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Parental Perceptions of a Motivational Interviewing–Based Pediatric Obesity Prevention Intervention

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Abstract

Motivational interviewing (MI) shows promise for pediatric obesity prevention, but few studies address parental perceptions of MI. The aim of this study was to identify correlates of parental perceptions of helpfulness of and satisfaction with a MI-based pediatric obesity prevention intervention. We studied 253 children 2 to 6 years of age in the intervention arm of High Five for Kids, a primary care–based randomized controlled trial. In multivariable models, parents born outside the United States (odds ratio [OR] = 8.81; 95% confidence interval [CI] = 2.44, 31.8), with lower household income (OR = 3.60; 95% CI = 1.03, 12.55), and with higher BMI (OR = 2.86; 95% CI = 1.07, 7.65) were more likely to perceive MI-based visits as helpful in improving children's obesity-related behaviors after the first year of the intervention. Parents of female (vs male), black (vs white), and Latino (vs white) children had lower intervention satisfaction. Our findings underscore the importance of tailoring pediatric obesity prevention efforts to target populations.

Keywords

obesity; parental perceptions; motivational interviewing; intervention; child; preschool

Introduction

A recent report by the Institute of Medicine underscores the need to identify successful methods of obesity prevention in young children as a strategy to reduce risk of obesity and comorbidities later in life.¹ Preschool-aged children are seen by their primary care providers regularly for routine health maintenance, placing primary care provider settings in an ideal position for identification and prevention of pediatric overweight and obesity in young

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children.¹ However, there is a paucity of information regarding effective means of obesity prevention in this age group, particularly in the primary care setting.^{2–6}

Motivational interviewing (MI) is a communication technique that is effective for weight management, tobacco use, alcohol use, and dietary control in adults and adolescents.^{7–9} Recent evidence suggests that MI may be effective in preventing and treating pediatric obesity.⁵ In the High Five for Kids study, use of MI as part of a multicomponent intervention resulted in decreases in television viewing as well as improved BMI over the course of 1 year among girls and low-income families.¹⁰

Although MI techniques are being increasingly used for obesity management, little is known about parental perceptions of interventions centered on MI, nor whether MI techniques are accepted equally across different sociodemographic groups. Previous studies have shown that differences exist in perceptions of behavioral counseling in a primary care setting based on family and child characteristics, such as race/ethnicity and BMI.¹¹ Satisfaction with health care has been tied to patient compliance, health care utilization, and expenditures.^{12,13} With the passage of the Affordable Care Act, patient satisfaction has garnered attention as a metric of provider performance and an important component of value-based health care. Implementing office-based interventions that both reduce childhood obesity and enhance parental satisfaction with their child's health care could affect health care system reimbursement and expenditures. The goal of this study was to explore child, parent, and household characteristics that may influence parental perceptions of helpfulness of and satisfaction with a MI-based childhood obesity intervention in the High Five for Kids study.

Methods

Study Participants

We studied parents of 253 children in the intervention arm of the High Five for Kids study, a cluster-randomized controlled obesity prevention trial of children aged 2.0 to 6.9 years. Children were eligible for enrollment if they had a baseline body mass index (BMI) ≥95th percentile or BMI in the 85th to <95th percentile with at least 1 overweight (BMI ≥25 kg/m²) parent, received their care at one of the participating primary care offices, and had a parent fluent in English or Spanish. Recruitment and randomization procedure details are described elsewhere.¹⁰

Study Design and Intervention Description

High Five for Kids took place in 10 primary care pediatric offices of Harvard Vanguard Medical Associates, a multisite group practice in Massachusetts. Practices were stratified based on size and racial/ethnic composition and then randomized to treatment and usual care practices. One of the major components of the High Five for Kids intervention was health care provider visits that used MI and brief negotiation techniques. Children randomized to the intervention arm received counseling from nurse practitioners (NPs) trained in MI. The NPs were the key intervening clinicians and used MI during four 20- to 40-minute, in-person, chronic disease management visits and 3 brief telephone calls in the first year of the intervention. MI is a communication technique that enhances self-efficacy, increases recognition of inconsistencies between actual and desired behaviors, teaches skills for reduction of this dissonance, and enhances motivation for change.^{14,15} Components include de-emphasizing labels, providing parent responsibility for identification of problematic behaviors, encouraging parents to clarify and resolve ambivalence about behavior change, and setting goals to initiate the change process.^{14,15}

The study protocols were approved by the human subjects committee of Harvard Pilgrim Health Care. All parents of participating children provided written, informed consent.

Outcome Measures

The main outcomes of this study were (1) parental perception of the helpfulness of NP visits in achieving child behavior change and (2) parental report of satisfaction with the intervention.

Trained research assistants surveyed parents of eligible patients by telephone at baseline and at 1 year after enrollment. At the 1-year time point, we asked parents which behaviors they had selected to reduce during the intervention, including TV viewing, sugar-sweetened beverage intake, and fast food consumption. For each selected behavior, we asked how helpful their NP visits were in making behavior change. Response options included “not very much,” “some,” or “a lot.” We also asked parents how participation in High Five for Kids influenced their satisfaction with their child’s primary care. Response options were increased, decreased, or no change. Parents also reported how satisfied they were with High Five for Kids. Response options were very satisfied, somewhat satisfied, somewhat dissatisfied, and very dissatisfied. Finally, parents were asked whether they would recommend High Five for Kids to their friends and family members. Available responses were yes, no, or unsure.

Other Measures

At baseline, parents reported child age, sex, and race/ethnicity. We categorized children as Latino if their ethnicity was reported as such regardless of race. Parents also reported their own educational attainment, marital status, annual household income, country of birth, and duration of years living in the United States. Based on parent report of height, we read them a series of weight ranges that corresponded to BMI categories of normal ($<25.0 \text{ kg/m}^2$), overweight (25.0 to $<30.0 \text{ kg/m}^2$), and obese ($\geq 30.0 \text{ kg/m}^2$), and parents identified the range that their weight currently fell in. At baseline and at 1 year, we used previously validated questions to obtain a parent report of the child’s daily TV/video viewing¹⁶ and sugar-sweetened beverage intake.¹⁷ We obtained fast food consumption information with a question previously shown to be related to adolescent BMI.¹⁸ Child height and weight were measured by trained clinical assistants. We calculated child BMI and age- and sex-specific BMI percentiles using these measurements.

Statistical Analysis

We used descriptive statistics to calculate means (standard deviations [SDs]) for continuous variables and proportions (%) for categorical variables for child and parent/household sociodemographic characteristics, behaviors, anthropometrics, and our main outcomes. In logistic regression models, we assessed associations of child and parent/household characteristics with odds of (1) parental perception of the helpfulness of NP visits (“a lot” helpful vs “some”/“not very much”), (2) parent report of program satisfaction (very satisfied vs somewhat satisfied/somewhat dissatisfied/very dissatisfied), and (3) increased versus decreased effect or no effect on satisfaction with child’s primary care. Model 1 was unadjusted. In model 2, we adjusted for child age, sex, race/ethnicity, and baseline BMI category; parent BMI category, education, marital status, born in the United States or not; and household income. For analyses that included parent perception of NP visit helpfulness in changing child behavior, we also included child baseline behaviors of TV and video viewing (hours/d), sugar-sweetened beverage consumption (servings/d), and fast food intake (servings/wk) in adjusted models for respective behaviors.

We corrected all models for clustering by study site using generalized linear mixed models. We conducted all the analyses using SAS version 9.3 (SAS Institute, Inc, Cary, NC).

Results

Baseline Participant Characteristics

Baseline study participant characteristics are shown in Table 1. For the 253 children, the mean (SD) age was 4.8 (1.2) years, and 53% were of nonwhite race/ethnicity. Mean (SD) child BMI z-score was 1.88 (0.69). Of the parents, 61% were obese and 36% were overweight; 27% were born outside the United States, with 35% of foreign-born parents being Latino and 31% black.

Parental Perceptions of Helpfulness and Satisfaction

Table 2 shows the distribution of our main outcomes. At 1 year, most parents reported that they had selected to reduce television viewing (63%), sugary beverage intake (68%), and fast food intake (62%) during the intervention. Also, 49% of parents reported that NP visits were “a lot” helpful in decreasing their child’s television viewing; 66% reported NP visits as “a lot” helpful in reducing sugary beverage intake, and 63% reported NP visits as “a lot” helpful in reducing fast food intake. The intervention increased satisfaction with primary care for 62% of parents. Overall, 56% of parents reported that they were very satisfied with the intervention, and 91% stated that they would recommend the intervention to family and friends.

Correlates of Perception of MI-Based Visit Helpfulness

Table 3 shows unadjusted and multivariate adjusted correlates of parental perceptions that MI-based visits were “a lot” helpful in achieving behavior change. In multivariate adjusted models, parents with BMI ≥ 30 kg/m² (vs <30 kg/m²) were more likely to find MI-based visits “a lot” helpful in reducing their child’s sugar-sweetened beverage intake (odds ratio [OR] = 2.86; 95% confidence interval [CI] = 1.07, 7.65). Parents with a household income of \$50 000 or less (OR = 3.60; 95% CI = 1.03, 12.55) had higher odds of perceiving MI-based visits as “a lot” helpful in reducing TV viewing than those with a higher income. Foreign-born parents were more likely than US-born parents to find MI-based visits “a lot” helpful in reducing TV viewing time (OR = 8.81; 95% CI = 2.44, 31.8) and sugar-sweetened beverage intake (OR = 3.32; 95% CI = 1.02, 10.79).

Correlates of Intervention Satisfaction

Table 4 shows correlates of intervention satisfaction. In unadjusted models, child race/ethnicity was not associated with satisfaction. However, in multivariate adjusted models, parents of black (vs white) children were less likely to report being very satisfied with the intervention (OR = 0.43; 95% CI = 0.20, 0.95), and parents of Latino (vs white) children were less likely to report that the intervention increased satisfaction with their child’s primary care (OR = 0.32; 95% CI = 0.14, 0.77). Also, in multivariable models, parents of female (vs male) children were less likely to report that they were very satisfied with the intervention (OR = 0.49; 95% CI = 0.28, 0.85). Child sex-specific BMI ≥ 95 th percentile for age (OR = 2.51; 95% CI = 1.22, 3.77), lower household income (OR = 3.42; 95% CI = 1.53, 7.64), and foreign-born parents (OR = 2.23; 95% CI = 1.06, 4.69) had higher odds of increased satisfaction with primary care services.

Discussion

In this study of more than 250 parents participating in a MI-based childhood obesity intervention, parents were generally very satisfied and perceived MI-based visits as helpful.

We did observe differences in parental perceptions according to sociodemographic characteristics. Parents born outside the United States, with lower household income and with higher BMI were more likely to perceive MI-based visits as more helpful in improving their pre-school children's obesity-related behaviors. Furthermore, the MI-based approach used in High Five for Kids increased satisfaction with pediatric primary care among parents who were foreign born, obese, had an obese child, and had lower household income. However, black and Latino parents were less satisfied with the intervention after adjusting for socioeconomic factors.

Previous work has shown provider use of MI communication techniques during routine health care visits in adults to be associated with positive patient perceptions of their care.^{19,20} Our findings extend this research by demonstrating that parents of overweight and obese children have positive perceptions of and high satisfaction with a MI-based intervention. In a study of adolescent girls who participated in a multi-ethnic obesity prevention study that used MI communication techniques, self-reported rates of satisfaction were similar to those in our study, with 41% being satisfied and 54% very satisfied (compared with 41% of our parents being somewhat satisfied and 56% of parents being very satisfied).²¹ To our knowledge, our study is one of the first to describe perceptions of an obesity intervention consisting of MI among a diverse group of parents with young children.

We found that foreign-born parents were more likely than US-born parents to perceive greater helpfulness of MI-based visits and experience increased satisfaction with their child's primary care as a result of intervention participation. The majority of foreign-born parents spoke English and had been living in the United States for an average of almost 19 years, likely representing an acculturated population. The reasons for our findings of generally positive intervention perceptions by immigrant parents are likely multifactorial. First, unmeasured cultural beliefs regarding medical care, such as respect and hierarchy,²² could have translated into greater perceived helpfulness and satisfaction. Second, immigrant Latina mothers have described social isolation and less social support in the United States compared with their countries of birth²³; thus, the human contact and supportive environment provided by nonjudgmental MI communication techniques may have contributed to foreign-born parents' positive perceptions. Finally, the inclusion of intervention materials in both English and Spanish languages may have influenced immigrant parents' acceptance of the intervention.

Parents of black and Latino children experienced less satisfaction with the intervention than parents of white children. Lower satisfaction with counseling in primary care settings has previously been described for parents of minority children.¹¹ Although our intervention included bilingual materials and providers, the intervention population was heterogeneous, with a variety of countries and likely several native languages represented. Potential explanations for lower report of satisfaction by parents of black and Latino children include the existence of communication gaps, differences in communication between providers and patients of different racial/ethnic groups, or differences in communication preferences among racial/ethnic groups.^{24–27} Additionally, concordance of provider and patient race/ethnicity has been associated with patient perceptions of health care provision; thus, discordance of sociodemographic factors may have played a role in lower participant satisfaction among racial/ethnic minorities.^{28,29}

In our study, parent obesity, child obesity, and lower household income were associated with higher likelihood of the intervention increasing satisfaction with children's primary care. Parent obesity has repeatedly been shown to be a strong predictor of childhood obesity risk.^{30,31} In contrast to the findings of our study, parental overweight has been associated with reports of low frequency and poor ratings of dietary and physical activity counseling

provided by physicians during routine health care visits of overweight and obese children in a primary care setting.¹¹ Correlations between parent behavior and child behavior change have been previously described.^{32,33} In the High Five for Kids study, child success in meeting behavior goals was directly related to maternal success in achieving goals.³⁴ Thus, the positive perceptions of obese parents in our intervention may have resulted from improvement in their own, personal unhealthful behaviors. Lower household income has been related to increased obesity risk.³⁵ As previously reported, children from families with an annual household income \$50 000 had a significant decrease in BMI at 1 year follow-up of our intervention, making success of the intervention in this subgroup a likely explanation for the increased satisfaction in lower-income households in our current study.¹¹ Our findings that parent and child obesity and lower household income are related to increased satisfaction with children's primary care after participation in High Five for Kids suggest that individual attention by providers trained in MI is well received by these groups that are at high risk for obesity.

Several limitations of our study should be considered. First, although sampled from 5 pediatric offices with racial/ethnically diverse patient populations, our participants on average had higher income and education levels than the general US population. This may limit the ability to generalize our findings. Second, social desirability may have contributed to inflated reporting of helpfulness and satisfaction. Finally, we have limited information available regarding family language use and immigration status because only 1 parent per child was interviewed. This prevents our ability to more comprehensively explore the role of acculturation in our outcomes. However, our study did include a diverse population with a considerable number of foreign-born black and Latino participants. Because the number of immigrants in the United States is growing³⁶ and the highest risk for childhood obesity exists among black and second-generation Latino children,³⁷ identifying how immigration and race/ethnicity affect suitability of counseling and communication techniques used in early childhood obesity interventions is imperative.

This study supports the important role of family sociodemographic characteristics in the acceptance of a MI-based intervention for pediatric obesity prevention. Parents born outside the United States, with lower household income, and with higher BMI perceived that MI-based visits in a primary care setting were helpful in improving their preschool children's obesity-related behaviors. Our findings that parents of black and Latino children had lower satisfaction with this MI-based intervention suggest the need for alternative approaches to MI to effect behavior change among racial/ethnic minorities. Taken together, these results emphasize the need to consider immigration status, social contextual factors, and communication preferences when implementing and evaluating obesity interventions in young children.

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Table 1

Baseline Characteristics of 253 Participants in the High Five for Kids Study Intervention Arm.

Baseline Characteristics	n (%) or Mean (SD)
Child characteristics	
Age, years (SD)	4.8 (1.2)
Gender	
Female	121 (47.8)
Male	132 (52.2)
Race/Ethnicity	
White	118 (46.6)
Black	70 (27.7)
Latino	48 (19.0)
Other	17 (6.7)
Body mass index, kg/m ² (SD)	19.2 (2.6)
Body mass index, z-score (SD)	1.88 (0.69)
Body mass index category	
85th to 94th Percentile	118 (46.6)
95th Percentile	135 (53.4)
Child health behaviors	
Sugar-sweetened beverage intake, servings/d (SD)	2.3 (1.8)
Fast food consumption, servings/wk (SD)	1.2 (0.9)
Total TV + video viewing, h/d (SD)	2.7 (1.6)
Parent and household characteristics	
Parent overweight/obesity status	
Normal weight (BMI <25 kg/m ²)	8 (3.2)
Overweight (BMI 25 to <30 kg/m ²)	90 (35.7)
Obese (BMI ≥30 kg/m ²)	154 (61.1)
Parent educational attainment	
Some college or below	106 (41.9)
College graduate	147 (58.1)
Annual household income	
\$50 000 or less	88 (35.5)
>\$50 001	160 (64.5)
Marital status	
Married	187 (73.9)
Not married	66 (26.1)
Country of birth	
US born	185 (73.1)
Black	49 (19.4)
Hispanic/Latino	24 (9.5)
White/Other	112 (44.3)
Foreign born	68 (26.9)

Baseline Characteristics	n (%) or Mean (SD)
Black	21 (8.3)
Latino	24 (9.5)
White/Other	23 (9.1)
Mean duration of years in the United States	18.5 (9.9)

Abbreviation: SD, standard deviation.

Table 2

Parental Perceptions of Helpfulness of Motivational Interviewing (MI) Visits and Satisfaction with Intervention Components.^a

Perception of helpfulness of MI-based visits in changing child behaviors (reported as “a lot”)	n (%)
Helpfulness in reduction of television viewing	55 (49)
Helpfulness in decreasing sugary beverage intake	79 (66)
Helpfulness in reduction of fast food intake	62 (63)
Report of satisfaction	
Very satisfied with High Five for Kids	140 (56)
Increased satisfaction with child’s primary care	156 (62)
Would recommend High Five for Kids to family/friends	230 (91)

^aData from 253 intervention participants in the High Five for Kids study.

Table 3

Unadjusted and Multivariable-Adjusted Correlates of Parent Perception of Intervention Visit Helpfulness in Achieving Behavior Change.^a

Baseline Correlates	“A Lot” Helpful to Reduce Television Viewing			“A Lot” Helpful to Decrease Sugar-Sweetened Beverage Intake			“A Lot” Helpful to Decrease Fast Food Intake		
	OR (95%CI)	AOR (95% CI) ^b	OR (95% CI)	AOR (95% CI)	OR (95% CI)	AOR (95%CI) ^b	OR (95% CI)	AOR (95%CI) ^b	AOR (95%CI) ^b
Child									
Age									
<60 Months	1.0 (reference)	1.0 (reference)	1.0 (reference)	1.0 (reference)	1.0 (reference)	1.0 (reference)	1.0 (reference)	1.0 (reference)	1.0 (reference)
60 Months	1.21 (0.57, 2.55)	1.06 (0.43, 2.58)	1.47 (0.66, 3.26)	1.42 (0.59, 3.43)	1.09 (0.47, 2.54)	1.38 (0.52, 3.68)			
Sex									
Male	1.0 (reference)	1.0 (reference)	1.0 (reference)	1.0 (reference)	1.0 (reference)	1.0 (reference)	1.0 (reference)	1.0 (reference)	1.0 (reference)
Female	0.78 (0.37, 1.64)	0.70 (0.28, 1.74)	1.52 (0.67, 3.44)	1.56 (0.62, 3.91)	0.89 (0.38, 2.08)	0.84 (0.32, 2.18)			
Race/Ethnicity									
Black	1.60 (0.67, 3.81)	1.01 (0.30, 3.39)	0.70 (0.25, 1.99)	0.49 (0.15, 1.63)	1.43 (0.47, 4.30)	0.80 (0.21, 3.08)			
Latino	1.75 (0.61, 5.01)	0.35 (0.07, 1.76)	1.07 (0.30, 3.79)	0.35 (0.07, 1.72)	1.11 (0.34, 3.67)	0.54 (0.11, 2.65)			
Other	2.86 (0.47, 17.41)	1.33 (0.14, 12.76)	0.77 (0.15, 3.95)	0.52 (0.07, 3.64)	1.12 (0.09, 14.79)	1.06 (0.05, 22.01)			
White	1.0 (reference)	1.0 (reference)	1.0 (reference)	1.0 (reference)	1.0 (reference)	1.0 (reference)	1.0 (reference)	1.0 (reference)	1.0 (reference)
BMI category									
85th–94th Percentile	1.0 (reference)	1.0 (reference)	1.0 (reference)	1.0 (reference)	1.0 (reference)	1.0 (reference)	1.0 (reference)	1.0 (reference)	1.0 (reference)
95th Percentile	1.95 (0.89, 4.24)	1.63 (0.63, 4.20)	1.71 (0.76, 3.85)	1.72 (0.69, 4.29)	0.77 (0.33, 1.81)	0.69 (0.26, 1.84)			
Behaviors									
TV (h/d)	1.09 (0.86, 1.38)	0.98 (0.74, 1.29)	—	—	—	—	—	—	—
Sugar-sweetened beverages (servings/d)	—	—	1.10 (0.87, 1.38)	1.50 (0.85, 2.64)	—	—	—	—	—
Fast food (servings/wk)	—	—	—	—	1.37 (0.82, 2.30)	1.50 (0.85, 2.64)			
Household									
Parent BMI (kg/m ²)									
<30	1.0 (reference)	1.0 (reference)	1.0 (reference)	1.0 (reference)	1.0 (reference)	1.0 (reference)	1.0 (reference)	1.0 (reference)	1.0 (reference)
Obese (≥ 30)	1.72 (0.78, 3.79)	1.61 (0.62, 4.22)	2.05 (0.87, 4.81)	2.86 (1.07, 7.65)	1.47 (0.59, 3.65)	1.63 (0.54, 4.92)			
Parent education									
No college degree	1.58 (0.74, 3.41)	2.11 (0.76, 5.82)	1.19 (0.52, 2.73)	1.32 (0.43, 4.08)	1.71 (0.69, 4.21)	1.50 (0.43, 5.28)			
College degree	1.0 (reference)	1.0 (reference)	1.0 (reference)	1.0 (reference)	1.0 (reference)	1.0 (reference)	1.0 (reference)	1.0 (reference)	1.0 (reference)
Annual household income									

Baseline Correlates	“A Lot” Helpful to Reduce Television Viewing		“A Lot” Helpful to Decrease Sugar-Sweetened Beverage Intake		“A Lot” Helpful to Decrease Fast Food Intake	
	OR (95%CI) ^b	AOR (95% CI) ^b	OR (95% CI)	AOR (95%CI) ^b	OR (95% CI)	AOR (95%CI) ^b
\$50 000 or less	2.23 (0.98, 5.07)	3.60 (1.03, 12.55)	1.61 (0.65, 3.97)	2.20 (0.66, 7.29)	2.69 (0.99, 7.33)	3.04 (0.83, 11.13)
\$50 001	1.0 (reference)	1.0 (reference)	1.0 (reference)	1.0 (reference)	1.0 (reference)	1.0 (reference)
Marital status						
Not married	0.97 (0.39, 2.37)	0.29 (0.08, 1.10)	0.69 (0.27, 1.77)	0.34 (0.09, 1.33)	1.49 (0.51, 4.33)	0.69 (0.16, 2.95)
Married	1.0 (reference)	1.0 (reference)	1.0 (reference)	1.0 (reference)	1.0 (reference)	1.0 (reference)
Country of birth						
Foreign born	4.90 (2.00, 12.01)	8.81 (2.44, 31.80)	2.24 (0.87, 5.77)	3.32 (1.02, 10.79)	1.18 (0.46, 3.02)	1.97 (0.55, 7.02)
US born	1.0 (reference)	1.0 (reference)	1.0 (reference)	1.0 (reference)	1.0 (reference)	1.0 (reference)

Abbreviations: OR, odds ratio; CI, confidence interval; AOR, adjusted odds ratio.

^aData from 253 intervention participants in the High Five for Kids study.

^bAdjusted for child age, sex, race/ethnicity, and baseline BMI category; child baseline behaviors; parent baseline BMI, education, marital status, US born, and household income.

Table 4Unadjusted and Multivariable-Adjusted Correlates of Intervention Satisfaction.^a

	<u>Very Satisfied With High Five for Kids</u>		<u>Increased Satisfaction With Child's Primary Care</u>	
	OR (95% CI)	AOR ^b (95% CI)	OR (95% CI)	AOR ^b (95% CI)
Child correlates				
Age				
<60 Months	1.0 (reference)	1.0 (reference)	1.0 (reference)	1.0 (reference)
60 Months	1.36 (0.82, 2.27)	1.48 (0.85, 2.56)	1.12 (0.67, 1.88)	1.13 (0.64, 1.97)
Sex				
Male	1.0 (reference)	1.0 (reference)	1.0 (reference)	1.0 (reference)
Female	0.54 (0.32, 0.90)	0.49 (0.28, 0.85)	0.97 (0.58, 1.62)	1.02 (0.58, 1.79)
Race/Ethnicity				
Black	0.79 (0.41, 1.55)	0.43 (0.20, 0.95)	1.07 (0.56, 2.07)	0.62 (0.28, 1.34)
Latino	0.91 (0.45, 1.86)	0.52 (0.22, 1.21)	0.65 (0.32, 1.30)	0.32 (0.14, 0.77)
Other	0.81 (0.29, 2.27)	0.77 (0.23, 2.55)	1.42 (0.46, 4.32)	1.08 (0.30, 3.83)
White	1.0 (reference)	1.0 (reference)	1.0 (reference)	1.0 (reference)
BMI category				
85th–94th Percentile	1.0 (reference)	1.0 (reference)	1.0 (reference)	1.0 (reference)
95th Percentile	1.63 (0.98, 2.72)	1.55 (0.90, 2.68)	2.33 (1.38, 3.93)	2.15 (1.22, 3.77)
Household (HH)				
Parent BMI (kg/m ²)				
<30	1.0 (reference)	1.0 (reference)	1.0 (reference)	1.0 (reference)
Obese (≥ 30)	1.08 (0.64, 1.82)	1.16 (0.65, 2.08)	1.71 (1.01, 2.89)	1.99 (1.10, 3.63)
Parent education				
No college degree	1.46 (0.87, 2.46)	0.98 (0.49, 1.96)	1.18 (0.70, 1.99)	0.68 (0.33, 1.39)
College graduate	1.0 (reference)	1.0 (reference)	1.0 (reference)	1.0 (reference)
Annual HH income				
\$50 000 or less	1.85 (1.05, 3.25)	1.59 (0.76, 3.34)	2.23 (1.25, 3.97)	3.42 (1.53, 7.64)
\$50 001	1.0 (reference)	1.0 (reference)	1.0 (reference)	1.0 (reference)
Marital status				
Not married	1.98 (1.07, 3.67)	1.75 (0.78, 3.90)	1.36 (0.74, 2.49)	1.02 (0.44, 2.37)
Married	1.0 (reference)	1.0 (reference)	1.0 (reference)	1.0 (reference)
Country of birth				
Foreign born	1.18 (0.66, 2.12)	1.48 (0.73, 3.00)	1.74 (0.94, 3.22)	2.23 (1.06, 4.69)
US born	1.0 (reference)	1.0 (reference)	1.0 (reference)	1.0 (reference)

Abbreviations: OR, odds ratio; CI, confidence interval; AOR, adjusted odds ratio.

^aData from 253 intervention participants in the High Five for Kids study.^bAdjusted for child age, sex, race/ethnicity, and baseline BMI category; parent baseline BMI, education, marital status, US born, and household income