

How dispensary workload affects checking skills

Environmental factors in the dispensary can affect staff performance in a number of ways. This article describes an audit undertaken to assess the impact of increased workload on the time taken to carry out the final check of prescriptions in a paediatric hospital, and the processes used to check it.

Most errors result from defects in the systems in which we work. These are failures in the design of processes, tasks, training, and work conditions that make errors more likely.¹

We wanted to investigate whether it is possible to identify latent system failures (less apparent failures, or ‘accidents waiting to happen’) in a paediatric hospital dispensary setting (see Background box), and thus identify potential errors prospectively.

Errors can occur at all stages of the medicines supply process. This study focused on the final checking stage of prescriptions in the dispensary of a paediatric hospital.

Aim

The aim of this study was to investigate how environmental factors such as workload affect the performance of pharmacists and technicians carrying out the final check of prescriptions. An insight into factors that may affect the accuracy of this process could help to prospectively identify the causes of errors in this population, and thus reduce the frequency of their occurrence. We investigated how dispensary workload affects:



Pharmacists took longer to check a prescription when workload was higher

- The time taken for pharmacists and technicians to perform the final accuracy check
- The number of process steps carried out during checking
- The number of purely safety checks carried out during checking

Method

Birmingham Children’s Hospital is a tertiary referral children’s hospital. A non-participant, direct observation study of the final accuracy checking stage of the dispensing process was undertaken. Pharmacists (n=9) and technicians (n=9) were each observed for a 30-minute period, and their individual actions during the checking process were recorded and timed. Workload data was obtained from dispensary computer records, based on the number of items dispensed in a 30-minute period. The data was tabulated, linear regression analysis was carried out, and the standard error of the mean (SEM) was calculated for each indicator. A number of interviews, questionnaires and focus groups were then used to ascertain:

- The number of process steps (e.g. printing the label) and safety checks (e.g. checking the patient’s name) staff members thought should be carried out to check a simple prescription (using a basic systems analysis technique to compile a process map)
- Staff members’ opinions on the dispensary environment and workload
- Any comments on errors made during the checking process

Separate focus groups were held for pharmacists and technicians to encourage uninhibited responses.

Results

Three data sets were obtained from the study, showing the impact of increasing workload on: the time taken to check items; the number of process steps used; and the number of safety checks carried out (see Tables 1 and 2, p61).

Background

Children are a particularly vulnerable patient group when it comes to medication errors. Data from the National Patient Safety Agency’s National Reporting and Learning System shows that the proportion of reported medication incidents that involve children under four years old is higher than expected.² A number of reasons have been attributed to this, including:

- Medicines used for children are often used outside of their licence (or are not licensed for children)

- Dose calculations are complicated
- Medicines are used in *ad hoc* formulations and presentations

Research has shown that paediatric patients are exposed to a rate of potentially dangerous medication errors three times higher than that for adult patients.^{3,4}

Recent research from the School of Pharmacy, University of London, shows that prescriptions for paediatric inpatients contain errors in over 10% of cases.⁵

Time taken In the technician group, the time spent checking an item decreased as workload increased. See Figure 1. The mean time taken to check one prescription was 6.09 minutes (SEM \pm 1.4). In the pharmacist group the time taken to check items increased as workload increased. The mean time taken to check one prescription for the pharmacist group was 3.27 (SEM \pm 0.4).

Process steps As workload increased, the number of process steps taken to check an item reduced in the technician group but increased in the pharmacist group. See Figure 2. The mean number of steps was 27.9 (SEM \pm 16.1) for the technician group and 29.6 (SEM \pm 4.72) for the pharmacist group.

Safety steps As workload increased, the number of safety checks carried out by the technicians increased. The reverse was seen in the pharmacist group. The mean number of safety checks was 45.9 (SEM \pm 17.1) for the technician group and 63.7 (SEM \pm 10.5) for the pharmacist group.

Other environmental factors The focus groups and questionnaires revealed that pharmacists and technicians felt more affected by the working environment (e.g. the dispensary temperature) when workload was higher. Respondents reported feeling stressed in one in three dispensary sessions. Those who reported making checking errors were more likely to report feeling stressed because of the working environment. Other environmental issues that staff reported as having a negative effect on their work included: pressure to work faster, noise, distractions, poor workplace design and poor paperwork design. All of these are recognised risk factors for errors.⁶

Discussion

Time The results of the impact of workload on checking time were unexpected. The observation that as workload increased, technicians spent less time checking prescriptions but pharmacists spent more time, could imply that technicians are more task-orientated, while pharmacists are concentrating on other priorities and responsibilities, such as safety. Future work could examine the link, if any, between education, training and professional culture and the approach taken to dispensary work.

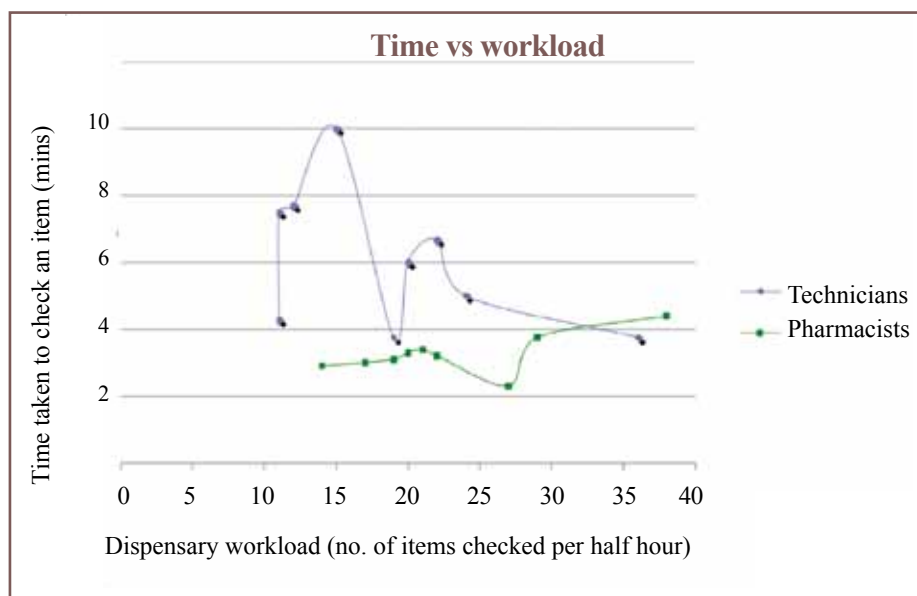


Figure 1: The impact of increasing workload on the time taken to check a prescription

Process steps The above trend was repeated in the data set relating to the number of steps in the checking process. As workload increased, pharmacists tended not only to slow down, but to carry out more steps in the checking process. An interesting observation is that many of these steps were repeat steps, for example when a pharmacist double-checked an element of the prescription following an interruption. During the focus sessions, both pharmacists and technicians said that the average number of steps it would take to check a simple prescription was 5 or 6. In practice, the number of steps taken averaged 27, because of double- and triple-checks.

Safety checks The number of safety checks increased for the technician group when workload increased. Reasons for this are unclear, although it may be related to recovery from interruptions. Although the number of safety checks undertaken by pharmacists decreased when workload increased, the total number of safety checks remained higher than that for the technician group, as seen in Table 2 (p61).

Further work

The next stage of this work will be to assess the impact of using a written protocol during the final checking stage in the dispensary, and also during nurse administration of medicines. We

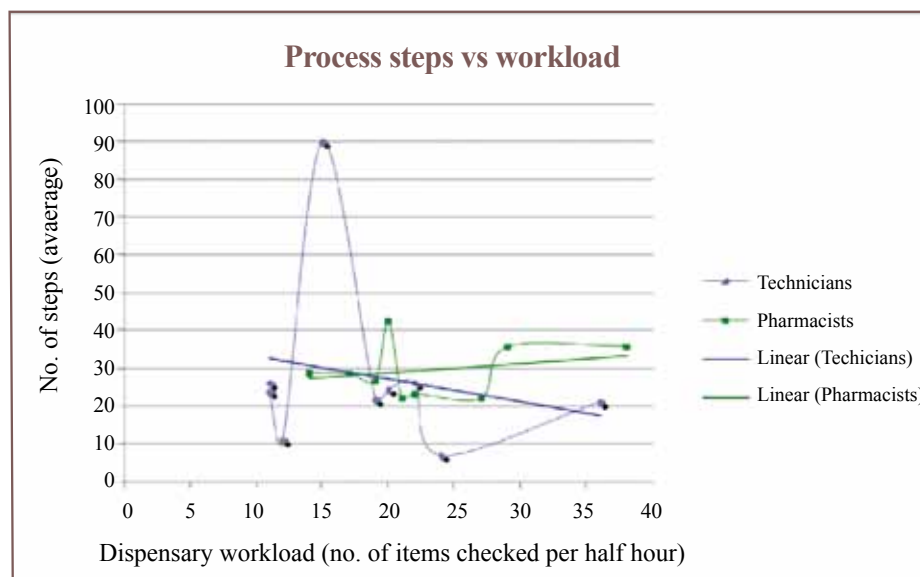


Figure 2: The impact of increasing workload on the number of process steps taken to check a prescription

will also be looking in more detail at the environmental factors that negatively impact dispensary work, and how they can be controlled. This could lead to workflow and/or dispensary redesign. The impact of interruption on memory and work performance is another area for further investigation.

Conclusion

Although this is a small scale study, we have identified that increased workload increases the time taken for pharmacists to check prescriptions, and the number of steps in the checking process, but decreases the time and number of steps taken by technicians. Reasons for this warrant further investigation. The number of safety checks carried out by pharmacists decreased as workload increased, and the reverse was true for technicians. However, it should be noted that the number of safety checks carried out by pharmacists was already at a high level. Environmental factors including dispensary noise, interruptions and design are known to affect staff performance,⁶ and should be further investigated.

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References

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	Workload (no. of items checked per half hour)	Time taken (mins)
Pharmacists		
Dispensary busiest	29	3.75
Dispensary quietist	14	2.9
Technicians		
Dispensary busiest	36	3.75
Dispensary quietist	11	7.5

Table 1: The impact of increasing workload on the time taken to check a prescription

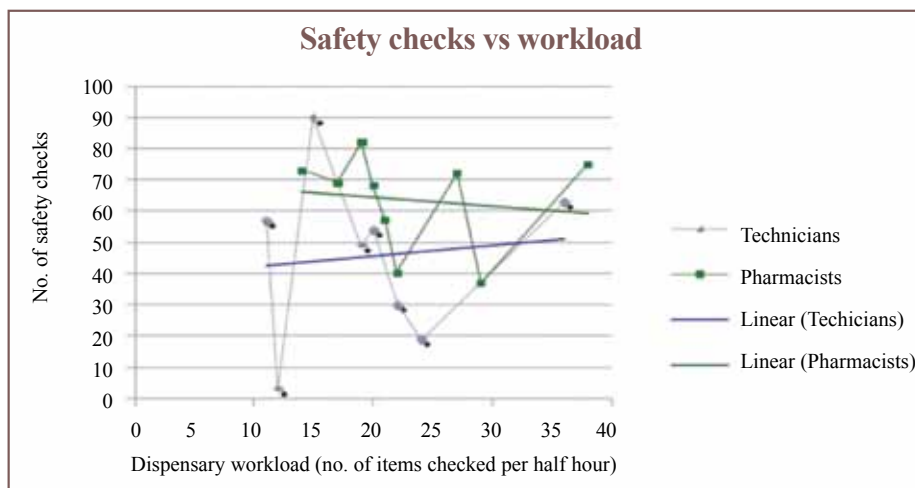


Figure 3: The impact of increasing workload on the number of safety steps taken to check a prescription

	Workload (no. of items checked per half hour)	No. of steps taken
Checking steps — pharmacists		
Dispensary busiest	29	143
Dispensary quietist	14	231
Checking steps — technicians		
Dispensary busiest	36	147
Dispensary quietist	11	166
Safety steps — pharmacists		
Dispensary busiest	38	75
Dispensary quietist	14	73
Safety steps — technicians		
Dispensary busiest	36	63
Dispensary quietist	11	48

Table 2: The impact of increasing workload on the number of steps carried out during the checking