The advancement of medical technology contributed to the increased use of intensive care. This led to increased risks of healthcare-associated infections [CDC definition: infections caused by a wide variety of common and unusual bacteria, fungi, and viruses during the course of receiving medical care], which posed an increasing threat to the safety of ICU patients including pediatric patients.

Single-bed patient rooms can be one part of the design solution to address the increased risks of HAI’s. Many studies have demonstrated significant benefits of single rooms in infection prevention in different settings. In this specific study, single-bed patient rooms with separate sinks were one key component of the contact isolation measure for infection prevention in this 6-bed (150 m2) PICU at a 1200-bed tertiary care center.

A key factor in decision-making around single rooms versus multi-bed rooms is often the cost-benefit comparison of both options. The authors concluded that the benefits of preventing infections outweighed the extra costs of single rooms.

A 150-m2 PICU at a 1200-bed tertiary care center in Israel was converted from a six-bed open bay to all single rooms in 1995. Six-month prospective surveillance data of infections (including bacteremia, candidemia, ventilator-associated pneumonia, gastrointestinal infection, and urinary tract infection developed at least 48 hours after admission in 115 patients in single rooms) were collected and compared with retrospective historical data for the same six months in 1992 (78 patients in open bays) before the renovation. The before-after comparison using

**OBJECTIVES**

The study aimed at examining the effects of single-bed patient rooms on cross transmission of infections in a pediatric ICU.

**Key Concepts/Context**

The advancement of medical technology contributed to the increased use of intensive care. This led to increased risks of healthcare-associated infections [CDC definition: infections caused by a wide variety of common and unusual bacteria, fungi, and viruses during the course of receiving medical care], which posed an increasing threat to the safety of ICU patients including pediatric patients.

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**Methods**

A 150-m2 PICU at a 1200-bed tertiary care center in Israel was converted from a six-bed open bay to all single rooms in 1995. Six-month prospective surveillance data of infections (including bacteremia, candidemia, ventilator-associated pneumonia, gastrointestinal infection, and urinary tract infection developed at least 48 hours after admission in 115 patients in single rooms) were collected and compared with retrospective historical data for the same six months in 1992 (78 patients in open bays) before the renovation. The before-after comparison using
statistical tests were used to determine whether there were fewer HAI’s and shorter length of stay in single rooms than in open bays.

The authors identified and examined certain potential confounding variables including medical staffing, protocol of infection prevention, treatment intensity, and patient age and diagnosis. These variables were found to be similar between two patient groups.

Findings

The 12-month data (6 months before and 6 months after the renovation) showed that nosocomial infections were significantly reduced in the new all-single-room unit (from an average of 3.62 infections per patient in the old unit to 1.87 infections per patient in the new unit). Average length of stay in PICU was reduced from 25 days to 11 days. Minimal difference was observed in the confounding variables.

Limitations

There were several potential biases that may threaten the validity of results.

- Different data collection methods were used to collect data in single rooms (prospective surveillance) and open bays (probably incomplete retrospective data from medical records). This might impact the accuracy of measuring infection rates.
- In addition, it was also possible that patient case mixes were different in the new and old units. This may pose as another potential confounding variable.

Design Implications

The study clearly showed that single-bed patient rooms may support infection prevention in ICU by isolating or separating patients.

This benefit of single room in infection prevention may also apply to other types of patient rooms including regular medical/surgical care rooms. Together with other relevant research (see below) that shows the many other benefits of single rooms, the study support the use of single rooms in PICU’s as well as other settings.

This evidence also calls for other design innovations of isolating or separating patients in infection prevention.