

Handling of anti-infective drugs in nursing - a health risk for employees?

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Introduction & Objective

- Individual administration of pharmaceuticals to patients is one of the major tasks of nursing staff
- Typical operations such as preparation and application of infusions, but also handling of finished dosage forms such as tablets (e.g. their splitting or crushing) can potentially involve an exposure of employees to hazardous compounds after an unintended release of active ingredients into the work environment (fig. 1) [1]



Fig. 1: Chain of risk in handling pharmaceuticals

- The problem is well known for the handling of anti-neoplastic drugs and is met by extensive safety measures [2]
- But: Exposure to compounds classified as carcinogenic, mutagenic, toxic to reproduction (CMR) or sensitizing is also possible when handling other relevant groups of pharmaceuticals (e.g. anti-infective drugs) [3]
- Objective: To describe the status quo in the handling of anti-infective drugs by registered nursing personnel, including the assessment of organizational and personal protective measures, potential routes of exposure as well as potential health effects after exposure to respective pharmaceuticals

Methods

- Structured interviews with n=104 nurses and ward nurses, employed at three hospitals of different service levels, one geriatric care facility and one mobile nursing service
- Topics:
 - Type and frequency of drug related operations
 - Dosage forms handled
 - Workplace design and organizational framework for drug related operations
 - Use of personal protective equipment
 - Level of information
 - Own experiences with critical operations or drugs
- Descriptive data analysis



Results

- Drug related operations take up to 93 min of working time on average (range 15-360 min) per work shift

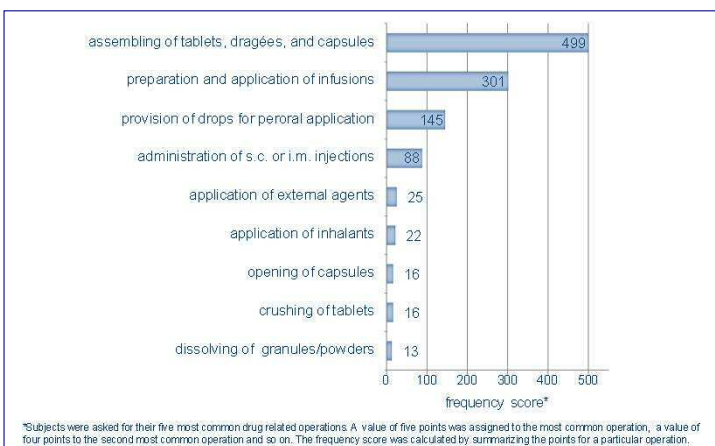


Fig. 2: Most frequent drug related operations

- Assembling solid oral dosage forms is the most common operation, followed by handling of infusions (fig. 2)
- Though less common, operations with potential release of dust (e.g. crushing of tablets) into the work environment seem to be an issue
- Availability of a separate designated workspace for provision of drugs affirmed by 41.3% of the subjects (disaffirmation: 33.7%; not specified: 25.0%).
- Regular cleaning of the workspace before and after use or at least after use was stated by 34.7% of the subjects (other or no cleaning regimes: 59.5%, not specified: 5.8%)
- Defined time slots for provision of drugs affirmed by 87.5% of the subjects. Work interruptions and distractions during these times reported by 79.0% of the participants
- Regular use of gloves as most obvious personal protective measure is not commonly established (fig. 3)

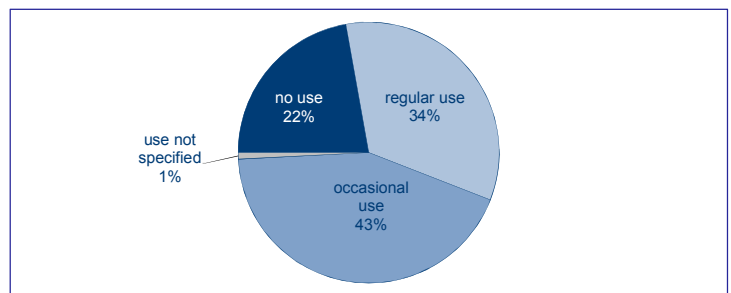


Fig. 3: Use of gloves for as personal protective equipment when handling pharmaceuticals

- Handling of liquid dosage forms, in particular infusions, was reported as critical operation with potential for unintended release of active ingredient by 19 subjects. Typical examples: De-aeration of infusion sets, (dis)connection of infusion set to i.v. catheters
- Spontaneous perception of anti-infective drugs as hazardous substances was reported by only 15% of the subjects (rating as non-hazardous: 2%, no ad hoc answer: 83%)
- Experience of physical discomfort (mostly skin reactions such as flush, rash or itching) after unintended contact to pharmaceuticals in past was reported by 25% of the subjects

Discussion

- Results cannot be considered as representative for the whole nursing sector due to the selection of participants. Nevertheless, some important aspects can be derived
- Exposure of employees to active ingredients during the handling of anti-infective drugs seems to take place, leading in some cases to physical effects
- Due to their relevance in daily routine a closer look at substance release during operations with solid dosage forms and intravenously applied liquid pharmaceuticals appears meaningful, particularly since the latter is also mentioned as critical by employees
- Work stages relevant for release of active ingredients into the work environment have to be identified within the workflow. Respective data can be used to develop appropriate measures to reduce exposure of employees
- Since organizational issues, but also a lack of awareness, could be promoting factors for unintended exposure to hazardous pharmaceuticals, improving conditions in that regard could additionally advance workplace safety and health

References

- Nygren O, Lindahl R. Screening of Spill and Leakage of Antibiotics in Hospital Wards. Journal of ASTM International 2011. DOI: 10.1520/JAI103453
- Zytostatika im Gesundheitsdienst. Berufsgenossenschaft für Gesundheitsdienst und Wohlfahrtspflege, Hamburg 2009
- Hadtstein, C; Arzneistoffe mit Verdacht auf sensiblisierende und CMR-Eigenschaften. Berufsgenossenschaft für Gesundheitsdienst und Wohlfahrtspflege, Hamburg; 2009

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