



Research report

Who's feeding baby? Non-maternal involvement in feeding and its association with dietary intakes among infants and toddlers [☆]



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ABSTRACT

This study examined non-maternal involvement in feeding during the first 2 years of life and its association with breastfeeding duration, early introduction of complementary foods, and dietary intakes of selected foods and beverages. Data were from the Infant Care, Feeding and Risk of Obesity Study, a cohort of 217 low-income, African-American mother-infant dyads, followed from 3 to 18 months postpartum. Non-maternal caregivers (NMCs) were defined as persons involved in feeding an infant/toddler 50% or more of the total daily feedings. Use of any NMC and the type of NMC was tabulated for each study visit (3, 6, 9, 12, and 18 months). At each time point, more than half of all households reported a NMC. Fathers, grandmothers, and licensed childcare providers were the most common types of NMCs. In longitudinal models adjusted for confounding variables, NMC use was associated with a decreased likelihood of continued breastfeeding, and an increased likelihood of infants and toddlers consuming juice or whole fruit. Given the high prevalence of non-maternal involvement in feeding, interventions targeting multiple family members are warranted as they are likely to be more effective than those targeting the mother alone.

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Introduction

It is well documented that the prevalence of obesity among children and adolescents ages 2–19 years has more than tripled since 1980 (Ogden & Carroll, 2010). Among infants and toddlers, the increase has been smaller, yet still substantial—in 2010 compared to 1976–1980, 35% more children less than 2 years had a high weight-for-length z-score (WLZ) (WLZ \geq 95th percentile) (Ogden, Flegal, Carroll, & Johnson, 2002, 1728–1732; Ogden, Carroll, Kit, & Flegal, 2012, 483–490). In light of these trends, obesity prevention has begun earlier in life, with a growing number of interventions targeting risk factors during the first 2 years (Ciampa & et al., 2010, 1098–1104).

There are several dietary factors occurring during infancy which may have protective effects against later obesity. Several meta-analyses have reported similar findings that breastfeeding confers

a small, protective effect against obesity or overweight in childhood or adolescence (OR = 0.78, 95% CI: 0.72–0.84) (Arenz, Ruckerl, Koletzko, & von Kries, 2004, 1247–56; Horta, Bahl, Martines, & Victora, 2007). Duration of any breastfeeding may be particularly important in light of the findings by Harder, Bergmann, Kallischnigg, and Plagemann (2005) that each month of breastfeeding was associated with a four percent decrease in the risk of overweight (95% CI: 0.94, 0.98) (Harder et al., 2005, 397–403).

Several factors during the period of complementary feeding may also play a role in obesity prevention. Complementary feeding is the transitional process between exclusive milk feeding in which nutritive foods and beverages other than breast milk or infant formula are gradually introduced. Both the American Academy of Pediatrics and the World Health Organization recommend that complementary feeding begin at 6 months, after a period of exclusive breastfeeding (American Academy of Pediatrics Committee on Nutrition, 2009, 113–29; World Health Organization, 2003). However, many infants are fed complementary foods before this time (Grummer-Strawn, Scanlon, & Fein, 2008, S36–42; Wasser & et al., 2011, 229–237), some as early as 7–10 days postpartum (Bronner & et al., 1999, 457–61). In a recent systematic review, Moorcroft, Marshall, and McCormick (2011) reported no clear

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association between the age of introduction of complementary foods and obesity (Moorcroft et al., 2011, 3–26). However, studies were highly heterogeneous in terms of the exposure (early introduction to complementary foods) and the outcome (infant and child obesity) preventing the conduct of a meta-analysis and the ability to make robust conclusions.

A less studied but emerging area of interest is the quality of the diet during the span of complementary feeding. Several rounds of data from the Feeding Infants and Toddlers Study (FITS), a nationally representative sample of young children from birth to 4 years, have raised concern about the quality of the diet during this time of transition (Fox, Pac, Devaney, & Jankowski, 2004, s22–30; Skinner, Ziegler, Pac, & Devaney, 2004, s65–70; Skinner, Ziegler, & Ponza, 2004, s45–50; Siega-Riz et al., 2010, S38–51). The latest estimates from FITS continue to show that approximately 25% of infants and toddlers fail to consume any amount of whole fruit and 30% consume no whole vegetables on a given day. In contrast, nearly 20% of infants, ages 6–8.9 months, consume a dessert or sweet in a day, with the proportion increasing to 80.6% of toddlers consuming such foods at 21–23.9 months (Siega-Riz et al., 2010, S38–51). While the data is limited among infants and toddlers (Dattilo et al., 2012, 123023), these patterns are troubling since low intakes of whole fruits and vegetables and high intakes of energy-dense foods, such as desserts and sweets and sweetened beverages, have been associated with obesity among older children and adults (Flynn & et al., 2006, 7–66; Swinburn, Caterson, Seidell, & James, 2004, 123–146).

An important social change paralleling the rise in childhood obesity is the increase in mothers participating in the labor force (Anderson & Butcher, 2006, 19–45). Between 1970 and 2000, the rate of mothers in the labor force, either employed or looking for work, increased from 38% to 68% (Ehrle, Adams, & Tout, 2001). The increase was even more dramatic among mothers with children under the age of three, with 24% of such mothers in the labor force in 1970 and 57% in 2000 (Bianchi & Casper, 2000; Ehrle et al., 2001) (merged). These changes in maternal employment have had implications for childcare arrangements of young children while the mother is working. The use of non-parental care begins early in life, with approximately half of all 9-month-olds in a regular non-parental care arrangement: 26% in relative care, 15% in non-relative care, 9% in center-based care, and 1% in multiple arrangements (Mulligan, Brimhall, West, & Chapman, 2005).

Despite these social changes, relatively little is known about the types of non-maternal caregivers involved in feeding infants and toddlers and the impact they may have on early dietary habits. To fill this gap, the current study sought to answer several research questions. *To what extent do non-maternal caregivers share responsibility for feeding during the first two years of life? What types of non-maternal caregivers are used most frequently? Is NMC involvement associated with breastfeeding, timing of introduction of complementary foods, and dietary intakes among infants and toddlers?*

Methods

Study design and participants

Data are from the Infant Care, Feeding and Risk of Obesity Study (Infant Care), an observational cohort of 217 low-income mother–infant dyads from 3 to 18 months after delivery (Slining, Adair, Goldman, Borja, & Bentley, 2009, 51; Slining, Adair, Goldman, Borja, & Bentley, 2010, 20–25.e1; Thompson et al., 2009, 210–221; Wasser et al., 2011, 229–237). First-time African–American mothers aged 18–35 years were recruited through the North Carolina Supplemental Nutrition Program for Women Infants and Children (WIC) and assessed during in-home visits at infant ages 3, 6, 9,

12, and 18 months. Exclusion criteria for the Infant Care Study included delivery at <35 weeks gestation or presence of any of the following conditions: Down syndrome, epilepsy, cleft lip/palate, cerebral palsy, failure to thrive, mental retardation, severe food allergies, and any condition that might affect appetite, feeding, or growth. Data were collected from 2003 to 2007. The institutional review board of the University of North Carolina at Chapel Hill approved this study.

Measures

Non-maternal caregivers

Non-maternal caregivers (NMCs) were defined in Infant Care as those persons involved in feeding an infant or toddler 50% or more of his/her total feedings in a day. At each study visit, NMCs were identified through a series of three questions. First, the mother was asked how many times the index child was usually fed in a day. Fifty percent of this number was then calculated and mothers were asked if there was anyone, other than herself, responsible for feeding the index child that number of times (or more) in a day. If the mother affirmed use of a NMC, she was asked how the person was related to the index child. A total of six variables were created, one representing any use of a NMC and five representing the type of NMC. Categories for type of NMC included father, grandmother, other relative (e.g. aunt, cousin), non-relative (e.g. babysitter, nanny), and licensed child care provider, which included child care centers and family day care homes.

Infant and toddler dietary intake

During each home visit, mothers completed a questionnaire assessing current breastfeeding status (still breastfeeding “yes/no”) and a 24-h dietary recall (DR). To improve estimates of usual food intakes, the Infant Care Study collected two additional 24-h DRs, which were taken by telephone on random, nonconsecutive days within 2 weeks of the home visit (Thompson & Subar, 2008, 3–40; 1). Mothers were aware of the timing of home visits and telephone recalls and were instructed in advance to obtain information about any foods and beverages consumed by the infant while not in her care. The 24-h DR was administered and analyzed using the 2005 version of the Nutrition Data System for Research (NDSR) (Nutrition Coordinating Center, University of Minnesota, Minneapolis, MN). Study personnel were trained by an NDSR–certified staff member of the University of North Carolina at Chapel Hill Nutrition Epidemiology Core.

We used data from NDSR to create several variables of interest, including early introduction to complementary foods before 4 months of age and intake of a series of foods and beverages associated, either positively or negatively, with obesity among older children and adults (Flynn et al., 2006, 7–66; Swinburn et al., 2004, 123–146), namely low energy-dense foods (whole fruits and whole vegetables) and foods and beverages high in energy-density (100% juice, fried potatoes, desserts and sweets, sweetened beverages, and salty snacks). This latter set of variables was patterned after the major and minor food groups utilized in FITS (Fox et al., 2004, s22–30; Siega-Riz et al., 2010, S38–51). For each of these major and minor food groups, two variables were created: the proportion of infants and toddlers consuming any amount, and total daily servings consumed. Serving sizes rather than gram amounts were chosen as serving sizes are based on commonly used household metrics, such as cups, ounces, and tablespoons, and may be easier for researchers and public health workers to translate to parents and caregivers. When reporting servings of the major and minor food groups of interest, we adjusted the NDSR *adult-based* serving sizes to those appropriate for infants and toddlers, as has been done in previous studies (Hoerr, Horodynski, Lee, & Henry, 2006, 1766–1773; Cox, Skinner, Carruth, Moran, &

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