

FEASIBILITY AND MEASUREMENT OF BEDSIDE PUMPING IN THE NICU

A MIXED METHODS STUDY

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Disclosures

None


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Objectives


Describe	the significance of Mother's Own Milk (MOM) for preterm infants in the NICU.
Identify	barriers and facilitators to bedside pumping from maternal, infant, and environmental perspectives.
Explain	the mixed methods approach used to evaluate feasibility and maternal experiences.
Interpret	the impact of maternal coping as a moderator in breastfeeding outcomes.
Discuss	clinical implications and future research directions to improve NICU breastfeeding support.

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Background



2nd
Prematurity is the 2nd leading cause of Infant death in US¹



\$ 25.2 Billion
Annual Health Care Costs Related to Preterm Birth³



383,373 Babies
10.23% of Annual US Births are Born Preterm (<37 weeks)²

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Significance

Neonatal ICU


Infant Health Infant Nutrition

Mother's Milk is Best^{4,5}


Stored Versus Fresh Milk

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Barriers to Holistic Breastfeeding in NICU



Emotional⁶⁻⁹
Stress
Fear
Permission
Participation

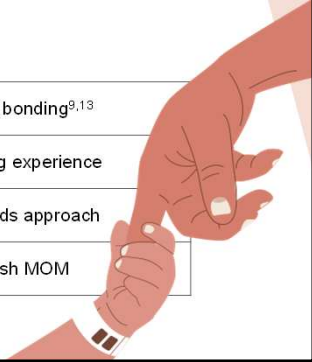


Physical¹⁰⁻¹²
Separation
Decreased hormone exposure
Delayed initiation
Delayed secretory activation

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Innovation

Proximity	Important for bonding ^{9,13}
Improve	Breastfeeding experience
Design	mixed methods approach
Provides	Access to fresh MOM

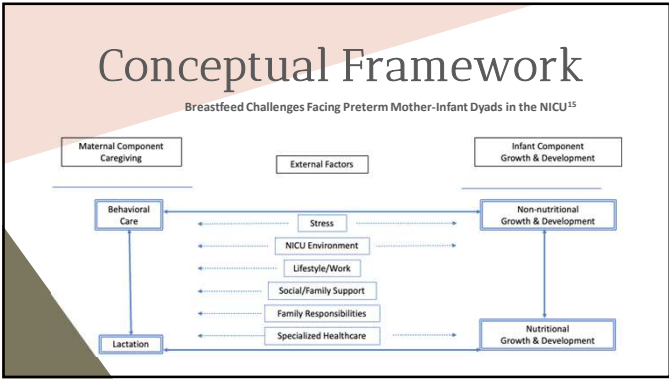


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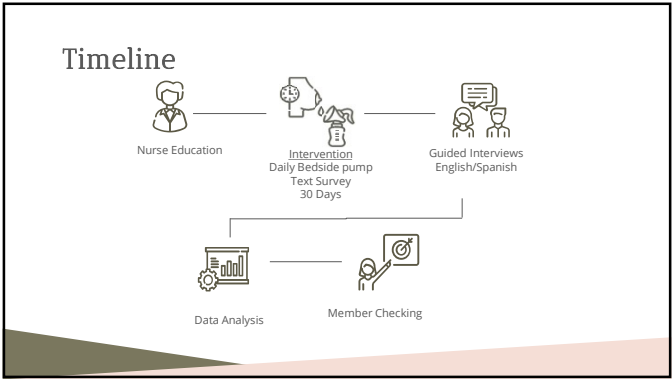
Specific Aims

1. Evaluate the feasibility of frequent bedside pumping for mothers of infants born ≤ 32 weeks in the NICU by measuring enrollment rate, retention rate, adherence to daily pumping, and percent of Mother's milk in the total infant diet at one month or infant discharge.
2. Explore the lived experiences of mothers pumping at the bedside for their infant born ≤ 32 weeks in the NICU

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Methodology




Convergent Mixed Methods

- Daily bedside pumps + text surveys
- Number and location of pumps last 24 hours
- Which location less stressful?
- Any problems?




Recruitment

- Convenience sample
- 48-hours postpartum
- 2-month period
- 28 Mothers



Inclusion

- Mother ≥ 18 years
- Infants ≤ 32 Weeks
- Read/Write Spanish or English
- No contraindications to Mother's Milk
- Cell phone access



Exclusion

- Cannot read/write
- Mother does not wish to provide milk
- Infant with life-limiting diagnosis

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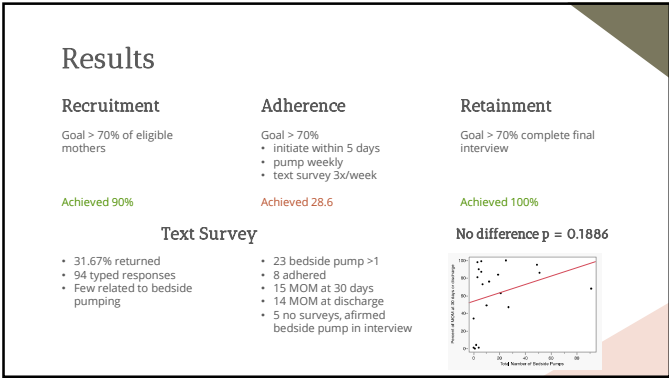
Where & Who

Setting

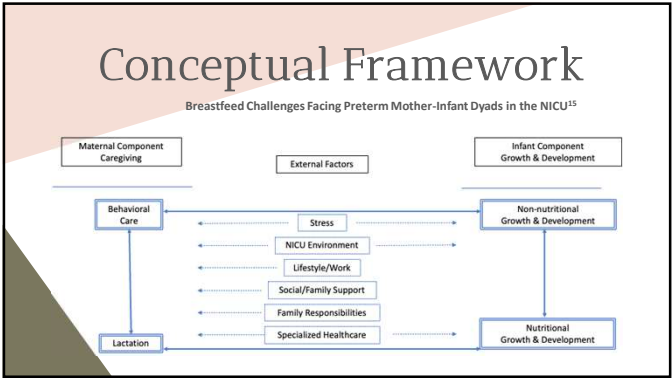
- Level 4 NICU
- Average daily census 120.6 (Range 107-136)
- Diverse population
- >50% Medicaid
- Lactation consultants daily
- Pumps available for use in unit

Characteristics	n (%)
Race	
Black/AA	10 (35.7)
White/Non-Hispanic	1 (3.6)
White/Hispanic	16 (57.1)
Asian	1 (3.6)
Education Level	
<High School	8 (28.6)
High School Graduate	3 (10.7)
Associates/Some College	7 (25.0)
Bachelor's	8 (28.6)
Master's	2 (7.1)
Insurance	
Medicaid	21 (75.0)
Private Insurance	7 (25.0%)
Previous Breastfed	10 (35.7)
Mean (SD)	
Maternal age	30.57 (6.17)
Gestational age at birth	29.15 (2.73)
Percent of MOM received to date at 30 days	55.41 (38.44)
Last day MOM fed	21.95 (11.53)

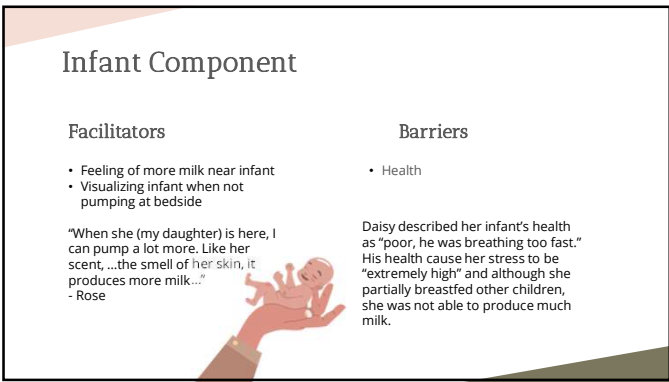
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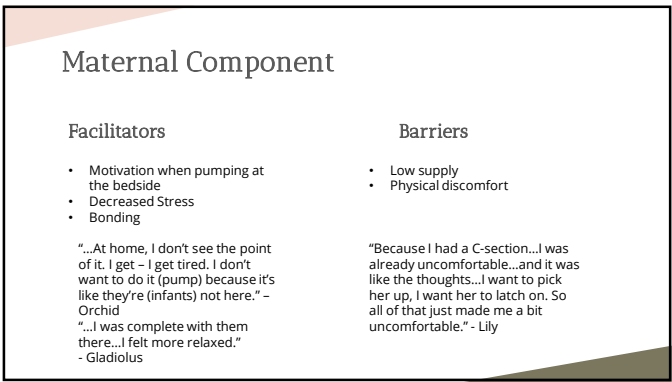
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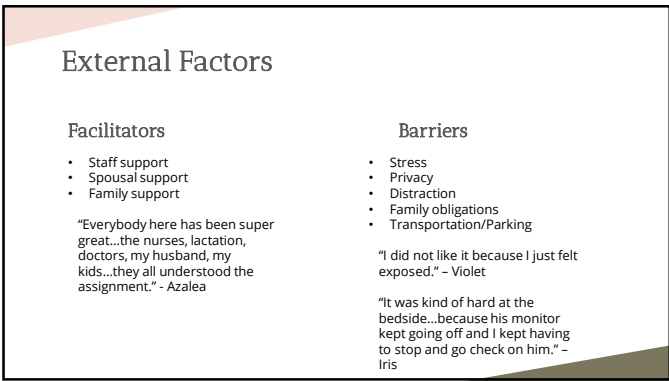
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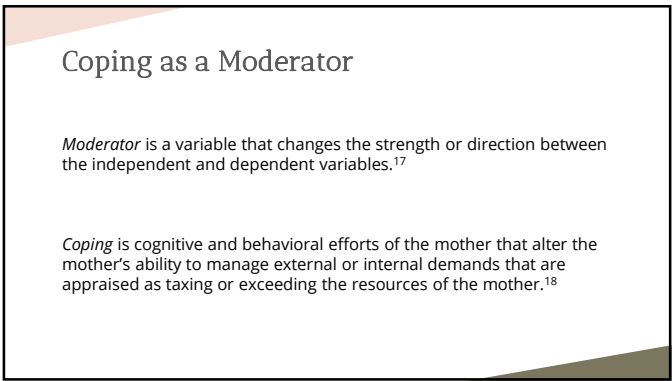
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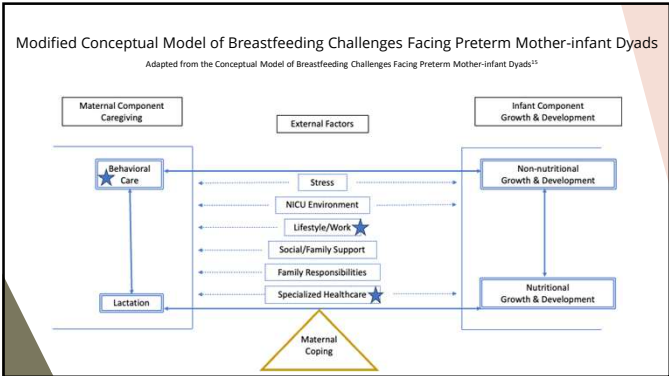
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Coping Moderated Barriers and Facilitators

Petunia	Fuchsia
<ul style="list-style-type: none">From out of state – little social supportMajor surgery first 30 day“Producing something for him”NICU environment49 bedside pumps95% MOM in first 30 days	<ul style="list-style-type: none">Lived nearby“Health is pretty good”Extended family supportPrivacy concerns“Pretty Stressful”“Pumping for nothing”0 bedside pumps34% MOM in first 30 days

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Limitations

- Small sample
- Mostly Black/AA or Hispanic/White
- Text surveys poorly measured bedside pumping activities

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Conclusions

- Did not meet all feasibility criteria
- Text survey response poor 31.67% vs >50%¹⁹
- Subjective feelings of bonding, motivation & milk increase
 - Acuña-Muga et al. compared 623 pumps near and 743 pumps far²⁰
 - Pumps nearby were often after skin-to-skin holding²¹
- Coping moderated barriers/facilitators >> adapted model

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Clinical Implications

Decrease barriers for pumping mothers
<ul style="list-style-type: none">Increased access to pumping supplies and pumpsSupport for transportation/parking i.e. ReDiMOM²⁶Improve coping skills
Text model for communication tool
<ul style="list-style-type: none">Fill in boxes of text surveys often asking for supplies, help, troubleshooting
Improve NICU Environment
<ul style="list-style-type: none">Music therapy, singing, readingPrivate roomsImproved acoustical parameters of alarms
Promote parental presence in NICU
<ul style="list-style-type: none">Support for transportation/parking i.e. ReDiMOM²⁶Provide privacy, screens, nursing cover

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References

- Murphy S, Xu J, Kochanek K, Arias E, Tejada-Vera B. National Vital Statistics Reports, Deaths: Final Data for 2018. 2021;69:83. [cdc.gov/nchs/data/nvsr/nvsr69/nvsr69-13-508.pdf](https://www.cdc.gov/nchs/data/nvsr/nvsr69/nvsr69-13-508.pdf)
- Martin JA, Hamilton BE, Osterman MJ, Driscoll AK. National Vital Statistics Reports, Births: Final Data for 2019. 2021;70:51. <https://www.cdc.gov/nchs/data/nvsr/nvsr70/nvsr70-02-508.pdf>
- Waitzman NJ, Jalaia A, Grosse SD. Preterm birth lifetime costs in the United States in 2016: An update. *Semin Perinatol*. Published online 2021;151390. doi:10.1016/j.semper.2021.151390
- Meier PP. Human Milk and Clinical Outcomes in Preterm Infants. *Hum Milk Compos Clin Benefits Future Oppor*. 2019;90:163-174. doi:10.1159/000490304
- American Academy of Pediatrics. Breastfeeding and the Use of Human Milk. *Pediatrics*. 2012;129(3):e827-e841. doi:10.1542/peds.2011-3552
- Fernández-Molina IM, Fernández-Sola C, López-Rodríguez MM, Hernández-Padilla JM, Jiménez-Lasserote M Del Mar, Guerrero-Molina J. Barriers to Providing Mother's Own Milk to Extremely Preterm Infants in the NICU. *Adv Neonatal Care Adv Neonatal Care*. 2019;19(5):349-360. doi:10.1097/ANC.0000000000000652
- Witt RE, Colvin BN, Lenz SN, et al. Lived experiences of stress of Black and Hispanic mothers during hospitalization of preterm infants in neonatal intensive care units. *J Perinatol*. 2022;42(2):195-201.
- Nigal EM, Howland MA, Pando C, et al. Maternal psychological distress and lactation and breastfeeding outcomes: A narrative review. *Clin Ther*. Published online 2022. doi:https://doi.org/10.1016/j.clinthera.2021.11.007
- Treherne SC, Feeley N, Charbonneau L, Axelin A. Parents' perspectives of closeness and separation with their preterm infants in the NICU. *J Obstet Gynecol Neonatal Nurs*. 2017;46(5):737-747.
- Cragan MD, De Mello TR, Kershaw D, McDougall K, Hartmann PE. Initiation of lactation in women after preterm delivery. *Acta Obstet Gynecol Scand*. 2002;81(9):870-877. doi:10.1034/j.1600-0412.2002.810913.x
- Neville MC, Morton J, Umemura S. Lactogenesis: the transition from pregnancy to lactation. *Pediatr Clin North Am*. 2001;48(1):35-52.
- Yu X, Li J, Lin X, Lian D. Association between Delayed Lactogenesis II and Early Milk Volume among Mothers of Preterm Infants. *Asian Nurs Res*. 2019;13(2):93-98. doi:https://doi.org/10.1016/j.asnr.2019.02.001
- Bjorklund M, Feeley N, Axelin A, Cinqunio C. Expressing Human Milk in the NICU: Coping Mechanisms and Challenges Shape the Complex Experience of Closeness and Separation. *Adv Neonatal Care*. 2018;18(1):38-48. doi:10.1097/ANC.0000000000000455
- Joan J, Möhler E. Maternal Bonding in Early Infancy Predicts Children's Social Competences in Preschool Age. *Frontiers in Psychiatry*. Published online 2021;1278.
- Lau C. Breastfeeding Challenges and the Preterm Mother-Infant Dyad: A Conceptual Model. *Breastfeed Med*. 2018;13(1):8-17. doi:10.1089/bfm.2016.0206

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References

16. Guba EG, Lincoln YS. Competing paradigms in qualitative research. *Handb Qual Res.* 1994;2(163-194):105.
17. Baron RM, Kenny DA. The Moderator-Mediator Variable Distinction in Social Psychological Research: Conceptual, Strategic, and Statistical Considerations.
18. Lazarus RS, Folkman S. *Stress, Appraisal, and Coping.* Springer publishing company; 1984.
19. Axelin A, Ruiskila S, Lehtonen L. The Development of Data Collection Tools to Measure Parent-Infant Closeness and Family-Centered Care in NICUs. *Nordic Nurs Evid Based Nurs.* 2020;17(6):448-456. doi:10.1111/vwn.12475
20. Acuna-Muga J, Ureña-Velasco N, de la Cruz-Bertolo J, et al. Volume of Milk Obtained in Relation to Location and Circumstances of Expression in Mothers of Very Low Birth Weight Infants. *J Hum Lact.* 2014;30(1):41-46. doi:10.1177/0890334413509140
21. Sharma D, Farahbakhsh N, Sharma S, Sharma P, Sharma A. Role of kangaroo mother care in growth and breast feeding rates in very low birth weight (VLBW) neonates: a systematic review. *J Matern Fetal Neonatal Med.* 2019;32(1):129-142. doi:10.1080/14767058.2017.1304535
22. Fernández-Medina IM, Gracero-Molina J, Fernández-Sola C, Hernández-Padilla JM, Ávila MC, Rodríguez M del ML. Bonding in neonatal intensive care units: Experiences of extremely preterm infants' mothers. *Women Birth.* 2018;31(4):325-330. doi:https://doi.org/10.1016/j.wombi.2017.11.008
23. Trehearne SC, Feeley N, Charbonneau L, Axelin A. Parents' perspectives of closeness and separation with their preterm infants in the NICU. *J Obstet Gynecol Neonatal Nurs.* 2017;46(5):737-747.
24. O'Callaghan N, Dee A, Philip RK. Evidence-based design for neonatal units: a systematic review. *Matern Health Neonatal Perinatol.* 2019;5(1):6. doi:10.1186/s40748-019-0101-0 25.
25. Chifa M, Hadar T, Politimou N, Reynolds G, Franco F. The Soundscape of Neonatal Intensive Care: A Mixed-Methods Study of the Parents' Experience. *Children.* 2021;8(8):644. doi:10.3390/children8080644
26. Johnson TJ, Meier PP, Schoeny ME, et al. Study protocol for reducing disparity in receipt of mother's own milk in very low birth weight infants (ReDMOM): a randomized trial to improve adherence to sustained maternal breast pump use. *BMC Pediatr.* 2022;22(1):27. doi:10.1186/s12887-021-03088-y

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Questions

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