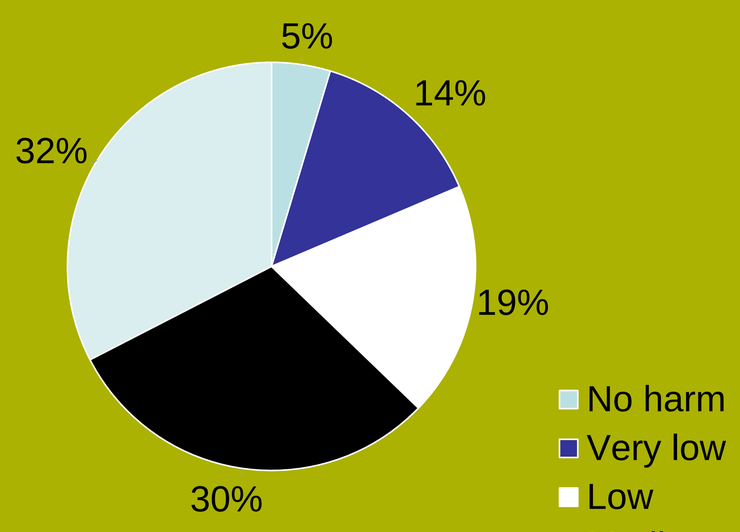

Figure 1: PE of ADE occurence per patient

COST ANALYSIS:

1. ***Drug cost savings:*** € 395.30 (median € 1.47/intervention, range -€ 21.01 to € 67.23).
2. ***ADE cost avoidance:*** € 8,164.62 (median €64.34/opioid related ADE, range € 0.00 - € 500.48)
3. ***Personnel expenses:*** € 3,688.62

Total cost-benefit (1 + 2 – 3):
= € 4,871.30 (cost-benefit ratio: 2.32)

Sensitivity analysis: mostly variations in the ADE cost avoidance affected the outcome.
- Lower limit: -€ 1,386.56
- Upper limit: € 27,307.49

- **First Belgian study** to estimate the cost-benefit of POV from a hospital's perspective.
- POV is essential for patient safety. Unfortunately clinical pharmacists can not (yet) validate all prescriptions: supplementary electronic systems are needed to achieve a 100% coverage. Standardized clinical decision rules, preferably electronically integrated, can limit a potential inter-pharmacist variability by alerting high-risk prescriptions to the pharmacist.

Limitations (small expert panel, pragmatic cost calculation method, main focus on opioids): further research remains necessary.

Conclusion

Investments in clinical pharmacy services like POV of opioids are valuable, not only to improve the patient's clinical outcome, but also to reduce the hospital's costs.

[1]Nesbit, T.W., et al., *Implementation and pharmacoeconomic analysis of a clinical staff pharmacist practice model.* Am J Health Syst Pharm, 2001. **58**(9): p. 784-90.
[2]Swartenbroekx N et al., Manual for cost-based pricing of hospital interventions. 2012, Belgian Health Care Knowledge Centre (KCE): Brussels.

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