A recent New York Times article about the negative effects of noise and clatter in hospitals generated a large amount of blog entries. The majority of comments came from patients and nurses who were unanimous in their conclusion that noise in hospitals, particularly in the ICU and other high-acuity units, is a serious threat to the patient’s ultimate recovery.

This reminds me of a time a patient rang her call bell to ask “Is there a cocktail party going on at the nurse’s station?” The din of conversation had kept the patient sleepless and feeling helpless. She was angry and demanded an explanation. Although some hospital noise and sleep interruptions, such as alarms from cardiac monitors, can’t be avoided, much of hospital noise is attributed to preventable sources such as staff conversation.1

The World Health Organization’s (WHO) recommended noise level values for continuous background noise in patient rooms is 35 decibels (dB) during the day and 30 dB at night, with night time...
peaks not to exceed 40 dB. A review of the literature on hospital noise found that compliance to these guidelines isn’t met. Recent studies noted high noise levels, at times exceeding WHO’s prescribed noise levels, in various patient-care areas such as the OR, burn ICU, medical inpatient units, and in chemotherapy clinics. The OR is one of the noisiest places, particularly neurosurgery and orthopedic surgery. One study reported that the peak noise level during these procedures exceeded 100 dB for almost half the entire procedure. There’s no doubt the use of equipment such as drills and saws during orthopedic surgeries contribute to the noise level. Although the effects of prolonged exposure to noise on staff aren’t well understood, the ill effects of noise on patients, most notably significant sleep loss, are well documented.

**Sound check: impact of noise on safety**

Noise disrupts sleep. Since adequate sleep is essential to health and well-being, sleep deprivation can lead to a host of ill effects. Sleep disturbance is associated with elevated stress hormone response, hypertension, increased incidence of cardiovascular disease, impaired immune function, attention and memory deficits, and depressed mood. These findings are significant considering that cardiovascular diseases are among the leading causes of morbidity and mortality.

In neonatal ICUs (NICUs), stimulation resulting from noise may lead to adverse responses such as increased energy demand and oxygen desaturation. Since sound sleep is essential for central nervous system development, sleep disruption may negatively impact the overall health of preterm infants. The burden of disease is thereby increased by noise.

Communication breakdowns and interruptions during patient handoffs happen as a result of noise. The clatter and noise produced during change-of-shift report in a crowded nurses station can lead to poor-quality handoffs that result in inefficiency, delayed treatment, mismanagement, and avoidable adverse events. High noise levels in the workplace have been implicated in increased staff stress, increased rates of burnout, and reduced occupational health. These ill effects of noise will ultimately affect professional behavior, quality of work, workplace civility, and patient safety.

Alarm fatigue and noise desensitization may lead the staff to ignore or disable important alarms. The Joint Commission has reported sentinel events related to alarm misuse or inadequate alarms that resulted in patient deaths. Meaningful use of technology to optimize staff response to alarms will promote better sleep for patients and optimal monitoring of critical changes.

**Gerontological considerations**

Hospitalized older adults are particularly vulnerable to the negative effects of noise and other interruptions due to higher risk for delirium. Although no specific study was found that looked into the role of noise in causing or aggravating delirium in older adults, the interventions used to treat delirium might require noise-generating devices such as infusion pumps and monitors or admitting the patient to the ICU, an inherently loud area where constant monitoring takes precedence over rest and sleep. Delirium is the strongest independent predictor of death, mechanical ventilation time, and ICU stay. Sleep deprivation due to noise can potentially exacerbate delirium.

A recent study showed that not all noises are created equal. Electronic sounds (alarms from monitors and infusion devices and the ringing from telephones) caused a greater and more sustained elevation of heart rate. This undue cardiac stress (tachycardia) is of particular concern to older adults who might already have underlying cardiac dysrhythmias. An increased heart rate increases myocardial oxygen demand and triggers a cascade of adverse hemodynamic effects in already compromised heart function.
Alarm parameters, for example on heart monitors, should be customized to meet the needs of individual patients. Clinical context and professional judgment play a major part in preventing unnecessary alarms, not only for older adults, but for all patients.24

**Noise and patient satisfaction**

“I have often been surprised at the thoughtlessness (resulting in cruelty, quite unintentionally) of friends or of doctors who will hold a long conversation just in the room or passage adjoining to the room of the patient, who is either at every moment expecting them to come in, or who has just seen them, and knows they are talking about him.”

Florence Nightingale17

Noise not only impacts staff performance, but may also decrease patients’ confidence in their caregivers.17 This in turn may impact a patient’s hospital experience satisfaction. With the current emphasis on value-based purchasing that’s linked to patient satisfaction scores, hospitals that care for Medicare and Medicaid patients now participate in the Hospital Consumer Assessment of Healthcare Providers and Systems (HCAHPS) quality survey.18 Patients will be asked to rate how often the area around their room was quiet at night. Based on current data, patients rated the quietness question the lowest of all the quality metrics, responding only 58% of the time that the area around their room was always quiet at night as compared to an average score of 72% for all other metrics.19

**Recommendations for best practices**

“How well a patient will generally bear, e.g., the putting up of a scaffolding close to the house, when he cannot bear the talking, still less the whispering, especially if it be of a familiar voice, outside his door.”

Florence Nightingale17

The patient-care environment is a powerhouse noise generator. As healthcare becomes more tethered to machines and technology, the pool of noise source increases, in addition to the routine harshness of alarms, paging systems, telephones, computer printers, ice machines, TV, delivery carts, and clipboards.20

Addressing the adverse reactions of noise in healthcare is not new. In 1860, Florence Nightingale’s cutting-edge book *Notes on Nursing: What It Is and What It Is Not* contained multiple pages devoted to countering the ill effects of noise and how to care for the patient quietly.17 Nightingale emphasized that nurses should speak softly and not rustle around the bedside to keep the noise down.

“A nurse who rustles (I am speaking of nurses professional and unprofessional) is the horror of a patient, though perhaps he does not know why,” Florence Nightingale.17

Interestingly, a review of research on hospital noise cited nurses’ voices among the most disturbing noise frequently mentioned by patients.20 This is important to note because noise reduction often requires costly architectural solutions. Knowing that talking loudly is the main source of noise, speaking softly would then be the single most cost-effective way to reduce noise; an intervention well within the scope of nursing practice.17 Examples of Nightingale’s observations include:

“Never to allow a patient to be waked, intentionally or accidentally, is a sine qua non of all good nursing.”

“...the rattling of keys, the creaking of stays and of shoes will do a patient more harm than all the medicine in the world will do him good.”

“A good nurse will always make sure that no door or window in her patient’s room shall rattle or creak.”

“...unnecessary noise has undoubtedly aggravated delirium in many cases.”

“All hurry and bustle is peculiarly painful to the sick.”

To effectively address noise requires interprofessional collaboration. Reflective discussions among staff, family members, patients, or long-term-care residents on the effect of noise would be a vital first step in designing lasting solutions. Shared governance teams can be powerful change agents. In addressing the noise problem, this multidisciplinary team can assess modifiable sources of noise and create solutions that are achievable. Volume of staff voices can easily be modified by posting signs that promote speaking softly around the nurses’ station. Other modifiable sources of noise are defective equipment such as a broken wheel of a trolley cart and a TV that is left on even when there’s no patient in the room. Controlling noise in the patient-care setting is very much aligned with
Shhh! Too much hospital noise slows recovery

providing patient-centered care and rests in the domain of nursing. Below are further strategies to curtail noise in hospitals:

- staff-development programs and simulation of “noisy” situations and how to apply best practices
- develop clinical protocols addressing noise and other patient hospital experience satisfaction issues
- designate “quiet time” or “noise time-out” periods, for example, between 2300 and 0600 or between 1400 and 1600
- provide a sleep mask and earplugs as requested by patients
- encourage patients, family, and staff to display a “Do Not Disturb” sign (commonly found in hotel rooms) outside the door during the hours of sleep or during the daytime to allow for naps
- turn off the TV or lower the TV volume whenever possible
- dim the lights at bedtime and close the door as monitoring requirements allow
- keep equipment in good repair
- call environmental services to repair leaky faucets as soon as possible.

Nurse-led initiatives in noise reduction have included installing sound meters in nursing stations to increase awareness of noise levels; installing soft door closers, turning down the volume of phones; setting up conference areas that aren’t near patient rooms; coordinating care activities to reduce patient disruptions; and conducting random surveys of patients to assess their perceptions of noise levels. After a noise reduction initiative, patient satisfaction scores in one facility greatly improved (noise domain) and overall noise level reduction was sustained.

Addressing the noise problem is gaining more attention from practitioners and stakeholders largely due to the Centers for Medicare and Medicaid Service (CMS) ruling on value-based purchasing in which reimbursements will be based on patient experience satisfaction scores. The emphasis on financial incentives might in fact make the hospitals quieter. Interestingly, strategies to curtail noise using sound detection equipment and expensive environmental alterations haven’t proven to be adequate in minimizing hospital noise to levels specified by international agencies.

The American Association of Critical Care Nurses has published a Practice Alert on alarm management related to monitoring devices such as cardiac monitors. This evidence-based clinical practice resource aims to help clinicians apply best practices to avoid alarm fatigue, which will also aid in noise reduction. The full report can be found at http://www.aacn.org/wd/practice/docs/practicealerts/alarm-management-practice-alert.pdf.

An in-depth analysis of noise trends is needed to create policy and practice guidelines that might entail a change in the philosophy of care. All direct patient-care providers in acute care settings need to be aware of the patient’s need for meaningful healing sleep that requires more than just a quiet environment. Care should be coordinated to minimize sleep interruptions during the night or during afternoon naps by avoiding non-urgent interventions such as obtaining vital signs more frequently than needed based on the patient’s clinical status or washing the patient at 0500. A related research question would be to investigate how much sleep loss (hours) is attributable to noise.

**Summary**

There are approximately 36 million hospital admissions annually in the United States. If all healthcare providers took the time to stop and listen to the clatter, we’d be more sensitive to our patient’s comfort needs. In achieving better patient outcomes, we can combine both the wisdom of Nightingale and today’s leading-edge technology in implementing a “quiet approach” conducive to healing and recovery. Care improvements based on HCAHPS survey data
has largely focused on communication about medicines, discharge information, and cleanliness. It’s time for all stakeholders to address the hospital noise issue and apply low-cost, evidence-based noise reduction programs.

REFERENCES


Fidelindo A. Lim is a full-time faculty member of New York University (NYU) College of Nursing in New York, N.Y.

The author has disclosed that he has no financial relationships related to this article.

DOI: 10.1097/CCN.0b013e3182443997.85316.c6