The Effect of Peer Counselors on Breastfeeding Rates in the Neonatal Intensive Care Unit

Results of a Randomized Controlled Trial

Anne Merewood, MPH, IBCLC; Laura Beth Chamberlain, BA, IBCLC; John T. Cook, PhD; Barbara L. Philipp, MD; Kirsten Malone, BA, IBCLC; Howard Bauchner, MD, MPH

Objective: To determine whether peer counselors impacted breastfeeding duration among premature infants in an urban population.

Design: This was a randomized controlled clinical trial.

Setting: The trial was conducted in the Newborn Intensive Care Unit at Boston Medical Center, an inner-city teaching hospital with approximately 2000 births per year.

Participants: One hundred eight mother-infant pairs were enrolled between 2001 and 2004. Pairs were eligible if the mother intended and was eligible to breastfeed per the 1997 guidelines from the American Academy of Pediatrics and if the infant was 26 to 37 weeks' gestational age and otherwise healthy.

Intervention: Subjects were randomized to either a peer counselor who saw the mother weekly for 6 weeks or to standard of care.

Main Outcome Measure: The main outcome measure was any breast-milk feeding at 12 weeks postpartum.

Results: Intervention and control groups were similar on all measured sociodemographic factors. The average gestational age of infants was 32 weeks (range, 26.3-37 weeks) with a mean birth weight of 1875 g (range, 682-3005 g). At 12 weeks postpartum, women with a peer counselor had odds of providing any amount of breast milk 181% greater than women without a peer counselor (odds ratio, 2.81 [95% confidence interval, 1.11-7.14]; P=.01).

Conclusions: Peer counselors increased breastfeeding duration among premature infants born in an inner-city hospital and admitted to the neonatal intensive care unit. Peer counseling programs can help to increase breastfeeding in this vulnerable population.

Arch Pediatr Adolesc Med. 2006;160:681-685

METHODS

REPRINTED ARCH PEDIATR ADOLESC MED/VOL 160, JULY 2006 WWW.ARCHPEDIATRICS.COM

©2006 American Medical Association. All rights reserved.
Eligible women had an otherwise healthy premature infant (no congenital anomalies and no life-threatening condition in the immediate postpartum period) between 26 and 37 weeks’ gestational age in the NICU; spoke English or Spanish; were eligible to breastfeed according to the 1997 guidelines from the American Academy of Pediatrics; and chose to do so. Women younger than 26 weeks were excluded, because a relatively high number of these infants are at risk for death or permanent disabilities. Also excluded were infants with gestational age in the NICU; spoke English or Spanish; were eligible to breastfeed according to the 1997 guidelines from the American Academy of Pediatrics21; and chose to do so. Women younger than 26 weeks were excluded, because a relatively high number of these infants are at risk for death or permanent disabilities. However, between 26 and 37 weeks of gestational age, breastfeeding is associated with improved outcomes.21-23 Eligible women were approached about study participation within 72 hours postpartum and, if interested, provided consent. At the time of enrollment, consenting women were randomized to receive peer support or standard of care control. The research assistant then contacted the peer counselor for intervention group assignees; all initial peer counselor contacts with intervention mothers took place within the same 72-hour postpartum period. The reason for the 72-hour time frame was to ensure that the initial contact happened before the mother’s hospital discharge. Some infants were not able to recall accurately the exact number of feeds in the previous 48 hours, in which case they were prompted to record the number of breast and/or formula feeds the infant had taken food at any observation point, the research assistant reviewed the infant’s medical record and recorded feeding status as determined by maternal recall by telephone after hospital discharge. The bedside feeding record was examined for the 48-hour period immediately preceding the date of the infant’s 2-, 4-, 8-, and 12-week birthday. If an infant was not taking food at any observation point, the research assistant traced the history in the infant’s medical record and recorded data from the 48-hour period immediately prior to feeding being halted. In the case of telephone calls, mothers were called on the infant’s 2-, 4-, 8-, and 12-week birthdays (or as soon as possible thereafter, if not reachable on the exact day) and asked to report the number of breast and/or formula feeds the infant had received in the previous 48 hours. On some occasions, mothers were not able to recall accurately the exact number of feeds in the previous 48 hours, in which case they were prompted to report categorically whether the baby received “only breast milk, mainly breast milk, mainly formula, or only formula.”

**DEFINITION OF BREASTFEEDING AND PRIMARY OUTCOME MEASURES**

Nationally, any amount of breastfeeding is used as a definition of breastfeeding to assess breastfeeding rates.2,3 In keeping with
this definition, we described breastfeeding as receiving any breast milk at 12 weeks as our primary outcome measure. However, this national definition is controversial. Thus, we collected more detailed data in the 4 categories listed earlier. Our final data are reported as any breast milk (combining the 3 categories of only breast milk, mostly breast milk, and mostly formula) and mostly and only breast milk, which adds useful and more detailed information. Mostly breast-milk feeders received equal to or greater than 50% of their feeds as breast milk; breast milk may have been received by gavage, bottle, or at the breast.

DESCRIPTION OF ANALYSIS

Our sample-size calculation was based on a prestudy estimation that the proportion of infants breastfeeding would be 10% at 12 weeks with the intervention. We assumed that these proportions would rise to 40% at 12 weeks. Assuming an $\alpha$ of .05 and a power of 80%, the sample size necessary at 12 weeks would be 78. To have 2 groups stratified by gestational age, we would need a final sample size of 156 infants. In fact, we enrolled a total of 108 mother-infant pairs, after assessing 577 pairs for eligibility during 2 years. Fewer pairs than anticipated met the prematurity eligibility requirement, and when the project funding expired, we ended enrollment. As a result, stratification by gestational age was not pursued.

We examined differences in feeding behavior between mothers with and without peer counselors using logistic regression models with 3 separate dichotomous (yes or no) feeding outcome variables (any breast milk, mostly breast milk, and all breast milk). After determining that the 2 groups were similar on all measured sociodemographic variables using $\chi^2$ tests, data obtained at the 12-week follow-up observation point were analyzed. Because race is a factor in breastfeeding duration among term infants (39% of white US infants are breastfeeding at 6 months compared with 24% of African American infants), and because of the high incidence of premature births among African American women, we performed a subgroup analysis on African American subjects.

We used Stata software version 8 (StataCorp, College Station, Tex) for all hypothesis tests, with a significance level of $\alpha = .05$.

RESULTS

Overall, 577 mother-infant pairs were assessed for eligibility and 469 were excluded: 452 for not meeting inclusion criteria, 14 for refusing to participate, and 3 for other reasons (Figure). A total of 108 mother-infant pairs were enrolled and randomized; 53 were assigned to the intervention and 55 to the control groups. Of the 53 enrolled in the intervention group, 5 did not receive the allocated intervention; 3 subjects changed their mind after enrollment but before receiving the intervention, 1 mother had positive postpartum drug test results and was therefore not eligible to breastfeed, and 1 infant died, leaving a total of 48 women in the intervention group. Of the 55 women randomized to the control group, 2 were subsequently withdrawn from the study; both were found to have positive postpartum drug test results and were thus ineligible to breastfeed, leaving 53 in the control group. (Many women were not enrolled because of illicit drug use; those in whom drug use became apparent after enrollment had misled health care professionals regarding their drug use, which only became apparent through clinical symptoms afterward.) The 2 groups were similar on all measured characteristics, including maternal ethnicity, educational status, age, parity, breastfeeding history, and infant birth weight (intervention group, 1914.4 g; control group, 1840 g); gestational age; sex; and length of hospital stay (intervention group, mean 27.1 days [range, 2-81 days]; control group, mean 25.2 days [range, 1-104 days]) (Table 1). Most women (70 of 101; 69% of the total study population) were African American.

Field records from the peer counselors were available for 43 of the 48 pairs in the intervention group. At the initial contact, peer counselors discussed pumping techniques in 100% of documented cases; helped the mother pump in 72.1% of cases; accompanied the mother to or greater than 50% of their feeds as breast milk; breast milk may have been received by gavage, bottle, or at the breast.

### Table 1. Baseline Characteristics of the Study Sample

<table>
<thead>
<tr>
<th>Infant characteristics</th>
<th>Intervention Group (n = 48)</th>
<th>Control Group (n = 53)</th>
<th>P Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Birth weight, g, mean (range)</td>
<td>1914.4 (724-3320)</td>
<td>1840 (882-3005)</td>
<td>.51</td>
</tr>
<tr>
<td>Gestational age, wk</td>
<td>Mean (range)</td>
<td>32.6 (26.3-37)</td>
<td>32.7 (26.4-36.3)</td>
</tr>
<tr>
<td>≤26 to &lt;32, No.</td>
<td>14</td>
<td>16</td>
<td>.75</td>
</tr>
<tr>
<td>≥32 to ≤37, No.</td>
<td>34</td>
<td>37</td>
<td></td>
</tr>
<tr>
<td>APGAR score</td>
<td>1 min, mean (range)</td>
<td>6.6 (0-9)</td>
<td>6.2 (0-9)</td>
</tr>
<tr>
<td></td>
<td>5 min, mean (range)</td>
<td>8.0 (3-9)</td>
<td>7.8 (1-9)</td>
</tr>
<tr>
<td></td>
<td>Male, No. (%)</td>
<td>25 (52)</td>
<td>30 (57)</td>
</tr>
<tr>
<td></td>
<td>Female, No. (%)</td>
<td>23 (48)</td>
<td>23 (43)</td>
</tr>
</tbody>
</table>

**Abbreviations:** APGAR, appearance (color), pulse (heart rate), grimace (reflex irritability), activity (muscle tone), and respiration (score reflecting condition of newborn); HMO, health maintenance organization.

...
managers. At the same time, the lactation consultant’s and to a lactation consultant working on the unit and to project counselors. Peer counselors had immediate daily access ords, and close supervision of, and support for, the peer counseling. These elements included face-to-face con- most successful in previously published peer counsel- ing studies. These elements included face-to-face con- to a careful design incorporating elements shown to be the effectiveness of this particular program was owing

had odds of providing any breast milk 249% greater than those for African American mothers without peer coun-
selors (odds ratio, 3.59 [95% confidence interval, 1.16-
11.03]; P = .03) (Table 3).

In this randomized controlled trial, the use of peer coun-
selors for breastfeeding mothers of premature infants in-
creased breastfeeding duration, measured by the infants receiving any breast milk at 12 weeks. Because the ben-
efits of breastfeeding are, in most studies, shown to be dose dependent, increasing the amount of breast milk con-
sumed by premature infants, either through extending duration or increasing the number of breast vs formula feeds, is an important contribution to their short- and long-term health.

These results represent an important addition to the literature already describing the effectiveness of peer counsel-
sing programs at increasing breastfeeding rates. Although operating a peer counseling program can be challenging, it is manageable in a hospital setting. Not all peer counseling programs have equal success, and comparisons are difficult because peer counseling programs vary in their content and implementation. We believe that the effectiveness of this particular program was owing to a careful design incorporating elements shown to be most successful in previously published peer counseling studies. These elements included face-to-face con-
tact, a checklist of goals for the peer counselors at their first meeting with mothers, carefully maintained field records, and close supervision of, and support for, the peer counselors. Peer counselors had immediate daily access to a lactation consultant working on the unit and to project managers. At the same time, the lactation consultant’s and the project managers’ presence helped to ensure peer counselor consistency, accuracy of knowledge, and reliability. In light of current investment at the national level by the US Department of Agriculture in breastfeeding peer counseling as part of the Women, Infants, and Children program, we strongly suggest that peer counseling programs be established with clear guidelines and an evaluation component.

This study has a number of limitations. Although we focused on premature infants, the majority of infants in this study were between 32 and 37 weeks’ gestational age and were otherwise healthy. Infants with congenital anomalies or with life-threatening complications in the immediate postpartum period were excluded from the study. The study was conducted in a Baby-Friendly hos-
pital. Baseline breastfeeding rates among both intervention and control groups were very high compared with state and national rates in this population. How much the environment of a Baby-Friendly hospital influenced findings cannot be determined; however, both interven-
tion and control groups were exposed to the Baby-
Friendly environment. Because breastfeeding is a desir-
able outcome, when feeding data were collected from the mother rather than the medical record of hospitalized in-
fants, there may have been a tendency to overreport breast-
feeding. It is also possible that nondifferential reporting inaccuracy might be expected to bias the effect of the inter-
vention, and the direction of this bias would be un-
clear. The main limitation of the study is that 16 of 108 women were lost to follow-up at 12 weeks, and loss to follow-up was higher in the intervention arm than in the control group (10 and 6, respectively), although, in a cross-tabulation of number of mothers in each study arm by follow-up period, there was no statistically signifi-
cant difference in loss to follow-up between the 2 groups (P = .98). Given the desirability of breastfeeding, it is pos-
sible that women in the intervention group felt more guilty about discontinuing breastfeeding than control women because of relationships developed with the peer coun-
selor, and thus, they did not answer telephone calls when the research assistant called to ascertain feeding status. However, the peer counselor contact ended at week 6 and the majority of losses to follow-up occurred later than 6 weeks, and attempts to elaborate on reasons for loss to follow-up would be conjectural.

Many groups, including the American Academy of Pe-
diatrics,28 the American College of Obstetricians and Gynecologists,29 the American Academy of Family Practice,30 the US Department of Health and Human Services,31 and the World Health Organization,32 recognize the im-
portance of prolonged breastfeeding. This is likely even more important in premature infants than in term in-
fants because of the additional health risks they face. We found that NICU-based peer counselors increased breast-
feeding duration among premature infants in an inner-
city, Baby-Friendly hospital. Peer counseling programs can help to increase breastfeeding in this vulnerable popu-
lation.

Table 2. Odds of Mothers Giving Different Amounts of Breast Milk at 12 Weeks’ Follow-up

<table>
<thead>
<tr>
<th>Breast Milk Category</th>
<th>Control Group (n = 47)</th>
<th>Intervention Group, OR (95% CI) (n = 38)</th>
<th>P Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Any</td>
<td>1.00</td>
<td>2.61 (1.11-7.14)</td>
<td>.03</td>
</tr>
<tr>
<td>Mostly</td>
<td>1.00</td>
<td>2.49 (0.97-6.40)</td>
<td>.006</td>
</tr>
<tr>
<td>All</td>
<td>1.00</td>
<td>1.30 (0.30-5.65)</td>
<td>.72</td>
</tr>
</tbody>
</table>

Table 3. Odds of African American Mothers Giving Different Amounts of Breast Milk at Each Observation Point at 12 Weeks’ Follow-up

<table>
<thead>
<tr>
<th>Breast Milk Category</th>
<th>Control Group (n = 29)</th>
<th>Intervention Group, OR (95% CI) (n = 30)</th>
<th>P Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Any</td>
<td>1.00</td>
<td>3.59 (1.16-11.03)</td>
<td>.03</td>
</tr>
<tr>
<td>Mostly</td>
<td>1.00</td>
<td>1.94 (0.64-5.86)</td>
<td>.24</td>
</tr>
<tr>
<td>All</td>
<td>1.00</td>
<td>0.23 (0.02-2.26)</td>
<td>.21</td>
</tr>
</tbody>
</table>

Abbreviations: CI, confidence interval; OR, odds ratio.
91 E Concord St, Boston Medical Center, Boston, MA 02118 (anne.merewood@bmc.org).

Author Contributions: Study concept and design: Merewood, Philipp, and Bauchner. Acquisition of data: Merewood, Chamberlain, and Malone. Analysis and interpretation of data: Cook. Drafting of the manuscript: Merewood, Chamberlain, and Bauchner. Critical revision of the manuscript for important intellectual content: Merewood, Cook, and Philipp. Statistical analysis: Cook. Obtained funding: Merewood and Philipp. Study supervision: Merewood and Bauchner.

Funding/Support: This study was supported by grant R40 MC 00252-03 from the Bureau of Maternal Child Health. Dr. Bauchner was supported in part by grant K24HD 042489 from the National Institute of Child Health and Human Development.

Acknowledgment: We would like to thank our peer counselors, particularly Luz Lopez, Dawn Kennedy, and Karen Gunter, for their work on this project.

REFERENCES


Correction

Error in Byline. In the letter “Dismissing Families: A Slippery Slope” published in the April issue of the ARCHIVES (2006;160:452), a coauthor was mistakenly listed in the byline. The sole author of the letter was Kathi J. Kemper, MD, MPH.


©2006 American Medical Association. All rights reserved.