



KEY POINT SUMMARY

OBJECTIVES

This study was to determine the cost effectiveness of a medical vigilance system in preventing patient falls in a 24-bed post-neurosurgery unit of a large acute care hospital.

Cost Effectiveness of a Medical Vigilance System to Reduce Patient Falls

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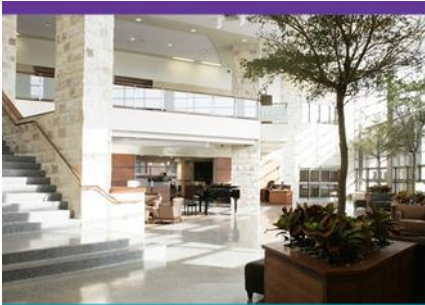
Key Concepts/Context

Patient falls refer to patients' unplanned descent to the floor with or without injuries to the patients. Patient falls are a leading cause of injuries and death and contribute to healthcare cost increase. The prevention of patient falls is especially important in certain patients and settings such as post-neurosurgery units where patients are often confused. A variety of fall-prevention programs have been implemented by many hospitals. Some of such programs include environmental modifications in addition to educational and operational changes. However, it is not clear how cost-effective the individual interventions are because of the lack of research.

Medical vigilance systems such as bed alarms notifying nurses about patients' bed exiting have been used in some fall prevention programs. The system used in this study included a passive sensor array that was placed under the patient on a hospital bed and was connected to the nurse call system to alert nurses about bed exits and abnormal vital signs.

Methods

A medical vigilance system was installed on ten of the 24 beds in the post-neurosurgery unit. The patient fall rate was monitored and calculated as the number of falls per patient. A decision model was used to estimate the cost-effectiveness of the medical vigilance system based on multiple factors including average length of stay for patient with or without fall, cost per patient day, cost of the medical vigilance system per day, cost associated with treatment of patients with falls (e.g. CT scan), patient sitter cost, and cost associated with nursing time in



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responding to fall alerts. Incremental cost effectiveness was measured as the increased cost per prevented fall.

Findings

There were two falls among 103 patients assigned to beds with the medical vigilance system installed and 15 falls among 464 patients in regular beds. The medical vigilance beds were associated with lower fall rate (0.0194 vs. 0.0323 falls per patient). The use of the vigilance system reduced fall rate by 0.0129 falls per patient and increase the cost by \$79, which was translated to an incremental cost of about \$6,000 per prevented fall. The use of the vigilance system would result in savings if the incremental healthcare cost associated fall-related health issues (including injuries) and other issues (e.g. law suit, lost revenues) exceeded the cost of vigilance system use.

Limitations

There were several limitations of this study:

- Patient assignment was not random. During the study, the nurses were aware about the potential benefits of the medical vigilance system and assigned patients with high fall risks to the beds with the vigilance system installed. The possible difference in fall risk might have biased the result and the actual reduction in fall rate could be more significant. However, more accurate estimate was not possible because consistent data around patient fall risk were not available for the study.
- Certain costs associated with the use of the vigilance system may not be applicable to other nursing units or healthcare organizations. The cost analysis did not include important potential savings from prevented falls such as pain, reimbursement, revenue, and so on.
- No description was provided about the methods of measuring patient fall rate. No statistical analysis was reported in the article to compare the fall rates.

Design Implications

- The study suggested that a medical vigilance system that alerted nurses about bed exits and abnormal vitals might reduce the probability of patient falls at a post-neurosurgery unit. Designers may pay attention to similar devices that make it easy for nurses to monitor and assist patients with high fall risks.
- Before wide application, a new invention or design innovation should be evaluated based on empirical data about its cost-effectiveness. This study is an example of such evaluation.