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QUIET ON THE HALL: RESEARCHERS SEARCH FOR WAYS TO REDUCE NOISE AND IMPROVE SLEEP IN NURSING HOMES

Even modest increases in noise above the background level disturb the sleep of seniors in nursing homes, an ongoing study shows.

Now, researchers will test the effectiveness of several noise-reducing environmental interventions they developed to reduce sleep disturbances among nursing home residents. Their ultimate goal is to improve residents' health and quality of life.

Noise increases measured at six or more decibels were a factor in 18 percent of almost 4,000 nighttime awakenings, according to researchers at the Georgia Institute of Technology, Emory University and the Atlanta Veterans Administration Medical Center. Researchers collected the data from 92 metro Atlanta nursing home residents studied for about 500 person-nights. The National Institute of Aging is funding the five-year study.

"The nursing home population has a great deal of sleep disturbance," said Bettye Rose Connell, a health research scientist at the Atlanta V.A. Medical Center and an assistant professor of medicine at Emory. "... Not all awakenings are related to noise. But sleep disruption related to noise is enough of a problem that we want to find ways to relieve it."

Researchers have determined that nursing home noises usually fall into one of three broad categories: people talking; mechanical noises, such



Georgia Tech researchers take sound-level measurements during experiments at Ross Memorial Healthcare Center, a nursing home in Kennesaw, Ga.

as cleaning equipment; and people doing things, such as pushing carts.

So acoustical engineers at the Georgia Tech Research Institute (GTRI) have created several low-cost, noise-reducing environmental interventions and tested them in five nursing homes. The results are promising, researchers said. One of the interventions – sound-absorbing panels hung on hallway walls – has reduced noise by a factor of 16. That is equivalent to the difference in noise between music booming from 16 speakers versus just one speaker.

"These interventions reduce echoes and reverberations in hallways and rooms," said Krishan Ahuja, a Regents researcher at GTRI and a professor of aerospace engineering at Georgia Tech.

“We have the noise-absorbing panels, ways to reduce the noise of banging doors, special hooks for curtains, and we even wrap the ice machines with a sound-deadening blanket to reduce noise.”

Researchers are also reducing television noise by moving the speakers from the TV set to the headboards of nursing home beds, eliminating the need for residents to turn up the volume too high. And they are experimenting with tiny speakers embedded in bed pillows.

“These environmental interventions are appealing because they create no additional burden on the staff, which is already stretched thin because of the nursing shortage,” Connell says.

Nursing home residents and staff participating in the study report positive effects from the interventions.

At Ross Memorial Healthcare Center in Kennesaw, Ga., assistant administrator Jimmy Ross noted “a tremendous reduction” in noise after researchers temporarily installed sound-absorbing panels on his facility’s hallways. “You don’t even hear yourself walking down the hall,” he said.

Nursing home resident Alice Cook, added: “It’s much quieter here, especially in the evening.... There really has been quite a bit of difference. When I’m watching TV in the evening, it’s definitely quieter. I don’t hear all the interference from the hall.”

Having studied the extent to which noise level is associated with wakes in nursing home residents, researchers are eager to determine how much the noise-reducing strategies can reduce awakenings among residents, Ahuja said.

“In the next phase, we will apply these interventions in facilities for a longer period of time and actually compare the noise at bedside with data from volunteer residents who are wearing equipment to detect whether they are sleeping and how many times they wake up during the night,” explained Robert Funk, a GTRI research engineer, who is leading the field study.

Researchers are studying sleep using wrist actigraphy, in which residents wear a device that looks like a large sports watch. The device records the normal arm movements a person makes when he or she awakes. To gather noise data, researchers use standard sound level meters.

After researchers quantify the effects of environmental interventions on nursing home residents’ sleep, they plan to study the combination

of these environmental interventions with behavioral interventions being investigated in a parallel study led by physician Joseph Ouslander, a professor of medicine and nursing and director of the Emory Center for Health in Aging. Ouslander’s study is testing the effects of such things as increased daytime activity, light exposure and consistent bedtime routine.

“The implications of our data so far are that it will probably take a combination of behavioral and environmental interventions to improve sleep in nursing home residents,” Ouslander said.

Ross is hopeful the studies will provide some practical insight for nursing homes. “We’re looking forward to the data from the study so we can make better decisions about dealing with noise,” he said.

For nursing homes, which operate under tight budgets, the cost of the interventions will have to be weighed against the benefits, Ross added. The cost of implementing noise-reducing interventions is unknown for now. But Ahuja estimates the cost of sound-absorbing panels at \$1.50 to \$2 per square foot.

Implementing the researchers’ noise-reducing interventions is problematic for now, though. “Some of the interventions are not commercially available yet, but they are made from commercially available materials,” Funk explained.

Bringing the materials together to create a product available on the market may take some time. The researchers’ immediate focus is on creating design rules for retrofitting existing nursing homes and designing new ones to mitigate noise.

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