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Nurse Staffing Tied to In-Hospital Cardiac Arrest Survival

Marcia Frellick | May 21, 2015

Nurse staffing levels and hospital work environment have a direct effect on survival for patients who experience in-hospital cardiac arrest, new research shows.

Nurses are commonly the first responders for in-hospital cardiac arrest, said investigator Monica Rochman, PhD, from the Center for Health Outcomes and Policy Research at the University of Pennsylvania School of Nursing in Philadelphia.

However, adding nurses is difficult because nursing staff salaries make up 44% of direct costs for inpatient care, she explained. Still, changing the culture might be cost-effective.

This study demonstrates that "improving the work environment is a low-cost strategy, especially for improving relationships and communications between physicians and nurses," Dr Rochman told *Medscape Medical News*. Of course, this has implications beyond in-hospital cardiac arrest, she added.

Little research has been done to determine the potential environmental factors that affect care. But identifying opportunities for early intervention is important because, in the United States, of the 200,000 patients who experience in-hospital cardiac arrest annually, the rate of survival is less than 25%.

For their study, Dr Rochman and her colleagues examined data from the University of Pennsylvania Multi-State Nursing Survey, the American Hospital Association annual survey, and the American Heart Association's Get With the Guidelines–Resuscitation database.

The findings were presented at the American Association of Critical-Care Nurses 2015 National Teaching Institute and Critical Care Exposition in San Diego.

The team analyzed the outcomes for 11,160 patients 18 years and older who were hospitalized from 2005 to 2007 in one of 75 hospitals in California, Florida, New Jersey, and Pennsylvania. All patients were on inpatient units at the time of cardiac arrest, and documentation was available on initial rhythms of pulseless electrical activity, asystole, ventricular tachycardia, and ventricular fibrillation.

The mean patient-to-nurse ratio was calculated for medical–surgical and adult intensive care units (ICUs) at each hospital. To calculate the hospital-level aggregate measure, the investigators divided the nurse-reported average number of patients on his or her most recent shift by the average number of nurses on the unit.

Supportive Work Environment

The 31-item Practice Environment Scale of the Nursing Work Index was used to measure the work environment. It assesses nursing leadership and whether nurses are supported, empowered, and satisfied.

Each additional patient per nurse on medical–surgical units beyond the baseline number was associated with a 4% decrease in the odds of survival until discharge (odds ratio [OR], 0.96; 95% confidence interval [CI], 0.93 - 0.99).

And for patients treated in hospitals with poor work environments, compared with better environments, there was a 22% decrease in the odds of survival (OR, 0.78; 95% CI, 0.64 - 0.95).

No cardiac arrest in a hospital should ever be a surprise.

There was no link between nurse staffing in ICUs and survival, probably because national standards require a staffing ratio of two patients per nurse, Dr Rochman explained. Staffing levels in medical–surgical units, however, varied substantially by hospital, she pointed out, with as many as eight patients per nurse.

This research is important because the survival rate for in-hospital cardiac arrest is so low, said Nicole Kupchik, RN, from the Swedish Medical Center in Seattle.

Fewer patients per nurse can lead to earlier detection of telltale signs, she told *Medscape Medical News*. "No cardiac arrest in a hospital should ever be a surprise. Patients are telling us for about 48 hours that something is changing."

Improving the quality of cardiopulmonary resuscitation performed by nurses could also help improve survival rates, Kupchik pointed out. Chest compressions are often done too fast with too many interruptions, or aren't deep enough, she warned.

Funding for this study is from the National Institute of Nursing Research, the National Institute on Aging, and the American Association of Critical Care Nurses. Dr Rochman and Ms Kupchik have disclosed no relevant financial relationships.

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