



KEY POINT SUMMARY

OBJECTIVES

The study aimed at evaluating the effects of the drug counter and the pharmacy fixture on prescription filling time and distance travelled by pharmacists in dispensing process at the outpatient pharmacy of a 504-bed hospital.

Effects of Simulated Facility-Design Changes on Outpatient Pharmacy Efficiency

Lin, A. C., Barker, K. N., Hassall, T. H., Gallelli, J. F.
1988 | American Journal of Hospital Pharmacy
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Key Concepts/Context

The environmental design of pharmacies (including pharmacy layout, equipment, and fixture design) may help increase the work efficiency of pharmacists by reducing time spent by pharmacists in filling prescriptions. The increased efficiency may help accommodate higher workload, increase the time pharmacists spend with patients, and improve service quality.

One type of programmable drug counter and one type of circular-shape pharmacy fixture design were two examples of ergonomic design aiming at reducing medication dispensing time and reducing pharmacists' travel distance in filling prescriptions. Before this study, both products were installed widely in pharmacies but their manufacturers' claims about their effects on pharmacist efficiency had not been critically evaluated.

Methods

In this simulated experimental study, 635 prescriptions (20% of the total number of prescriptions, i.e., the workload of one of the five pharmacists) were randomly selected from prescriptions dispensed during a 2-week period at the outpatient pharmacy of a 504-bed hospital. In computer simulations, four environmental configurations were compared: existing condition as the baseline, the addition of the drug counter, the addition of the circular fixture design, and the addition of both drug counter and circular fixture design. The 285 prescriptions that involved counting of dosage units were used in comparing prescription filling time in different conditions. An analytic technique called predetermined motion time (PMT) systems was used in estimating the prescription time. The PMT systems subdivided human task into basic motions and used standard time predetermined



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for each basic motion based on observation of many workers. Motion analysis was conducted on videotaping of the five pharmacists to identify the standard prescription-filling operation and the formula for calculating prescription filling time. The distance travelled for filling each prescription was calculated using measurements on the floor plan for all the 635 prescriptions.

Findings

The drug counter, circular fixture design, and the combination of both resulted in reductions in the average prescription filling time by 0.123 to 0.280 minutes (12% to 28%). The drug counter was not associated with any reduction in travel distance for prescription dispensing. The circular fixture design (either with or without the drug counter) led to about 86.3% reduction in average travel distance for filling out a prescription.

Limitations

There were several limitations of this study:

- The prescription filling time and pharmacist's travel distance estimated by computer simulation might not accurately reflect the actual behaviors of pharmacists. The simulation study should be only the first step in verifying the effectiveness of design innovations. The results should be further evaluated in subsequent studies based on pharmacists' real behaviors.
- The article included only a very brief description about the drug counter and the circular fixture design. The simulation results answered the question about whether the two design interventions led to higher work efficiency but the article did not include detailed analysis regarding how the design interventions influenced pharmacy behaviors. A detailed analysis of individual features of each design intervention might be helpful in understanding the mechanism of influence on pharmacist efficiency.

Design Implications

- The study showed that the selection of pharmacy fixture and equipment might impact pharmacist efficiency therefore designers should compare the probable effects of each option on work performance before making selection. The simulation method used in this study can be a low-cost option to test different design options before implementation.
- New design solutions or products should be evaluated against manufacturers' claims by using sound empirical methods.