

Associations Between Overweight and Obesity With Bullying Behaviors in School-Aged Children

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ABSTRACT. *Objective.* The prevalence of overweight and obesity in children is rising. Childhood obesity is associated with many negative social and psychological ramifications such as peer aggression. However, the relationship between overweight and obesity status with different forms of bullying behaviors remains unclear. The purpose of this article is to examine these relationships.

Methods. We examined associations between bullying behaviors (physical, verbal, relational, and sexual harassment) with overweight and obesity status in a representative sample of 5749 boys and girls (11–16 years old). The results were based on the Canadian records from the 2001/2002 World Health Organization *Health Behaviour in School-Aged Children Survey*. Body mass index (BMI) and bullying behaviors were determined from self-reports.

Results. With the exception of 15- to 16-year-old boys, relationships were observed between BMI category and peer victimization, such that overweight and obese youth were at greater relative odds of being victims of aggression than normal-weight youth. Strong and significant associations were seen for relational (eg, withdrawing friendship or spreading rumors or lies) and overt (eg, name-calling or teasing or hitting, kicking, or pushing) victimization but not for sexual harassment. Independent of gender, there were no associations between BMI category and bully-perpetrating in 11- to 14-year-olds. However, there were relationships between BMI category and bully-perpetrating in 15- to 16-year-old boys and girls such that the overweight and obese 15- to 16-year-olds were more likely to perpetrate bullying than their normal-weight classmates. Associations were seen for relational (boys only) and overt (both genders) forms of bully-perpetrating but not for sexual harassment.

Conclusions. Overweight and obese school-aged children are more likely to be the victims and perpetrators of bullying behaviors than their normal-weight peers. These tendencies may hinder the short- and long-term social and psychological development of overweight and obese youth. *Pediatrics* 2004;113:1187–1194; *body mass index, adolescence, bully-perpetrating, peer victimization.*

ABBREVIATIONS. HBSC, *Health Behaviour in School-Aged Children Survey*; BMI, body mass index; OR, odds ratio; CI, confidence interval.

Over the past 2 decades, there has been a marked increase in the prevalence of overweight and obesity in children worldwide.^{1–4} In Canada, for example, the prevalence of 7- to 13-year-old youth who were either overweight or obese was ~12% in 1981 and increased to ~30% in 1996.⁴ Indeed, children are the fastest-growing segment of the overweight and obese population.⁵

Childhood obesity leads to a variety of clinical health problems. Excess body weight in children is associated with a plethora of type 2 diabetes and cardiovascular disease risk factors,^{6,7} overweight and obese youth are more likely to become obese adults,⁸ and obese adolescents have an increased risk of morbidity and mortality in adulthood.^{9,10} Of equal importance are the negative social and psychological ramifications of childhood obesity including being liked to a lesser extent by peers,^{11–14} being rejected by peers,¹³ and being the victims of various forms of peer aggression such as bullying.^{15,16}

Bullying is a highly prevalent (~30%) form of aggression in youth that involves the repeated use of power and aggression.^{17,18} Through repeated aggressive interactions, the perpetrator of bullying acquires and consolidates power over the student who is being victimized.¹⁹ Adolescence is characterized by changes in appearance and body size, and because these physical changes are a salient feature in this age group, they may be a focus of bullying behaviors. A reciprocal interaction may unfold in which peers bully their classmate about a topic that is likely to elicit a response and the victimized adolescent is more likely to react to aggression that is aimed at a vulnerable issue. Thus, bullying behaviors may be related to body size and obesity in adolescence.

The social and psychological ramifications induced by the bullying-victimization process may hinder the social development of overweight and obese youth, because adolescents are extremely reliant on peers for social support, identity, and self-esteem.²⁰ Indeed, the prevalence of social problems among obese adolescents is quite high,²¹ and these social problems are predictive of both short-term and long-term psychological outcomes.^{22–24} For example, overweight adolescents are less likely to marry as adults compared with average-weight adolescents, and obese girls complete less schooling and have

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lower household income as adults than nonobese girls.²²

Many studies have examined the relationship between overweight and obesity with aggression and victimization in youth, and, in general, they have shown positive associations between adiposity level and victimization.^{11–16} However, these studies are limited by several factors. First, they included preadolescents or adolescents but not both. In addition, most of this work has emphasized the forms of aggression that are salient to boys (eg, teasing or physical bullying), whereas the forms of aggression that are salient to girls (eg, relational) have largely been ignored. We have also included 2 other forms of aggression, overt racial aggression and sexual harassment, that have not been considered to date and are important constructs to consider. Furthermore, previous studies have typically relied on observations in relatively small, localized populations of obese children, and the applicability of these findings to the general population is unknown. Finally, few studies have controlled for the degree of overweight. Because the social impact increases the further the individual deviates from normal,²⁵ it is possible that obese youth may be the victims of bullying behaviors, whereas the same may not hold true for moderately overweight youth. It is also important to note that previous studies have only examined the victimization component of bullying behaviors. Thus, it is unknown as to whether overweight and obese youth are also more likely to perpetrate bullying than their normal-weight peers.

The purpose of this study was to examine the relationship between bullying behaviors (physical, verbal, relational, and sexual harassment) with both overweight (preobese) and obesity status in a large, representative sample of preadolescent and adolescent Canadians. An increased understanding of the factors that increase bullying behaviors could guide future interventions and policy development.

METHODS

Description of Survey and Study Population

These results are based on the Canadian records from the 2001/2002 World Health Organization *Health Behaviour in School-Aged Children Survey* (HBSC). The 2001/2002 HBSC is a cross-sectional survey from elementary and high schools in 35 countries.²⁶ The survey consisted of a questionnaire completed in the classroom setting, and the information from the questionnaires was extracted for the current analysis. The goal of the HBSC is to identify youth health indicators and the factors that influence them. The Canadian data were collected in the first half of 2002. The Canadian sample was designed according to the international HBSC protocol that has been used since 1985 in that a cluster design was used with the school class being the basic cluster, the distribution of the students reflected the distribution of Canadians in grades 6 through 10, and the sample was designed to be self-weighting.²⁶ Within each province, samples were selected to represent distributions of schools by size, location, language, and religion. Of the students selected for the study, 74.2% completed the questionnaire, and their demographic profile was representative of Canadians in the same age range. Youth in private and special-needs schools, street youth, and the incarcerated were excluded. The total sample included 7266 children. Of the total sample, we excluded those who were <11 years old or >16 years old and subjects who did not have measures of both height and body mass (which were needed to determine overweight and obesity status). This left a total of 5749 of the subjects for consid-

eration in the current analysis. Because this was a nationally representative sample, the subject demographics (eg, race and socioeconomic status) varied widely.

Survey Methods

Body Mass Index Measurement and Obesity Classification

Height and body mass (without shoes) were based on self-reports of the children. The body mass index (BMI) was calculated as body mass/height² (kg/m²). The international age- and gender-specific BMI cutpoints for children that were developed by the Childhood Obesity Working Group of the International Obesity Task Force were used to define subjects as normal weight, overweight (preobese), or obese.²⁷ These cutpoints were derived from a large international sample using regression techniques by passing a line through the health-related adult cutpoints at 18 years.²⁷ Children with BMI values that corresponded to an adult BMI of ≤ 24.9 kg/m² were classified as normal weight; children with BMI values that corresponded to an adult BMI of 25.0 to 29.9 kg/m² were classified as overweight (preobese); and children with BMI values that corresponded to an adult BMI of ≥ 30.0 kg/m² were classified as obese. These particular cutpoints corresponded to approximately the 92nd (overweight) and 98th (obese) percentiles in a large international sample of children.²⁷ In our analysis, the overweight group did not include the obese youth.

Bullying Behavior Measurement and Classification

Aggression items were based on both theoretical hypotheses related to the social context of adolescents and measurements that have been validated in other studies or previous HBSCs.²⁶ The children were asked how many times they had been bullied at school in the past 2 months and how often they had taken part in bullying another student(s) at school in the past 2 months. For each question the possible responses were: never, once or twice, 2 or 3 times a month, about once a week, or several times a week. Those who reported being bullied ≥ 2 to 3 times a month were classified as victims of bullying (victims). Those who reported taking part in bullying ≥ 2 to 3 times a month were classified as perpetrators of bullying (bullies). Those who reported being bullied ≥ 2 to 3 times a month and participated in bullying ≥ 2 to 3 times a month were classified as both victims and perpetrators of bullying (victims/bullies).

Questions about the types of bullying behaviors were also asked. Two questions were asked about verbal bullying behaviors: 1) "Have you or have you been called mean names, made fun of, or teased in a hurtful way?" and 2) "Have you or have you been made fun of because of race or color?" One question was asked about physical bullying behaviors: "Have you or have you been hit, kicked, pushed, shoved around, or locked indoors?" Two questions were asked about relational bullying behaviors: 1) "Have you been left out of things on purpose, excluded from a group of friends, or been completely ignored or done the same to another?" and 2) "Have you told lies or spread false rumors about another and tried to make others dislike him/her or had the same directed at you?" One question was asked about sexual harassment: "Have you made sexual jokes, comments, or gestures or had the same directed at you?" For each of these questions the possible responses were: never, once or twice, 2 or 3 times a month, about once a week, or several times a week. For each question, separate response categories were provided for bully perpetration and victimization.

Statistical Analysis

All statistical analyses were performed by using SPSS 11 (SPSS Inc, Chicago, IL) using a design effect of 1.2.²⁶ Prevalences of victims, bully-perpetrators, and victims/bullies according to BMI category (normal-weight, overweight, and obese) were compared by using χ^2 statistics (Table 1). Logistic regression was used to examine the association between categories of BMI with categories of victims (Tables 2 and 3), bully-perpetrators (Tables 4 and 5), and victims/bullies (Table 6). The BMI category was considered as the independent variable, and the victim, bully-perpetrator, or victim/bully categories were the dependent variables. The odds ratios (ORs) and associated 95% confidence intervals (CIs) are presented for overweight and obese children in comparison with normal-weight children (referent group) (Tables 2–6). ORs were run separately for 3 gradients of bullying behaviors (ever, ≥ 2 -3

TABLE 1. Prevalence of Being a Victim and/or Bully-Perpetrator in Normal-Weight, Overweight, and Obese Children According to Gender and Age

	Victims			Bully-Perpetrators			Victims/Bullies		
	Normal Weight	Overweight	Obese	Normal Weight	Overweight	Obese	Normal Weight	Overweight	Obese
Boys									
11–12 y (<i>n</i> = 958)	12.4	15.7	24.6*	7.6	11.3	10.5	2.9	2.5	0.0
13–14 y (<i>n</i> = 1049)	11.1	15.3	14.8	12.6	13.8	13.1	5.0	5.8	1.6
15–16 y (<i>n</i> = 711)	10.5	10.0	2.6	14.5	19.2	17.9	3.0	6.2	10.3*
All boys (<i>n</i> = 2718)	11.4	14.0	15.3	11.3	14.4	13.4	3.7	4.8	3.2
Girls									
11–12 y (<i>n</i> = 1008)	14.5	17.0	25.0	4.5	6.8	2.5	2.6	1.7	5.0
13–14 y (<i>n</i> = 1165)	9.9	17.4	24.2*	8.9	8.3	0.0	2.4	4.5	6.1
15–16 y (<i>n</i> = 858)	5.1	9.7	20.0*	3.3	5.3	8.6	1.3	1.8	2.9
All girls (<i>n</i> = 3031)	10.1	14.9	23.1*	5.9	6.9	3.7	2.2	2.8	4.6
All children (<i>n</i> = 5749)	10.7	14.4	18.5*	8.3	11.2	9.2*	2.9	3.9	3.8

* Significant increase with increasing BMI category ($P < .05$ for trend).

TABLE 2. Associations Between Overweight and Obesity With Being a Victim of Peer Aggression

Age and No. of Times as Victim	Boys			Girls		
	Normal Weight	Overweight OR (95% CI)*	Obese OR (95% CI)*	Normal Weight	Overweight OR (95% CI)*	Obese OR (95% CI)*
11–12 y						
Ever	1.00	1.19 (0.71–2.02)	1.75 (0.85–3.61)†	1.00	1.06 (0.59–1.87)	1.47 (0.65–3.32)
≥2–3 times/mo	1.00	1.15 (0.61–2.16)	1.73 (0.77–3.91)	1.00	1.15 (0.58–2.67)	2.12 (0.87–5.17)†
≥Once/wk	1.00	1.44 (0.69–3.00)	2.32 (0.93–5.80)†	1.00	1.23 (0.57–2.64)	2.43 (0.94–6.30)†
13–14 y						
Ever	1.00	1.59 (0.97–2.62)	1.50 (0.74–3.04)	1.00	1.37 (0.79–2.36)	1.94 (0.81–4.67)†
≥2–3 times/mo	1.00	1.39 (0.78–2.48)	1.02 (0.42–2.48)	1.00	2.00 (1.06–3.78)	3.13 (1.21–8.06)†
≥Once/wk	1.00	1.13 (0.57–2.26)	1.61 (0.64–4.08)	1.00	2.36 (1.13–4.88)	2.52 (0.78–8.10)†
15–16 y						
Ever	1.00	1.32 (0.74–4.29)	0.97 (0.41–2.32)	1.00	1.39 (0.76–2.56)	2.74 (1.15–6.50)†
≥2–3 times/mo	1.00	1.27 (0.63–2.56)	1.14 (0.38–3.37)	1.00	1.90 (0.82–4.37)	4.37 (1.57–12.20)†
≥Once/wk	1.00	0.77 (0.32–1.87)	1.36 (0.42–4.34)	1.00	2.16 (0.82–5.68)	2.37 (0.57–9.86)†
All ages‡						
Ever	1.00	1.37 (0.93–2.00)	1.44 (0.87–2.39)†	1.00	1.26 (0.83–1.88)	1.91 (1.07–3.38)†
≥2–3 times/mo	1.00	1.28 (0.82–1.98)	1.30 (0.72–2.35)†	1.00	1.60 (0.99–2.58)	2.85 (1.52–5.32)†
≥Once/wk	1.00	1.12 (0.67–1.87)	1.77 (0.93–3.36)†	1.00	1.79 (1.05–3.06)	2.44 (1.18–5.14)†

* The normal-weight BMI category was used as the referent group. The logistic regression analyses were run separately for the 3 gradients (ever, ≥2–3 times/month, and ≥once/week); therefore, the ORs for each level are exclusive of each other.

† Significant increase with increasing BMI category ($P < .05$ for trend).

‡ ORs were adjusted for age.

times a month, and ≥once a week); therefore, the ORs for each level are exclusive of each other. *P* values associated with tests for linear trend in these ORs are provided.

RESULTS

The prevalences of victims, bully-perpetrators, and victims/bullies in the entire sample of Canadian 11- to 16-year-old youth were 11.6%, 8.8%, and 3.1%, respectively. The prevalence of victims increased with increasing BMI category in 11- to 12-year-old boys, 13- to 14-year-old girls, and 15- to 16-year-old girls (Table 1). Collapsed across age, the prevalence of bully-perpetrators increased with increasing BMI category in girls but not in boys. The prevalence of victims/bullies increased with increasing BMI category in 15- to 16-year-old boys alone.

As shown in Table 2, there was a direct and significant relationship between BMI category and victimization in girls, independent of age, such that, with increasing BMI, there were greater relative odds of peer victimization. This relationship was observed also for 11- to 12-year-old boys and for all boys after controlling for age.

Within both boys and girls there were positive

associations between BMI category and verbal victimization; however, the findings for verbal victimization were limited to being called names, made fun of, or teased (Table 3). In girls, there were significant trends between BMI category and physical victimization, such that physical victimization increased with increasing BMI category. In boys, there were no significant associations between BMI and physical victimization. Within both genders, there were associations between BMI category and relational victimization. The significant findings for relational victimization did not include false lies/rumors in boys. Overweight and obesity were not associated with sexual harassment victimization in boys or girls.

Independent of gender, there were no significant associations between BMI category and bully-perpetrating in 11- to 12-year-olds or 13- to 14-year-olds (Table 4). However, there were significant positive relationships between BMI category and bully-perpetrating in 15- to 16-year-old boys and girls, such that overweight and obese 15- to 16-year-olds were more likely to perpetrate bullying than their normal-weight classmates.

TABLE 3. Associations Between Overweight and Obesity With Different Forms of Victimization

Form of Victimization	Boys			Girls		
	Normal Weight	Overweight OR (95% CI)*	Obese OR (95% CI)*	Normal Weight	Overweight OR (95% CI)*	Obese OR (95% CI)*
Verbal: others called names, made fun of, or teased me						
Ever	1.00	1.38 (0.94–2.02)	1.50 (0.90–2.48)†	1.00	1.53 (1.02–2.30)†	2.32 (1.31–4.15)†
≥2–3 times/mo	1.00	1.42 (0.92–2.18)	1.49 (0.84–2.65)†	1.00	1.99 (1.26–3.03)†	2.67 (1.43–4.96)†
≥Once/wk	1.00	1.27 (0.79–2.03)	1.76 (0.96–3.20)†	1.00	1.82 (1.08–3.04)†	2.66 (1.34–5.27)†
Verbal: others made fun of me because of race or color						
Ever	1.00	1.04 (0.61–1.79)	1.16 (0.55–2.45)	1.00	0.72 (0.33–1.54)	1.29 (0.48–3.40)
≥2–3 times/mo	1.00	1.08 (0.54–2.17)	1.95 (0.84–4.51)	1.00	0.76 (0.27–2.12)	1.23 (0.33–4.81)
≥Once/wk	1.00	1.15 (0.52–2.51)	2.03 (0.79–5.22)	1.00	0.97 (0.32–2.99)	1.27 (0.25–6.40)
Physical: others hit, kicked, pushed, or shoved me						
Ever	1.00	1.10 (0.72–2.29)	1.42 (0.82–2.45)	1.00	1.18 (0.68–2.02)	1.78 (0.87–3.65)†
≥2–3 times/mo	1.00	0.98 (0.74–2.03)	1.65 (0.84–3.25)	1.00	1.45 (0.70–3.02)	2.43 (0.95–6.22)†
≥Once/wk	1.00	0.92 (0.72–2.28)	1.83 (0.87–3.88)	1.00	1.58 (0.70–3.58)	2.14 (0.70–6.59)†
Relational: others intentionally left me out of group or group activities						
Ever	1.00	1.53 (1.02–2.29)	1.69 (1.00–2.90)†	1.00	1.25 (0.82–1.91)	2.14 (1.20–3.80)†
≥2–3 times/mo	1.00	1.22 (0.74–2.03)	1.76 (0.92–3.36)†	1.00	1.35 (0.79–3.04)	3.37 (1.78–6.40)†
≥Once/wk	1.00	1.28 (0.72–2.28)	2.16 (1.07–4.39)†	1.00	1.68 (0.92–3.07)†	2.56 (1.16–5.60)†
Relational: others lied or spread false rumors about me						
Ever	1.00	1.22 (0.82–1.81)	1.21 (0.71–2.06)	1.00	1.18 (0.78–1.79)	1.18 (0.66–2.11)
≥2–3 times/mo	1.00	1.23 (0.74–2.03)	1.46 (0.75–2.84)	1.00	1.15 (0.67–1.99)	2.28 (1.17–4.45)†
≥Once/wk	1.00	1.13 (0.62–1.98)	1.54 (0.73–3.23)	1.00	1.24 (0.67–2.29)	2.15 (0.98–4.73)†
Sexual harassment: others made sexual jokes, comments, or gestures toward me						
Ever	1.00	1.14 (0.73–1.69)	1.33 (0.77–2.32)	1.00	1.06 (0.68–1.63)	1.34 (0.74–2.45)
≥2–3 times/mo	1.00	0.95 (0.57–1.58)	1.13 (0.57–2.26)	1.00	1.11 (0.64–1.93)	1.51 (0.71–3.24)
≥Once/wk	1.00	0.86 (0.48–1.56)	1.17 (0.54–2.54)	1.00	1.10 (0.59–2.04)	1.52 (0.65–3.55)

* The normal-weight BMI category was used as the referent group. The logistic regression analyses were run separately for the 3 gradients (ever, ≥2–3 times/month, and ≥once/week); therefore, the ORs for each level are exclusive of each other.

† Significant increase with increasing BMI category ($P < .05$ for trend).

TABLE 4. Associations Between Overweight and Obesity With Being a Perpetrator of Bullying

Age, No. of Times as Bully	Boys			Girls		
	Normal Weight	Overweight OR (95% CI)*	Obese OR (95% CI)*	Normal Weight	Overweight OR (95% CI)*	Obese OR (95% CI)*
11–12 y						
Ever	1.00	1.07 (0.63–1.81)	1.50 (0.73–3.11)	1.00	1.15 (0.64–2.08)	1.67 (0.73–3.80)
≥2–3 times/mo	1.00	1.27 (0.64–2.54)	0.91 (0.32–2.65)	1.00	1.20 (0.50–2.89)	1.07 (0.27–4.30)
≥Once/wk	1.00	1.77 (0.78–4.04)	0.66 (0.13–3.36)	1.00	1.11 (0.35–3.49)	0.66 (0.08–5.98)
13–14 y						
Ever	1.00	1.43 (0.87–2.36)	1.17 (0.58–2.36)	1.00	1.36 (0.78–2.35)	0.61 (0.24–1.57)
≥2–3 times/mo	1.00	1.22 (0.63–2.18)	0.90 (0.38–2.18)	1.00	1.16 (0.58–2.40)	0.50 (0.10–2.54)
≥Once/wk	1.00	1.23 (0.59–2.56)	1.49 (0.54–4.68)	1.00	0.55 (0.17–1.85)	0.54 (0.06–4.86)
15–16 y						
Ever	1.00	1.40 (0.79–2.48)	0.99 (0.43–2.27)	1.00	1.37 (0.76–2.47)	1.71 (0.72–4.09)†
≥2–3 times/mo	1.00	1.69 (0.89–3.19)	1.84 (0.74–4.61)†	1.00	1.58 (0.59–4.24)	2.72 (0.76–9.80)†
≥Once/wk	1.00	1.71 (0.83–3.52)	2.05 (0.75–5.62)†	1.00	0.95 (0.18–5.11)	1.56 (0.17–14.75)
All ages (11–16 y)‡						
Ever	1.00	1.30 (0.88–1.90)	1.23 (0.74–2.05)†	1.00	1.27 (0.84–1.90)	1.18 (0.67–2.10)
≥2–3 times/mo	1.00	1.37 (0.88–2.14)	1.15 (0.63–2.14)	1.00	1.22 (0.70–2.14)	1.04 (0.43–2.51)
≥Once/wk	1.00	1.51 (0.91–2.52)	1.45 (0.71–2.96)†	1.00	0.78 (0.35–1.78)	0.71 (0.18–2.75)

* The normal-weight BMI category was used as the referent group. The logistic regression analyses were run separately for the 3 gradients (ever, ≥2–3 times/month, and ≥once/week); therefore, the ORs for each level are exclusive of each other.

† Significant increase with increasing BMI category ($P < .05$ for trend).

‡ ORs were adjusted for age.

As shown in Table 5, there tended to be a positive relationship between BMI category with verbal and relational bully-perpetrating in boys but not in girls. Conversely, there were significant trends between BMI category and physical bully-perpetrating in girls

but not boys, such that physical bullying increased with increasing BMI category in girls. Overweight and obesity were not associated with sexual harassment in boys or girls.

Results of the logistic regression examining the

TABLE 5. Association Between Overweight and Obesity With Different Types of Bully-Perpetrating

Type of Bully-Perpetrating	Boys			Girls		
	Normal Weight	Overweight OR (95% CI)*	Obese OR (95% CI)*	Normal Weight	Overweight OR (95% CI)*	Obese OR (95% CI)*
Verbal: called names, made fun of, or teased others						
Ever	1.00	1.30 (0.89–1.91)	0.98 (0.59–1.64)	1.00	1.09 (0.73–1.63)	1.09 (0.61–1.94)
≥2–3 times/mo	1.00	1.35 (0.85–2.12)	1.10 (0.57–2.12)	1.00	0.92 (0.50–1.69)	1.10 (0.46–2.68)
≥Once/wk	1.00	1.61 (0.95–2.71)	1.51 (0.72–3.19)†	1.00	1.26 (0.62–2.56)	1.26 (0.42–3.79)
Verbal: made fun of others because of race or color						
Ever	1.00	1.28 (0.75–2.18)	1.18 (0.54–2.56)	1.00	0.85 (0.30–2.40)	1.46 (0.38–5.72)
≥2–3 times/mo	1.00	1.50 (0.76–2.95)	1.71 (0.67–4.39)‡	1.00	2.33 (0.53–10.40)	2.65 (0.28–25.34)
≥Once/wk	1.00	1.69 (0.77–3.73)	2.50 (0.91–6.88)†	1.00	4.25 (0.84–21.49)	4.80 (0.47–49.76)†
Physical: hit, kicked, pushed, or shoved others around						
Ever	1.00	1.33 (0.88–1.99)	1.12 (0.63–1.98)	1.00	1.37 (0.78–2.41)	1.99 (0.93–4.27)†
≥2–3 times/mo	1.00	1.57 (0.93–2.65)	1.16 (0.53–2.57)	1.00	1.17 (0.46–2.99)	2.55 (0.83–7.86)
≥Once/wk	1.00	1.42 (0.75–2.69)	1.35 (0.53–3.42)	1.00	1.59 (0.45–5.68)	5.50 (1.52–19.87)†
Relational: intentionally left others out of group or group activities						
Ever	1.00	1.13 (0.74–1.70)	1.07 (0.61–1.90)	1.00	1.23 (0.79–1.90)	0.97 (0.50–1.86)
≥2–3 times/mo	1.00	1.26 (0.73–2.20)	1.29 (0.59–2.81)	1.00	0.98 (0.49–1.96)	0.36 (0.08–1.78)
≥Once/wk	1.00	1.62 (0.86–3.06)	1.69 (0.69–4.16)†	1.00	0.86 (0.33–2.27)	0.80 (0.16–3.98)
Relational: lied or spread false rumors about others						
Ever	1.00	1.25 (0.78–1.98)	1.66 (0.91–3.02)†	1.00	0.96 (0.54–1.70)	0.70 (0.27–1.82)
≥2–3 times/mo	1.00	1.71 (0.93–3.14)	1.85 (0.80–4.26)†	1.00	1.14 (0.45–2.92)	0.48 (0.06–4.21)
≥Once/wk	1.00	1.82 (0.91–3.64)	2.63 (1.09–6.36)†	1.00	1.05 (0.26–4.27)	1.19 (0.13–10.75)
Sexual harassment: made sexual jokes, comments, or gestures toward others						
Ever	1.00	1.20 (0.78–1.82)	1.20 (0.68–2.12)	1.00	0.94 (0.53–1.69)	1.09 (0.47–2.56)
≥2–3 times/mo	1.00	1.06 (0.60–1.85)	1.16 (0.53–2.53)	1.00	0.81 (0.29–2.29)	0.46 (0.05–4.03)
≥Once/wk	1.00	1.14 (0.60–2.18)	1.50 (0.63–3.55)	1.00	0.72 (0.18–2.86)	0.82 (0.09–7.28)

* The normal-weight BMI category was used as the referent group. All ORs were adjusted for age. The logistic regression analyses were run separately for the 3 gradients (ever, ≥2–3 times/month, and ≥once/week); therefore, the ORs for each level are exclusive of each other.

† Significant increase with increasing BMI category ($P < .05$ for trend).

‡ Significant increase with increasing BMI category ($P = .05$ for trend).

TABLE 6. Associations Between Overweight and Obesity Status With Between Being Both a Victim and Perpetrator of Bully Behaviors (Victim/Bully)

Age	Boys			Girls		
	Normal Weight	Overweight OR (95% CI)*	Obese OR (95% CI)*	Normal Weight	Overweight OR (95% CI)*	Obese OR (95% CI)*
11–12 y	1.00	0.86 (0.24–3.05)	§	1.00	0.64 (0.13–3.34)	1.95 (0.37–10.32)
13–14 y	1.00	1.18 (0.49–2.82)	0.32 (0.03–2.83)	1.00	1.92 (0.64–5.75)	2.61 (0.49–13.81)
15–16 y	1.00	2.11 (0.73–6.05)	3.67 (0.14–13.91)†	1.00	1.39 (0.25–7.81)	2.27 (0.23–22.10)
All ages‡	1.00	1.30 (0.68–2.52)	0.85 (0.28–2.56)	1.00	1.29 (0.54–3.07)	2.20 (0.72–6.73)

* The normal-weight BMI category was used as the referent group.

† Significant increase with increasing BMI category ($P < .05$ for trend).

‡ ORs were adjusted for age.

§ Not enough cases (<10) for meaningful observations.

associations between overweight and obesity with combined victim and bully-perpetrating status are presented in Table 6. In boys, BMI category was significantly associated with being a victim/bully in 15- to 16-year-olds alone. Although the ORs were reasonably high, there were no significant associations between BMI category and being a victim/bully in girls. Because a small percentage of the girls fit within the victim/bully category (Table 1), the sample size may have been too small to achieve significance.

DISCUSSION

The purpose of this study was to examine relationships between bullying behaviors with overweight and obesity status in a large sample of 11- to 16-year-old youth. Our findings indicate that overweight and obese boys and girls are more likely to be the victims and perpetrators of verbal, physical, and relational bullying than their normal-weight peers. The relationship between victimization and adiposity level was observed in all ages studied (11- to 16-year olds), but the relationship between bully-perpetrating and

adiposity level was observed only in older (15- to 16-year-olds) youth. These observations highlight the increased vulnerability to bullying behaviors among overweight and obese youth.

Lerner²⁸ proposed a theoretical model for understanding the relationship between physical appearance and social functioning. His model states that physical appearances influence others to react differentially within a cultural environment that has high beauty standards. Accordingly, being overweight may be a salient target for bullying behaviors. Indeed, children characterize their overweight and obese classmates as individuals who tease, get teased, fight, and are selfish and mean,^{29,30} which is entirely consistent with stereotypes associated with an overweight body build. Because children are heavily reliant on physical cues in their social interactions,^{31,32} they are likely influenced by stereotypes associated with physical cues. Therefore, children may internalize some of the negative beliefs of the obesity stereotype and subsequently behave in a manner that elicits these beliefs. There may be a reciprocal interaction whereby the youth's physical appearance (weight) may elicit a bullying interaction from peers, and in turn these negative interactions may contribute to continued issues with body weight. Indeed, our findings, and those of others,¹¹⁻¹⁶ indicate that overweight and obese school-aged children are more frequently victims of bullying, compared with children with a normal body weight. Our findings were quite consistent for different doses of peer victimization (eg, ever, $\geq 2-3$ times a month, and \geq once a week) and for the various age and gender groups. Additionally, the magnitude of the ORs for victimization in the overweight, and particularly in the obese youth, underline the extent to which peer victimization is influenced by body size.

An increase in peer victimization in overweight and obese children may be associated with a plethora of social and psychological ramifications and compound already existing problems. The prevalence of social problems among obese youth is quite high,²¹ and these social problems are predictive of both short-term and long-term psychological outcomes.²²⁻²⁴ One study demonstrated that decreasing self-esteem in obese children resulted in significantly elevated levels of loneliness, sadness, and nervousness.³³ Other studies report that overweight children are unhappy with their weight and that they experience more depressive symptoms than their normal-weight peers.^{34,35} These symptoms are also experienced by children who are victimized by their peers.¹⁹ Overweight during adolescence has an effect on high-school performance³⁶ and college acceptance.³⁷ Overweight adolescents are less likely to marry as adults, compared with average-weight adolescents, and obese adolescents have lower household income as adults than nonobese adolescents.²² These observations highlight both the short- and long-term impact that bullying behaviors may have on social and psychological functioning in overweight and obese youth.

Bullying behaviors can take place in many forms

including name-calling, teasing, threats, physical harm, rejection, rumors, and sexual harassment. Historically, research in bullying behaviors has been limited to overt aggression, which includes behaviors that harm others through physical damage or verbal name-calling and teasing. Although the gender gap has been closing in recent decades,³⁸ overt aggression is far more common in boys than girls.^{38,39} Therefore, to properly address the issue of bullying behaviors in girls, it is important to consider other forms of aggression. Relational forms have been identified in which harm to others occurs through manipulation or control of their relationships (eg, threatening to withdraw friendship or rumor-spreading).^{39,40} Girls exhibit higher levels of relational aggression than do boys.^{39,40} Although overt bullying is more common in boys, and relational bullying is more common in girls, in the present study we saw an increase in both overt and relational peer victimization in overweight and obese youth, independent of gender. This relational form of victimization may serve to isolate these vulnerable youth further from the mainstream peer group and heighten the negative social effects of their weight problems.

In addition to being more likely to be victims of verbal bullying, overweight and obese children were more likely to be perpetrators of verbal bullying. Verbal victimization in overweight and obese children was limited to being called names or teased and did not include being made fun of because of race, color, or religion. Thus, it is likely that the name-calling was in reference to their physical appearance (eg, adiposity). In contrast, verbal bully-perpetrating in overweight and obese children was limited to making fun of others because of race, color, or religion and did not include teasing or calling others names. The overweight and obese bully-perpetrators may not have wanted to draw attention to themselves by focusing on weight issues but rather may have made comments related to ethnic identity, another vulnerable aspect of adolescent development. Alternatively, there may be a hierarchy of aggression such that overweight and obese youth may make fun of others because of race, color, or religion as a means of retaliating for being made fun of because of their excess body weight. Despite the increase in ethnically oriented verbal bullying, the likelihood of sexual harassment bullying behaviors (eg, sexual jokes, comments, or gestures) were not different in normal-weight, overweight, and obese children. This latter observation, however, may have been expected, given that overweight is viewed as an unappealing physical condition and therefore is asexual in nature.

Previous research has indicated that negative stereotypes associated with overweight and obesity in childhood decline with increasing age.²⁹ Our findings are somewhat congruent, because we found increased rates of victimization in the 11- to 14-year-old boys but not in the 15- to 16-year-old boys. Nonetheless, in girls there were associations between BMI and victimization independent of age. In terms of bully-perpetrating, there were no associations with BMI category in 11- to 14-year-old boys or girls.

However, overweight and obese 15- to 16-year-old boys and girls were more likely to be bully-perpetrators than their normal-weight peers. This observation is consistent with others who report an increasing prevalence of relational bully-perpetrating in girls as they go through high school.⁴⁰ Approval from peers is particularly important for developing self-esteem in older adolescents.⁴¹ Thus, the increase in bully-perpetrating in the 15- to 16-year-old overweight and obese youth may have reflected a means of initiating peer-group domination at a time when peer groups were becoming increasingly important. This may be particularly true for physical bully-perpetrating, because size may be a way for overweight boys and girls to dominate others.

Earlier studies with smaller sample sizes and homogenous groups found a greater likelihood of victimization in obese adolescents, compared with normal-weight adolescents;^{15,16} however, the likelihood of victimization was not different in normal-weight and overweight (preobese) adolescents. These results suggest that a threshold of adiposity must be reached before an increase in victimization occurs. By comparison, in a large and heterogeneous sample of Canadian youth, we found a graded increase in victimization with increasing BMI category, such that the likelihood of victimization was lower in normal-weight youth by comparison to overweight youth, who in turn had a lower likelihood of victimization than obese youth. The exception to this finding was for physical victimization in boys. In this case, overweight and obese boys were not more likely to be victimized than normal-weight boys. These findings indicate that the use of BMI to classify boys as overweight may be confounded by a subset of children who have a high BMI because of increased muscle mass rather than increased fat mass. It is less likely that these muscular boys would be attacked physically by their peers.

Previous studies have noted cross-national differences in the rates of bullying behaviors.^{42,43} A number of factors may account for these cross-national differences, such as the definition of bullying and corresponding terminology in different languages, differences in the ways in which children from different countries construe bullying behaviors, variations in school systems across countries, and cross-cultural differences that directly impact bullying behaviors. Given that bullying behaviors vary from country to country, the results from the present study may not be generalizable for all countries.

A primary limitation of this study was that the measures of bullying behaviors were derived from a self-reported questionnaire, and the extent to which these tendencies can be predicted from a paper-and-pencil measure needs to be verified. Given that youth do not tell adults about their bullying behaviors, there is a strong rationale to utilize self-report.¹⁹ The heights and body mass values used to calculate BMI were also derived from self-reports. However, previous studies have shown that self-reported heights and body mass values are fairly accurate by comparison with measured values. For example, in a nationally representative sample of American youth,

94% of the subjects were classified correctly as normal weight or obese based on self-reported height and body mass.⁴⁴ The present study was also limited by its cross-sectional nature and subsequent inability to address questions of causality. It is plausible that overweight and obese children are mistreated by peers because of their physical differences. It is also plausible that overweight and obese youth have a poor self-concept because of their appearance and consequently interact less effectively with peers, resulting in rejection, which may be perceived as aggression. Problems with peer relationships may also lead to depression, which in turn could result in overeating and obesity.

Previous school-based interventions have focused on increasing the awareness of bullying behaviors, increasing parent and teacher supervision, and providing support for bully victims.^{17,45-47} These interventions have reduced bullying behaviors by 30% to 50%. Targeting high-risk groups such as overweight and obese adolescents may increase the effectiveness of current interventions. However, because bullying is such an important and highly prevalent developmental issue, a universal approach may be the most appropriate means to reduce the occurrence of bullying behaviors.

CONCLUSIONS

The results of the present study are important, because they confirm that childhood overweight/obesity is not only associated with metabolic health risk but also with problems in social interactions and relationships. These findings highlight the importance of using BMI to identify overweight and obese youth, the need to develop effective treatments to prevent and treat overweight and obesity in youth, and the need to help overweight and obese youth recognize and adjust to obesity-related social issues. Future research should address the cause-effect relationship between obesity and bullying behaviors in school-aged children.

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