



A Donor Human Milk Implementation Project: Examining the Evidence

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Introduction

Mothers of preterm infants admitted to neonatal intensive care units (NICU) frequently are unable to provide their infant(s) with an exclusive human milk diet.

Practice Change: When mother’s milk is unavailable, neonates weighing less ≤ 1500 grams and/or born at ≤ 30 weeks gestation are offered Donor Human Milk (DHM) in the first 28 days of life.

Background

Mother’s milk is the first choice for optimal infant nutrition and protection from infection. The CDC reports that in the United States only 18.8% of infants receive an exclusive breastmilk diet. It has been estimated that infant mortality could be reduced by 21% if all infants received an exclusive breastmilk diet for the first 6 months of life (Spatz & Edwards, 2016). Several studies have noted a decrease in the incidence of NEC in preterm infants that receive exclusive human milk over formula. Preterm infants admitted to the NICU are frequently supplemented with formula when mother’s milk is not available. Pasteurized donor milk can provide the infant protection from infection and decrease feeding intolerance, when mother’s milk is not available (Quigley, Embleton & McGuire, 2018).

Purpose of Study

To evaluate the effectiveness of a DHM program by comparing pre- and post-implementation data on:

- 1) Incidence of necrotizing enterocolitis, jaundice, and feeding tolerance (i.e. “time to full feeds”)
- 2) Differences in neonate growth in preterm infants
- 3) Change in use of non-human products for nutrition in this same population.

Research Method & Design

Retrospective study examining the medical records of preterm infants and their mothers admitted to Sentara Princess Anne Hospital (SPAH) Level III Neonatal Intensive Care Unit and Sentara Norfolk General Hospital (SNGH) Special Care Nursery between 09/01/2010 - 11/30/2016.

- Pre-implementation period: 09/01/2010 - 08/31/2013
- Post-implementation period: 09/01/2013 – 11/30/2016

Inclusion criteria: Preterm infants with gestation of ≤ 30 weeks, and/or birth weight of ≤ 1500 gm. Age Range: Newborns to 2 months and Mothers 15 to 50 years.

Exclusion criteria: Preterm infant death and/or preterm infants with the following: major congenital malformations, transfer to non-study site ≤ 3 days, transfer to study sites at ≥ 1 day of life, and/or who received feeding(s) outside the study sites.

Results

The study was comprised of 667 patients across two study sites.

	SNGH		SPAH		TOTAL	
	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%
Subtotal	555	82.0	122	18.0	677	100.0
Pre	229	79.2	60	20.8	289	42.7
Post	326	84.0	62	16.0	388	57.3

Differences by DHM Implementation Period in Infant Birth Characteristics

	PRE-IMPLEMENTATION		POST-IMPLEMENTATION	
	<i>n</i>	%	<i>n</i>	%
Gender				
Male	137	47.4	194	50.0
Female	152	50.0	194	50.0
Gestational Age				
Weeks	<i>n</i>	<i>M (SD)</i>	<i>n</i>	<i>M (SD)</i>
Birth Weight				
Grams	285	30.4 (2.00)	300	30.2 (2.3)
APGAR				
1 min.	270	5.9 (2.2)	377	5.8 (2.0)
5 min.	268	7.7 (1.5)	377	7.7 (1.3)
LOS**	289	39.1 (16.4)	388	41.8 (20.2)

Use of Human Milk Products: An increase in use of human milk products after the implementation of the DHM program was found at SNGH and SPAH ($\chi^2 = 84.58$, $p < .001$; $\chi^2 = 31.70$, $p < .001$, respectively). See table below.

Infant Feeding Type by Pre vs. Post DHM Implementation During First 4 Weeks

Feeding Types	SNGH		SPAH		TOTAL	
	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%
Human Milk						
Pre	24	10.5	18	30.0	42	14.5
Post	156	47.9	49	79.0	205	52.8
Formula						
Pre	69	30.1	5	8.3	74	25.6
Post	14	4.3	1	1.6	15	3.9
Human Milk/Formula						
Pre	136	59.4	37	61.7	173	59.9
Post	156	47.9	12	19.4	168	43.3

Incidence of NEC: There was a statistically significant difference in the incidence of NEC in preterm infants at SNGH from pre [23 out of 229 infants (10.0%)] to post [10 out of 326 infants (3.1%)] DHM implementation $\chi^2 = 11.71$, $p = .001$. At SPAH there were 2 incidences of NEC pre-implementation compared to 1 incident in the post-implementation period.

				Incidence of NEC		
Hospital Site				No	Yes	Total
SNGH**	DHM Program Implementation	Pre	<i>n</i>	206	23	229
		Post	<i>n</i>	316	10	326
	Total			<i>n</i>	522	33
SPAH	DHM Program Implementation	Pre	<i>n</i>	58	2	60
		Post	<i>n</i>	61	1	62
	Total			<i>n</i>	119	3

* $p < .05$, ** $p < .01$, *** $p < .001$

Results (cont.)

Growth: There was no statistically significant difference in weight, length or head circumference at either facility in the pre to post implementation period.

Sepsis: No statistical difference at either facility in the pre vs post implementation period.

Feeding Tolerance: Feeding tolerance was measured by number of TPN days. See table below.

SNGH: The infants in the post-DHM implementation infants had significantly **fewer days** on TPN compared to those in the pre-DHM program period.

SPAH: The infants in the post-DHM implementation infants had significantly more days on TPN compared to those in the pre-DHM program period. Of note, the average gestational age was significantly lower during post implementation possibly contributing to the increase.

Feeding Intolerance Comparing Pre to Post-DHM Program Implementation				
Hospital Site	DHM Implementation	Mean	Std. Deviation	N
SNGH***	Pre	8.147	10.7071	223
	Post	5.741	7.8723	318
	Total	6.732	9.2150	541
SPAH***	Pre	4.498	7.2138	57
	Post	10.792	10.7984	58
	Total	7.672	9.6878	115

* $p < .05$, ** $p < .01$, *** $p < .001$

Conclusion

This retrospective study concluded that offering DHM in the NICU increased the % of infants receiving exclusive breastmilk diet by 38%. Additionally the study supported previous studies by showing a decrease in the incidence of NEC. One site demonstrated a decrease in TPN days by more than 2 days.

Implications for Nursing Practice

Future studies should include the use of human milk human milk fortifiers (i.e. Prolacta) with DHM to establish an exclusive human milk diet. This study did not use human milk human milk fortifiers therefore the diet was not exclusively human milk. Additionally it would be valuable to monitor growth from birth to discharge. This study only measured growth during the first 4 weeks.

References: Available upon request

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