

Child Feeding Style and Dietary Outcomes in a Cohort of Latino Farmworker Families

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ABSTRACT

Background The high level of obesity in Latino children, especially in farmworker families, may be partly attributed to feeding styles of parents. Feeding styles used in Latino farmworker families have not been well characterized.

Objective This study sought to identify and describe feeding styles used by mothers in farmworker families with 2.5- to 3.5-year-old children, describe how styles change over time, and characterize the relationship of feeding styles to dietary outcomes and measures of overweight and obesity.

Design This was a longitudinal cohort study, with families participating for a 2-year period; surveys were administered to mothers with varying frequency depending on the instrument, and dietary measurements were collected at baseline and 12 and 24 months.

Participants/setting Eligible participants were self-identified Latino women with a co-resident child aged 2.5 to 3.5 years old and at least one household member engaged in farm work during the previous year. The sample included 248 farmworker families enrolled between 2011 and 2012 in the Niños Sanos study, a longitudinal investigation of Latino mothers and their young children in rural North Carolina. Eleven families provided incomplete dietary data, so the analysis included 237 families. Fifteen families were lost to follow-up and 12 withdrew during the course of the study.

Main outcome measures Feeding style was assessed using items from the Caregiver's Feeding Style Questionnaire, selected dietary components were assessed using the Revised Children's Diet Quality Index, and weight outcomes were determined using body mass index-for-age percentile. Performance on the Caregiver's Feeding Style Questionnaire items was used to assign mothers to one of four feeding style states.

Statistical analyses performed Exploratory factor analysis was conducted on baseline data to verify the replicability of the factor structure of the instrument Caregiver's Feeding Style Questionnaire. Hidden Markov Model analysis was used to delineate different subtypes of feeding style. Multivariable mixed-effects regression models were used to assess the impact of feeding style on selected dietary components, energy intake, and body mass index-for-age percentile.

Results Four distinct states emerged from the Hidden Markov Model: low parent-centered (PC)/moderate child-centered (CC) feeding style (28% at baseline), high PC/CC without physical control (24%), high PC/CC (26%), and moderate PC/CC (22%). The low PC/moderate CC state increased in prevalence over time. Compared to high PC/CC, the low PC/moderate CC state was associated with greater intake of added sugars ($P<0.01$), lower intake of whole grains and vegetables ($P<0.01$), and lower overall diet quality ($P<0.05$). Children in low PC/moderate CC also had higher mean body mass index percentiles (76.2 percentile vs 66.7 percentile in high PC/CC; $P<0.001$).

Conclusions High PC feeding along with high CC feeding is associated with improved diet quality and weight outcomes for children in the study.

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RECENT FINDINGS FROM THE 2011-2014 NATIONAL Health and Nutrition Examination Study indicate that 8.9% of all children ages 2 to 5 years were obese (≥ 95 th percentile body mass index [BMI]-for-age and sex).¹ Approximately twice as many Hispanic children in this age group (15.6%) met criteria for obesity. Some groups

of Latino children, such as those in farmworker families, may be even more vulnerable. A recent study examining 495 Latino children in a migrant farmworker community, ranging from 3 to 16 years of age, found that 27% were obese.² A study of 52 migrant farmworker children 6 to 11 years of age, nearly all of whom were Latino, found 41% were obese.³ The number

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of Latino farmworkers in the United States is substantial, and they are estimated to have more than 800,000 children.⁴ Given that agricultural work often serves as the portal through which Latino immigrants enter the United States, understanding potential determinants of obesity in this population is likely to benefit the broader Latino community.⁵

The high level of obesity found in Latino farmworker children appears multifactorial in nature. Cultural factors, such as beliefs and values about proper food and physical activity for children and preferred body shapes, as well as buffering children from hardship, may play a role.⁶⁻⁹ These children often reside in low-income, rural, immigrant households, a context that can limit access to nutritious food and hinder safe and appropriate forms of physical activity.¹⁰ Given that many farmworkers are undocumented and migrate, some parents may be unable to utilize government safety-net programs intended to ensure children's access to healthy foods and health care.^{3,11,12} Parents may receive little guidance about children's diet and fail to recognize children with excess weight as being at risk for health issues.¹³

An important influence on children's diet is feeding style, which describes how parents interact with their children in feeding situations.¹⁴ Like parenting style, feeding style is often described in terms of two underlying dimensions—demandingness and responsiveness. In this context, demandingness refers to the extent to which parents encourage eating, and responsiveness refers to the manner in which parents encourage eating.¹⁵ Dichotomizing demandingness and responsiveness as high and low gives rise to a fourfold classification system—authoritative (high demandingness, high responsiveness), authoritarian (high demandingness, low responsiveness), indulgent (low demandingness, high responsiveness), and uninvolved (low demandingness, low responsiveness).^{14,16} An authoritarian parent does little to consider the needs of the child and imposes strict rules regarding food, typically enforced by a system of rewards and punishments.¹⁴ An authoritative parent is sensitive to the child and negotiates appropriate food selection while setting firm limits. The indulgent parent is “nice” and acquiesces to the wishes of the child with few conditions. The uninvolved parent allows the child to do as he or she wishes with minimal engagement. Feeding style is distinct from feeding practices, which are specific behaviors used to influence children's eating, such as pressure to eat or restriction of certain foods.¹⁷ However, style can moderate the association between practices and outcomes such as weight for age.¹⁸

As the body of research on caregivers' feeding styles has increased, some trends have emerged in the literature. The authoritarian and indulgent feeding styles appear to be more common than authoritative and uninvolved feeding styles.^{14,15,18-21} Indulgent feeding styles have been associated with less ideal dietary outcomes among racial/ethnic minority children.^{14,15,17-20,22} There is less evidence about the benefits of an authoritative vs authoritarian feeding style,¹⁷ although one study did find an authoritative feeding style was associated with greater vegetable and dairy consumption.²³ Although low-income racial/ethnic minority children have been examined in terms of feeding style,^{16,18} Latino farmworker children may differ in important ways. Cultural values related to parenting in Latino families may produce different dimensions of feeding styles, particularly in recent

immigrants.²⁴ For example, Mexican culture values warmth and closeness of families, but also respect, which may be reflected in dimensions of indulgence and authority.^{25,26} Better understanding of the relationship between feeding style and obesity risk may help to explain this population's high rate of obesity.²⁷

This study is unique in several aspects: 1) the presence of longitudinal data for understanding the dynamic of feeding style as the child develops, 2) a data-driven approach to examine the heterogeneity of feeding styles in a population of children of Latino farmworker families, and 3) the use of extensive dietary and anthropometric outcomes collected at multiple time points. For 2), an extended version of latent class analysis, the Hidden Markov Model (HMM) was applied to the longitudinal data. The HMM was used for two reasons. First, in exploratory data analysis, it was found that feeding-style patterns could not be fully captured by the sum-score approach of traditional methods. For example, there existed a group of mothers that tended to physically struggle with the child to get the child to eat. This kind of nuanced information could not be made available using a sum-score approach. Second, previous work for forming feeding-style topology was based on cutoff scores. As a result, findings may be sensitive to cut points and not robust. The data-driven HMM approach is able to offer insightful information into feeding style. Insight into the benefits of one feeding style relative to the others could form the basis for parental interventions. Although many factors contribute to Latino children's high prevalence of obesity, feeding style may represent an important modifiable factor for mitigating this disparity.

The purpose of this study is to determine what feeding styles Latino farmworkers use with their young children (2.5 to 3.5 years old), the dynamic of these feeding styles over an extended period of time, and whether or not feeding style is related to a broad set of dietary and weight-related outcomes. The primary hypothesis of the current study is that children whose parents regulate feeding more closely will have better selected dietary components and lower risk of overweight and obesity.

METHODS

This analysis included 248 families enrolled in the Niños Sanos study, a longitudinal 2-year study designed to describe the dietary and physical activity patterns of young children of Latino farmworkers in North Carolina.^{6,10} Eligible participants were self-identified Latino women with a co-resident child aged 2.5 to 3.5 years and at least one member of the household engaging in farm work during the previous year. The study focused on 2.5- to 3.5-year-old children because this is an age when eating and feeding practices are established. Children with special health care needs limiting physical activity were excluded.

Sampling and Recruitment

A site-based sampling plan with a large contact base was developed to recruit participants. This approach was chosen due to the narrow age range of children and lack of sampling frame for Latino farmworker families in North Carolina. “Sites” are organizations or locations with which members of the target community are associated. Sites used in this study

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