Published in final edited form as:

J Reprod Infant Psychol. 2013 July 1; 31(3): 299–308. doi:10.1080/02646838.2013.784898.

A Month of Breastfeeding Associated with Greater Adherence to Pediatric Nutrition Guidelines

Ali Khalessi¹ and Stephanie M. Reich, PhD²

¹Biomedical Engineering, University of California, Irvine

²School of Education, University of California, Irvine

Abstract

Background—Research has shown that both breastfeeding and delaying the introduction of solids or liquids other than breast milk protect against obesity later in early childhood.

Objectives—To compare whether breastfeeding mothers adhere to more of the American Academy of Pediatrics (AAP) feeding recommendations for infants.

Method—This longitudinal study compared the breastfeeding knowledge, intentions, and practices as well as complementary feeding choices of 163 ethnically diverse, primiparous women over the first 18 months of motherhood.

Results—Although almost all women knew about the health benefits of (98%) breastfeeding and intended to (98%) breastfeed, only 85% initiated and 51% continued beyond 4 weeks. Breastfeeding for longer durations was associated with better feeding choices. Mothers who breastfed for more weeks were more likely to adhere to AAP guidelines on liquids other than breast milk at 4, 6, and 12 months, and introduce solids, liquids other than breast milk, and other complimentary foods at later ages. Furthermore, mothers who breastfed for less than 1 month were more likely to introduce solids by 2 months in comparison to mothers who breastfed for 1 month or more (OR=3.22).

Conclusion—Knowledge and intentions do not explain breastfeeding initiation or continuation. However, when women committed to more weeks of breastfeeding, especially more than 4 weeks, they made better nutrition choices for their infants.

Keywords

Breastfeeding; Complimentary Feeding; Nutrition; Food Introduction; AAP Nutrition Guidelines; Infant nutrition; Breast milk

Background

Numerous studies have found breastfeeding to be protective against infant and child obesity (Harder, Bergmann, Kallischnigg, & Plagemann, 2005; Huh, Rifas-Shiman, Taveras, Oken, & Gillman, 2011). Research investigating this connection has explored such things as the passive and long-lasting active immunity provided by breast milk (Hanson, 1998, 2004) as well as the molecular composition of breast milk and beneficial biofactors (Hamosh, 2001). Knowledge of such benefits has been shown to help form positive attitudes towards

---

Correspondence: Stephanie M. Reich, PhD School of Education, University of California, Irvine 3200 Education Irvine, CA 92697-5500, phone: 949-824-5970, fax: 949-824- 2965, smreich@uci.edu.

Neither author has any financial or other type of conflict of interest in this project

breastfeeding and predict higher rates of initiation among low-income, first time mothers (Persad, 2008; Shaker, 2004). Although knowledge of the benefits of breastfeeding is important, research suggests that it alone is not sufficient to ensure breastfeeding initiation and continuation (Chezem, Friesen, & Boettcher, 2006; Kronborg & Væth, 2004).

Another possible protective benefit of breastfeeding against later obesity might be derived from mothers' commitment to breastfeeding and the subsequent nutritional choices they make when introducing complementary fluids and solids to infants. Although retrospective studies suggest a relationship between early eating habits and those formed during childhood, few studies have explored how breastfeeding is related to food introduction. In general, little is known about the formation of early feeding practices, although retrospective studies suggest a relationship between early eating habits and those formed during childhood (Skinner, Carruth, Bounds, Ziegler, & Reidy, 2002). Thus, questions remain as to how feeding habits are established from first consumption of fluid (i.e. breast milk, formula) through the introduction of solids - particularly for low-income, non-white children who are most at risk of developing obesity (Kumanyika, 2006).

This study explores new mothers' attitudes, beliefs, and intentions to breastfeed, actual breastfeeding practices, and the association between the duration of breastfeeding and adherence to pediatric nutrition recommendations for the first year (American Academy of Pediatrics, 2009) to explore possible benefits of breastfeeding beyond the nutritional value of the milk itself.

Method

Study Population

To investigate the relationship between breastfeeding and early feeding habits, primiparous mothers from the NICHD-funded Baby Books Project, a study of the effectiveness of embedding educational information into baby books as a way of promoting maternal and child health, were recruited for the study. Of the 198 mothers who completed baseline data collection (prenatal), 167 completed data collection at the next interview (postnatal) and 163 completed the breastfeeding survey. Reasons for attrition included fetal demise (4), infant death (1), moving out of the area (2), inability to contact (11), and no longer being interested (13). Women in their 3rd trimester of pregnancy were approached by a researcher in the waiting room of obstetric resident continuity clinics in the South, who explained the study and scheduled a baseline interview for those who were interested (see Reich, Bickman, Saville, & Alvarez, 2010; Reich, Penner, & Duncan, 2011 for details). Women were low-income and ethnically diverse. Participation was voluntary and women were paid up to \$350 for completing all waves of data collection. See table 1 for participant details. INSERT TABLE 1

Data Collection

Participants were interviewed in their homes by trained researchers (blind to experimental condition) during pregnancy and when their infant was 2, 4, 6, 9, 12, and 18 months of age. Interviews typically lasted 45 to 70 minutes and researchers followed a structured interview protocol and script. Thus, all women were asked the same questions, in the same order. With the exception of interviewer illness, the same interviewer was present for each visit.

During pregnancy, women were asked about their intentions to breastfeed, knowledge of the health benefits of breast milk and formula (e.g., antibodies, nutrition), and the importance of breastfeeding. At the first visit following the birth of the child (2 months postpartum), each mother was asked about her breastfeeding practices (e.g., initiation, duration). For those that

reported still breastfeeding, questions about breastfeeding were repeated at every wave of data collection until participants reported no longer breastfeeding.

At every postnatal visit, women were interviewed about their infant's eating habits over the past week. Questions focused on the introduction of certain foods as well as the total amount of such foods consumed during the week. Mothers were asked to estimate serving size and frequency (per day and per week) for various foods in any metric familiar to them (e.g., ½ a jar, one spoonful, breast milk bag), which were then used to calculate the total ounces per week of the following: breast milk, formula, cow milk, juice, soft drinks, baby food (fruits, vegetables, meat), baby cereal, finger foods (e.g., cheerios, crackers), foods associated with choking (e.g., whole grapes, whole nuts, hotdogs, popcorn), meat, honey, and fresh fruits and vegetables. All study materials and procedures were approved by two university Institutional Review Boards.

Analytic Plan

From the pool of 167 women, 163 mothers completed the breastfeeding practices interview, which was used to create two key predictor variables; 1) the number of weeks each mother breastfed and 2) three breastfeeding categories; mothers that did not ever breastfeed, mothers that breastfed for less than one month, and mothers that breastfed for one month or more. The second group, less than one month, was created because some (n=25) women initiated breastfeeding but only for a few days or weeks. To assess any differences between the nutritional practices based on grouping or duration of breastfeeding, data about infant nutrition collected at each wave were used to test differences in food introduction and serving sizes in reference to the American Academy of Pediatrics' (AAP) recommendations (American Academy of Pediatrics, 2009).

Logistic regressions were used to identify predictors of breastfeeding as well as to assess if specific liquids and foods had been introduced by each wave (2, 4, 6, 9, 12, and 18 months). Dichotomized dependent variables included juice, solid foods (e.g., baby food, cereal) and fresh fruits and vegetables throughout the infants' first year. To control for participant differences, maternal age at birth, income, education, race, receipt of Women Infants and Children (WIC) and food stamp benefits were included as covariates in the model. No difference in breastfeeding or nutrition practices existed between women who received educational books or not, however a study variable was included as an additional control.

Using a general linear model, regressions were run with the same covariates to determine the percentage of adherence to AAP recommended feeding strategies at each wave over the first year (O. C. American Academy of Pediatrics). These included whether the mother refrained from giving inappropriate solids and liquids at each age and whether she gave the appropriate amount of fresh fruits and vegetables upon reaching the recommended age for introduction (see Table 2). Together, the key dependent variable was percentage of AAP recommended feeding behaviors adhered to at 2, 4, 6, 9, and 12 months. Additionally, breastfeeding duration was used to predict the age at which a liquid (e.g., juice, soda) or solid (e.g., cereal, finger foods) was first introduced to the child.

Results

During pregnancy almost all women believed that breastfeeding was more nutritious than formula (98%), and that breastfeeding was more effective than formula in preventing their baby from getting sick (94%). Overall, 97% of mothers reported that breastfeeding was somewhat to very important, and 98.5% stated that it was somewhat to very important for them that their baby be breastfed.

Despite this knowledge, the initial postnatal interview found 138 (85%) of the 163 mothers had ever breastfed, while 83 women (51%) breastfed their infant for at least one month and only 29 mothers (17%) breastfed for 6 months or longer. On average, mothers breastfed for only 11.4 weeks (SD=16.3). In exploring if any demographic characteristics predicted breastfeeding, we found that mothers with higher educational attainment breastfeed for more weeks ($\beta = 0.405$, $p < 0.01$) and that African-American mothers breastfeed for fewer weeks than Caucasian mothers ($\beta = -0.293$, $p < 0.01$). Table 3 provides details about reasons women reported for discontinuing breastfeeding.

Does Breastfeeding Predict Healthier Feeding Practices?

In general, women who breastfed for more weeks were more likely to adhere to AAP guidelines on sugary drinks such as juice or sodas for the first year, either by not introducing such drinks or by feeding appropriate amounts once introduction was allowed, and followed a higher percentage of AAP nutrition guidelines at 4 months (see Table 4). These findings amount to a 3–8% increase in adherence for each additional week of breastfeeding. Additionally, women who breastfed longer tended to delay complementary feeding in general (sugary drinks ($\beta = 0.342$, $p < 0.01$) and solids ($\beta = 0.244$, $p < 0.001$)).

Comparing mothers across the three breastfeeding duration groups revealed that mothers who breastfed for 1 month or more were more likely to follow a higher percentage of AAP feeding guidelines at 6 months compared to mothers who did not breastfeed at all ($\beta = 0.241$, $p < 0.05$), and were more likely to refrain from feeding solids at 2 months compared to mothers who breastfed only a little (i.e., less than a month) (OR=3.22, $p < 0.05$). Additionally, mothers who did not breastfeed at all were less likely to feed appropriate amounts of fruits and vegetables compared to mothers who breastfed a little (OR=0.33, $p < 0.05$), who in turn were less likely to feed appropriate amounts of fruits and vegetables when compared to mothers who breastfed for 1 month or more (OR=0.23, $p < 0.05$) (see Table 5).

In considering the impact of participant characteristics, African-American mothers were less likely to follow AAP recommendations by not refraining from feeding solids at 2 month (OR=0.37, $p < 0.05$) and juice at 4 months (OR=0.40, $p < 0.05$), not giving the appropriate amount of juice at 6 (OR=-0.18, $p < 0.05$), 9 (OR=0.36, $p < 0.05$), 12 (OR=0.16, $p < 0.01$) and 18 months (OR=0.27, $p < 0.05$) and feeding fewer fruits and vegetables at 9 (OR=0.25, $p < 0.05$) and 12 months (OR=0.30, $p < 0.05$).

Discussion

Although new mothers were knowledgeable about the benefits of breastfeeding, only half of participants breastfed for one month or more and even fewer breastfed for the AAP recommended duration (American Academy of Pediatrics, 2009), showing that prenatal education alone is not enough to promote and sustain breastfeeding among low-income, ethnically diverse first-time mothers. This finding, consistent with previous research across other ethnicities and income groups (Bonuck, Trombley, Freeman, & McKee, 2005; Currò, Lanni, Scipione, Grimaldi, & Mastroiacovo, 1997), suggests that intervention beyond education is required to increase the frequency of breastfeeding among US mothers. Our finding that African-American mothers were less likely, and mothers with higher education were more likely, to breastfeed for at least one month is also consistent with previous research (Li, Darling, Maurice, Barker, & Grummer-Strawn; Mitra, Khoury, Hinton, & Carothers, 2004).

In looking at the overall differences in feeding behaviors based on the duration of breastfeeding, mothers who breastfed for more weeks were consistently more likely to

adhere to AAP feeding guidelines on sugary drinks. Previous literature has found juice to play a significant role in early weight gain as well as the formation of poor feeding habits later in life (Skinner, et al., 2002), particularly among low-income children (Dennison, Rockwell, & Baker, 1997; Faith, Dennison, Edmunds, & Stratton, 2006; Ludwig, Peterson, & Gortmaker, 2001). Given these findings, promoting increased duration of breastfeeding might be one way to reduce infant consumption of juice.

Similarly, the early introduction of solids has been linked to increased weight gain during early childhood (Baker, Michaelsen, Rasmussen, & Sørensen, 2004), and mothers who breastfed for at least one month tended to refrain from the early introduction of solid foods (e.g., baby food, cereal) when compared to those who breastfed for less than one month. Additionally, mothers who breastfed for more weeks tended to introduce complimentary solids at later ages. While recent work has shown that breastfeeding can reduce the risk of obesity when complimentary foods are introduced early (Huh, et al., 2011), these data suggest that breastfeeding itself is associated with preventing early complementary feeding, further reducing the risk of obesity.

Furthermore, between the ages of 7 to 12 months, fruits and vegetables are among an infant's primary source of fiber, assisting not only in proper digestion but also reducing the protein and caloric density of food. Studies have found an inverse relationship between the amount of fiber intake and obesity among children, and so correct timing and age appropriate amounts of fruits and vegetables may be an additional way to promote healthier feeding habits and thus protect against childhood obesity (Pereira & Ludwig, 2001).

Additionally, African-American mothers were less likely to adhere to AAP guidelines on when to introduce solids, servings of fruits and vegetables from 9 to 12 months, and sugary drinks from 4 to 18 months. These findings are meaningful since within low-income communities, African-American families are the most likely to have overweight or obese infants (Ogden et al., 2006), and these early differences may result in magnified health disparities over the life course (Halfon & Hochstein, 2002).

Given that research has shown that the introduction of certain foods (e.g., vegetables, fruits, juice, soft drinks) have significant effects on early childhood eating habits and even weight (Cooke et al., 2004; Savage, Fisher, & Birch, 2007; Skinner, et al., 2002), identifying behaviors associated with these choices is important. The possibility that the commitment to breastfeeding is associated with better feeding habits during infancy is particularly interesting.

Limitations and Future Directions

Our study is not without limitations. First, since only half of the sample breastfed for at least one month and 17% nursed past the recommended 6 months, we were unable to assess whether longer breastfeeding duration was associated with even more positive feeding habits. Also, feeding practices later in toddlerhood were not recorded. Furthermore, the sample size was limited, reducing statistical power to identify smaller effects. This study involved only low-income, ethnically diverse, primiparous women and results may not generalize to other types of mothers (multiparous, middle class, or other ethnicities). Furthermore, feeding practices were measured for the seven days preceding the home visit, rather than the exact age when foods were introduced. For instance, the data can confirm that a baby was fed cereal by 2 months but not whether the initial introduction happened much earlier. Finally, feeding practices were self-reported and thus are subject to errors in memory and socially desirability effects.

Perhaps more importantly, the relationship between the nature of mothers who chose to and succeeded in breastfeeding and their subsequent feeding habits was not entirely clear. For instance, women who are committed to breastfeeding for at least a month may also be more committed to making healthier feeding choices. Conversely, women who commit to a month or more of breastfeeding may then feel more obliged to continue to make healthier feeding choices. Future research should explore whether the commitment to breastfeed leads to healthier feeding habits or whether there is some characteristic inherent in mothers whom breastfeed that predisposes them to make healthier feeding choices. Future studies should also examine differences in attitudes towards complementary feeding before birth, nutrition advice received from health care providers, and potential contributors to choices for non-recommended foods (e.g., juice, sodas).

Conclusions

These findings suggest that there is a clear association between breastfeeding for at least 4 weeks and better nutritional choices over the infants' first year, specifically delaying the introduction of foods, especially those associated with childhood obesity (Cooke, et al., 2004; Savage, et al., 2007; Skinner, et al., 2002). Thus, there seems to be additional health benefits to breastfeeding beyond just the nutritional value of breast milk.

Acknowledgments

Funding/Support: Funding for this study was provided by the National Institute for Child Health and Human Development (RO1HD047749-01A1) and the UCI Undergraduate Research Opportunity Program

References

- American Academy of Pediatrics. Pediatric nutrition handbook. 6. Elk Grove Village: American Academy of Pediatrics; 2009.
- American Academy of Pediatrics, O. C. An Ounce of Prevention: Shaping Habits that Shape Obesity. 2010. from <http://www.ohioaap.org/pediatrician-education/ohio-aap-educational-materials/ounce-of-prevention>
- Baker J, Michaelsen K, Rasmussen K, Sørensen T. Maternal prepregnant body mass index, duration of breastfeeding, and timing of complementary food introduction are associated with infant weight gain. *The American Journal of Clinical Nutrition*. 2004; 80(6):1579–1588. [PubMed: 15585772]
- Bonuck KA, Trombley M, Freeman K, McKee D. Randomized, controlled trial of a prenatal and postnatal lactation consultant intervention on duration and intensity of breastfeeding up to 12 months. *Pediatrics*. 2005; 116(6):1413–1426.10.1542/peds.2005-0435 [PubMed: 16322166]
- Chezem J, Friesen C, Boettcher J. Breastfeeding knowledge, breastfeeding confidence, and infant feeding plans: Effects on actual feeding practices. *JOGNN*. 2006; 32(1):40–47.10.1177/0884217502239799 [PubMed: 12570180]
- Cooke L, Wardle J, Gibson E, Sapochnik M, Sheiham A, Lawson M. Demographic, familial and trait predictors of fruit and vegetable consumption by pre-school children. *Public Health Nutrition*. 2004; 7(2):295–302.10.1079/PHN2003527 [PubMed: 15003137]
- Curro V, Lanni R, Scipione F, Grimaldi V, Mastroiacovo P. Randomized controlled trial assessing the effectiveness of a booklet on the duration of breast feeding. *Archives of Disease in Childhood*. 1997; 76(6):500–504.10.1136/adc.76.6.500 [PubMed: 9245846]
- Dennison BA, Rockwell H, Baker S. Excess fruit juice consumption by preschool-aged children is associated with short stature and obesity. *Pediatrics*. 1997; 99(1):15–22. [PubMed: 8989331]
- Faith MS, Dennison B, Edmunds L, Stratton H. Fruit juice intake predicts increased adiposity gain in children from low-income families: Weight status-by-environment interaction. *Pediatrics*. 2006; 118(5):2066–2075.10.1542/peds.2006-1117 [PubMed: 17079580]

- Halfon N, Hochstein M. Life course health development: An integrated framework for developing health, policy and research. *The Milbank Quarterly*. 2002; 80(3):433–479.10.1111/1468-0009.00019 [PubMed: 12233246]
- Hamosh M. Bioactive factors in human milk. *Pediatric Clinics of North America*. 2001; 48(1):69–86.10.1016/S0031-3955(05)70286-8 [PubMed: 11236734]
- Hanson L. Breastfeeding provides passive and likely long-lasting active immunity. *Annals of Allergy, Asthma, & Immunology*. 1998; 81(6):523.
- Hanson L. The transfer of immunity from mother to child. *Annals of the New York Academy of Sciences*. 2004; 987(1):199.10.1111/j.1749-6632.2003.tb06049.x [PubMed: 12727640]
- Harder T, Bergmann R, Kallischnigg G, Plagemann A. Duration of breastfeeding and risk of overweight: A meta-analysis. *American Journal of Epidemiology*. 2005; 162(5):397–403.10.1093/aje/kwi222 [PubMed: 16076830]
- Huh S, Rifas-Shiman S, Taveras E, Oken E, Gillman M. Timing of solid food introduction and risk of obesity in preschool-aged children. *Pediatrics*. 2011; 127:e544–551.10.1542/peds.2010-0740 [PubMed: 21300681]
- Kronborg H, Væth M. The influence of psychosocial factors on the duration of breastfeeding. *Scandinavian Journal of Public Health*. 2004; 32:210–216.10.1080/14034940310019218 [PubMed: 15204182]
- Kumanyika S. Targeting interventions for ethnic minority and low-income populations. *The Future of Children*. 2006; 16(1):187–201. [PubMed: 16532664]
- Li R, Darling N, Maurice E, Barker L, Grummer-Strawn L. Breastfeeding rates in the United States by characteristics of the child, mother or family: The 2002 National Immunization Survey. *Pediatrics*. 2005; 115(1):e31–e37.10.1542/peds.2004-0481 [PubMed: 15579667]
- Ludwig DS, Peterson K, Gortmaker S. Relation between consumption of sugar-sweetened drinks and childhood obesity: A prospective, observational analysis. *Lancet*. 2001; 357(9255):505–508. [PubMed: 11229668]
- Mitra A, Khoury A, Hinton A, Carothers C. Predictors of breastfeeding intention among low-income women. *Maternal and Child Health Journal*. 2004; 8(2):65–70.10.1023/B:MACI.0000025728.54271.27 [PubMed: 15198173]
- Ogden C, Carroll M, Curtin L, McDowell M, Tabak C, Flegal K. Prevalence of overweight and obesity in the United States, 1999 – 2004. *JAMA*. 2006; 295(13):1549–1555.10.1001/jama.295.13.1549 [PubMed: 16595758]
- Pereira M, Ludwig D. Dietary fiber and body-weight regulation: Observations and mechanisms. *Pediatric Clinics of North America*. 2001; 48:969–980. [PubMed: 11494646]
- Persad MD. Maternal breastfeeding attitudes: association with breastfeeding intent and socio-demographics among urban primiparas. *Journal of Community health*. 2008; 33(2)10.1007/s10900-007-9068-2
- Reich SM, Bickman L, Saville B, Alvarez J. The effectiveness of baby books for providing pediatric anticipatory guidance to new mothers. *Pediatrics*. 2010; 125(5):997–1002.10.1542/peds.2009-2728 [PubMed: 20385630]
- Reich SM, Penner EM, Duncan GJ. Using baby books to increase new mothers' safety practices. *Academic Pediatrics*. 2011; 11(1):34–43.10.1016/j.acap.2010.12.006 [PubMed: 21272822]
- Savage JS, Fisher J, Birch L. Parental influence on eating behavior: Conception to adolescence. *The Journal of Law, Medicine & Ethics*. 2007; 35(1):22–34.10.1111/j.1748-720X.2007.00111.x
- Shaker I. Infant feeding attitudes of expectant parents: breastfeeding and formula feeding. *Journal of Advanced Nursing*. 2004; 45(3):260–268.10.1046/j.1365-2648.2003.02887.x [PubMed: 14720243]
- Skinner JD, Carruth B, Bounds W, Ziegler P, Reidy K. Do food-related experiences in the first 2 years of life predict dietary variety in school-aged children? *Journal of Nutrition Education and Behavior*. 2002; 34(6):310–315.10.1016/S1499-4046 [PubMed: 12556269]

Table 1

Participant Characteristics

	All mothers (n=163)	Did not breastfeed (n=55)	Breastfed <1 month (n=25)	Breastfed 1 month (n=83)
Race				
African-American	97 (60%)	45 (82%)	13 (52%)	39 (47%)
European-American	49 (30%)	7 (13%)	9 (36%)	33 (40%)
Other	17 (10%)	3 (5%)	3 (12%)	11 (13%)
Ethnicity				
Hispanic/Latina	13 (8%)	1 (2%)	2 (8%)	10 (12%)
Income				
Less than \$8,000	23 (14%)	9 (16%)	2 (8%)	12 (15%)
\$8000–\$12,000	20 (12%)	7 (13%)	3 (12%)	10 (12%)
\$12,001–\$16,000	11 (7%)	6 (11%)	0 (0%)	5 (6%)
\$16,001–\$21,000	11 (7%)	3 (5%)	2 (8%)	6 (7%)
\$21,001–\$26,000	11 (7%)	2 (4%)	3 (12%)	6 (7%)
\$26,001–\$30,000	3 (2%)	1 (2%)	0 (0%)	2 (2%)
\$30,001–\$40,000	8 (5%)	0 (0%)	3 (12%)	5 (6%)
\$40,001–\$50,000	4 (2%)	0 (0%)	0 (0%)	4 (5%)
Over \$50,000	11 (7%)	1 (2%)	2 (8%)	8 (10%)
Refused to answer	61 (37%)	26 (47%)	10 (40%)	25 (30%)
Education				
Some high school	38 (23%)	18 (33%)	8 (32%)	12 (14.5%)
Completed high school or GED	51 (31%)	20 (36%)	7 (28%)	24 (29%)
Some college, but no degree	49 (30%)	13 (24%)	7 (28%)	29 (35%)
Associate degree	11 (7%)	4 (7%)	1 (4%)	6 (7%)
Bachelor's degree or higher	14 (9%)	0 (0%)	2 (8%)	12 (14.5%)
Public Assistance				
Received Financial Assistance	98 (60%)	38 (69%)	13 (52%)	47 (57%)
Maternal age				
Maternal age	23.23 (SD=4.66)	21.85 (SD=3.31)	23.43 (SD=4.05)	24.09 (SD=5.37)

Table 2

Variables used to calculate AAP adherence

Wave	Refrain from...	Give...
2 months	Cow's milk Solids (incl. Cereal, Finger foods, Baby foods, fruits, vegetables) Choking hazards Sugary drinks (inc. juice)	---
4 months	Cow's Milk Finger foods Fruits Vegetables Choking hazards Sugary drinks (inc. juice)	---
6 months	Cow's Milk Choking hazards More than 6 oz of juice	2 or more oz of fruit 2 or more oz of vegetables 4 or more oz of fruits/veg
9 months	Cow's Milk Choking hazards More than 6 oz of juice	2 or more oz of fruit 2 or more oz of vegetables 4 or more oz of fruits/veg
12 months	Choking hazards More than 6 oz of juice	4 or more oz of fruit 4 or more oz of vegetables 8 or more oz of fruits/veg
18 months	Choking hazards More than 6 oz of juice	4 or more oz of fruit 4 or more oz of vegetables 8 or more oz of fruits/veg

Table 3**Reason for Discontinuing Breastfeeding**

Maternal reasons	Frequency
Sore nipples	21
Started taking medication	9
Too tired/fatigued	8
You got sick	4
Never really wanted to	3
Difficulties with breastfeeding	
Not enough milk	43
Baby not latching on properly	25
Baby not interested	24
Baby not gaining weight	5
Baby biting	5
Baby got sick	2
Time constraints	
Too hard with your schedule time	22
Went back to work	7
Lack of support	
Partner wanted you to stop	1
Family/friend wanted you to stop	1

Note: able to select more than one reason

Table 4

AAP Adherence by Weeks of Breastfeeding

	Refrained from sugary drinks	Appropriate amounts of sugary drinks	Refrained from giving fruits and vegetables	Refrained from giving choking hazards	Percentage of AAP guidelines followed
4 months	B = 0.074 **	No amt is approp.	B = 0.058 **	--	= 0.220 *
6 months	B = 0.060 **	B = 0.015	NA	B = 0.039	= 0.108
12 months	B = 0.00	B = 0.031 *	NA		= 0.147
18 months	B = 0.072 *	B = 0.000	NA	B = 0.034 *	= 0.066

* p<.05,

** p<.01

-- not enough variability

Table 5

AAP Adherence by Breastfeeding Group

	Introduced solids before 4 months	Appropriate amounts of fruits and vegetables at 9 months	Percent AAP guidelines at 6 months
None vs. Some	OR=0.42	OR=0.33 *	= 0.022
None vs. 1 month	OR=1.49	OR=0.28 *	= 0.241 *
Some vs. 1 month	OR=3.22 *	OR=0.23 *	= 0.059

*
p<.05,**
p<.01