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Improving the Patient's Experience With a Multimodal Quiet-at-Night Initiative

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This project describes a multifaceted noise reduction program on 2 hospital units designed to ensure a quiet hospital environment, with the goal of improving the patient experience. The noise committee in an urban city hospital developed a plan to control noise including scripted leadership rounding, staff education, a nighttime sleep promotion cart, and visual aids to remind staff to be quiet. Postintervention improvement in patient satisfaction scores was noted. **Key words:** *hospitals*, *noise*, *noise reduction*, *patient satisfaction*, *quality improvement*

LITERATURE SUPPORTS the importance of sleep and biophysical reasons for sleep.[1] Nursing values the importance of individualized patient care and recommends the provision of quiet and rest in a manner conducive to patient wishes. Unfortunately, patients are faced with noisy tube systems, the constant beeping of monitors, equipment rolling in the hallways, phones ringing, pagers buzzing, and the ever-present voices in the hallway. The whispered voices of the staff or the screaming of a confused patient adds to patient anxiety and an environment that is counterproductive to healing.

Patients in noisy hospitals are more likely to develop negative side effects from exposure to noise than those who are not.[1] Pope[1] found that there are multiple negative side effects from noise including sleep disturbances, elevated blood pressure and heart rate, and even increased use of pain medication. Equipment may also be an issue. Noisy systems, such as the paging system, IV machines beeping, the ringing of the telemetry, telephones, calls lights, pneumatic tube systems, and carts, are problematic.[1,2]

The need for a quiet environment in the hospitalized population has been well documented. Many hospitals struggle for solutions in the current climate. In a recent study by Murphy et al, in which a specific unit was piloted to test a variety of noise reduction strategies, barriers to a quiet environment were identified as large volume and turnover of

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patients, large staff numbers, and many rooms close to a loud and busy nurses' station.[3] Interventions and strategies for noise reduction were identified as noise identification, decibel level studies, equipment maintenance, and setting low noise standards.

An additional reason to address noise in the hospital at night is the financial solvency of the hospital. Value-based purchasing has become an incentive to improve the patient experience because Hospital Consumer Assessment of Healthcare Providers and Systems (HCAHPS) links the patient experience scores to Medicare reimbursement rates. Hospitals are rewarded for improved quality of care by redistributing the payments from Medicare to hospitals that perform at a higher level.[4,5]

LOCAL PROBLEM

The project was completed in a 350-bed acute care hospital, which consistently received low scores for noise in both HCAHPS scores and the Press Ganey questionnaire. The facility had a Noise Committee since 2008. In 2011, the HCAHPS noise score was 44% overall for a response to the question, "During your hospital stay, how often was the area around your room quiet at night?" After much work in educating the staff through a computerized learning management system and improvement of equipment, such as new wheels for the carts, the scores in 2012 only increased to 46% and then to 52.3% in 2013. It was clear to the Noise Committee that education alone was not sufficient to reach the goal of achieving a top box score of 65% in the HCAHPS score for noise at night, which would place the hospital in the 75th percentile. The Noise Committee set a goal for 2014 of 58%.

LITERATURE REVIEW

A literature search was completed using the electronic databases of EBSCOhost, CINAHL, and Medline in January 2014. The search included English language research articles related to the effect of noise on patients and staff in the hospital setting and methods used to reduce noise levels. The following keywords were used: *noise*, *hospital*, *health promotion*, *noise control*, and *practice*. Although there has been evidence about sleep disturbances and the effect on immunity, respiratory status, cardiovascular health, and the development of delirium in intensive care units, few interventional studies have been performed, and little literature was directly related to care of patients on the general units. Categories of interventions included earplugs, behavioral modification, sound masking, and acoustical absorption.[6] Richardson et al[7] used sleep promotions posters to create staff awareness in a noise intervention program as part of a noise reduction program. After education was completed, noise levels audits showed a reduction in peak noise levels on the 3 units used in the study; however, no change in the average noise level was achieved. The author suggested that staff members were concentrating on efforts to reduce noise during peak times while not focusing on noise reduction activities during the nonpeak times.[7]

In a study by Kontani and Oakley,[8] the most irritating sound reported by patients was identified as people talking. Morning noise was often the cause of annoyance, and the most common source of noise was talking. These researchers concluded that the best practices to eliminate noise from talking were education about noise reduction for the staff; public indicators, such as a beacon to light when expected noise levels are exceeded; a quiet time protocol; and low-cost environmental fixes, such as fixing noisy doors and squeaky wheels. Pitfalls included lack of clear measurements and no record of cost savings.[8]

Studer[9] found that even when significant noise reduction changes had been made, such as softer wheels on carts, the elimination of paging, signs, quieter keyboards, and reminding staff to keep personal noise levels down, there was no significant improvement in HCAHPS scores. With addition of leadership scripting to the routine interventions, patients' perception of quietness increased, and the perception of noise decreased.[9]

Intended improvement

The purpose of this project was to implement a multifaceted noise reduction program to decrease noise at night and improve patient satisfaction scores as measured by HCAHPS and Press Ganey scores.

METHODS

The Iowa Model of Evidence-Based Practice to Promote Quality Care[10] was used to guide the project and Kotter's Model of Change was used during the project implementation. Two pilot units were selected for testing changes. Both units cared for medical-surgical patients with 1 unit specializing in medical oncology patients and the other care of surgical patients. Before the start of the project, average decibel levels were obtained over a 24-hour period on both pilot floors using the Reed SL-4012 (Reed Instruments, New Jersey) sound level meter. Decibel levels were obtained again 4 months after implementation of the practice changes and at the end of the project for comparison. The instrument was installed according to the manufacturer's instructions by the biomedical department for 24 hours during a weekday using the fast setting, which represents the human ear response time. The day for decibel readings was based on the availability of meter and the biomedical engineer. This project was approved by the hospital's staff development and nursing education department and the University Institutional Review Board.

Patient preference posters

On admission to the unit, questions about patients' preferences for nighttime, such as the use of a night light, were assessed by the nurse leader. The technicians transferred the preferences to a poster that was hung in each patient room. The posters included an explanation of the project and a place for recording patients' preferences for noise control. The phone number for the nurses' station was provided for patients to call in case of excessive noise. In addition, the nursing director's name and phone number were present on the poster with the message to call with concerns (Supplemental Digital Content, Poster available at: http://links.lww.com/JNCQ/A284). The evening nursing manger or the unit's charge nurse checked nightly to ensure the patient's poster was updated and the patient's requests were being respected.

Nighttime cart

Senior technicians or nursing assistants met with the Noise Committee to discuss their ideas and to obtain buy-in for a bedtime project. Senior technicians gave suggestions for supplies that might be stocked on a nighttime cart, and on the basis of the literature and clinical experiences the team decided to provide earplugs, blankets, hygiene supplies, oral care supplies, and light snacks. The technicians rounded nightly to assist with oral care, provide fresh water, help patient change positions if indicated, and meet any hygiene or sure toileting needs. Technicians were given a script to follow during nighttime rounds.

Purposeful leadership rounding

Purposeful leadership rounding was an essential part of the noise control practice change. Nurse leaders used a scripted message to inform patients of the hospital's goal of providing a quiet environment at night and ask open-ended questions about their perception of the noise during the previous night shift. During the project, information gained in rounds was used for real-time improvements, such as service recovery for any complaints and for trends in patient comments. During leadership rounding, a random convenience sample of 30 patients was interviewed before the project started and another 30 patients at the end to discuss their impressions of noise at night and determine the causes of the noise.

Staff education

After the planning of the practice changes, staff was educated about the project by the use of a computerized learning module. The module included information about the deleterious effects of noise on patient outcomes and patient satisfaction. After completing an educational module, employees were given a

flashlight that was embossed with "Quiet = Caring." The flashlight enhanced the education by encouraging the staff to use flashlights rather than turning on overhead lights. As new staff became assimilated to the units, quiet-at-night education was provided during staff meetings as well as a one-on-one basis. Noise scores were posted on the unit monthly so staff could see the progress.

Noise committee rounds

On a monthly basis, a member of the Noise Committee rounded on all units during the night shift. The time of night rounds varied but was never earlier than 10 PM. The committee used rounding to discuss with staff any barriers to noise control, reinforce education, and audit in real-time whether the patient's wishes for earplugs, lights out, and doors closed were being followed. Checks for compliance with dimmed lights and no television in vacant rooms or common areas were completed.

Measures

Average decibel levels over a random 24-hour period in the 2 units were measured before, at 4 months, and at the end of the project. Process measures included percentage of completion of education, results of audits, leadership rounding on night shift, and patient comments during leadership rounds. The outcome measure was the patient satisfaction scores during the 4-month implementation period and for 4 months after implementation as compared with the 4 months before the practice change. All patients discharged from the pilot units were uploaded to the Press-Ganey Web site, and 50% of the total sample was randomly selected to receive satisfaction surveys.

Analysis

Descriptive statistics were used to analyze characteristics such as responses to patient interviews, observations of lighting and closed doors, and staff using quiet, respectful voices. The patient interview questions obtained during leadership rounding were recorded using the patient's words. The data were then categorized according to the source of noise: staff, equipment, other patients; noise on the unit was diffused by earplugs or doors closed, or no complaint of noise. Postintervention HCAHPS scores were obtained and compared with previous months. During September 2014, 4 months before the project began, HCAHPS data were analyzed on both pilot units. The project then began in January 2015 and concluded in May 2015. Decibel levels were also collected before the project began, month 2 of the project and then 1 month after it. Finally, the collected data were graphed to show trends.

OUTCOMES

Maximum baseline decibel readings on the surgical unit were 83.8 decibels and 90.7 on the medical-surgical unit. Mean decibel levels were 53.44 and 55.07 decibels, respectively. Both units achieved a decrease in the maximum and average decibel level by 6-month postimplementation; however, the surgical unit experienced an increase of decibel levels for the reading at the end of the 4-month pilot.

Ninety-six percent (n = 132) of the staff completed the education online. Audits revealed that staff completed the posters with patient information 93% of the time. The interventions offered by technicians using the nighttime cart showed a patient preference for having the doors closed (56%), followed by earplugs (45%), the lights completely off (25%), and a night light on (16%). The use of a "Do-Not-Disturb" sign was preferred by only 3% of the patients. The audits from the evening nurse manager or the unit charge nurse revealed 100% compliance with providing patients with their preferred interventions.

During leadership rounds, patients reported in 86% of the audits that the nighttime cart and evening care had been offered. Comments from patients during leadership rounds before the project were mostly negative, with 89% reporting the area around the room at night was noisy. After implementation of the practice change, the percentage of

positive patient comments increased to 90%. The Table presents patients' complaints about noise pre- and postintervention. After the quiet-at-night interventions, 86.7% of the patients on the surgical unit and 90% of patients on the medical unit had no complaints of noise. Night-shift rounding by the Noise Committee showed improvement over time. Committee members checked for dimmed hallway lights, closed doors, common area televisions turned off, quiet staff, and any staff concerns regarding noise. Compliance was 50% in January 2014 and improved to 80% in April 2014 during random monthly checks.

As seen in the Figure, HCAHPS scores showed an improvement during and after the project. For the surgical unit, the overall HCAHPS score for noise at night preintervention was 51.8%, with scores during the first months of the project decreasing as low as 23.3% before gradually increasing to 68% by the end of the project. The overall HCAHPS score related to noise for the other unit was 47.6% before the intervention and then increasing to 76.5% by the end.

DISCUSSION

In this project, multifaceted interventions were used to decrease the noise levels on patient units. Decibel readings done before the project implementation were at the level that would replicate the sound of a jack hammer. One-time random decibel levels collected over 24 hours improved on the surgical unit at 4 months after the practice change and showed sustained improvement 3 months after the implementation period. The medical-surgical unit had an increase in decibel level at 3 months but decreased at 6 months. It should be noted that the average noise levels include readings collected during the entire 24-hour period and may not represent the noise at night. Decibel readings for specific time periods, especially during the night, may have been more useful for determining whether noise at night had decreased. Also continuous evaluations of longer periods of time would have improved this measure.

Audits revealed that the staff followed the interventions planned in the project, and patient comments during leadership rounding were positive, but the patient satisfaction scores for noise at night did not immediately improve. At the beginning of the project, the units experienced an acute rise in census, possibly because of influenza season, between September and December 2014. Staffing became a daily issue because of the ever-increasing demand. The HCAHPS for all

Table. Patient Comments During Leadership Rounds

	October 2014 (Preproject)		April 2015 (End of Project)	
Patient Comments[a]	**Surgical Unit n (%)**	**Medical Unit n (%)**	**Surgical Unit n (%)**	**Medical Unit n (%)**
Complaints of staff noise	6 (20)	12 (40)	1 (3.3)	0 (0)
Complaints of equipment noise	4 (13.3)	1 (3.3)	0 (0)	0 (0)
Complaints of noise from other patients	6 (20)	3 (10)	0 (0)	0 (0)
Miscellaneous noise complaints	4 (13.3)	6 (20)	2 (6.7)	1 (3.3)
Noise adjusted by earplugs, door closed	7 (23.3)	3 (10)	1 (3.3)	2 (6.7)
No complaint of noise	3 (10)	5 (16.7)	26 (86.7)	27 (90)

[a]A total of 30 patients interviewed in each group.

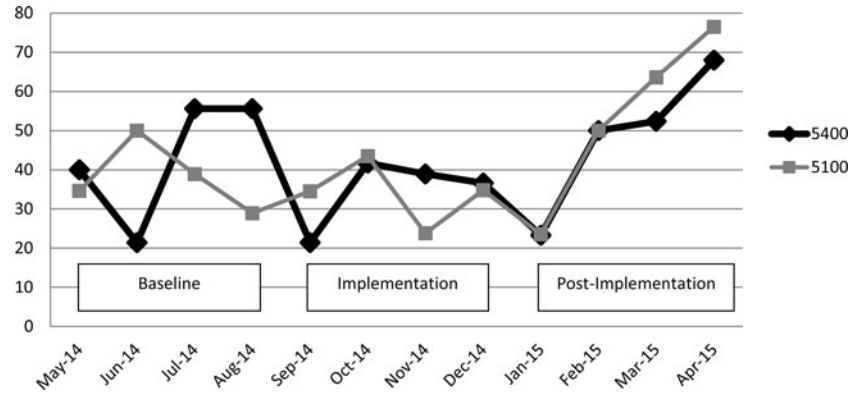

Figure. HCAHPS scores. HCAHPS, Hospital Consumer Assessment of Healthcare Providers and Systems (5400 medical surgical unit, 5100 surgical unit).

categories decreased dramatically at that time, including low noise at night scores down to a low of 21.4 on the surgical unit and 34.5 on the medical-surgical unit in September 2014, before the project began. As the project progressed and staffing improved, the HCAHPS scores increased in all areas and were sustained. A possible explanation for the decrease in noise at night scores between September and December 2014 is that during the staffing crisis, patients were dissatisfied with the nursing care. In 2013, Press Ganey did an analysis of patient satisfaction scores. A relationship between performance in the "Communication with Nurses" category and with other patient experience categories existed.[11]

Another explanation for low satisfaction scores in the first 4 months of the project may be related to the process in which the data are obtained. Because HCAHPS surveys are not sent to all patients and the return rate is low, it is possible that the surveys do not adequately represent patient satisfaction. For example, the surgical unit discharges an average of 207 patients per month, but only 17% (n = 27) of the surveys were returned during the project period, which is well below the national average return rate of 33%.[12] It is possible that more dissatisfied patients spend the time to answer surveys than satisfied patients. Info Survey, a leading survey research firm, suggests there is a bias in survey returns with either very satisfied consumers or very dissatisfied consumers most likely to respond.[13] In contrast to the HCAHPS scores, comments from patients were overwhelmingly positive during leadership rounds during October to December 2014. Perhaps patients were reluctant to express concern over the noise while still in the hospital or those who were satisfied either did not receive or did not complete the HCAHPS survey.

It is difficult to determine whether the perception of quiet at night is related to noise levels at night or whether perhaps interrupted sleep is scored by patients as noise at night. Hospitalized patients are awakened frequently in the middle of the night for medications, blood pressure testing, laboratory blood draws, and other routine testing. Patients may be reacting to being awakened at night rather than the noise of the units.[14]

Limitations

Decibel levels were completed on three 24-hour periods taken before, immediately after, and 3 months after the project implementation, and the isolated readings may not have been representative of the noise on the units on other days. HCAHPS surveys are routinely mailed to only 50% of all discharged patients, and the return rate of the surveys is low. Opinions in HCAHPS surveys returned may not have been representative of all of the patients discharged from the units.

CONCLUSION

Each night brings with it its own challenges. Increased census, confused patients, and poor staffing levels can affect the staff's ability to complete the interventions as planned.

Multifaceted interventions for noise may improve patient satisfaction related to noise at night. Increase in patient satisfaction scores may be sustained with continued, focused effort on quiet-at-night initiatives.

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