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Adolescent Health

Weight Misperception among African American Adolescents: The Jackson Heart KIDS Pilot Study

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Background: Weight misperception is a common problem among adolescents; however, few studies have examined contributing factors among an exclusively African American population. The purpose of this study was to examine factors associated with weight misperception among 12- to 19-year-old participants in the Jackson Heart KIDS Pilot Study (JHS-KIDS).

Methods: Data were drawn from JHS-KIDS, a prospective, observational examination of cardiovascular-related risk factors among African American adolescents who were children or grandchildren of participants in the Jackson Heart Study. Adolescent weight misperception – discordance between measured weight status and perceived weight status – was the primary outcome of interest. Self-reported weight control behaviors, parent concerns about adolescents' weight, parent-perceived responsibility for adolescent's weight and daily hassles were the primary independent variables of interest.

Results: The analytic sample was equally divided by females (n=107) and males (n=105) and one third of study participants (33.5%) had discordance between their actual and perceived weight. Results from fully adjusted sex-stratified modified Poisson regression models indicated that weight behavior control was significant among females (PR = .66, 95%CI:1.20-2.30). Parental concerns about child weight were significant for males. Each additional point increase in the parent's concern about their weight score was associated with a 9% increase in the adjusted prevalence of weight misperception among males (95%CI: 1.03-1.16).

Conclusions: The sex-specific patterns in this study highlight heterogeneity among African American adolescents and an urgent need to consider sex and gender when developing targeted interventions for youth who are at high risk for weight misperceptions and unhealthy weight control practices. *Ethn Dis*. 2021;31(3):461-468; doi:10.18865/ed.31.3.461

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Introduction

In 2015, the Robert Wood Johnson Foundation announced a second 10-year, $500 million commitment to childhood obesity to ensure that all children have the opportunity to grow up at a healthy weight.[1] Underserved, higher-risk populations and early childhood prevention strategies were emphasized in an effort to address the disproportionately high prevalence of overweight and obesity among groups such as African American adolescents in the United States (US).[2] Despite this significant investment, the proportion of youth with overweight and obesity continues to be alarmingly high.[2,3] There is a critical need to elucidate factors that serve as barriers and facilitators to healthy weight management practices among youth, especially those who are more likely to experience overweight and obesity early in the life course.

Body weight perception is widely recognized as a predictor of weight management practices among adolescents.[4] Weight misperception – discordance between perceived and

actual weight[5] – can significantly contribute to unhealthy weight management behaviors. Adolescents who overestimate their body weight may engage in excessive caloric restrictions and behaviors related to eating disorders, whereas those who underestimate their body weight are less likely to take appropriate steps to reduce excessive weight gain and risks for early chronic disease onset.[6] As overweight and obesity prevalence rates have increased over the past 30 years, there has also been a concomitant increase in adolescent weight misperception. Results from recent studies indicate that, of the overweight and obese children and adolescents, 77% and 43%, respectively, misperceive their weight to be within the healthy range. [7,8] Further, a recent analysis of data from adolescent participants in the National Health and Nutrition Examination Survey demonstrated that trends in weight misperceptions are increasing.[9] Lu and colleagues[9] also noted that trends in weight misperception among White adolescents were slightly more pronounced than African American adolescents. Nonetheless, these findings are concerning for African Americans youth given that the prevalence of obesity among this group (22.0%) exceeds the corresponding prevalence (14.1%) for their White peers.[2]

There is a critical need to elucidate factors that serve as barriers and facilitators to healthy weight management practices among youth, especially those who are more likely to experience overweight and obesity early in the life course.

Parental perceptions and concerns about child weight status are generally thought to influence adolescent weight perceptions, particularly since parents have influence over food availability and dietary intake.[10-13] Studies have also shown that nearly 50% of parents with overweight children describe them as normal weight.[14] Parental misperception can influence the weight management practices of youth[10,11,15-17]; however, studies also suggest that parent perception of their child as overweight can paradoxically increase the risk of future child weight gain.[16,18,19]

Previous studies have identified factors associated with racial/ethnic differences in accurate weight perceptions[4,20]; however, no studies to our knowledge have explored the heterogeneity of these factors among African American youth and their parents. Examining factors associated with weight misperception among African American youth is critical given the high prevalence of obesity among this group and the association between weight perception and weight-related behaviors among adolescents.[8,13] The purpose of this study was to examine factors associated with weight misperception among African American adolescent participants in the Jackson Heart KIDS Pilot Study (JHS-KIDS).

Methods

Data for the present study were drawn from JHS-KIDS, a cohort feasibility study of cardiovascular disease (CVD) risk factors among 12- to 19-year-old adolescents who were children and grandchildren of participants in the Jackson Heart Study (JHS)–the largest single-site cohort study of CVD among African Americans.[21,22] This study was approved by the University of Mississippi Medical Center Institutional Review Board (IRB) and all procedures followed were in accordance with the ethical standards of the IRB and the Helsinki Declaration of 1975, as revised in 2000. The JHS-KIDS sample was derived from the pool of JHS participants who indicated during the third wave of data collection that they had children or grandchildren aged <18 years who lived with them (or had lived with them in the past year).[23] Recruitment approaches undergirded by three theoretical perspectives, Diffusion of Innovation Theory, Strength of Weak Ties, and Marketing Theory, were utilized to form the study sample.[23] Eligible youth and a parent or grandparent who expressed interest in participating received further information about the study and completed consent and assent forms prior to data collection. Adolescents had their blood pressure, height, weight, and waist

circumference measured by trained data collectors; the procedures used for measuring weight and height are described elsewere.[24-26] Participants were also asked to complete a number of self-report measures regarding their health and health-related behaviors. The accompanying parent or grandparent, regardless of their participation in JHS, had their blood pressure, height and weight measured and were asked to complete the Childhood Feeding Questionnaire. A total of 212 adolescents participated in the pilot study which consisted of 107 females and 105 males.

Outcome Variables

Adolescent weight misperception was the primary outcome for this study and was defined as the lack of agreement between measured weight status and perceived weight status. Measured weight status was a three-category variable derived from a transformation of crude body mass index (BMI = measured weight in kilograms/ height in meters squared)[27] to z-scores using the lambda-mu-sigma (LMS) method, allowing for the development of smoothed growth using the curves and the efficient calculation of z-scores simultaneously.[28,29] Z-scores were standardized to the reference population for participants' age and sex using the 2000 Centers for Disease Control and Prevention Growth Charts in the United States.[30,31] The three categories aligned with the cutpoints for 12- to 18-year-old participants specified by Childhood Obesity Working Group of the International Obesity Taskforce[32] were normal weight (BMI < 85th percentile), overweight (85th percentile ≤ BMI < 95th percentile), and obese (BMI ≥ 95th percentile). The three weight status categories for study participants aged 19 years were normal weight (BMI <25), overweight (25 ≤ BMI < 30) and obese (BMI ≥ 30). Perceived weight status was derived from an item asking adolescent participants to describe their weight. The responses "very underweight," "slightly underweight," and "about the right weight" were collapsed into an underweight/normal weight category, while the "slightly overweight" and "very overweight" responses were assigned to overweight and obese categories, respectively. Adolescent weight misperception was derived as a dichotomous variable that was coded "1" when the measured weight status and perceived weight status were discordant and was coded "0" when they were concordant.

Independent Variables

Adolescent measures in this study included daily hassles and weight behavior control. Daily hassles are everyday minor stresses that are experienced as irritating and frustrating demands that occur during everyday transactions.[33] Daily hassles were measured with a modified version of the original 26-item Daily Hassles for Adolescents Scale.[34,35] An 18-item measure from a self-report inventory was utilized to reflect day-to-day concerns of adolescents.[8] Respondents were asked to rate the extent to which each item was a hassle during the past week using a 4-point scale (1= not at all a hassle, 4 = very big hassle). Adolescents responded to items regarding hassles with parents/family members (eg, "conflict with parents about leisure time"), academic/school (eg, "keeping up with school work") and social/peers (eg, "not being part of the popular group"). Responses were summed to create a cumulative index of the overall number of daily hassles. The internal consistency for the cumulative score was .79.

Weight behavior control was a composite measure of responses to items asking if respondents ever attempted to lose weight by exercising, eating less, fasting, using dietary supplements, or purging using a dichotomous, "yes"/"no" response options (1 = yes, 0 = no). The responses were summed to create a weight behavior control score.

The parent/grandparent measures were drawn from a subscale of the Child Feeding Questionnaire.[36] The concern about child weight variable was the sum of responses to three items about the participating parent's or grandparent's concerns about the adolescent respondent's risk for obesity. The items associated with this subscale asked accompanying parents and grandparents how concerned they were about their child/ grandchild eating too much when they were not around them; having to diet to maintain a desirable weight; and becoming overweight. The five response categories ranged from unconcerned (coded 0) to very concerned (coded 4) The parent's "perceived responsibility for food served" variable was a composite of three items asking participating parents and grandparents about their responsibility for the quality and quantity of food served to their child. The questions for this subscale

Table 1. Characteristics of participants in the Jackson Heart KIDS Pilot Study for the total sample and by sex

Variable	Total Sample, N=212	Females, N=107	Males, N=105	P
Male adolescent	49.5			
Age, years, mean ± SD	15.2 ± 2.2	15.2 ± 2.1	15.1 ± 2.2	.93
Parent education, %				.43
Up to high school diploma	20.3	17.8	22.9	
Associate degree/some college	22.6	19.6	25.7	
Baccalaureate degree	33.5	37.4	29.5	
Graduate degree/some graduate school	23.6	25.2	21.9	
Adolescent hassles, mean ± SD	24.4 ± 10.3	25.4 ± 10.0	23.5 ± 10.5	.18
Weight control score, mean ± SD	1.5 ± 1.1	1.8 ± 1.0	1.2 ± 1.0	<.001
Parent/grandparent concerns about child weight, mean ± SD	5.4 ± 4.3	5.9 ± 4.3	5.0 ± 4.2	.10
Parent/grandparent perceived responsibility, mean ± SD	8.2 ± 3.5	7.8 ± 3.6	8.5 ± 3.3	.11
Measured weight status, %				.31
Normal weight	46.2	41.1	51.4	
Overweight	30.2	33.6	26.7	
Obese	23.6	25.2	21.9	
Adolescent perceived weight status, %				.05
Normal weight	63.2	55.1	71.4	
Overweight	29.3	35.5	22.9	
Obese	7.6	9.4	5.7	
Adolescent weight misperception, %	33.5	31.8	35.2	.59

asked the parent or grandparent how often they were: 1) responsible for feeding their child/grandchild; 2) responsible for deciding portion sizes for their child/grandchild; and 3) responsible for deciding if their child/grandchild had eaten the right kind of foods. The five response categories for this item ranged from never (coded 0) to always (coded 4).

Other covariates in this analysis included child sex, child age, and the education level of the participating parent/grandparent. Child sex was a self-reported dichotomous variable with males coded as "1." Child age was based on self-report at the time of study enrollment. Parents/grandparents were asked to report their highest level of education. Responses ranged from less than high school (coded 1) to doctorate (coded 8). The number of responses for each category were small in some cases; therefore, data were collapsed into four categories: Up to High School Diploma, Associate Degree/Some College, Baccalaureate Degree, Graduate Degree/Some Graduate School.

Analytic Strategy

Sample characteristics were described for the total sample using means and standard deviations for continuous variables and proportions for categorical variables. Chi square tests for categorical variables and Student's t test for continuous variables were used to examine proportional and mean differences for the independent variables by sex. The prevalence of our outcome variable was >10%, therefore a Modified Poisson regression with robust standard errors was utilized to estimate prevalence ratios (PR) and corresponding 95% CIs.[37-39] For all analyses, Ps<.05 were considered statistically significant and statistical tests were two-sided. All statistical analyses were completed using STATA statistical software, Version 15.

Results

Sample characteristics of African American adolescents in the JHS-KIDS for the total sample and by sex are shown in Table 1. The mean age for sample members was 15.2±2.2 years, and the study sample was equally divided between females and males. Over half of the adolescents in the sample (53.8%) were overweight or obese and one-third of the sample members (33.5%) had discordance between their actual and perceived weight. Approximately one-third (31.6%) of the sample underreport-

Table 2. Modified Poisson Regression of weight misperception for the total sample and by sex for adolescents in the Jackson Heart KIDS Pilot Study

Variable		Stratified by Sex	
	Total Sample, N=212	Females only, n=107	Males only, n=105
	PR(95%CI)	PR(95%CI)	PR(95%CI)
Male	1.36(.95-1.96)	---	---
Age (years)	.97(.89-1.07)	.98(.85-1.12)	.96(.86-1.08)
Associate degree/some college	1.15(.62-2.13)	2.72(.84-8.79)	.57(.24-1.35)
Baccalaureate degree	1.25(.71-2.17)	1.71(.54-5.46)	1.06(.57-1.97)
Graduate degree/some graduate school	1.13(.63-2.07)	2.05(.61-6.88)	.76(.38-1.54)
Adolescent hassles	1.00(.98-1.02)	1.00(.97-1.02)	1.00(.98-1.03)
Weight control score	1.30(1.10-1.55)	1.66(1.20-2.30)	1.12(.90-1.39)
Parent/grandparent concern about child weight	1.05(1.00-1.11)	1.00(.94-1.07)	1.09(1.03-1.16)
Parent/grandparent perceived responsibility	1.00(.95-1.07)	1.04(.96-1.14)	.97(.89-1.06)

PR, prevalence ratio; CI, confidence interval.
Significance was determined based on confidence intervals.

ed their body weight and fasting was the most prevalent unhealthy weight control behavior (15.6%) (data not shown). The average daily hassles score for adolescents in the sample was 24.4±10.3, and the mean weight behavior control score for this group was 1.5±1.1. Slightly more than half of parents/grandparents earned at least a baccalaureate degree. The average parent/grandparent concerns about child weight score was 5.4±4.3, and their perceived responsibility for food served to child score was 8.2±3.5. Few sex differences were noted as adolescent females and males were similar across most of the variables in the analysis. The exceptions were weight control behavior and adolescent perceived weight status. Adolescent females had a higher average weight control behavior score (1.8±1.1) than adolescent males in the sample (1.2±1.1). Table 1 also highlights sex differences in perceived weight status among adolescents in the study. Compared with females, a higher proportion of adolescent males perceived their weight status as normal (71.4% vs 55.1%) and a lower percentage who perceived themselves as overweight (22.9% vs 35.5%) or obese (5.7% vs 9.4%).

The association between adolescent weight misperception and selected characteristics are shown in Table 2 for the total sample and stratified by sex. Weight behavior control and parent/grandparent concern about child weight were positively related to weight misperception among adolescents in the study. Each additional point increase in the weight behavior control and parent concern about child weight scores was associated with 30% (CI: 1.10-1.55) and 5% (CI: 1.00-1.11) increases, respectively, in the adjusted prevalence in weight misperception. The sex-stratified models in Table 2 indicate that weight behavior control was significant among females. A point increase in the weight behavior control score was associated with a 66% (CI: 1.20-2.30) increase in the adjusted prevalence in weight misperception among this group. Parent concerns about child weight was significant for males, and each additional point increase in the parent concern about child weight score was associated with a 9% (CI: 1.03-1.16) increase in the adjusted prevalence in weight misperception among adolescent males.

Discussion

African American children and adolescents continue to represent a disproportionately large segment of youth with overweight and obesity; research examining factors associated with these patterns is underdeveloped.[23,24] Body weight perception contributes to weight management and control and to our knowledge, our study was the first to evaluate factors associated with weight misperceptions among an exclusively African American adolescent sample.

Results from our analyses indicated that weight control behavior and parental/grandparental concern about child weight were associated with weight misperception; however, attempts to control weight were associated with weight misperception among adolescent females. Parental/grandparental concerns about child weight was only a significant factor for males in the study. Results from this study demonstrate how patterns in subgroup analyses can be masked in pooled analysis. The sex-specific patterns present in this study highlight an urgent need for future studies to consider sex and gender and the potential implications for weight misperception and other weight-related outcomes among African American adolescents.

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Racial and ethnic disparities in adolescent weight misperceptions have been well-documented in the scientific literature[4,20]; however, factors associated with weight misperception among an exclusively African American adolescent population have not been examined. Data from nationally representative, stratified, diverse samples of adolescents showed that African American males and females have greater odds of underestimating their body weight, and are at a lower risk of unhealthy weight control practices than peers from other racial and ethnic groups.[4,20] Analyses of our exclusively African American sample was congruent with the relatively high prevalence of weight misperception, but illustrated that African American girls practiced unhealthy weight control practices at rates higher than found in comparative studies.

Parents have a substantial impact on the development of adolescent health behavior, and family structure and dynamics can also influence weight perceptions of adolescents.[40,41] Parental perceptions of child weight status are important for the management of child obesity; however, most parents do not accurately perceive their child's weight.[12,42] Indeed, studies have shown that more than half of all parents of children with overweight and obesity either underestimate their child's weight status or are not concerned with the risks associated with childhood obesity.[36,43-45] Gender may be a factor influencing parental child weight concern as results from our study indicated that the association between parental concern for child weight and weight misperception was only significant for adolescent males.

Study Limitations

Results from this study are noteworthy because they illuminate some potentially fruitful avenues of inquiry. However, there are limitations worth mentioning. The analytic models are estimated using cross-sectional data and causality and temporal order cannot be inferred when interpreting findings. Second, participants in the JHS KIDS study resided in a Deep South state and were descendants of individuals in a longitudinal study. Results from this study may not be generalizable to African American adolescents in other regions of the United States or a larger population of individuals aged between 12 and 19 years. Third, data for these analyses were drawn from a small pilot study and the number of variables included in the regression models were limited. Finally, several key variables were measured using self-reported questionnaires. For example, as noted in other studies, the Child Feeding Questionnaire is a validated measure[36]; however, the items in the perceived child weight subscale are asked in a manner that could be subject to recall bias.[12]

Conclusions

Our study is one of a few reporting data from an exclusively African American adolescent sample that was equally represented by males and females and included information from an accompanying parent or grandparent. Our outcome measures were collected by trained research staff which eliminated reporting bias often associated with studies using self-report data. The age groups examined in our study crossed pubertal developmental stages and spanned periods when health concerns and

excess weight become noticeable. Our study demonstrated sex differences in factors that contribute to weight misperceptions among African American adolescents and their parents. These findings are relevant for the development of targeted weight control interventions and prevent unhealthy weight control behaviors among African American youth.

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Conflict of Interest

No conflicts of interest to report.

Author Contributions

Research concept and design: Beech, Bruce; Acquisition of data: Beech, Bruce; Data analysis and interpretation: Beech, Bruce, Cohen-Winans, Harris, Jones, Tyrone, Thorpe; Manuscript draft: Beech, Bruce, Cohen-Winans, Harris, Jones, Tyrone, Thorpe; Statistical expertise: Beech, Bruce, Thorpe; Acquisition of funding: Beech; Administrative: Cohen-Winans, Harris, Jones, Tyrone; Supervision: Beech, Bruce, Thorpe

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