

IMPACT OF A COMPUTERISED MEDICATION DISPENSING CABINET ON DISPENSING ERRORS IN AN EXPERIMENTAL SETTING

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Background

Medication error is a major source of problems during drug dispensing, particularly when this process is performed manually. Computerised medication dispensing cabinets (CMDC) can help reduce the rate of errors, but their real impact is poorly documented, especially for the more recent technologies. The principal objective of this study was to evaluate the Pyxis MEDSTATION[®] by comparing the dispensing error rate with that obtained in a previous study involving a traditional manual method in an experimental pharmacy simulating global ward stock (Fig. 1)¹

Methods

Thirty volunteer nurses were asked to prepare 20 pill boxes each containing 4 different drugs with various administration times (80 drugs, 146 doses) (Fig. 2). The prescriptions, drugs and volunteer number were the same as in the previous study, the only difference being the use of the CMDC (Fig. 3) instead of the traditional pharmacy. Physician's orders were introduced in the CMDC prior to the experiment and drugs were all stored in CUBIE (Computerised Unit-Based Inventory Exchange) Smart Pockets, with selective opening (Fig. 4). Nurses received a short basic education (25') before to start the experiment.

Errors were tracked by comparison with reference pill boxes (Fig. 5). At the end of the experiment, a questionnaire was filled in to comment on the utility of the CMDC from the point of view of security, stock management and control, and ease of use.



Fig 1: Experimental pharmacy



Fig 3: Pyxis MEDSTATION[®]



Fig 4: CUBIE Smart Pockets

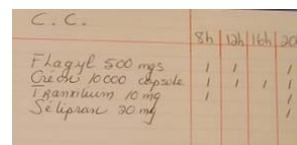


Fig 2: Example of prescription set



Fig 5: Comparison with reference pill-box

Results

The total number of errors was markedly decreased with the CMDC, by a factor approaching one log (from 3.0 to 0.4%).

Selection (taking the wrong drug), the major error type in the first experiment, as well as omission errors were totally eliminated, whereas counting (wrong number of pills) and repartition (supplying at the wrong time) errors were not significantly reduced (Tab. 1).

Tab. 1: Comparison of error rates

n=2399	Manual dispensing ¹		Pyxis dispensing		
	number	rate	number	rate	
Omission error	5	0.2%	0	0.0%	p=0.03
Selection error	48	2.0%	0	0.0%	p<0.001
Counting error	14	0.6%	6	0.2%	p=0.06
Repartition error	4	0.2%	4	0.2%	p=0.6
Total	71	3.0%	10	0.4%	p<0.001

The volunteers particularly appreciated the touch screen, the legibility of the prescription and the user-friendliness of the software (Fig. 6).

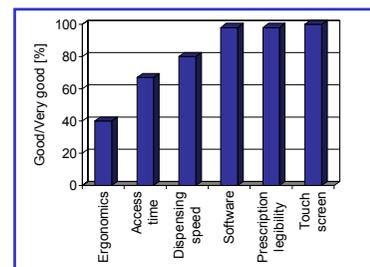


Fig 6: Answers rates to Pyxis MEDSTATION[®] query

On the more problematic side were the ergonomics of the cabinet, work space and access time in case of emergencies. Almost all of the volunteers found that the CMDC could be useful in their practice, mainly to improve the stock management and above all the security due to error reduction.

Conclusion

The comparison of the two studies shows that the CMDC significantly contributes to the reduction of errors in medication dispensing, in particular by preventing selection errors. To our point of view, this result is strongly associated with the connection to a computerised physician order entry system and the use of CUBIE Smart Pockets technology. Even though there were several points of interrogation, the volunteers were mostly favourable towards an eventual use of the system in their wards.

Reference

¹Meier B, Garnerin P, Chopard P, Muller R, Bonnabry P. Estimation of dispensing errors made by nurses in an experimental pharmacy. 6th EAHP congress, 2001.