

Relationships between Weight Status and Bullying Victimization among School-aged Adolescents in Guangdong Province of China

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Objective To examine relationships between weight status and different forms of bullying victimization among adolescents aged 11-18 years. **Methods** The relationships between weight status and bullying victimization (physical, verbal, and relational) were examined utilizing data from the Guangdong Provincial Youth Health Behavior Survey. Data on height, weight, and victimization behaviors were collected by self-reporting from 12 439 subjects. χ^2 test and logistic regression were used to analyze relationships between weight and bullying victimization. **Results** The incidence of victimization for adolescents aged 11-18 years was 8.6%, with higher rates for boys (12.4%) than for girls (4.7%). For children with normal, overweight and obese body mass index (BMI), the incidence rates of victimization were 8.2%, 17.3%, and 11.5%, respectively. Compared to normal weight, overweight was a risk factor for bullying victimization (OR=1.60, 95% CI:1.18-2.17), and it also increased children's risk of being teased in a hurtful way (OR=2.13, 95% CI: 1.41-3.24) and being made fun of due to physical appearance (OR=3.58, 95% CI: 2.27-5.67). Obesity only increased the risk for children of being made fun of due to physical appearance (OR=2.45, 95% CI: 1.44-4.15). **Conclusions** The victimization for children at school is common in Guangdong province, China. Overweight and obese children are more likely to be victims of bullying behaviors, especially verbal victimization.

Key words: Body mass index; Adolescents; Victimization

INTRODUCTION

Childhood obesity is receiving greater attention in many countries as its incidence has increased tremendously in the last two decades^[1-2]. Childhood obesity can lead to a variety of clinical health problems, and more importantly, its risk to health can last through adulthood^[2-3]. Meanwhile, psychological and social consequences are found to be associated with obesity, including impaired peer relationships, poor psychological wellbeing, and victimization through various forms of bullying^[2, 4-6].

A victim of bullying refers to a person who is repeatedly exposed to negative actions of other persons with the intention to hurt, which usually involve an imbalance in strength, either real or perceived^[7]. Victimization can be verbal (e.g. name calling), physical (e.g. hitting), or relational (e.g. social exclusion)^[7-8]. It is highly prevalent in school settings across different countries^[8-10]. Victimization can induce adverse outcomes including poorer social, emotional,

and physical health status which may seriously hinder the social development of youth^[8, 11-12].

Many studies have shown positive associations between adiposity level and peer victimization, that is, in general, overweight and obese children are more often victimized than their normal-weight peers^[4, 7, 9]. However, these studies mainly focus on younger children. In addition, the respondents of these studies were mainly from developed countries. In China, bullying victimization is also a major part of school violence^[13-14]. However, the relationships between childhood weight and victimization have not been examined in current literature.

METHODS

Description of the Survey and Sample

This study was based on the data from the Guangdong Provincial Children's Health Behavior Survey in 2007. This was a cross-sectional survey

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conducted in 21 areas (8 urban areas, 13 rural areas) of Guangdong province. Within each area, 5 schools were selected randomly, which included: one common junior high school, one common senior high school, one key junior high school, one key senior high school, and one vocational-technical high school. Then one class was chosen in each grade of the selected schools. In this study, only the data of students aged 11-18 years were analyzed. The total sample size was 19 299 children. Of the total sample, those who did not report height and/or weight (which were needed to calculate BMI) were excluded. This left a total of 12 439 subjects to be analyzed.

Data Collection

All data were collected using the questionnaire designed by the Children and Adolescents/School Health Center of the Chinese Center for Disease Control and Prevention. The questionnaire was administered anonymously to protect respondents' privacy. All respondents signed informed consent forms before the survey was implemented. Demographic information (such as gender, age, race, and others) was reported by the respondents under the guidance of the trained interviewers.

Body Mass Index

Height and weight (without shoes) were self reported by students. The body mass index (BMI) was calculated as $\text{weight}/\text{height}^2$ (kg/m^2). The Chinese age- and gender-specific BMI cut-off points for children developed by the Task Force on Children Obesity in China (TFCO) were used to classify subjects as normal-weight, overweight, and obese^[15]. These cut-off points corresponded to approximately the 85th (overweight) and 95th (obese) percentiles in a large national sample of children aged 7-18 years. In this study, underweight was not classified separately but was merged into normal weight because the cut-off point for children's underweight has not been developed in TFCO.

Victimization Behaviors

Children were asked detailed questions related to bullying victimization if they had experienced any forms of such behaviors in schools in the past month (30 days). Four questions were asked about verbal victimization: 1) "Have you been teased in a hurtful way?" 2) "Have you been threatened?" 3) "Have you been made the focus of sexual jokes, comments or gestures?" and 4) "Have you been made fun of due to your physical appearance?" Two questions were asked about physical victimization: 1) "Have you been blackmailed" and 2) "Have you been hit, kicked, pushed, shoved around or locked indoors?" One question was asked about relational victimization: "Have you been rejected or isolated by peers?" For each question the possible responses were "never", "sometimes" and "often". Those who answered "often" were classified as subjects of bullying victimization.

Statistic Analysis

All questionnaires were doubly entered using software Epidata 3.0 to reduce entry error. All statistical analyses were performed in SPSS 13.0. χ^2 tests and logistic regressions were used to examine the associations between BMI category and the forms of victimization. The factors performed in logistic regressions are shown in Table 1. In logistic regression analyses, BMI category was considered an independent variable, victimization was a dependent variable and the other variables were defined as confounding factors. Dummy variables were used and the first category was taken as control (Table 1). The odds ratios (ORs) and associated 95% confidence intervals (CIs) were presented for overweight or obese children in comparison with normal-weight individuals (referent group). ORs were run separately for seven forms of bullying behaviors.

TABLE 1

Explanation of Factors Performed in Logistic Regressions

Variables	Explanation of Variables
If Have been Bullied	No =0, yes =1
BMI Category	Normal weight =0, Overweight =1, Obesity =2
Location of the School	Urban =0, Rural =1
Gender	Boy =0, Girl =1

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Variables	Explanation of Variables
Age (y)	11-14 =0, 15-16 =1, 17-18 =2
Residence	In school =0, at home =1
Learning Achievement	Lower=0, Average=1, Higher=2, Excellent=3, Not Sure=4
Mother's Education	Less Than High School=0, Junior High School=1, Senior High School=2, Undergraduate or Postgraduate=3, Unknown=4
School's Type	Junior High School=0, Senior High School=1, Vocational-technical School =2

RESULTS

Of the 12 439 respondents included in the current analysis, 4 405 (35.4%) were from junior high schools, 4 760 (38.3%) from senior high schools, and 3 274 (26.3%) from vocational-technical schools. Half (50.2%) were boys, and 39.3% were from urban schools. The respondents were 11-18 years old with a median age of 16 years. The proportions of children aged 11-14, 15-16, 17-18 years were 20.4%, 33.0%, and 46.6%, respectively.

A total of 1 052 children aged 11-18 years reported often being bullied in the past month. The incidence of victimization was 8.6%, with higher incidence in boys (12.4%) than in girls (4.7%) ($\chi^2=227.46$, $P=0.00$). However, there was no statistical significance between urban (8.8%) and rural (8.4%) school children ($\chi^2=0.71$, $P=0.40$). The incidence of victimization showed a decreasing trend as children's ages increased. For children aged 11-14, 15-16, 17-18 years the incidences were 10.8%, 9.3%, 7.0%, respectively.

The incidences of victimization in children whose BMI was normal, overweight and obese were 8.2%, 17.3%, and 11.5%, respectively. The incidences in overweight children aged 11-14, 15-16, and 17-18 years were 20.8%, 13.6%, and 16.3%,

respectively; those in obese children corresponding to these age groups were 14.8%, 7.1%, and 11.3%, respectively. However, χ^2 tests showed that age was not associated with victimization for either overweight or obese individuals ($\chi^2_{\text{overweight}}=1.95$, $P=0.38$; $\chi^2_{\text{obese}}=3.04$, $P=0.22$). The incidences of victimization in overweight and obese boys were 17.9% and 16.4%, respectively, and both higher than in normal-weight boys (12.0%) ($\chi^2=9.95$, $P=0.01$). The incidence in overweight girls (15.4%) was about 3.3 times that in normal-weight girls (4.6%) while obese girls (5.6%) were similar to the normal-weight ones ($\chi^2=0.35$, $P=0.56$).

For different forms of victimization, the incidences by BMI category were shown in Table 2. For both overweight and obese children, verbal victimization was the most common form, when they were teased in hurtful way, experienced sex harassment or were made fun of due to their physical appearance. χ^2 tests showed that for the two forms of threatening and blackmail the differences in incidences between normal-weight, overweight and obese children were not significant. For other forms of victimization, the incidences among overweight and obese children were all higher compared with those among normal-weight children.

TABLE 2

Incidence of Victimization in Normal-weight, Overweight, and Obese Children (%)

Form of victimization	Total	Normal- weight	Over-weight	Obese	<i>P</i> -value [#]
Overall Victimization *	8.6	8.2	17.3	11.5	0.00
Verbal Victimization					
Being Often Teased in Hurtful Way	3.2	2.9	8.5	5.1	0.00
Being Often Made Sexual Jokes, Comments or Gestures	4.7	4.6	9.5	6.7	0.00
Being Often Made Fun of due to Physical Appearance	2.1	1.9	7.1	5.1	0.00

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Form of victimization	Total	Normal-weight	Over-weight	Obese	P-value [#]
Being often threatened	1.0	1.0	1.5	1.6	0.40
Physical victimization					
Being often blackmailed	0.8	0.8	0.6	1.3	0.57
Being often hit, kicked, pushed, shoved around or locked indoors	0.8	0.8	1.8	1.6	0.05
Relational victimization					
Being often rejected or isolated	1.5	1.4	2.4	2.5	0.09

Note.[^]It includes those who had ever experienced any forms of victimization in the past month. [#]P value is calculated from chi-square test and significant at $P \leq 0.05$.

The association between overall victimization and BMI category was examined using univariate logistic regression. Overweight or obese individuals both had significantly higher ORs compared with normal-weight individuals. After controlling confounding factors in the multivariate model, overweight was a risk factor of victimization for children, and the OR was 1.60 (95% CI:1.18-2.17). However, there was no statistical significance between obesity and victimization ($P=0.23$).

The relationships between different forms of victimization and BMI category were also examined separately using univariate logistic regressions. Overweight was associated with three forms of victimization: being teased in hurtful way, being made fun of due to physical appearance, and sex harassment. And obesity was associated with two forms of victimization: being teased in hurtful way and being made fun of due to physical appearance. After controlling potential confounding factors in the multivariate models, compared with normal-weight group, overweight increased the risk for children of being teased in hurtful way (OR=2.13, 95% CI:1.41-3.24) and being made fun of due to physical appearance (OR=3.58, 95% CI:2.27-5.67). However, obesity only increased the risk of being made fun of due to physical appearance (OR=2.45, 95% CI:1.44-4.15).

DISCUSSIONS

The present study was designed to examine relationships between weight status and victimization among adolescents in Guangdong province, China. The findings indicated that overweight could increase adolescents' risk of victimization, but no association between obesity and overall victimization was identified. Overweight and obese adolescents were more likely to experience verbal victimizations than their normal-weight peers. In a way, these

observations highlighted the increased vulnerability to victimization among overweight and obese adolescents.

C.L. Fox and his colleagues have suggested that global self-esteem for physical appearance and body dissatisfaction may act as mediators of the relationship between weight status and bullying victimization^[16]. Many studies have shown that children who are overweight or obese are more likely to report lower self-esteem related to physical appearance and greater body dissatisfaction^[16-17]. It is possible that this psychological vulnerability is then communicated to peers through their behaviors, making them targets of bullying. These adolescents may be less likely to defend themselves once victimized, displaying submissive and non-assertive behaviors, which increases the risk of bullying victimization even further^[16]. The experience of victimization might heighten their body dissatisfaction and psychological problems which may then lead to emotional eating and further weight gain. Then, a vicious circle may follow.

Negative social stereotypes to overweight or obesity may also play an important role in making the overweight children a prime target of bullying^[9]. It has been found that overweight and obese children are often characterized as ugly, stupid, lazy, and selfish by their peers^[18-19]. These children may internalize some negative beliefs and subsequently behave in a manner that elicits these beliefs^[9]. Therefore overweight and obese children are more frequently the targets of victimizations. In fact, our study and other studies have shown that overweight and obese children were susceptible to teasing due to physical appearance^[6].

Previous researches have indicated that over-weight and obesity are associated with verbal, physical and relational victimization among children aged 11-16 years, but significant relationship between weight status and relational victimization has not

been found in Fox's study^[9, 16]. Our study has shown that weight status is only associated with verbal victimization among children aged 11-18 years. This suggests that verbal victimization should be further studied among overweight or obese adolescents in Guangdong province.

Our failure to find an association between obesity and overall victimization is inconsistent with previous reports^[4, 9, 20]. This can be interpreted in several ways. Firstly, the differences in the bullying classification may have contributed to our different findings. In this study, those who reported being bullied often in the past month were classified as victims of bullying. However, for example, Janssen classified those who reported being bullied ≥ 2 to 3 times a month as victims^[9]. Secondly, the findings may be unique to the Chinese population. Therefore, further studies will be needed to clarify the above inconsistency.

A primary limitation of this study was that the measures of heights and weights were derived from self-reports accompanied with a number of missing values. Compared with included respondents, the incidence rate of victimization and the proportions of unhealthy food habits, lack of regular physical exercises and sedentary activities were higher in those respondents who were not included in the study. This indicated that the seriousness of victimization and the effect of overweight and obesity on victimization could be underestimated. The present study was also limited by its cross-sectional nature and subsequent inability to address questions of causality.

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