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Child-feeding Practices among Chinese-American and Non-Hispanic White Caregivers

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Abstract

This study compared child-feeding and related practices with child weight status between Chinese-American and non-Hispanic white caregivers who attended three community health centers. Study participants were caregivers of 50 Chinese-American and 108 non-Hispanic white children ages 2 to 12 years who completed a short version of the Child Feeding Questionnaire in English or Chinese. The feeding behaviors assessed were concern, pressure, restriction, and monitoring. Child body mass index (BMI) z-scores were calculated from child weight and height measured in clinic by clinicians trained in anthropometrics. The sample was stratified into 2 to 5 and 6 to 12 years age groups to account for developmental differences. Internal consistency (Cronbach's alpha) was moderate to high and similar by ethnicity for all four behaviors for Chinese Americans and non-Hispanic whites. In models adjusted for confounding variables, Chinese-American caregivers had higher mean scores than non-Hispanic white caregivers for concern and restriction in all age groups and monitoring in 2 to 5 year-olds. No feeding practices were associated with child BMI in Chinese Americans; concern and restriction were associated with child BMI in non-Hispanic whites in 2 to 5 year-olds. These results suggest that differences in child-feeding practices exist between Chinese-American and non-Hispanic white caregivers.

Keywords

childhood obesity; Chinese Americans; child-feeding practices; ethnicity; parenting

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Introduction

Chinese Americans are one of the fastest growing ethnic populations in the United States, having increased by 43.3% between 2000 and 2010 (Census, 2010). The prevalence of overweight or obesity in Chinese-American children (ages 6–19) is 29.8%, and is 13.3% for obesity alone (Au, Kwong, Chou, Tso, & Wong, 2009). Although the prevalence of obesity in Chinese-American children is lower than that of non-Hispanic whites, non-Hispanic blacks, and certain other Asian groups (such as Pacific Islanders) Chinese-American adults (Wen et al., 2009) and children (Freedman et al., 2008; Navder et al., 2009) have a higher percentage of body fat than non-Hispanic whites for the same body mass index (BMI). Chinese-American adults also have a higher risk for type 2 diabetes, cardiovascular disease, hypertension and dyslipidemia at lower BMI levels than non-Hispanic white adults (Wen, et al., 2009; WHO, 2004) and, as in other populations, it is likely that childhood obesity tracks into adulthood. It is therefore important to prevent overweight and obesity in Chinese-American children and to identify culturally specific approaches to prevention in this burgeoning minority.

Child-feeding practices have been implicated in the development of childhood obesity (Faith, Scanlon, Birch, Francis, & Sherry, 2004). In particular, parental restriction of certain foods (typically high-fat, high-sugar foods) while forcing the consumption of others (typically vegetables) and using high-fat, high-sugar foods as a reward or withholding them as a punishment can result in the overconsumption of restricted foods and obesity in their children (Faith et al., 2004; Patrick, Nicklas, Hughes, & Morales, 2005). Ethnic differences in child-feeding practices have been reported between non-Hispanic black and non-Hispanic white (Spruijt-Metz, Lindquist, Birch, Fisher, & Goran, 2002) and Hispanic and non-Hispanic black parents (Hughes et al., 2006), suggesting that cultural values may influence child-feeding styles and practices.

Child-feeding practices relevant to obesity have, however, not been well studied among Chinese Americans. Compared to parents from other ethnic backgrounds in Western societies, Chinese parents have been characterized as using an authoritarian parenting style that is higher in control and supervision, but is perceived as an expression of caring and loving parenting in the Chinese culture (X. Y. Chen, Liu, & Li, 2000). According to child-feeding practice theories, the use of the authoritarian parenting style by Chinese-American parents would be expected to be associated with more controlling feeding practices (such as restriction and pressure to eat) and should be predictive of an increased risk for childhood obesity (Hubbs-Tait, Kennedy, Page, Topham, & Harrist, 2008; Hughes, Power, Fisher, Mueller, & Nicklas, 2005). In non-Hispanic whites, controlling feeding practices have been associated with increased BMI z-score and an increased risk for childhood obesity (BMI greater than the 95th percentile) (Birch, Fisher, & Davison, 2003; Faith, Berkowitz, et al., 2004). However, the association of controlling child-feeding practices in Chinese Americans with weight status has not been studied.

To gain a better understanding of attitudes, beliefs, and child-feeding practices in Chinese Americans and explore these practices in relation to obesity risk, we examined child-feeding practices of caregivers of 2- to 12-year-old Chinese-American children in comparison to those of non-Hispanic white caregivers using the Child Feeding Questionnaire (CFQ) (Birch et al., 2001). To our knowledge, the CFQ or other instruments to measure child-feeding practices have not been studied or validated among Mandarin-speaking Chinese Americans. Modified or reduced versions have been used among non-Hispanic black and Hispanic parents of pre-school children, but less information is available for Asian Americans (Boles et al., 2010; Faith, Scanlon, et al., 2004; Hughes, et al., 2006; Kasemsup & Reicks, 2006). The primary objectives were to compare child-feeding practices of urban Chinese-American

and urban non-Hispanic white caregivers, to compare child-feeding practices of urban Chinese-American caregivers with a broader non-Hispanic white caregiver population that includes urban and rural caregivers, and to explore the associations of child-feeding practices with child weight status. Given that there have been no studies using the CFQ in Chinese Americans we wanted to compare the CFQ to a broader non-Hispanic white population. However, recognizing that there may be differences between urban and rural populations, we also compared urban Chinese Americans with urban non-Hispanic whites. An additional objective was to determine the internal consistency of a short version of the CFQ in a Chinese-American sample.

METHODS

Study Design and Setting

This study was part of a larger, cross-sectional study that investigated risk factors for overweight in children ages 2 to 12 years at eight community health centers (CHCs) (Grier, Mensinger, Huang, Kumanyika, & Stettler, 2007; Kranz et al., 2009). A convenience sample of eight CHCs was chosen from 30 CHCs that participated in a previous study (Stettler, 2005) based on a desired distribution of urban and rural locations, interest in participation, and availability of time and resources for research at the CHC. These CHCs serve urban and rural populations in medically underserved areas and are located in the Health Resources and Services Administration Regional Divisions II and III (New Jersey, New York, Puerto Rico, Delaware, District of Columbia, Maryland, Pennsylvania, Virginia, and West Virginia). Three CHCs were not used for the present investigation because the study participants at those centers did not include non-Hispanic white or Chinese-American children.

The study was approved by the Institutional Review Boards of The Children's Hospital of Philadelphia, University of Pennsylvania, Pennsylvania State University, and the National Center for Health Statistics Research Ethics Review Board. Informed consents and child assents when age appropriate were obtained for all subjects.

Participants

Study participants were a sample of individuals that received services at one of the five participating CHCs and included children ages 2 to 12 years and their primary caregivers (defined as the main person responsible for attending to the needs of the child at home, usually a parent or grandparent). Caregivers identified their children’s race/ethnicity. The present analysis is limited to caregivers of children self-identified as non-Hispanic white or Chinese American (having Asian origin from either China or Taiwan). The sample was stratified into 2 to 5 and 6 to 12 years age groups to account for developmental differences in age. A convenience sample of 50 Chinese-American children from one urban CHC in the ethnically homogenous Chinatown neighborhood of New York, NY, 40 urban non-Hispanic white children who were recruited from two urban CHCs (38 from Brockport, NY and 2 from Bronx, NY), and 68 non-Hispanic white children from two rural CHCs (42 from Franklin, WV, and 26 from Denton, MD) were included in this analysis. Some CHCs where non-Hispanic whites were recruited also had a large number of Hispanic and non-Hispanic blacks participants as part of 50 participants recruited at each site and were not included in the present analysis.

Measures

Child Feeding Questionnaire—“The CFQ is a widely used tool to assess parental beliefs, attitudes, and practices regarding child-feeding and the likelihood of their child becoming obese, or ‘obesity proneness’ ” (Birch, et al., 2001). It is based on Costanzo’s

theory regarding parenting related to a child's risk for becoming obese that suggests that "more parental control is exerted over a child's eating by parents who perceive that a child is at risk for becoming obese, and that this control may impede the child's ability to respond appropriately to internal hunger and satiety cues" (Costanzo & Woody, 1985). The CFQ was administered to caregivers as part of a larger 195-item questionnaire that included the subjects' ethnic background, as reported by the primary caregiver. Confirmatory factor analysis of the CFQ has been validated in children ages 5 to 11 years in non-Hispanic white and Hispanic parents and ages 3 to 5 years in non-Hispanic black parents of children 3 to 5 years (Birch, et al., 2001; Boles, et al., 2010). The full version of the CFQ contains 31 items that assess parental perceptions, attitudes, beliefs, and practices regarding child-feeding relevant to the development of obesity proneness in children (Birch, et al., 2001). This study used the shorter 18-question version of the CFQ (Birch, et al., 2001). A short version was chosen because the rest of the questionnaire was already lengthy and would have overburdened families. As described by Birch et al: "The short CFQ measured four factors related to caregiver control attitudes and practices in child-feeding: 1) caregiver *concern* about child weight, 2) *monitoring* (the extent to which each parent keeps track of unhealthy foods, e.g., "How much do you keep track of the amount of high-fat foods your child eats?"), 3) *restriction* of the child's access to foods (parents' control of their child's eating by restriction of type and amount of food, use of foods as rewards, e.g., "If I did not guide or regulate my child's behavior she would eat too many junk foods"), and 4) *pressure* to eat (the extent to which parents attempt to increase their children's consumption of food in terms of type or amount, e.g., "If my child says 'I'm not hungry,' I try to get her to eat anyway"); restriction and pressure to eat" (Birch, et al., 2001). All 18 questions used a 5-point Likert scale, with each point on the scale represented by a word anchor. A translator accredited by the American Translators Association (Rosales Communications, Philadelphia, PA) with experienced native translators translated the study questionnaire into Chinese, evaluated it for accuracy, intelligibility, as well as reading level, and adapted it to the Chinese culture as necessary. The company did not recommend back translation for this study. As participants in this study were either Mandarin or English speaking, the translated questionnaire was administered to the caregivers in Mandarin or English by a native speaker. The Chinese version of this 18-item questionnaire is available from the corresponding author upon request. All questionnaire variables were collected at a single visit.

Other questionnaire variables used in this analysis were child age, child/caregiver sex, household income (assessed by the total combined income before taxes for all people living in the household and included salaries, wages, Social Security benefits, child support, alimony), caregiver education (based on the highest level of education attended by the caregiver from never/kindergarten to doctoral degree), and BMI calculated from the weight and height of the child's two biological parents as reported by the caregiver who answered the questionnaire.

Child Anthropometrics—Weight and height were obtained using standard procedures with a digital scale (HD351, Tanita Corporation of America, Inc., Arlington Heights, IL) and stadiometer (Shorr Productions, Olney, MD). Up to eight "study leaders," such as a dietitian, nurse, or health educator, were identified at each site to collect data. On-site training was provided by one of the investigators for research-quality anthropometric measurements, questionnaire administration, and protocol procedures. A video on weight and height assessment (CHOP, 2003) was presented, and measures by each study leader were observed on at least ten volunteers and repeated until consistency was achieved. Only study leaders who were trained and observed measuring anthropometrics were allowed to collect measurements for this study. BMI was calculated as weight (kg)/(height (m))^2, and Z scores for BMI (BMIZ) were computed (Kuczmarski et al., 2000). Both anthropometric and questionnaire data were collected at the same visit.

Statistical Analyses

In order to account for the effect of developmental differences by age stratified analyses by age group (2 to 5 and 6 to 12) was conducted. Internal consistency of the four CFQ factors (concern, monitoring, restriction, and pressure) was assessed using Cronbach's alpha. Summary statistics were calculated for all descriptive variables, including means and standard deviations. Fisher's exact and Kruskall-Wallis tests were used, as appropriate, to perform unadjusted comparisons between the urban Chinese-American and the urban white groups and separate unadjusted comparison of the urban Chinese-American and combined urban and rural white groups. The main effects of ethnicity on the four CFQ dimensions were then evaluated after adjustment for potential confounding/explanatory variables using multiple linear regressions. The following potential confounding/explanatory variables were selected *a priori* based on theory and/or to allow for comparisons with existing literature: sex, household income, caregiver education, maternal BMI, and paternal BMI. Additional analyses performed included all of these variables plus the child BMIZ score.

An exploratory analysis to examine the association of each CFQ dimension with the child BMIZ was performed using Spearman's rank correlation test and then with adjustment for potential confounding/explanatory variables listed above using multiple linear regressions. In order to account for the effect of differences by sex on the association between the CFQ factors and BMIZ score, interaction by sex was also tested. A two-sided p-value of less than 0.05 was considered to be statistically significant. The analyses were conducted using Stata Statistical Software 8.0 (Stata Corporation, College Station, TX, 2002).

Results

Child and Caregiver Characteristics

Of the 50 subjects identified as Chinese American by the primary caregiver, 48 had parents who originated from China or Taiwan, one from Malaysia, and one from an unreported Asian country. Compared to urban non-Hispanic whites and combined urban and rural non-Hispanic whites (all non-Hispanic whites), Chinese Americans had a lower household income, lower level of caregiver education, lower maternal and paternal BMI, lived in the U.S. for a shorter duration of time, received benefits from the Women, Infants and Children (WIC) program more often, and had more adults living in the household (Table 1). Most caregivers in all groups were mothers (Table 1).

Comparison of Child Feeding Questionnaire Factors between Chinese-American and Non-Hispanic White Caregivers

The internal consistency of the abbreviated version of the CFQ for each factor was moderate to high using Cronbach's alpha (0.48 to 0.99 for Chinese Americans and 0.56 to 0.91 for non-Hispanic whites (urban and all non-Hispanic whites)) in both age groups (Table 2). Urban Chinese-American caregivers reported higher mean scores than urban white caregivers (scale 1 (low) to 5 (high)) for concern about weight status and restriction of their child's access to foods in both age groups and monitoring in the 2 to 5 year age group only (Table 3). These differences remained significant in the adjusted models with or without child BMIZ score (Table 3). Similar differences between Chinese Americans and all non-Hispanic whites were seen for concern and restriction in the unadjusted and adjusted models, but not for pressure and monitoring.

The Relationship between Feeding Practices and Child BMI among Chinese-American and non-Hispanic White Caregivers

Among Chinese Americans, concern about child weight and monitoring of the child's eating were not associated with the child's weight status (BMIZ) in the unadjusted or the adjusted

analyses (Table 4). Pressure to eat was inversely associated with the child's weight in the 6 to 12 year old group, but not 2 to 5 year old group and restriction was positively associated with child BMIZ in 2 to 5 year olds, but not in 6 to 12 year olds (Table 4). These associations were no longer significant in the adjusted analyses (Table 4). Among urban non-Hispanic white caregivers concern was positively associated with child weight status in the unadjusted analyses in both age groups (Table 4). In the adjusted analysis restriction was positively associated with weight status in 2 to 5 year olds only (Table 4). Among all non-Hispanic white caregivers of 6 to 12 year olds, concern, restriction, and monitoring were positively associated with child weight status in the unadjusted analyses (Table 4). In the adjusted analyses there was a positive association of weight status with concern and restriction in 2 to 5 year olds, but not for 6 to 12 year olds (Table 4). Pressure to eat was not associated with child weight status in the unadjusted or adjusted analyses for urban or all non-Hispanic whites) at any age (Table 4). There were no interactions by sex on the association between the CFQ factors and BMIZ score among Chinese Americans, urban non-Hispanic whites, or all non-Hispanic whites ($p>0.05$).

Discussion

Our findings demonstrated that the short version of the CFQ had acceptable to good internal consistency among Chinese-American caregivers. The moderate to high internal consistencies were similar to estimates in other populations of preschool (Boles et al., 2010) and school-age children (Birch, et al., 2001). Chinese-American caregivers reported higher levels of concern, pressure to eat, and restriction but, unexpectedly, less monitoring of their child feeding than white caregivers. However, unlike what has been shown previously (Birch, et al., 2003; Faith, Berkowitz, et al., 2004; Faith, Scanlon, et al., 2004) and noted in this sample for non-Hispanic white caregivers, no associations of child-feeding practices with child weight status were observed in our exploratory analyses within this sample of Chinese Americans.

Because the Chinese culture has been noted to incorporate a parenting style that is higher in control and supervision than other ethnic groups within Western culture (the authoritarian parenting style) (Chiu, 1987), we had hypothesize**d** that Chinese-American caregivers would report more controlling child-feeding practices than non-Hispanic whites. This was verified in the present study for the concern and pressure to eat and for the restriction dimensions, but not for the monitoring dimension, where Chinese-American caregivers scored lower than non-Hispanic white caregivers.

Controlling feeding practices may have a different meaning in the Chinese-American culture than for other ethnic groups as has been seen in the literature for parenting styles (J. L. Chen & Kennedy, 2005; J. Chen & Kennedy, 2004). For example, use of a more controlling parenting style, authoritarian parenting, is considered a sign of caring in Chinese culture (J. Chen & Kennedy, 2004; J. L. Chen & Kennedy, 2005). This is in contrast to authoritarian parenting styles in Western culture that have been associated with low warmth or caring (Farrow & Blissett, 2008). Similar cultural differences may exist for child-feeding practices and should be explored in future studies.

Concern for a child's weight status has been associated with restrictive feeding practices in other ethnic groups in Western culture. In turn, restrictive feeding practices in non-Hispanic whites and non-Hispanic blacks have been associated with uninhibited eating, eating food for reasons other than hunger (e.g., boredom, emotional eating, etc.), and overweight (Birch & Fisher, 2000; Birch, et al., 2003; Faith, Berkowitz, et al., 2004). It is plausible that concern for a child's weight and restrictive feeding practices may not be associated with the

above feeding behaviors in Chinese Americans and therefore not associated with BMIZ score.

Monitoring was lower among Chinese-American than non-Hispanic white caregivers, which is inconsistent with expectations of authoritarian parenting. One could also speculate that given the expectation for parental obedience in this culture, caregivers may trust that their children will eat according to the rules they have been given, even without close parental monitoring (J. Chen & Kennedy, 2004; X. Chen et al., 2000; Chiu, 1987).

We did not find an association between child-feeding practices and BMIZ score in Chinese Americans in our exploratory analyses. Although controlling child-feeding practices (concern, restriction, monitoring) have been associated with child BMI in non- Hispanic white children (Birch, et al., 2003; Faith, Scanlon, et al., 2004), there have been conflicting results in Hispanic and non-Hispanic black populations (Anderson et al., 2005). Thus, child-feeding practices and their relationship to child weight status may need to be examined in the cultural and environmental context of the child and parent.

Limitations of this study included the cross-sectional design, the small convenience sample size, and the caregiver-reported measures of parental height, weight, and income. The fact that the CFQ was not back-translated was suboptimal. However, the study CFQ was professionally translated into the Chinese language and the questionnaire was administered by a native speaker. Social desirability in the assessment of these parental factors could have led to information bias that may have been different between Chinese-American and non-Hispanic white caregivers. External validity of this study is limited by the fact that the Chinese-American subjects were patients of a single CHC in a neighborhood of New York City where the Chinese culture is the majority culture. Chinese-American families living in neighborhoods without a predominance of Chinese Americans may have different child-feeding practices and should be studied in comparison with this group. On the other hand, the homogeneity of our sample allowed us to interpret the results in the cultural context of this specific group, which may be very different from the cultural context of other Asian-American groups.

There was also a significant difference in income between Chinese Americans and non-Hispanic whites in this sample. We have controlled for income in our analyses in order to account for differences in feeding practices between these groups. Furthermore, our findings are consistent with what is known about Chinese cultural influences on feeding practices. Additionally, the availability and types of food (snacks in particular) may differ between groups and reflect differences in monitoring by parents. A strength of this study was that the standardization of anthropometric equipment and measurement techniques between CHCs allowed for accurate measurements of child height and weight and BMI calculations.

Conclusions

The results of the present study suggest that using a short version of a translated CFQ for Chinese-American caregivers of children ages 2 to 12 years in CHCs was feasible and had acceptable internal consistency. We demonstrated that Chinese Americans had more controlling child-feeding practices than non-Hispanic whites, recognizing that this may have a different meaning in Chinese-American than in white caregivers. Use of the CFQ by Chinese Americans would be enhanced by further studies to understand the cultural meaning of the variables assessed and their potential implications for the prevention and treatment of childhood obesity in this growing U.S. minority.

Highlights

- Child-feeding practices were compared between Chinese-American and white caregivers.
- The association of child feeding practices and weight status were also compared.
- Chinese-American caregivers had higher scores for concern and restriction.
- Concern and restriction were associated with child BMI in urban and all (urban and rural) whites.
- Feeding practices were not associated with child BMI in Chinese Americans.

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Table 1

Characteristics of Chinese-American and non-Hispanic white children

Variable	Urban Chinese American	Urban non-Hispanic white	Total non-Hispanic white	p-value[¥]
	% or Mean ±SD	% or Mean ±SD	% or Mean ±SD	
Subject Characteristics				
Total Children, N	50	40	108	NA
Females, N (%)	23 (46)	16 (40)	52 (48)	0.400
Age, years	6.3 ± 2.5	6.6 ± 2.5	6.5 ± 2.6	0.900
BMIZ[‡]	0.4 ± 1.1	0.8 ± 1.0	0.6 ± 1.1	0.100
Overweight[§], N (%)	8 (16)	7 (18)	19 (18)	1.000
Caregiver Characteristics				
Relation to child				
Mother, N (%)	46 (92)	37 (93)	98(89)	<0.001
Father, N (%)	4 (8)	6 (5)	6 (6)	<0.001
Other, N (%)	0	2 (5)	6 (6)	<0.001
Gross household income per year	$10,000 to $14,999	$45,000 to $49,999	$30,000 to $49,999	<0.001
Caregiver education	10th grade	Associate's degree[//]	GED[¶] or equivalent	<0.002
Number of adults living in household	2.6 ± 1.1	2.2 ± 0.6	2.1 ± 0.5	0.006
Maternal BMI[†]	22.0 ± 3.1	27.2 ± 6.1	28.0 ± 5.8	<0.001
Paternal BMI[†]	23.1 ± 3.1	27.4 ± 3.9	27.3 ± 3.4	<0.001
Duration of residency	5 to 10 years	20 years	> 20 years	<0.001
WIC in past 12 months, N (%)	30 (60)	5 (13)	23 (21)	<0.001
Food Stamps in past 12 months, N (%)	15 (30)	7 (18)	20 (19)	0.300

[¥] comparison of Chinese-Americans and either Urban or total non-Hispanic whites, NA, not applicable; N, number;

[*] unless otherwise stated;

[†] BMI, body mass index;

[‡] BMIZ, body mass index Z-score;

[§] Overweight is defined as BMI ≥ 95 %ile for age and sex using the 2000 Centers for Disease Control and Prevention growth charts;

[//] GED, General Educational Development (high school-level academic skills testing);

[¶] Occupational, technical, or vocational program

Table 2

Description of Child Feeding Questionnaire* factors and internal consistencies

Factor	Description of factor	Number of questions	Child age group (yrs)	Cronbach's α, Chinese Americans	Cronbach's α, Urban non-Hispanic whites	Cronbach's α, non-Hispanic whites
Concern	Extent to which the caregiver is concerned about the child's risk of being overweight	3	2–5	0.86	0.59	0.61
			6–12	0.88	0.82	0.78
Pressure	Extent to which the caregiver encourages the type and amount of food that the child eats	4	2–5	0.48	0.56	0.60
			6–12	0.70	0.70	0.73
Restriction	Extent to which the caregiver restricts the child's access to foods, including the type and amount of food	8	2–5	0.51	0.75	0.73
			6–12	0.79	0.84	0.77
Monitoring	Extent to which the caregiver keeps track of the child's intake of sweets, snack foods, and high-fat foods	3	2–5	0.99	0.70	0.91
			6–12	0.98	0.87	0.88

*Mean score on CFQ 1(low) to 5 (high)

Table 3

Unadjusted and adjusted comparisons of Child Feeding Questionnaire factors between Chinese-American and non-Hispanic white caregivers

Factor		Urban Non-Hispanic White (reference group) vs. Chinese American			All Non-Hispanic Whites (reference group) vs. Chinese American		
		β (95% CI)			β (95% CI)		
	Child age group in years	Unadjusted	Adjusted*	Adjusted†	Unadjusted	Adjusted*	Adjusted†
Concern	2–5	2.32 (1.67, 2.97)‡	3.13 (1.68, 4.57)‡	3.32 (1.86, 4.78)‡	2.16 (1.63, 2.69)‡	2.27 (1.20, 3.33)‡	2.36 (1.32, 3.40)‡
	6–12	1.52 (0.71, 2.33)‡	2.90 (1.17, 4.64)‡	2.88 (1.11, 4.64)‡	1.76 (1.13, 2.39)‡	2.70 (1.62, 3.78)‡	2.68 (1.59, 3.77)‡
Pressure	2–5	1.11 (0.52, 1.71)‡	1.78 (0.23, 3.32)‡	1.55 (0.00, 3.10)§	0.89 (0.37, 1.41)‡	0.36 (−0.74, 1.46)	0.30 (−0.80, 1.41)
	6–12	0.81 (0.12, 1.49)‡	1.03 (−0.63, 2.70)	0.93 (−0.62, 2.47)	0.89 (0.34, 1.44)‡	0.48 (−0.63, 1.59)	0.57 (−0.53, 1.67)
Restriction	2–5	−0.04 (−0.57, 0.49)	0.94 (−0.34, 2.21)	1.27 (0.04, 2.51)‡	0.39 (−0.07, 0.86)	1.10 (0.10, 2.09)‡	1.24 (0.31, 2.17)‡
	6–12	0.19 (−0.43, 0.81)	2.19 (1.06, 3.32)‡	2.18 (1.02, 3.34)‡	0.39 (−0.08, 0.86)	1.49 (0.60, 2.37)‡	1.48 (0.58, 2.38)‡
Monitoring	2–5	−1.43 (−2.22, −0.64)‡	−2.51 (−4.49, −0.53)‡	−2.69 (−4.73, −0.66)‡	−0.65 (−1.40, 0.09)	−0.44 (−2.02, 1.13)	−0.40 (−1.99, 1.20)
	6–12	−1.77 (−2.53, −1.00)‡	−0.99 (−2.87, 0.89)	−1.02 (−2.94, 0.90)	−1.26 (−1.87, −0.65)‡	−0.97 (−2.13, 0.18)	−0.98 (−2.15, 0.20)

*Adjusted for child age, child sex, household income, caregiver education, maternal and paternal BMI using multiple linear regression

†Adjusted for child age, child sex, household income, caregiver education, maternal and paternal BMI, and child BMI Z-Score using multiple linear regression

‡p<0.05,

§p=0.05

Table 4

Unadjusted and adjusted associations of child-feeding practices and child BMI z-score in Chinese-American and non-Hispanic white caregivers

Factors	Child Age Group in years	Chinese American		Urban Non-Hispanic White		All Non-Hispanic White	
		Unadjusted† r_s, p	Adjusted* β (95% CI), p	Unadjusted† $r_{s,p}$	Adjusted* β (95% CI), p	Unadjusted† $r_{s,p}$	Adjusted* β (95% CI), p
Concern	2–5	0.19, 0.40	−0.31 (−1.51, 0.89), 0.57	0.50, 0.03	0.48 (−0.56, 1.52), 0.33	0.27, 0.07	0.45 (0.01, 0.89), 0.04‡
	6–12	−0.41, 0.04‡	−0.13 (−0.60, 0.33), 0.55	0.40, 0.06	−0.02 (−0.36, 0.33), 0.91	0.33, 0.01‡	0.16 (−0.06, 0.39), 0.20
Pressure	2–5	−0.20, 0.36	0.06 (−1.02, 1.13), 0.91	−0.51, 0.03‡	0.06 (−1.02, 1.13), 0.83	−0.17, 0.26	−0.20 (−0.63, 0.22), 0.33
	6–12	−0.42, 0.03‡	−0.37 (−0.89, 0.15), 0.15	0.07, 0.77	−0.37(−0.89, 0.15), 0.11	−0.10, 0.47‡	−0.08 (−0.28, 0.12), 0.42
Restriction	2–5	0.42, 0.04‡	1.08 (−0.55, 2.70), 0.17	0.34, 0.17	0.63 (0.18, 1.07), 0.01‡	0.47, <0.001‡	0.51 (0.10, 0.93), 0.02‡
	6–12	0.14, 0.49	−0.20 (−1.17, 0.76), 0.65	0.11, 0.62	−0.24 (−0.53, 0.05), 0.08	0.25, 0.05‡	0.01 (−0.24, 0.26), 0.93
Monitoring	2–5	−0.12, 0.57	−0.01 (−0.71, 0.68), 0.96	−0.21, 0.41	0.15 (−0.72, 0.42), 0.56	0.15, 0.32	0.17 (−0.15, 0.49), 0.30
	6–12	−0.02, 0.93	−0.14 (−0.71, 0.42), 0.60	0.40, 0.07	−0.16 (−0.70, 0.38), 0.54	0.29, 0.03	−0.01 (−0.22, 0.20), 0.90

†Spearman rank correlation coefficient (r_S)

*Adjusted for child age, child sex, household income, caregiver education, maternal and paternal BMI using multiple linear regression (β)

‡p<0.05