



KEY POINT SUMMARY

OBJECTIVES

Expanding upon prior research conducted by Guarascio-Howard & Malloch, 2007 that investigated nurse-initiated communications and response time to patient calls within a team nursing model, this research examines the addition of wireless technology into a pre-existing team nursing model and its impact on nurse response time to patient bed status changes and team communication.

Examination of Wireless Technology to Improve Nurse Communication, Response Time to Bed Alarms, and Patient Safety

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Key Concepts/Context

Patient safety programs, such as fall-prevention programs, are greatly impacted by communication within the care team. The ability to communicate effectively with other care team members is essential for achieving quick caregiver responses to changing patient conditions. While the majority of research has focused on the implementation of fall-prevention programs as a primary method for reducing patient falls within healthcare environments, this research looks to assess the interconnection between wireless technology, bed alarms, caregiver response, communication, and collaboration on fall-prevention.

Methods

For this study, a wireless communication device equipped with display and audio to receive alarms regarding bed status changes and team communication was linked to a pre-existing system within a medical-surgical care unit at a southwestern U.S. hospital. The wireless device was distributed to the care teams, health unit coordinator (HUC), and added the floor of the 24-bed medical-surgical unit. The wireless device was linked to the nurse-locator system, which allowed all caregivers to receive alarm notifications. Test messages with audible notification were used to display bed status changes, and simple verbal commands allowed team members to communicate with each other through the device. Prior to initiating the study, nurse managers and systems manufacturer representatives developed new protocols for bed alarm conditions and bed status notification. The protocol consisted of three bed protection status levels: (1) bed brake on, bed in the low position, and head rail up, (2) activation of the bed exit alarm, determined by an RN and the assessment



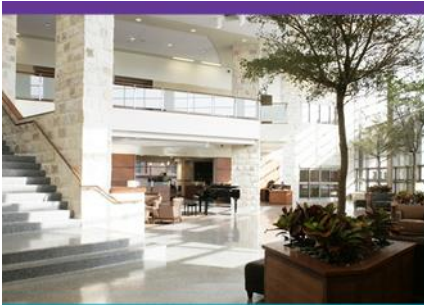
DESIGN IMPLICATIONS

This research suggests that wireless communication interventions can help to reduce fall risk factors, increase team communication across the caregiver teams, and facilitate a faster response to patient conditions. However, implementation of such an intervention requires increased management support, as well as a need for improved protocol systems that reevaluate all caregiver and management roles.

scoring system, (3) four rails up, activation of the bed exit alarm, and a physician's order. The bed alarm and status notifications were prioritized on four tiers: (1) Assigned-RN, (2) Assigned-LPN, (3) Assigned-CNA, (4) Assigned-HUC. If the alarm status notification reached the HUC, they could use the nurse locator to follow up with the closest caregiver. HUCs were also able to notify caregivers to assigned bed calls, indicate patient-initiated calls, and provide other needed information. Following the implementation and introduction of the wireless technology, staff training was conducted for the day shift caregivers and HUCs regarding Health Insurance Portability and Accountability Act considerations, bed status setup, and device information instructions. After an adjustment period of five weeks, a total of four registered nurses (RNs) were each shadowed, excluding patient rooms, for eight hours, in congruence with the experimental procedure of the baseline study. The wireless devices were used for six months following the five-week training period. Fall data were collected during the six-month wireless device intervention. Data were collected through five sources: nurse locator system, wireless report system, hospital fall records, shadow logs, and audio recordings. Data from the follow-up study were compared to baseline data collected from the previous study.

Findings

During the six-month follow-up study, patient falls rates trended downward compared to the same six months a year prior during the baseline study. However, the results were not significant. Shadow logs revealed differences in technology use, as phone use decreased by almost 50 percent from the baseline study and wireless communicator use was 11 percent. The wireless device software generated two reports. The first report listed all incoming calls; the second reported all outgoing calls. The reports showed that RNs were responsible for 65 percent of all completed calls, and 42 percent of the RN calls were made to CNAs. The average completed call time was between 30-34 seconds per call. During the follow-up study, significant decrease in the follow-up team response time to all calls was reported and a 145-percent increase in the number of calls was also seen. The number of bed status calls for follow-up data collection increased from 3-37, and normal calls increased from 69-84 during the four days of shadowing. Prior to the wireless communication devices being deployed, staff response to bed alarms was 1.5 minutes. Following the wireless communication intervention, RNs responded in less than 30 seconds to 38 percent of the calls. A response time of less than one minute was seen by the LPNs who responded to 24 percent of the calls, and CNAs responded to 14 percent of the calls in less than 1.5 minutes. The number of RN visits to patient rooms also increased by 38 percent, from 199 to 274 visits. Audio recordings collected while shadowing were used to analyze communication episodes. The total number and duration of communications increased by 77 percent in total minutes and 78 percent in total number. Additional communication episodes were explored through identification of the initiator of the



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communication. This analysis found that the frequency of RN-initiation increased significantly during the follow-up study.

Limitations

Due to the introduction of a new electronic system into the team nursing model, this study had several limitations due to increased need for training, systemic operational problems that included software breakdowns, compliance with locator badge and wireless device use, and training of floating staff. The follow-up study also had a change in caregiver teams from the baseline study. The team nursing model used one CNA and two RNs for 12 patients, and the baseline study used one RN for eight patients. Changes in this model could have resulted in a need for increased team coordination, regardless of the intervention.