



KEY POINT SUMMARY

OBJECTIVES

Fourteen pharmacists and 10 technicians in an ambulatory care pharmacy at a general medical-surgical hospital were studied to see if interruptions and distractions had an influence on pharmacy error rates.

Impact of Interruptions and Distractions on Dispensing Errors in an Ambulatory Care Pharmacy

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Key Concepts/Context

Errors and error rate have been used as outcome measures of the quality of drug distribution that is a function of the interaction between humans, procedures, equipment, and the work environment. Dispensing errors have been measured by observation and occur at rates of up to 24%. Studies show the relationship between errors and noise, light levels, and prescription workload, as well as the increased number of distractions and errors in an ambulatory care pharmacy. As interruptions and distractions may interfere with the process needed for remembering information and have the potential to adversely affect information-processing tasks, such as memory and decision making used in filling prescriptions, the study highlights the potential for additional features of the physical environment to reduce potential errors in medication delivery.

Methods

The study pharmacy was located in a 451-bed non-government, not-for-profit general medical-surgical hospital with clinics serving ambulatory patients. Fourteen pharmacists and 10 technicians in the ambulatory care pharmacy were tested for distractibility by using the group embedded figures test (GEFT) as well as for visual acuity, color blindness, and hearing. Study participants were videotaped as they filled prescriptions during a 23-day period in 1992. A study investigator compared each filled prescription with the physician's written order, noted details of deviations, verified with the pharmacist any errors that occurred, and asked the pharmacist to correct the error if necessary. Interruptions and distractions were detected and characterized by reviewing the videotapes. An interruption was defined as the cessation of productive activity before the current prescription-filling task was completed for any externally imposed, observable, or audible



DESIGN IMPLICATIONS

With no large differences between the sources of interruptions and distractions when error rates were compared indicates the need for a holistic approach to decrease any and all sources of interruptions and distractions. Staff training is one component to reduce errors, however, to help minimize errors from a built environment perspective, physical and/or spatial separation should be considered in spaces where medications are prepared and where prescriptions are filled. This should include:

1. Elimination of traffic from other areas around the preparation area
2. Visual barriers between the preparation area and other functions

reason; an interruption was not counted when workers stopped productive activity of their own volition. A distraction was defined as a stimulus from a source external to the pharmacist that was not followed by cessation of activity but by the pharmacist continuing productive efforts while responding in a manner that was observable, recognizing that individual workers may differ in their ability to continue working and their need to stop working when a potential interruption or distraction occurs.

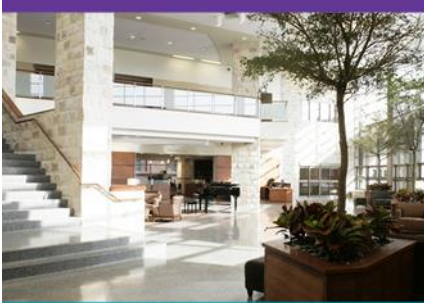
Findings

A total of 5,072 prescriptions were analyzed with 164 errors detected, for an overall error rate of 3.23%. Wrong label information was the most common type of error (80% of the errors detected). Most label errors involved incorrect instructions to the patient (46%), followed by incorrect physician (18%), wrong number of refills (8%), and miscellaneous (28%). The pharmacist GEFT scores ranged from 2 to 18, with a mean of 13. Score of 0 to 18 were possible. There was a significant relationship between GEFT score and each pharmacist's overall error rate, indicating that the more distractible pharmacists (those with a low GEFT score) had higher error rates than pharmacists who were less distractible (those with a high score). Most interruptions were related to prescription-processing questions, but a number of interruptions were caused by staff looking up at people passing through the ambulatory care pharmacy on their way to the inpatient pharmacy. A total of 2,022 interruptions were detected, affecting 1,143 prescription sets. The error rate for prescription sets with one or more interruptions was 6.65%. The error rate for the 1,551 uninterrupted prescription sets was 5.67%. A total of 2,457 distractions were detected for 1,329 prescription sets. The prescription set error rate for prescription sets with one or more distractions was 6.55%. The error rate for 1,365 prescription sets with no was 5.64%. Interruptions and distractions had an effect on errors when totaled over a half-hour period. There was no significant effect when the data were analyzed to see whether there was a direct effect on individual prescription sets alone. Findings suggests a workload effect of interruptions and distractions and is consistent with the proposition that interruptions force workers to review their work upon returning to the task to decide what to do next. It is possible that this self-review (a double-check) resulted in detection of errors and allowed for subsequent correction.

Limitations

According to the authors, under-detection of errors was the primary concern. Author-identified limitations included:

1. The analyses involving interruptions and distractions may have been underestimated if they occurred while a videotape was being changed (e.g. if the investigator was not able to insert a new tape before the previous tape was finished recording, or if the stimuli occurred off camera).



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2. Investigator accuracy could be an issue; no one double-checked the investigator for "error-free" prescriptions
3. The investigator was exposed to the same environment and low lighting level as the pharmacists. It was decided that any changes to the environment for the investigator would have also altered the environment of the pharmacists.