How Nurse Work Environments Relate to the Presence of Parents in Neonatal Intensive Care

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Conflict of Interest/Disclosure

Co-Authors of the publication of this study do not have any conflicts to disclose:

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• Eileen Lake PhD, RN, FAAN, Associate Professor of Nursing, Associate Director of the Center for Health Outcomes, University of Pennsylvania

The paper is under review by the Journal of Obstetrics, Gynecology and Neonatal Nursing
Conflict of Interest/Disclosure

I am employed as an Assistant Professor at Villanova University, College of Nursing and as Pediatric Nurse Practitioner at Children’s Hospital of Philadelphia – Division of Neonatology and Newborn Care at Pennsylvania Hospital.

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Conflict of Interest/Disclosure

I am a Pediatric Nurse Practitioner Board Exam Content Expert with the American Nurses Credentialing Center.

At the time of this study, I was the Jonas Policy Scholar to the Expert Panel of Breastfeeding for the American Academy of Nursing.

I am a Senior Fellow of the Center for Health Outcomes and Policy Research, University of Pennsylvania where the data is kept.
The learner will be able to:

• Describe the frequency and distribution of parental presences in a national sample of U.S. NICUs.
• Identify subscales of the National Quality Forum-endorsed Practice Environment Scale of the Nursing Work Index (PES-NWI), a measure of the nurse work environment, which are significantly associated with parental presence in the NICU.
Overview of the presentation

• Historic events 1900-2016 influencing parental presence in Pediatric Care
• Nurses as gatekeepers in the NICU
• Evidence of NICU outcomes linked to nurse sensitive measures and the practice environment
• Evidence of parental presence in the NICU
Greetings from Philadelphia!
Parental Presence in Neonatal Intensive Care

Parental Presence in Neonatal Intensive Care

Nurses caring for a premature infant, Philadelphia General Hospital, c. 1950

Parental Presence in Neonatal Intensive Care

To Err is Human
Institute of Medicine, 1999

- 44,000 - 90,000 deaths/yr
- 8th leading cause of death in US were medical errors
- National Costs: $17 to $29 billion
- $2 billion Adverse Rx event costs alone
- 2% hospitals admissions (preventable)
- Add $47,000 in costs to each hospital
Six Conditions for Quality Healthcare

1. Safe
2. Effective
3. Efficient
4. Timely
5. Patient centered
6. Equitable
Trends in mortality and morbidity for infants in the NICU

Since 1995, no additional improvements in mortality or morbidity have been seen, ending a decades-long trend of improving outcomes for these infants. -Horbar et. al., Pediatrics, 2002.

- 118, 448 infants 501 to 1500g from 362 neonatal intensive care units enrolled in the Network Database from 1991 to 1999.
Trends in mortality and morbidity for infants in the NICU

- From 2005 to 2014, rates of death prior to discharge and serious morbidities decreased among the NICUs in this study. - Horbar et. al., JAMA Pediatrics, 2017.

- However, the study also emphasizes the barriers—persistent variation between hospitals, volatility of rare outcomes, and the need to explore population-based outcomes of perinatal care—to continue the highlighted improvements. - Lorch (2017), JAMA Opinion
Ensuring that families are partners in the health care of their family member is a priority of the National Quality Strategy led by Agency for Healthcare Research and Quality on behalf of the U.S. Department of Health and Human Services (HHS) and mandated by the Affordable Care Act.
Nurses as gatekeepers in the NICU

For many new parents, the experience of their infant being admitted to the NICU invokes feelings of despair, powerlessness and fear due to uncertainty of their infants’ condition.
Nurses’ work environments, care rationing, job outcomes, and quality of care on neonatal units

Rochefort & Clarke, 2010, IJ NS

- 553 nurses in 9 NICUs in Quebec in 2007-2008
- 52-item NICU instrument used to measure Nursing care domains:
  - Life support and technological care
  - Patient surveillance
  - Parental support and teaching / Comfort care
  - Care coordination / Discharge planning
- Care that was most frequently rationed due to insufficient time included: discharge planning, parental support and teaching, and comfort care.
Nurse Staffing and NICU Infection Rates
Rogowski, Staiger, Patrick, Horbar, Kenny & Lake, JAMA Pediatrics, 2013

- Substantial NICU nurse understaffing relative to national guidelines is widespread.
- Understaffing is associated with an increased risk for VLBW nosocomial infection.
- Hospital administrators and NICU managers should assess their staffing decisions to devote needed nursing care to critically ill infants.
Infant Acuity Levels

- **Continuing care** - Infant only requiring PO or NG feedings, occasional enteral medications, basic monitoring—may or may not have a heparin lock for meds.

- **Requiring intermediate care** - Stable infant on established management plan, not requiring significant support. Examples would include: Room air, supplemental oxygen or low flow nasal cannula, several meds.

- **Requiring intensive care** - Infant is stabilized, though requires frequent treatment and monitoring to assure maintenance of stability. Examples would include: ventilator, CPAP, high flow nasal cannula, multiple IV needs via central or peripheral line.

- **Requiring multi-system support** - Infant requires continuous monitoring and interventions. Examples would include: Conventional ventilation, stable on HFV, continuous drug infusions, several IV fluid changes via central line.

- **Unstable, requiring complex critical care** - Infant is medically unstable and vulnerable requiring many simultaneous interventions. Examples of this type of infant would include: ECMO, HFV, nitric oxide, frequent administration of fluids, medication.
### Nurse Staffing In Neonatal Intensive Care Units in the United States

Rogowski et al 2015 Research in Nursing & Health

<table>
<thead>
<tr>
<th>Acuity Level</th>
<th>Patient-to-Nurse Ratio</th>
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<tbody>
<tr>
<td>1: Continuing Care</td>
<td>2.78</td>
</tr>
<tr>
<td>2: Intermediate care</td>
<td>2.43</td>
</tr>
<tr>
<td>3: Intensive care</td>
<td>1.92</td>
</tr>
<tr>
<td>4: Multi-system support</td>
<td>1.39</td>
</tr>
<tr>
<td>5: Unstable/complex critical care</td>
<td>1.04</td>
</tr>
</tbody>
</table>
Association Between Hospital Recognition for Nursing Excellence and Outcomes of Very Low-Birth-Weight Infants
Lake et al. Journal of the American Medical Association 2012


Results: VLBW (<2500g) Infants born in Magnet hospitals had significantly lower mortality, infection, and severe intraventricular hemorrhage.
Disparities in Perinatal Quality Outcomes for Very Low Birth Weight Infants in Neonatal Intensive Care

Lake et. al, Health Services Research 2015

- Hospitals with high concentrations of black infants have poorer nursing resources.
- Poorer nursing resources account for a third to a half of the poorer outcomes for these vulnerable infants.
Characteristics of the NICU Work Environment Associated with Breastfeeding Support
Hallowell, Spatz, Hanlon, & Lake, Advances in Neonatal Care, 2014

Results:
• Only 14% of NICU infants in the sample received breastfeeding support from the nurse.
• Only half of the NICU’s had a lactation consultant.
• NICUs with better nurse staffing had more parents who received breastfeeding support (p<.05).
Factors associated with infant feeding of human milk at discharge from neonatal intensive care

Hallowell, Rogowski, Spatz, Hanlon, Kenny & Lake IJ NS 2016

- The majority of VLBW infants (52%) are discharged from the NICU on formula only. Fewer infants (42%) receive human milk mixed with fortifier or formula. Only 6% of VLBW infants are discharged on exclusive human milk.
Factors associated with infant feeding of human milk at discharge from neonatal intensive care

Hallowell, Rogowski, Spatz, Hanlon, Kenny & Lake IJ NS 2016

• Better nurse work environments and staff nurses with a BSN level of education or higher are associated with a higher provision of human milk for VLBW infants.
Hypothesis: Hospitals foster the optimal contribution of NICU nurses’ work by having
• better work environments
• higher acuity-adjusted nurse staffing ratios
• more nurses educated at a baccalaureate level or higher.
Study Aims

1. To describe the presence of parents in the NICU and nursing care activities (addressing language or cultural needs, complex social situation, limited parenting skills, providing emotional support during end-of-life care, routine bedside teaching or formal teaching or training) that required additional time beyond what would have been required had the family not been present.

1. To examine the relationship between three organizational nursing factors (hospital work environment, acuity-adjusted nurse staffing ratio and nurse education), the rate of parental presence, and nursing care activities involving NICU parents.
Quality health outcomes model

SYSTEM
- PES-NWI
- Nurse Qualifications: Education, Experience & NICU specialty certification
- Acuity-Adjusted nurse-to-patient ratio

OUTCOMES
- Language or cultural needs
- Complex social situation
- Limited parenting skills
- Breastfeeding support
- Emotional support during end-of-life care
- Routine bedside teaching
- Formal teaching or training

INTERVENTION
- Additional time caring for the family by the nurse

CLIENT
- Individual, Family, community
  - Parental Presence

Adapted from Mitchell, Feketich & Jennings, 1998
Methods

**Design**
- Cross-sectional, observational

**Data**

**Sample**
- 104 NICUs, 6060 nurses and 15,233 infants nurses worked with on their last shift
Sample

2008

RN
6060

H
104
NICU

15,233 INFANTS
5 subscales

1. Nurse Participation in Hospital Affairs
2. Staffing and Resource Adequacy
3. Nursing Foundations for Quality of Care
4. Nurse Manager Ability, Leadership, and Support of Nurses
5. Collegial Nurse/Physician Relations
<table>
<thead>
<tr>
<th>NICU level of care</th>
<th>%</th>
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<tbody>
<tr>
<td>A</td>
<td>14</td>
</tr>
<tr>
<td>B</td>
<td>57</td>
</tr>
<tr>
<td>C</td>
<td>29</td>
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Number of beds, mean (SD) 41(20)
Registered Nurses, mean (SD) 75(42)

**Infant Acuity Distribution (n = 15,191)**

- Level 1 continuing care 33
- Level 2 requiring intermediate care 29
- Level 3 requiring intensive care 26
- Level 4 requiring multi-system support 8
- Level 5 requiring complex critical care 4

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*b* Level refers to level of clinical care: A, minor ventilation only; B, minor surgery; C, cardiac surgery and extracorporeal membrane oxygenation.

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<thead>
<tr>
<th>Frequency of Parental Presence and Nursing Care Activities provided with Parents</th>
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<tr>
<td><strong>Infants N = 15,233</strong></td>
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<tr>
<td>Parents were present at least half the nurses shift or more</td>
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<tr>
<td>Parents who were present and required extra nursing care</td>
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<tr>
<td><strong>Nursing Care Activities provided with Parents</strong></td>
</tr>
<tr>
<td>Routine beside teaching and communicating with families</td>
</tr>
<tr>
<td>Breastfeeding support</td>
</tr>
<tr>
<td>Parent teaching beyond routine bedside teaching</td>
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<tr>
<td>Parents have limited parenting skills</td>
</tr>
<tr>
<td>A complex social situation (eg. Drug use or addiction, housing)</td>
</tr>
<tr>
<td>Parents have special language or cultural needs</td>
</tr>
<tr>
<td>Emotional support to parents due to infant’s rapid deterioration or termination of life support</td>
</tr>
<tr>
<td>Needs formal teaching or training session</td>
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\(^a\) Activities performed with infants whose parents were reported to require extra nursing care
The national snapshot of parental presence in U.S. NICUs

Figure 1. Percentage of infants whose parents were present during the nurses shift. Abbreviation: NICU, neonatal intensive care unit

Mean 60%
Correlation between the composite PES-NWI score and parental presence

Abbreviation: NICU, neonatal intensive care unit; PES, Practice Environment Scale
Hospitals foster the optimal contribution of NICU nurses’ work by having:

1. Nurse Leadership and participation in hospital affairs
2. Nurse Manager ability, leadership and support
3. The PES composite
4. Staffing and Resources was only marginally significant
Implications for policy and practice

- Parental presence in the NICU is significantly associated with better nurse work environments.
- A patient-centered culture that facilitates parental presence is enhanced in NICUs that have effective nurse leaders and nurses empowered to participate in hospital governance and decision-making.
Thank You!

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