From machine to mouth

How can automated dose dispensing lead to safer and more effective patient medication?

Pharmakon

- B Frøkjær*
- L Thomsen*
- H Herborg*
- L Fonnesbæk**
- G Pedersen**

* Pharmakon,
Danish College of Pharmacy Practice,
Milnersvej 42, 3400 Hillerød, Denmark

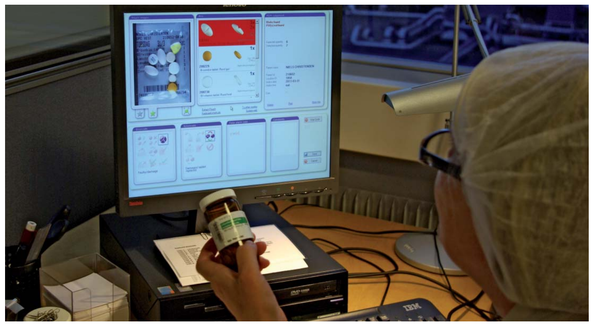
** Danish Society for Patient Safety,
Hvidovre Hospital, Kettegaard Allé 30,
2650 Hvidovre, Denmark

The aim of the study was to provide an overview of patient safety issues related to automated dose dispensing, and the solutions suggested or implemented.

Background

Automated dose dispensing (ADD) of medicine involves a complex range of processes. Ten years after implementing ADD in Danish primary healthcare, evidence concerning effects on patient safety and best practice is still limited.

This study precedes a failure mode and effect analysis of ADD and development of best practice guidelines focusing on patient safety.



Methods

We conducted two seperate analyses on perceptions and evidence concerning patient safety aspects of ADD:
1. A systematic review of the literature and
2. A documentary analysis.

Study objectives:
- Health professionals' and patients' perspectives on ADD
- Organisational and economic challenges and solutions
- Patient safety issues and suggested solutions
- Suggested target group for ADD
- Transition between primary and hospital care

Literature review:
We included articles, study reports, legal documents and notes describing ADD in primary healthcare. Literature was searched Sep. 2010 using Google and 17 Scandinavian healthcare related web pages.
The thematic framework analysis focused on the perspectives: technology, patient and organisation.

Documentary analysis:
Documentary data published by local councils, regions or hospitals were searched using Google and 11 Danish healthcare related web pages. Also, local councils and hospitals were asked to provide documents.
We included guidelines, reports, notes, letters and information on ADD.
For each local council and region we generated a summary of the documents. Also, we conducted a transverse analysis of the implemented solutions aimed at making ADD work in daily practice and solving or preventing safety issues.

Conclusions

- The literature study provides an overview of the evidence of ADD effects and how ADD is perceived, whereas the documentary analysis adds information on implementation and practical solutions to barriers and safety issues.

- The literature is inconclusive as to whether ADD is safe way of dispensing medicines.

- ADD reduces dispensing errors. Errors occur in other steps of the medication use process as a result of the legal, economic and organisational framework. Many of the percieved failure modes are well-known and not specific for ADD medicine.

- Health professionals' perspectives on ADD vary and should be equally considered to improve ADD implementation.

- ADD should be discontinued in unstable treatment periods, to reduce the risk of medication errors.

- User perspectives on ADD deserve more attention in the future.

Results

	Results of the literature review	Results of the documentary analysis
Included study material	Danish HTA report from 2005, HTA update from 2010, 44 new references (extracted from 1412 hits).	41 documents from 21 of the 98 local councils, 12 documents from 4 of the 5 regions, 1 hospital report (extracted from 512 hits).
Technological perspectives	- ADD reduces dispensing errors, but effects on patient safety is of limited evidence. - Health professionals predominantly percieve ADD as an advantage but their perspectives on ADD vary. - Solutions believed to improve safety: one continuously updated electronic medication list, prevent errors due to medication changes, knowledge on ADD medication errors, better treatment monitoring, avoid multiple dispensing systems.	- Health professionals experience a range of safety issues, but local council guidelines imply that these are handled differently. - Acute medication changes are resource demanding and often require a period of manually dispensed medicine. - Most local councils has guidelines describing the management of medication changes.
Patient perspectives	- Use of ADD increases but has not reached full potential. - Most users experience medication changes, and use multiple dispensing systems. - Users are predominantly positive, but experience barriers and suggest improvements.	- Less than half of the local councils' guidelines require patient information.
Organisational perspectives	- Health professionals target ADD at patients in stable medication treatment. - Barriers: lack of interdisciplinary cooperation, inadequate information sharing, and unresolved economic issues. - Suggested solutions: interdisciplinary cooperation, clarification of responsibilities, implementation of guidelines, improved electronic support. - ADD reduces medication waste, medication costs, and nursing hours when treatment is stable.	- Local councils recommend ADD for patients in stable medication, and often require that at least three medications are suitable for ADD. - Several local councils expected that more patients would be suitable for ADD. - Local councils are aware of the importance of interdisciplinary cooperation, communication and clarification of responsibilities. - Economic expectations decides the degree of implementation of ADD but also the degree of safety issues.
Transition between primary and hospital care	- Health professionals associate admission with increased risk of errors due to medication changes and little knowledge about ADD among hospital staff. - Suggested solutions: improved knowledge on ADD, clarification of work flow, communication, and responsibilities, and improved patient medication overview.	- Hospitals receive patients from several local councils that have different guidelines for hospital admission of ADD patients. - Hospital guidelines vary and are not well implemented.