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Mental Health Problems and Overweight in a Nationally Representative Sample of Adolescents: Effects of Race and Ethnicity

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Abstract

OBJECTIVES—In this study we examined the relation between mental health problems and weight in a population-based study of youth aged 12 to 17 years and whether the association between mental health problems and weight is moderated by race and ethnicity.

METHODS—We used 2003 National Survey on Children's Health data. Logistic regression was used to arrive at adjusted odds ratios showing the relation between BMI and mental health problems.

RESULTS—Compared with their nonoverweight counterparts, both white and Hispanic youth who were overweight were significantly more likely to report depression or anxiety, feelings of worthlessness or inferiority, behavior problems, and bullying of others. Odds ratios relating mental health problems and BMI in black subjects were not statistically significant except for physician diagnosis of depression.

CONCLUSIONS—Our results suggest that, when addressing youth overweight status, mental health problems also need to be addressed. Given that the relationship between mental health problems and youth overweight differs according to race/ethnic group, public health programs that target overweight youth should be cognizant of potential comorbid mental health problems and that race/ethnicity may play a role in the relationship between mental health and overweight status.

Keywords

adolescent health; black; Latino health; mental health; obesity

Adolescent obesity is a growing epidemic in the United States that is known to present a risk for a number of adverse physical outcomes, including type 2 diabetes mellitus, hypertension, musculoskeletal problems, and, more recently, mental health problems.^{1,2} The relationship between obesity and mental health has been documented nationally and internationally in adults and children.^{3–6} Obese children are more likely to suffer from psychiatric disorders,⁷ depression,⁸ behavior problems,⁹ and social marginalization,¹⁰ and obese children are often victims of bullying.¹¹ Findings from a study by Kolody and Sallis¹² provided evidence for

a concomitant increase in negative psychological outcomes and BMI over a 1-year period in preadolescent children.

Concern about body weight has been shown to mediate the relationship between BMI and mental health outcomes.¹³ Youth, especially girls, who are concerned about their weight are more likely to experience depressive symptoms than children who are overweight or obese but who are not concerned about their weight.¹⁴ The current literature shows that black youth, both boys and girls, are more likely to be overweight or obese compared with white girls¹⁵; however, they are also more likely to perceive themselves as being of normal weight and have less desire to be thin compared with white boys and girls.^{16,17} In addition, obese black youth report lower levels of impairments in body esteem associated with perceived body image compared with non-Hispanic, white youth.¹⁸ Therefore, we hypothesized that the relation between the presence of mental health problems and weight status is stronger in white youth compared with black youth.

This study examined the relation between comorbid mental health problems and youth weight status in a population-based study of youth aged 12 to 17 years and examined whether the association between mental health problems and weight status was moderated by race and ethnicity.

METHODS

Sample

We used the National Survey of Children's Health (NSCH; conducted by the National Center for Health Statistics, Centers for Disease Control and Prevention [CDC]) survey data. This survey is a module of the State and Local Area Integrated Telephone Survey Program. The survey includes data on physical, emotional, and behavioral health indicators for children in the United States. The response rate for the survey was 55.3%. A stratified sampling frame was used; data were sampled within each state. Respondents were parents reporting on behalf of their children. We restricted the sample to youth between the ages of 12 and 17 years whose parents reported that their child was white, black, or Hispanic. The survey was conducted in Spanish for respondents who preferred this language.

Measures

We examined 3 dimensions of mental health and well-being, including (1) anxiety, depression, and stress coping, (2) self-worth, and (3) behavior problems.

Anxiety, Depression, and Stress Coping

The following questions were included in the survey:

1. Has a health professional ever told you that your child has a problem with depression or anxiety?
2. Are you currently concerned, a lot, a little or not at all about how she/he copes with stressful things?

Self-worth

The following points were included in the survey:

1. He/she feels worthless or inferior (never, sometimes, usually, always).
2. Are you currently concerned a lot, a little, or not at all about your child's self-esteem?

Behavior Problems

The following points were included in the survey:

1. Has a health professional ever told you that your child has a behavior problem?
2. Your child is withdrawn and does not get along with others (never, sometimes, usually, or always).
3. Your child bullies or is cruel or mean to others (never, sometimes, usually, or always).

Several measures of anxiety and depression were available in the National Center for Health Statistics data and were all highly correlated (were significant in χ^2 tests at a P value of .05). We selected the most objective measure of depression and anxiety (report of physician diagnosis).

Because few parents indicated that their child was in the “usually” or “always” category, mental health items with response categories (never, sometimes, usually, or always) were collapsed into a dichotomous variable with 2 categories: never and sometimes/usually/always. Mental health items with response categories (a lot, a little, or never) were collapsed into a dichotomous variable with 2 categories: never and a little/a lot.

Main Effect—Parent respondents were asked the height and weight of their children. BMI was calculated using the CDC age-and gender-specific percentiles based on the CDC 2000 reference criteria. Youth were classified as underweight, normal, overweight, or obese. We further collapsed BMI into 2 categories: overweight (BMI ≥ 95th percentile) and not overweight (BMI < 95th percentile). Children who were underweight (BMI < 5th percentile) were excluded from the analysis.

Control Variables—All of the analyses accounted for sociodemographic confounding variables known to be related to youth overweight and mental health problems. We controlled for gender, child age in years, indicators of family socioeconomic status (poverty level and highest level of education for any adult family member), and family composition (biological or adoptive parents, 2-parent step-family, single mother, or other) in all of the models.

Analysis

Descriptive statistics were used to examine the distribution of mental health indicators and BMI among the sample of children. Frequencies and percentages presented in this study have been adjusted for the survey weights and the stratified sampling design. Logistic regression was used to arrive at adjusted odds ratios (ORs) showing the relation between BMI and each mental health status indicator.

To assess the role of race/ethnicity as a moderator (the differential effect of race on the relation between BMI classification and mental health outcomes), we conducted logistic regression analyses stratified according to race/ethnic group. Adjusted ORs representing the relation between BMI and each mental health indicator were then calculated within each racial/ethnic group. Because gender is known to be related to perceptions of body weight and potentially to mental health outcomes, all of the ORs expressing the relation between BMI classification and mental health outcomes were adjusted according to gender. Sociodemographic variables were also controlled for in each model by including them in the logistic regression model. All of the analyses were conducted by using Stata (Stata Corp, College Station, TX) survey commands to obtain the correct SEs. The Stata subgroup

command was used to specify the use of race/ethnicity subgroups while preserving the complete design matrix to obtain robust standard errors.

What's Known on This Subject

Obese children are more likely to suffer from depression, behavior problems, and social marginalization and are often victims of bullying. The current literature also indicates a concomitant increase in negative psychological outcomes and BMI over a 1-year period in children.

What This Study Adds

With this study we explored the relation between mental health and overweight and how race/ethnicity moderates this relationship. Understanding the role of race/ethnicity as a moderator of the association between mental health and overweight may help to inform the treatment of overweight adolescents.

RESULTS

Sample Descriptives

A total of 35 184 youth who met the age and ethnicity criteria were included in the sample. Seventy-six percent were white, 17.9% were black, and 5.7% were Hispanic. Fifty percent were boys, more than half (54.8%) lived in a 2-parent home (13.3% lived in a 2-parent step-family), and 26.0% lived in a single parent home. Almost all of the parents reported that their child was in good, very good, or excellent health (96.8%). Two thirds of the families had 1 adult who completed high school or greater (67.2%). Almost 15% (14.7%) of the youth surveyed lived in families declaring themselves below the poverty level.

More than one quarter of the youth in our sample were either obese (13.2%) or overweight (15.5%). A larger percentage of boys were obese (16.6%) or overweight (16.4%) compared with girls (9.8% and 14.0%, respectively; for the χ^2 test: $P < .0001$). Black youth were more likely to be classified as obese (21.2%) or overweight (18.4%) compared with white (10.8% and 14.1%) and Hispanic (15.4% and 18.8%) youth (for the χ^2 tests: $P < .0001$ and $P < .0001$, respectively).

Relation Between Mental Health and BMI

Table 1 displays the percentage of youth in each BMI category, for each mental health condition. Reports of mental health problems increased with increasing BMI; overweight youth had a higher reported occurrence of mental health problems than youth who were classified as normal weight. This relation was true for all of the mental health problems examined in this study. Table 1 also displays adjusted ORs explaining the relation between BMI and mental health indicators. Youth who were overweight were more likely to have been told by a health professional that they suffer from depression (OR: 1.6; $P < .001$), to have problems coping with stress (OR: 1.3; $P < .001$), or to have been told by a health professional that they have a behavior problem (OR: 1.7; $P = .0001$) compared with normal-weight children. Caregivers of youth who were overweight were also ~1.4 times more likely to have concerns about their child's self-worth, self-esteem, or participation in bullying ($P < .0001$).

Effects of Race/Ethnicity on the Relation Between Mental Health and BMI

Table 2 displays the relation between BMI classification and mental health problems according to race/ethnic group. Both white and Hispanic youth who were classified as overweight were significantly more likely to be reported as suffering from depression or anxiety, feeling worthless or inferior, having a behavior problem, and bullying others than their nonoverweight counterparts. Compared with caregivers of nonoverweight youth, caregivers of overweight white and Hispanic youth were more likely to report concern for their child's ability to cope with stress and their child's depression or anxiety. Caregivers of overweight, Hispanic youth were 1.9 times as likely to report concern for their overweight child's self-esteem compared with caregivers of normal-weight Hispanic youth. In general, black youth had a higher occurrence of certain reported mental health problems (eg, coping with stress and anxiety, self-esteem, behavior problems, OR being more likely to bully) compared with white and Hispanic youth, but the occurrence of these problems was unrelated to BMI classification. ORs relating mental health problems and BMI classification in black subjects were not statistically significant.

DISCUSSION

We examined the relation between weight status and reported mental health problems in a population-based sample of adolescents. Our findings showed that reported mental health problems increased with BMI class (normal to overweight). However, the relation between obesity and mental health problems was moderated by race. These findings highlight the need to address psychological health among overweight children.

Despite the higher incidence of mental health comorbidities in black youth, it was unclear why there was no association between mental health problems and BMI classification in the black youth in our sample. Young-Hyman et al¹⁹ found that depression in black children was not associated with their reports of body image dissatisfaction or weight-related teasing, despite the fact that black children in the study reported higher levels of body dissatisfaction. Perhaps there is a constellation of social and demographic factors that place black youth at risk for developing mental health problems, such that little is left to be explained by BMI. In addition, several study findings show that, regardless of weight status, black youth and adults tend to be more satisfied with larger body sizes than other racial groups.^{20,21} Hence, it is possible that overweight black youth are mentally unscathed by their weight status, which highlights the need to understand other factors that influence mental health problems in black youth. A recent qualitative study found that, among black adolescents ages 12 to 18 years, body size preferences were determined by their immediate peer group and that the adolescents in the study were not bothered by negative weight-related comments from peers.²² Other studies have also shown that black youth are less likely to be exposed to messages about thinness from their peers and family and that black boys and girls are more likely to desire a larger body size compared with white youth.²³ Furthermore, black youth are less likely to be bothered by being overweight compared with white youth.²⁴

For most mental health problems examined in this study, overweight Hispanic youth were more than twice as likely to be reported as being diagnosed with or experiencing the problem compared with their normal-weight counterparts. These findings show that Hispanic youth seem to be at particularly high risk of comorbid mental health problems in the presence of overweight.

Body image may play a role in the relationship between mental health problems and overweight status in Hispanic youth. Higher weight status has been shown to be associated with body image dissatisfaction in Mexican-American female youth and with a stronger

affiliation with Mexican culture.²⁵ Robinson et al²⁶ found that Hispanic girls in middle school reported higher body dissatisfaction than white girls.

White youth in this sample were more likely to be reported as experiencing problems with self-worth compared with black and Hispanic youth; however, they were less likely to be reported as experiencing other mental health problems compared with black and Hispanic children. Nevertheless, overweight white youth were moderately more likely to be reported as having mental health problems compared with normal-weight white youth.

Caregivers in this study consistently reported concern for their overweight children's mental health and problem behavior. A recent study by Hacker et al²⁷ showed that parental concern for children's mental health increased the effectiveness of mental health screening services for children. Similar findings have been reported for mental health and behavioral problems in children, showing that parental concerns for their child's behavior resulted in accurate identification of children with mental health problems in the clinical range.²⁸ Thus, parents' concerns seem to be warranted. In a study based on data from a larger age range of children from the same population-based sample used in the present study, caregivers who reported that their child had chronic emotional, behavioral, or developmental problems reported greater caregiver strain (ie, problems with employment and child care arrangements). In addition, children with chronic emotional, behavioral, or developmental problems were significantly more likely to miss school, which may explain the increased reports of caregiver strain.²⁹ These findings suggest that child mental health and behavioral problems may also have consequences for caregivers and families, which may heighten caregiver concern for children's mental health and behavior. Furthermore, the dual burden of overweight status and mental health problems may further exacerbate caregiver strain.

Eaton et al³⁰ found that BMI was significantly associated with suicide ideation in adolescents, and, furthermore, perceived weight status was associated with suicide attempts in black, white, and Hispanic adolescents. Collectively, these and the present study findings highlight the association between BMI and mental health problems as a serious public health concern. These findings underscore the need for mental health prevention and intervention programs targeted at overweight youth and youth at considerable risk for developing overweight and obesity status.

Our study is limited by the nature of the data used in this study, which were based on self-report and may be subject to bias. It is possible that parent respondents did not know the actual heights and weights of their children. In addition, parents may have been unaware of depression or stress and anxiety experienced by their child.

Furthermore, single-survey items typically used in a nationally representative survey may not fully represent the constructs of anxiety and depression, self-worth, and behavior problems. It is known that the national prevalence of depression and anxiety in youth in the United States are ~8.5%³¹ and 13.0%,³² respectively, which indicates that parent underreporting may be an issue in the NSCH study. Although a random sampling design was used when collecting the NSCH survey, Hispanic youth are still underrepresented, and whites are overrepresented.^{33–35}

Smaller sample sizes for the Hispanic population relative to the white and black populations are reflected in the larger SEs (wider confidence intervals); however, the relationship between BMI classification and mental health outcomes in Hispanic youth is evident. The small sample size also limited us from including other racial and ethnic minorities, such as Asian/Pacific Islanders and Native American youth. Because the NSCH was administered over the telephone, families who do not have telephones were also excluded.

Lastly, given the cross-sectional nature of these data, we were not able to infer causality. We could not infer whether mental health conditions caused obesogenic behavior and, subsequently, overweight or whether overweight youth were more inclined to develop mental health conditions or social problems. More research is needed to establish the causal relation between child overweight and mental health problems and the role that race/ethnicity and other factors may play in this relationship. Furthermore, the current literature indicates a relation between gender and mental health problems. Psychological disorders in male adolescents seem to be unrelated to weight status, whereas psychological disorders are more likely to be related to weight status for women.³⁶ The goal of the current study was to highlight the effect of race/ethnicity on the relation between mental health problems and overweight status in youth, so to achieve that goal we adjusted for gender in our models. However, additional studies are needed to disentangle the effects of race/ethnicity, gender, and mental health problems.

Additional studies are also needed to disentangle the relation between confounders of the relationship between mental health problems and youth overweight. Exposure to violence in the home, school, and neighborhood environments may be related to anxiety, depression, and other mental health problems and should be considered in future research.^{37,38}

CONCLUSIONS

Our results suggest that, when addressing youth overweight status, mental health problems also need to be addressed; the comorbidity of these conditions (mental health problems and overweight/obesity) may hinder any efforts at achieving a healthy weight status. Given that the relationship between mental health problems and youth overweight differs according to race/ethnic group, public health programs that target overweight youth should be cognizant of potential comorbid mental health problems and that race/ethnicity may play a role in the relationship between mental health and overweight status.

Abbreviations

NSCH	National Survey of Children's Health
CDC	Centers for Disease Control and Prevention
OR	odds ratio

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TABLE 1

Adjusted ORs Representing the Relation Between BMI and Mental Health Problems

Mental Health Problem	%	OR (95% Confidence Interval)
Anxiety and depression		
Has a health professional ever told you that your child has a problem with depression or anxiety (yes)?		
Not overweight	6.7	Ref
Overweight	11.1	1.6 (1.2–2.0) ^a
Are you currently concerned a <i>lot</i> about how he/she copes with stressful things?	7.1	Ref
Not overweight	28.3	Ref
Overweight	37.0	1.3 (1.2–1.5) ^a
Self-worth		
He/she feels worthless or inferior (sometimes, usually, or always)		
Not overweight	29.8	Ref
Overweight	35.0	1.4 (1.2–1.6) ^b
Are you currently concerned a lot about your child's self-esteem		
Not overweight	27.4	Ref
Overweight	36.2	1.4 (1.3–1.6) ^b
Behavior problems		
Has a doctor told you that your child has a behavior problem?		
Not overweight	5.6	Ref
Overweight	11.5	1.7 (1.4–2.2) ^b
Your child (sometimes, usually, or always) is withdrawn and does not get along with others		
Not overweight	19.1	Ref
Overweight	24.9	1.3 (1.1–1.6) ^a
Your child bullies or is cruel or mean to others (sometimes, usually, or always)		
Not overweight	22.2	Ref
Overweight	29.7	1.4 (1.2–1.6) ^b

For BMI not overweight, $n = 30\,805$. For BMI overweight, $n = 4379$. Data show the level of significance for ORs indicating the relation between BMI and mental health problems. Ref indicates reference data.

^a $P < .01$.

^b $P < .0001$.

TABLE 2
Adjusted ORs Representing the Relation Between BMI and Mental Health Problem According to Race/Ethnicity

Mental Health Problem	White (N = 30 316)		Black (N = 3259)		Hispanic (N = 1609)	
	%	OR (95% CI)	%	OR (95% CI)	%	OR (95% CI)
Anxiety, depression, stress, and coping						
Has a health professional ever told you that your child has a problem with depression or anxiety (yes)?						
Not overweight	7.3	Ref	5.3	Ref	5.7	Ref
Overweight	11.7	1.6 (1.3–2.0) ^a	8.8	(NS)	18.5	2.7 (1.2–6.5) ^b
Are you currently concerned a lot about how he/she copes with stressful things?						
Not overweight	24.8	Ref	40.6	Ref	33.4	Ref
Overweight	31.9	1.4 (1.2–1.6) ^c	46.9	(NS)	52.3	2.3 (1.3–4.0) ^a
Self-worth						
He/she feels worthless or inferior (sometimes, usually, or always).						
Not overweight	32.7	Ref ^c	21.2	Ref	24.2	Ref ^b
Overweight	41.3	1.4 (1.3–1.7) ^c	24.2	(NS)	39.1	1.8 (1.2–3.7) ^b
Are you currently concerned a lot about your child's self-esteem?						
Not overweight	23.2	Ref	43.6	Ref	31.8	Ref
Overweight	29.3	(NS)	48.4	(NS)	47.3	1.9 (1.1–3.4) ^a
Behavior problems						
Has a doctor told you that your child has a behavior problem (yes)?						
Not overweight	5.1	Ref	8.8	Ref	3.3	Ref
Overweight	11.6	1.9 (1.5–2.5) ^c	12.4	(NS)	16.9	5.3 (1.9–14.5) ^a
Your child (sometimes, usually, or always) is withdrawn and does not get along with others.						
Not overweight	17.4	Ref	21.2	Ref	21.7	Ref
Overweight	22.6	1.3 (1.2–1.6) ^c	26.5	(NS)	38.2	1.6 (1.2–2.6) ^a
Your child (sometimes, usually, or always) bullies or is cruel or mean to others.						
Not overweight	20.9	Ref	28.3	Ref	17.9	Ref
Overweight	29.1	1.3 (1.1–1.6) ^a	33.4	(NS)	39.1	2.9 (1.6–5.6) ^a

Reference category was BMI not overweight. Data show the level of significance for ORs, indicating the relation between BMI and mental health problem according to race/ethnicity. NS indicates not significant; Ref, reference data.

^a*P* < .01.
^b*P* < .05.
^c*P* < .0001.