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Title: Impact of Single-Family Room NICU Design on Maternal Feeding Practices and Preterm Infant Outcomes
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Background: Open-bay (OB) neonatal intensive care units (NICUs) have been incrementally replaced with single-family room (SFR) units. By design, SFR units permit an adaptable environment, encouraging parental rooming and increasing opportunities for maternal breast milk (MBM) provision. Potential limitations of SFR units include decreased sensory input critical for infant development and fewer parental social learning opportunities. Due to heterogeneous factors impacting the NICU experience, it remains uncertain whether the SFR design benefits infants and families. We aim to evaluate MBM provision rates, growth trends, and neurodevelopmental outcomes in preterm infants cared for in an SFR NICU.

Methods: Outcomes were compared between preterm infants born at ≤ 33 weeks and cared for in an OB (n=120) versus an SFR (n=105) NICU. Outcome measures included MBM provision, NICU length of stay, growth parameters, and Bayley-III scores at 12 months corrected age.

Results: No significant differences in baseline demographics or preterm comorbidities were observed between SFR and OB groups. MBM provision was similar between SFR and OB groups on day of life (DOL) 28 (81.3 vs. 82.4%). MBM provision rates decreased by NICU discharge, markedly in the SFR group (40 vs. 55.3%). Total percent of MBM feeds over the NICU stay was lower in the SFR group (59.9 vs. 68.1%). No significant differences were noted between groups in growth z-scores on DOL 28 or at discharge. Following NICU discharge, MBM provision rates continued to decrease in both groups, declining more rapidly in the OB group. While Bayley-III testing is ongoing for the SFR group, preliminary results indicate no differences between groups in cognitive or language scores, but a trend toward lower motor scores in the SFR group.

Conclusions: Preterm infants cared for in the SFR NICU receive less MBM during hospitalization yet do not differ in growth parameters at discharge. Preliminary neurodevelopmental outcomes indicate that infants cared for in the SFR NICU may have lower motor scores and increased rates of individual scores falling within concerning ranges. Further analyses will elucidate factors impacting MBM provision in the SFR unit as well as direct associations between the amount of MBM provided and developmental outcomes.

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