Teacher and Peer Reports of Overweight and Bullying Among Young Primary School Children

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KEY WORDS

overweight, obesity, weight status, bullying, victim, teacher, child, school

ABBREVIATIONS

aOR—adjusted odds ratio
CI—confidence interval
OR—odds ratio

Dr Jansen conceptualized and designed the study, performed the statistical analyses, and drafted the manuscript; Dr Verlinden coordinated and supervised the PEERS data collection, prepared the PEERS data for analyses, and reviewed the manuscript for important intellectual content; Ms Dommisse-van Berkel coordinated and supervised the teacher data collection and reviewed the manuscript for important intellectual content; Ms Mieloo assisted in the teacher data collection, prepared these data for analyses, and reviewed the manuscript for important intellectual content; Dr Raat made important contributions to the design of the Generation R Study and reviewed the manuscript for important intellectual content; Dr Hofman initiated and designed the Generation R Study and reviewed the manuscript for important intellectual content; Dr Jaddoe supervised data collection for the Generation R Study and reviewed the manuscript for important intellectual content; Dr Verhulst conceptualized and designed the study and reviewed the manuscript for important intellectual content; Dr Jansen assisted in conceptualizing and designing the study, supervised the teacher data collection, and reviewed the manuscript for important intellectual content; Dr Tiemeier conceptualized and designed the study and the data collection instruments and supervised the data analyses and drafting of the manuscript; and all authors approved the final manuscript as submitted.

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WHAT'S KNOWN ON THIS SUBJECT: Overweight and peer victimization are common in childhood and negatively affect health and well-being. Overweight may predispose children to peer victimization, but whether adiposity also increases the risk of bullying perpetration is unclear.

WHAT THIS STUDY ADDS: A high BMI at school entry predicts bullying involvement, according to reports of teachers and children themselves. Although trends were visible across the whole BMI spectrum, particularly obese children were victimized and likely to be bully perpetrators.

abstract

FREE

BACKGROUND: Overweight is a potential risk factor for peer victimization in late childhood and adolescence. The current study investigated the association between BMI in early primary school and different bullying involvement roles (uninvolved, bully, victim, and bully–victim) as reported by teachers and children themselves.

METHODS: In a population-based study in the Netherlands, measured BMI and teacher-reported bullying behavior were available for 4364 children (mean age = 6.2 years). In a subsample of 1327 children, a peer nomination method was used to obtain child reports of bullying.

RESULTS: In both teacher- and child-reported data, a higher BMI was associated with more victimization and more bullying perpetration. For instance, a 1-point increase in BMI was associated with a 0.05 increase on the standardized teacher-reported victimization score (95% confidence interval, 0.03 to 0.07; $P < .001$). Combining the victimization and bullying scores into different types of bullying involvement showed that children with obesity, but not children with overweight, had a significantly higher risk to be a bully–victim (odds ratio = 2.25; 95% confidence interval, 1.62 to 3.14) than normal-weight peers.

CONCLUSIONS: At school entry, a high BMI is a risk factor associated with victimization and bullying perpetration, with obese children particularly likely to be victims and aggressors. Results were consistent for teacher and child reports of bullying, supporting the validity of our findings. Possibly, obesity triggers peer problems, but the association may also reflect a common underlying cause that makes obese children vulnerable to bullying involvement. *Pediatrics* 2014;134:473–480

About 25% of children and adolescents in Western countries are overweight.[1,2] Childhood overweight has several short-term consequences for children's well-being, as it predicts depressive symptoms, poor self-esteem, stigmatization, and being bullied by peers.[3,4] Bullying is characterized by a repeated aggression in which a person intends to harm or disturb another person and can take various forms, such as hitting, name calling, gossiping, and social exclusion.[5] School bullying is a widespread phenomenon with a negative impact on children's mental health and school functioning.[6,7] Additionally, being victimized may also affect children's lifestyles and lead to obesogenic behaviors, such as avoiding social activities and sports and binge eating in response to distress.[8] This suggests children may become entrapped in a downward spiral of overweight, leading to victimization, which in turn worsens weight problems through unhealthy lifestyle behaviors.

Several studies have demonstrated that school-age children and adolescents with overweight are often victims of weight-related bullying but also of other forms of bullying behavior.[9–16] Using data from a population-based cohort in the United Kingdom, Griffiths and colleagues[11] reported that obese boys and girls in middle childhood were ~1.5 times more likely to be victimized than their normal-weight counterparts. Likewise, a large Canadian study showed that adolescents with overweight, particularly those with obesity, were at high risk of relational and verbal victimization.[12] Previous research focused mainly on victimization, but Griffiths et al[11] and Janssen et al[12] also assessed bullying perpetration and found that boys with a high body weight were likely to be bullies. This could reflect physical strength and dominance of heavyset boys, but bullying may also be an expression of reactive aggression in response to being victimized. Scientists typically refer to children who are both a victim and a bully as bully–victims. These so-called bully–victims have a very high risk of later psychosocial problems.[17] Because it is unclear whether BMI is associated with bully victimization, research assessing both victimization and bullying is needed to examine different bullying involvement roles among overweight children.

Previous research on weight status and bullying behavior was also limited in a few other respects. Except for 1 study,[13] research relied mostly on self-reported victimization and on self-reported rather than objectively measured weight and height.[9–12,14–16] Consequently, reported associations may be overestimated because of negative self-evaluation bias: Children with a poor self-esteem may be more likely to perceive mild teasing as victimization and plausibly also have a distorted self-image. Another important gap in the literature is the lack of studies in an age group before middle childhood (age 8–9 years), whereby it remains unknown whether overweight predisposes children to victimization already at school entry. The high prevalence of overweight[1,2,18] and the commonness of bullying behavior in early primary school[19] call for research to address this knowledge gap. Additionally, the notion that bullying may exacerbate the level of overweight in children or further harm their self-esteem strengthens the importance of intervening as early as possible, before a downward spiral is initiated.

The objective of our study was to examine whether overweight or obesity is associated with victimization and bullying perpetration among 5- to 6-year-old children in the first grades of primary school. We applied a multi-informant approach using teacher and child reports of bullying behavior to determine consistency of associations across informants. We hypothesized that a high BMI predisposes to victimization and bullying perpetration. Specifically, we postulated that overweight and obese children are more likely to be involved in bullying, particularly in physical bullying, than their normal-weight peers.

METHODS

Design

This cross-sectional study was embedded in Generation R, a population-based cohort from fetal life onwards.[20,21] Pregnant women living in Rotterdam, the Netherlands, with an expected delivery date between April 2002 and January 2006 were invited to participate during pregnancy and after birth of their child (participation rate: 61%). Written informed consent was obtained from all participating children and their parents, and the Medical Ethics Committee of the Erasmus University Medical Centre approved the study. The information used in the current study was obtained around school entry by hands-on measurements, postal questionnaires, and a peer nomination procedure. Teacher reports of bullying were collected by the Municipal Public Health Service as part of routine health examinations. The Medical Ethical Committee of Erasmus University approved the scientific use of these data, and Generation R participants gave consent for data linkage.

Study Population

Information on weight status at school entry was available for 6690 children (mean age: 6.2 years). School teachers of these children filled out a questionnaire that included questions about child bullying involvement at school. Only teachers of children still residing in Rotterdam were approached (n = 5743; see Fig 1). Teacher response was 76%, resulting in a study population

of 4364 children with data on weight status and teacher-reported bullying behavior. These children attended 1661 different school classes; the mean number of Generation R participants per school class was 2.6 (interquartile range: 3–8). In a subsample of the Generation R participants and their classmates, child reports of bullying were obtained with a peer nomination measure. Child reports of bullying were available for 1327 children (attending 186 different school classes) for whom weight data were also available.

In a nonresponse analysis, we compared eligible children with (n = 4364) and without (n = 1379) a teacher report. No differences in national origin (P = .46), maternal educational level (P = .17), or child BMI (P = .92) were found between the 2 groups.

Measures

Bullying and Victimization

Teachers rated the occurrence of 4 common forms of bullying and victimization[19,22] for each Generation R participant in their class. The victimization items assessed whether "child was physically victimized by peers, eg being hit, kicked or pinched" (physical victimization); "child was verbally victimized, eg being teased, laughed at or called names" (verbal victimization); "child was excluded by peers" (relational victimization); and "belongings of child were hidden or broken" (material victimization). Four analogous items were used to assess the same forms of bullying perpetration (eg, "whether child physically bullied peers"). Each item was rated on a 4-point rating scale with 0 = less than once a month, 1 = 1 to 3 times per month, 2 = 1 to 2 times per week, and 3 = more than twice a week. We calculated scale scores of victimization and bullying by summing the 4 items of each scale. As per existing precedents,[19,22] children with a "less than once a month" rating (0) on all 4 bullying and 4 victimization items were classified as uninvolved children. Children were classified as victims if they had a rating of ≥1 on any of the 4 victimization items. Likewise, children were classified as bullies if they had a rating of ≥1 on any of the 4 bullying perpetration items. Children meeting the criteria of both bullies and victims were categorized as bully–victims.[19,22]

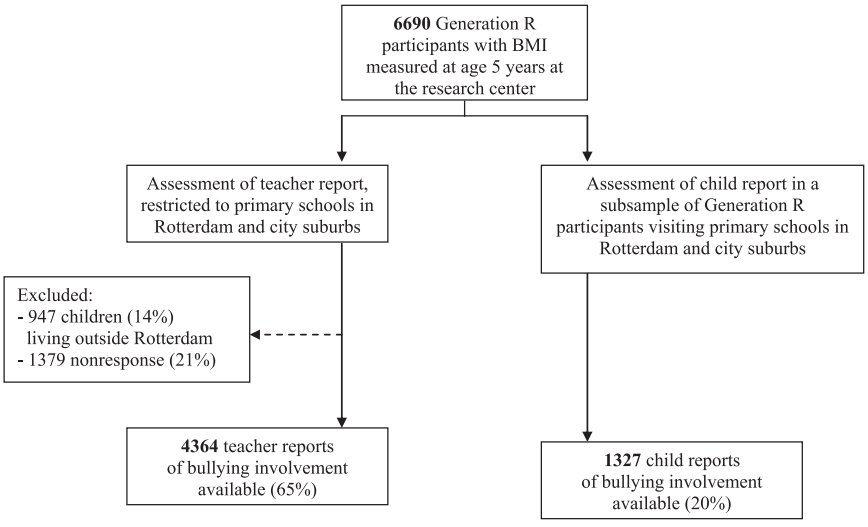

FIGURE 1
Selection of study population. In a subsample of 1102 children, both teacher and child reports of bullying involvement were available.

Child reports of bullying involvement were obtained using the PEERS* measure, a computerized peer nomination assessment.[23] As in the teacher assessment, 4 forms of victimization (physical, verbal, relational, material) were assessed via questions analogous to those described earlier, supported by visual images.[23] Children could nominate those who bullied them by clicking on the photos of classmates on the screen. The number of nominations a child gave to others was used to calculate individual victimization scores. The nominations each child received from his or her classmates were used to calculate individual bullying scores. The nomination scores were weighted by the number of children performing the PEERS task. To identify bullies, victims, and bully–victims, the continuous victimization and bullying scores were dichotomized using the top 25th percentile as cutoff, as was done in previous studies.[24] Children were then categorized into the nonoverlapping groups: uninvolved, bullies, victims, and bully–victims. Although the peer nomination assessment was done in complete school classes, the current study used only scores of children participating in Generation R. Previously, we demonstrated good internal consistency (α = .79 and .73, respectively) and test–retest reliability (intraclass correlation coefficients = .78 and .67, respectively) for the bullying and victimization scales.[23]

Despite substantial overlap between teachers and children (75% agreed on being a victim, 74% on being a bully), the interobserver agreement was low (κ = .12, n = 1102 with both reports available). Although cross-informant agreement in bullying research is typically low because of different reporters' perspectives,[25] additional methodological differences (different instruments and

*PEERS stands for peer evaluation of relationships at school (in Dutch: pesten en relaties op school).

assessment points) certainly account for the low agreement also.

BMI

Children's weight and height were measured by trained staff at our research center. BMI was used to classify children as having "normal weight" (including underweight), "overweight," or "obesity" according to international age- and gender-specific criteria.[26]

Covariates

Several sociodemographic variables (child gender, national origin, and age; maternal educational level; single parenthood; presence of siblings) were considered as possible confounders, because they were previously linked with children's bullying behavior.[19,23]

Statistical Analyses

The teacher- and child-reported victimization and bullying scores were square root transformed to approach a normal distribution, then standardized to allow comparability. To optimize statistical power, the relation of BMI with teacher- and child-reported victimization and bullying scores was first examined with linear regression analyses. Two-way BMI–gender interactions were tested in these analyses. Next, logistic regression analyses were conducted to examine the association between weight status and different bullying involvement roles. We calculated odds ratios (ORs) for each bullying role (victim, bully, bully–victim) as compared with uninvolved children.

Data were analyzed in a 2-level structure to account for children clustered in school classes. We present unadjusted results and results adjusted for possible confounding variables. Multiple imputation techniques (chained regression) were used to replace missing values of the confounders based on available information on all variables included in this study.[27] The reported effect estimates are the pooled results of 40 imputed datasets. All analyses were conducted in Stata 11.0 (Stata Corp, College Station, TX).

TABLE 1 Characteristics of the Study Population

	Children With Teacher Report Data of Bullying ($N = 4364$)		Children With Self and Peer Report Data of Bullying ($N = 1327$)[a]	
	N[b]	%	N	%
Child characteristics				
Gender (% boys)	2206	50.6	645	48.6
National origin				
Dutch	2313	54.5	776	60.0
Other western	379	8.9	143	11.0
Nonwestern	1549	36.5	375	29.0
Wt status				
Normal wt	3526	80.8	1106	83.4
Overweight	595	13.6	161	12.1
Obese	243	5.6	60	4.5
Mean age at BMI assessment in years (SD)	4364	6.2 (0.5)	1327	6.1 (0.5)
Bullying involvement				
Uninvolved	2846	65.2	872	65.7
Victim	193	4.4	193	14.5
Bully	715	16.4	162	12.2
Bully–victim	610	14.0	100	7.5
Mean age at bullying assessment in years (SD)	3757	6.8 (1.3)	1327	7.7 (0.8)
Maternal and family characteristics				
Educational level				
Primary or secondary	1734	47.4	411	36.2
Higher vocational	958	26.2	353	31.0
Academic	967	26.4	372	32.8
Single parenthood (% yes)	550	15.0	170	14.8
Presence of siblings (% no)	677	20.0	218	19.4

[a] Child reports represent self-reported victimization and peer-reported bullying.

[b] Some data were missing for national origin ($n = 123$), age at bullying assessment ($n = 607$), maternal educational level ($n = 705$), single parenthood ($n = 689$), and presence of siblings ($n = 797$).

RESULTS

Our sample included 50.6% boys, 54.5% children of Dutch national origin, and 19.2% overweight or obese children (Table 1). According to the teachers, 4.4% of children were victims of bullying, 16.4% bullies, and 14.0% bully–victims.

Association of Child Weight With Victimization and Bullying Scores

Table 2 shows the association of BMI with continuous victimization and bullying scores based on teacher and child reports. A small but statistically significant relationship between BMI and teacher-reported victimization was found: A 1-point increase in BMI was associated with a 0.05 increase on the standardized victimization score (95% confidence interval [CI], 0.03 to 0.07; $P < .001$). Child reports were concurring, although the BMI–victimization relationship attenuated to statistical nonsignificance after confounders were accounted for.

Next, we examined the relation between BMI and bullying perpetration scores. Again, similar results were found for teacher and child reports, with a high BMI predicting more bullying. The associations were partly (up to 40%) explained by confounding factors, but they remained statistically significant in the adjusted analyses.

Gender Interactions and Physical Bullying

The teacher-reported bullying perpetration score was predicted by an interaction between BMI and gender ($P = .026$).

TABLE 2 Children's BMI and Victimization and Bullying Scores in Early Primary School

	B (95% CI) for Victimization SD Scores			
	Teacher Report (N = 4364)		Child Report (N = 1327)[a]	
BMI	Unadjusted	Adjusted[b]	Unadjusted	Adjusted[b]
Per-unit increase	0.06 (0.04–0.08)***	0.05 (0.03–0.07)***	0.05 (0.02–0.08)**	0.03 (−0.004–0.06)
	B (95% CI) for Bullying SD Scores			
Per-unit increase	0.05 (0.03–0.07)***	0.03 (0.01–0.05)**	0.08 (0.05–0.11)***	0.05 (0.02–0.07)**

** $P < .01$. *** $P < .001$.

[a] Child reports represent self-reported victimization and peer-reported bullying.

[b] Adjusted for child gender, age, and national origin, maternal education, single parenthood, and presence of siblings in the family.

Analyses stratified by gender indicated that BMI was positively associated with bullying among boys (B = 0.05; 95% CI, 0.02 to 0.09; P = .002) but not in girls (B = 0.02; 95% CI, −0.01 to 0.01; P = .095).

Next, we analyzed physical, verbal, relational, and material bullying separately. A higher BMI predicted higher levels of physical, verbal, and relational bullying and victimization but not material bullying and victimization. A significant gender interaction was found for physical bullying. Analyses stratified by gender indicated that a higher BMI was associated with high levels of physical bullying among boys (B = 0.02; 95% CI, 0.01 to 0.04; P = .005) but not in girls (B = 0.01; 95% CI, −0.001 to 0.02; P = .054).

Association of Child Weight With Different Bullying Involvement Roles

Next, we examined whether weight status predicted bullying involvement roles. We compared the nonoverlapping groups of uninvolved children, victims, bullies, and bully–victims (Table 3). Obese children had a higher risk than normal-weight children to be a bully–victim according to teacher reports (adjusted odds ratio [aOR] = 2.25; 95% CI, 1.62 to 3.14). A similar result was found for the child reports of bullying, although the effect was attenuated in the adjusted analyses (OR = 2.37; 95% CI, 1.03 to 5.44; aOR = 1.92; 95% CI, 0.75 to 4.93). Overweight and obesity were not associated with risk of being solely a victim or solely a bully.

Sensitivity Analyses

Analyses presented in Table 2 were repeated in 1102 children for whom teacher and child reports were available, resulting in a picture similar to that of the full sample (Supplemental Table 4). Effect estimates for the associations did not differ between teacher and child reports (victimization: P = .26; bullying: P = .52). Combining the reports in multivariate analyses showed that a higher BMI was associated with more victimization (B = 0.02; 95% CI, 0.001 to 0.05; P = .041) and more bullying (B = 0.04; 95% CI, 0.01 to 0.06; P = .004).

DISCUSSION

Using a multiinformant approach relying on teacher and child reports of bullying, this large population-based study showed that already in early primary school, a higher BMI was associated with more bullying involvement. Although a graded relation was visible across the whole BMI spectrum, particularly obese children were often involved in bullying behavior. Additional analyses revealed that obese children are not solely victims or bullies but rather very likely to be bully–victims.

Our finding that a high BMI and victimization at school entry are related is important because it suggests that children perceive their peers with overweight or obesity as attainable targets of bullying at a younger age than previously shown.[9–16] Importantly, we relied on objectively measured BMI and multiple informants to assess bullying involvement. Results for teacher and child reports were consistent, suggesting that earlier research using self-reported data on both BMI and

TABLE 3 Children's Wt Status and Bullying Involvement in Early Primary School

Wt Status	Bullying Involvement Roles							
	Uninvolved		Victim		Bully		Bully–Victim	
	n	aOR (95% CI)[a]	n	aOR (95% CI)[a]	n	aOR (95% CI)[a]	n	aOR (95% CI)[a]
Teacher Report (N = 4364)								
Normal wt	2332	Reference	151	Reference	592	Reference	451	Reference
Overweight	383	Reference	28	1.00 (0.65 to 1.52)	93	0.86 (0.68 to 1.00)	91	1.14 (0.89 to 1.46)
Obesity	131	Reference	14	1.35 (0.76 to 2.39)	30	0.72 (0.48 to 1.10)	68	2.25 (1.62 to 3.14)***
Child Report (N = 1327)								
Normal wt	735	Reference	155	Reference	136	Reference	80	Reference
Overweight	106	Reference	26	0.86 (0.68 to 1.00)	17	1.10 (0.69 to 1.74)	12	0.81 (0.48 to 1.36)
Obesity	31	Reference	12	0.72 (0.48 to 1.10)	9	1.68 (0.85 to 3.30)	8	1.33 (0.59 to 3.01)

*** $P < .001$.

[a] Adjusted for child gender, age, and national origin, maternal education, single parenthood, and presence of siblings in the family.

victimization were not biased but probably reflect true findings.[9–12,14–16] Stigma against adiposity may explain the high rates of victimization among obese children, but it is also plausible that children with overweight have a low self-esteem, which makes them an easy target for peer bullying.

In line with previous research,[11,12] we found that a high BMI predisposes boys but not girls to bullying perpetration. This gender difference was due to heavier boys being particularly likely to participate in physical bullying, which provides support for the hypothesis that heavyset boys may use their physical strength to bully others.[11,12] Young girls with overweight or obesity do not seem tempted to use physical strength to obtain dominance or popularity in the peer group, probably because in general, girls participate more in indirect, relational forms of bullying, such as gossiping and excluding.[19]

By assessing both victimization and bullying perpetration, we were able to examine different bullying involvement roles. Results indicated that obese children are more likely to be bully–victims rather than victims or bullies only. This result is in line with findings of a Canadian study reporting a large but nonsignificant risk of overweight children to be bully–victims.[12] Several mechanisms may explain the association. The most intuitive explanation is the use of reactive aggression of obese children as a response to being victimized. This reasoning is supported by our recent work providing evidence that overweight or obesity is a cause rather than a consequence of peer problems (eg, having no friends).[28] Obesity and bullying involvement may also have a common underlying cause. Poor regulation of emotions could lead to maladaptive, awkward behavior toward peers but also to abnormal eating behaviors (eg, overeating) as a coping strategy. Likewise, bully–victims tend to have behavioral characteristics of attention-deficit/hyperactivity disorder, such as violating social norms by interrupting conversations and having difficulty taking turns appropriately.[5] These behaviors may predispose them to bullying involvement, and impulsivity and inhibition problems have also been linked to overeating and overweight.[29]

Contrary to our hypothesis, children with overweight had risks of bullying involvement similar to those of their normal-weight counterparts. This similarity has been observed previously in studies of secondary school and higher grades in primary school.[11–13,16] Considering that differences in physical appearance can lead to victimization, these findings suggest that overweight may be perceived by children as a normal characteristic rather than a deviation, probably because of its high prevalence.[18]

Another important addition to existing literature is the importance of possible confounding factors. Previous studies presented marginally adjusted results,[10–12,14–16] and sociodemographic factors such as socioeconomic and ethnic background are important risk factors for overweight[30,31] and have also been implicated in bullying involvement,[19,32] although not consistently.[33] We showed that these factors accounted for a substantial part of the BMI–bullying association. These covariates may mirror shared etiological factors: For instance, a recent meta-analysis indicated that maladaptive, negative parenting is a predictor of bullying involvement,[34] and these parenting practices are also more common among disadvantaged families.[35]

The current study is strengthened by its population-based sample of young primary school children, the availability of measured BMI, and multiple informants on bullying behavior, including both teachers and children. Future studies may consider also including parents as informants for an even more comprehensive picture. Limitations of this study include the cross-sectional nature of the analyses that preclude inferences on causality. Although it is likely that overweight triggers peer victimization, the direction of the association may also be reversed. Another limitation is that the extensive peer assessment of bullying was available only in a subsample of 1327 children in the Generation R cohort. Consequently, some analyses may have been underpowered, because high effect estimates were not always statistically significant, a tendency also observed in the complete case analysis (n = 1102).

In sum, we argue that the period around entry to primary school is an important developmental phase during which obese children are at risk for bullying involvement. Importantly, obese children are likely to be bully–victims rather than solely victims or bullies. Additional research is needed to unravel the factors contributing to the risk of obese children to be bully–victims and to elucidate whether obesity and bullying involvement are causally related or have a common underlying cause. Meanwhile, close monitoring of social well-being among children with obesity is advised. It should be evaluated whether young obese children benefit from skill training to improve coping with stigma and negative peer interactions. Finally, bullying involvement among overweight and obese children may be targeted in an anti-bullying program.[36] Typically, such interventions start in the higher grades of primary school,[37] whereas our findings support the importance of bullying prevention early in the school curriculum. Timely implementation may prevent overweight and obese children from becoming entrapped in a downward spiral in which their weight problems worsen because of peer problems.

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