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Staffing Ratio Has Impact on Risk of Nosocomial Infections

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Archibald and colleagues from the CDC's Hospital Infections Program, while conducting an investigation of a *Serratia marcescens* outbreak in a pediatric cardiac intensive-care unit (CICU), noted that understaffing or overcrowding might have been underlying risk factors. They conducted a study to assess the effect of fluctuations in CICU nurse-staffing levels and patient census on the CICU nosocomial infection rate (NIR). The monthly CICU nursing hours, patient days, and nosocomial infections were obtained from retrospective review of administrative, patient, and microbiology records during December 1994 through December 1995 (study period). The NIR and nursing hours to patient-day ratio then were calculated.

The correlations between NIR versus nursing hours, patient days, and nursing hours to patient-day ratio were determined.

The results showed that the median monthly CICU NIR was 6.9 (range, 0-15.2) infections per 1,000 patient days; the median number of hours worked per month by CICU registered nurses was 7,754 (range, 7,133-8,452) hours; the median number of patient days treated per month was 507 (range, 381-590) patient days; and the median monthly nursing hours to patient day ratio was 15.2 to 1 (range, 13.2:1-19.9:1). The strongest linear correlation was observed between the monthly NIR and patient days ($P=.0001$). There was an inverse correlation between the monthly NIR and nursing hours to patient-day ratio ($P=.003$).

The researchers concluded that

the NIR was correlated most strongly with patient census but also was associated strongly with the nursing hours to patient day ratio. It is believed that these factors may influence the infection rate because of breaks in healthcare worker aseptic technique or decreased handwashing. Increased patient census alone may increase the risk of cross-transmission of nosocomial infections. As hospitals proceed with cost-containment efforts, the effect of fluctuations in patient census and nurse staffing on patient outcomes needs evaluation.

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