The Risk of Obesity for Children with Obese Mothers is Greater for Latinos and African Americans than Whites from Low-Income Households

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Introduction

Objective
To investigate whether the magnitude of the increased obesity risk from having an obese mother is greater for children from certain racial/ethnic groups.

Background
Childhood obesity is associated with multiple health risks including type 2 diabetes, cardiovascular disease, and certain types of cancers (e.g., Weihrauch-Blüher, Schwarz, & Klusmann 2019). Paternal and maternal weight status, as assessed by BMI or obese status, are well-established risk factors for childhood obesity e.g., Classen & Thompson, 2016). African American and Latinx children appear to be at a higher risk of obesity than White and Asian children (e.g., Cockrell Skinner et al., 2018). Little investigation has been done into whether the link between parental and childhood obesity differs across racial/ethnic groups.

Since 2013, the California Family Health Study telephone survey has been administered annually by California's SNAP-Ed program, CalFresh Healthy Living. The survey includes questions about height and weight, asked of low-income California adults and their children. The current study made use of three years of California Family Health Study data to assess the magnitude of children's risk for obesity, associated with having an obese mother, across four racial/ethnic groups: Latinx, African American, White, and children of other and unreported races/ethnicities ("Other/Missing").

Methods

Participants and Procedure
Households from all 58 California counties were randomly selected from the California Department of Health Care Services Medi-Cal Eligibility Data System database. Participants were 5,484 children (50.3% female, 49.7% male) who provided valid height and weight data in the 2015, 2016, or 2017 administrations of the California Family Health Study and the children's low-income, female caregivers.

Children's race/ethnicity was 67.1% Latinx, 14.6% White, 14.4% African American, and 3.9% Other/Missing races/ethnicities.

Households were mailed an introductory letter, followed by a recruitment call. Households that agreed to participate received a packet including a tape measure for measuring height and instructions for measuring children's and adults' height.

Interviews were first conducted with mothers, who were asked permission to speak with children at the end of their interviews. Children 9 to 11 years old completed the interview with their caregivers on the phone for verification of responses. Caregivers of 6-to-8-year-olds were asked to give answers with their children on the phone for verification. Adult caregivers provided all responses for 5-year-olds.

Trained interviewers asked respondents three questions that were used in analyses:

- "How much do you [does CHILD'S NAME] weigh without your [HER/HIS] shoes on?"
- "How tall are you [is CHILD'S NAME] without your [HER/HIS] shoes on?"
- "Did you use the tape measure that was provided in the package to measure your [HER/HIS] height?"

Adults reported their highest level of education. All participants were asked to report age and gender.

Variables
BMI was computed as weight in kilograms divided by height in meters squared. Adult BMI was categorized using CDC cutoffs and children's BMI was categorized according to the CDC growth charts, using the CDC's (2019) SAS macro. Children at or above the 95th percentile of BMI for age and gender were categorized as obese. Race/ethnicity was categorized as Latinx, African American, White, or Other/Missing and effect coded for analyses with White as the reference category. The dichotomous tape measure variable was used as reported by participants (used tape measure: Yes vs. No). Age was centered on the mean for analysis and adults' levels of education were dummy coded such that some college or greater was the reference category whereas high school diploma and less than a high school diploma were coded as comparison categories. Caregivers' obesity status was dummy coded as obese vs. not obese.

Analyses
All 5,484 children who provided valid responses in the interview were included in the computation of child obesity odds and prevalence rate estimates by race/ethnicity. A logistic regression model was used, with child obesity status entered as the outcome, race/ethnicity entered as the predictor of interest, and age, gender, caregivers' education level, and use of the tape measure entered as control variables. The exponentiated logistic regression coefficients and their standard errors were used to calculate obesity prevalence rates for the four racial/ethnic categories. Confidence intervals were calculated using the Wald method.

Sixty-nine children were excluded from further analysis on the basis of outlier height or weight values (with cutoffs at the 3rd and 97th percentiles) or missing caregiver's BMI.

To assess the magnitude of obesity risk by mother's obesity status and race/ethnicity, a logistic regression was conducted with child obesity status as the outcome, caregiver obesity status and race/ethnicity as predictors.

Statistically significant differences between the odds ratios (alpha 0.05; critical value 1.96 for two-sided test) were identified by calculating the difference of the log odds over the square root of the sum of the reciprocals of the per group sizes.

Results

Odds and Prevalence Estimates
The adjusted childhood obesity rate was 25.2%. Examining obesity by racial/ethnic groups revealed greater odds for Latino and African American children, compared with White children.

Table 1. *Estimated odds and prevalences for child obesity by race/ethnicity.*

Race/Ethnicity	*n*	Adjusted Odds Ratio (95% CI)	Adjusted Prevalence (95% CI)
Latinx	3,683	1.69 (1.37 – 2.07)	28.8 (24.8 – 33.1)
African American	790	1.95 (1.53 – 2.48)	31.8 (26.8 – 37.2)
White	212	Reference	19.3 (16.5 – 22.5)
Other/Missing	799	1.20 (0.82 – 1.77)	22.3 (16.4 – 29.7)
Overall	5,484	--	25.2 (24.0 – 26.6)

As hypothesized, children with obese mothers were more likely to be obese regardless of ethnicity, age, gender, mother's highest level of education, and use of the study-supplied tape measure to assess height.

For the analyses of white, Latino, and African American children, odds ratios greater than 1.00 represent the increased risk of childhood obesity based on having an obese mother.

The increased odds of childhood obesity for having an obese mother were significantly greater for African American and Latino children than for White children.

Table 2. ***C****hild obesity odds and prevalences by race/ethnicity and mother's weight status.*

Race/Ethnicity	*n*	Adjusted Odds Ratio (95% CI) Obese Mother	Adjusted Prevalence (95% CI) Obese Mother	Adjusted Prevalence (95% CI) Non-obese Mother
Latinx	3,632	2.16 (1.86 – 2.52)*	36.8 (33.4 – 40.4)	21.2 (19.3 – 23.4)
African American	782	1.98 (1.43 – 2.74)*	34.6 (27.7 – 42.2)	21.1 (16.3 – 26.8)
White	789	1.45 (1.00 – 2.12)*	26.3 (19.6 – 34.3)	19.7 (15.0 – 25.5)
Other/Missing	212	❖	❖	❖
Overall	5,415	2.04 (1.80 – 2.31)	32.5 (29.8 – 35.3)	19.1 (17.1 – 21.3)

**Odds ratio for Whites < odds ratios for Latinx and African American children, p ≤ 0.01, calculated by difference of the log odds over the square root of the sum of the reciprocals of the per group sizes.*
❖ *Estimate unstable.*

Discussion

One-fourth of children 5 to 11 years and one-fifth of children 12 to 17 years from low-income households in California are obese. In line with past research, White children were less likely to be obese than Latino and African American children.

Our prevalence findings are subject to self-report biases. Yet, the comparative finding of increased risk of obesity for children with obese mothers for Latino and African American children is less subject to invalidity, as any bias due to self reporting of height and weight would be expected to be present across racial and ethnic groups included in the study.

We found that the increased risk of obesity for Latino and African American children whose female caregivers were obese was greater than that for White children with obese caregivers. Our study uniquely contributes to the research literature by demonstrating that disparities across racial/ethnic groups extend to disparities in risk. That is, having an obese mother significantly increases a child's risk of obesity, but the risk is statistically greater for Latino and African American children than it is for White children.

Nutrition educators and policy, systems, and environmental change interventions have the potential to impact environmental factors in households and communities. The current finding suggest that interventions should be targeted to meet the needs of families with Latinx and African American children.

References

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