ENHANCING THE SAFETY OF INJECTABLE CYTOTOXIC CHEMOTHERAPY AT A TERTIARY CARE HOSPITAL: A RETROSPECTIVE ANALYSIS OF PHARMACISTS’ INTERVENTIONS IN CHEMOTHERAPY PREPARATION SERVICES

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Background
• Cytotoxic chemotherapeutic agents are classified as high alert medications according to health accreditation standards.
• Detection of drug related problems (DRP) in chemotherapy prescriptions and resolving through pharmacist interventions (PI) was associated with an overall positive clinical and economic impact in international studies.

Aim
• To describe the economic and clinical impact of interventions performed by pharmacists in the chemotherapy preparation unit at Sultan Qaboos University Hospital (SQUH).

Method
• Design: A retrospective analysis of pharmacists’ interventions on injectable chemotherapy prescriptions between January and December 2021.
• Setting: A tertiary care multi-speciality hospital in Oman. Chemotherapy including biologicals are centrally prepared within the pharmacy.
• Intervention: Chemotherapy prescriptions were verified by trained pharmacists against set treatment protocols & in accordance to patients’ clinical and laboratory parameters prior to preparation/mixing. Consequently, a proportion of prescriptions was withheld and differed to a later date. The remaining prescriptions were screened for any DRP and PI were then documented on a specific form that was incorporated into the electronic patient record. The process of verification is presented in (Fig 1).
• Study Measures: The direct cost reduction of unprepared doses, and the grading of clinical significance of each intervention based on predefined criteria into: death, major, moderate and minor according to the associated potential harm prevented.

Results
• A total of 18,408 individual drug prescriptions were received for 1,096 patients during 2021
• Out of them, 4,440 (24.1%) prescriptions entailed a change with the introduction of verification process.
• Prior to mixing, 4,069 orders (22.1% of total) were differed and the estimated potential direct cost reduction from the unprepared doses was around 1,000,000 Omani Rials (2,000,000 €) (Fig 2).

![Figure 2: Proportion of prescriptions entailed a change with introduction of verification and required pharmacists' intervention](image)

A total of 303 DRP were identified and required a pharmacist interventions. The majority of interventions (96%) were accepted by the treating clinicians. Common DRPs & individual drugs involved in the interventions are shown in Fig.3. Grading of clinical significance of the performed interventions are in Table 1.

![Figure 3: Most frequent DRPs and commonly involved individual drugs](image)

| Table 1: Grading of clinical significance of pharmacist interventions N=303 |
|-----------------|-----------------|-----------------|
| Grading of clinical significance | % | Examples |
| Death | 1.6 | Azacytidine 900 mg prescribed instead of eculizumab 900mg |
| Major | 3.9 | Vinblastine prescribed as 6mg/m2 (actual dose 1.5mg) while the correct dose was 0.2mg/kg in patients weighing<10kg |
| Moderate | 41.0 | Daunorubicin prescribed on days 1, 2 & 3 instead of 1, 3 & 5 |
| Minor | 2.7 | Intrathecal methotrexate prescribed as 10mg, child turned 3 that month, hence dose increase to 12 mg was recommended |
| Suboptimal practice | 33.3 | Dacarbazine 610mg was prescribed, recommended rounding off to 600mg |
| Not applicable | 17.5 | Information on medication availability provided to the prescriber |

Conclusion
Chemotherapy order verification & PI have minimized potential harms associated with cytotoxic chemotherapy regimens and resulted in considerable cost saving.