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The Relationship Between Bullying and Weight Management Behaviors in High School Aged Youth

Lindsey Simpson-Pedigo
Purdue University, lsimp1389@yahoo.com

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Gerald Hyner

Chair

Elizabeth Richards

Rosann Lyle

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Approved by Major Professor(s): Gerald Hyner

Approved by: Tim Gavin

Head of the Graduate Program

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THE RELATIONSHIP BETWEEN BULLYING AND WEIGHT MANAGEMENT BEHAVIORS IN
HIGH SCHOOL AGED YOUTH

A Thesis

Submitted to the Faculty

of

Purdue University

by

Lindsey Simpson-Pedigo

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of

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I would like to dedicate this work to my husband, my family, my classmates and my committee. They have all been extremely supportive throughout this process and I would not have made it without them. Thank you everyone, especially my husband, Michael, for listening to my ideas and always encouraging me during hard times

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ABSTRACT

Simpson-Pedigo, Lindsey, M. M.P.H., Purdue University, December 2013. The relationship between bullying and weight management behaviors in high school aged youth. Major Professor: Gerry Hyner.

Purpose: Examined whether high-school students' body mass index (BMI) classification was related to being bullied, and whether being bullied mediates the student's likelihood of practicing unhealthy weight management and weight loss behaviors.

Methods: This study was a secondary data analysis of cross-sectional data obtained by the Youth Risk Behavior Surveillance System (YRBSS) 2011. Mediation analyses were used to assess relationships between weight status, being bullied and use of unhealthy weight management and weight loss behaviors.

Results: The sample consisted of 15,425 high-school students in the United States drawn from a nationally representative survey. In this sample, 15.8% were overweight and 13.7% were obese. Twenty-four percent reported being bullied and 16.7% reported unhealthy weight management and weight loss behaviors. Through mediation analysis, BMI was examined in relation to unhealthy weight management and weight loss behaviors; however, overweight or obese youth were not more likely to report being bullied. Therefore, being bullied does not seem to be a mediator of this relationship. It

was important to note that if the students reported being bullied, they were significantly more likely to report unhealthy weight management and weight loss behaviors. A stronger association was found when BMI was replaced with self-perception of weight. Age also appeared to be an important factor in this relationship.

Conclusion: Although bullying did not seem to mediate the relationship between BMI and self-perception of weight with unhealthy weight management and weight loss behaviors, there appeared to be significant relationships between these variables.

CHAPTER 1. INTRODUCTION

1.1 Introduction

High school has long been recognized as a time of dramatic change for many students, both physically and emotionally. Overweight, obesity and bullying have become more common in the United States school systems [1, 2]. It is important to examine how these issues can affect the physical and emotional well-being of high-school students, so that they can be better address with interventions [3].

Studies have shown associations between body mass index (BMI), body dissatisfaction, poor self-esteem, psychological functioning and overall life satisfaction. Puhl and Luedicke found that overweight adolescents tended to express lower body satisfaction and have worse psychological well-being than their normal weight peers [4]. This same study found that overweight adolescents with poorer body satisfaction were also more likely to engage in unhealthy weight control behaviors such as fasting, skipping meals, vomiting, and using laxatives, diuretics or diet pills than overweight teens with better body satisfaction [4, 5].

Social factors such as perceptions of self, peers, family and school appeared to influence how a teen perceived their weight [6]. Teasing and bullying about body weight are associated with body dissatisfaction, poor self-esteem, depression and suicidal

thoughts, especially in overweight adolescents [7]. There was also a relationship between increased BMI and vulnerability to victimization. Weight-based victimization was found to cause 40-50% of adolescents to feel sad, depressed, angry, afraid and worse about themselves and their body [4].

Several studies have been conducted to assess which adolescents were the most at risk for engaging in unhealthy weight loss/management behaviors. In a study conducted in Oregon, one in six girls reported using unhealthy weight loss behaviors and one in fourteen boys reported engaging in such behavior [8]. Unhealthy weight loss practices were also associated with being overweight or at risk of becoming overweight, self-perception of overweight, suicidal thoughts and depression [8]. Although this study used a survey with questions based on the YRBSS survey, it was conducted in only 33 of 36 Oregon counties [8].

Neumark-Sztainer et al. examined the prevalence of behaviors used to lose or gain weight among Connecticut adolescents in the seventh, ninth and eleventh grades. This study examined nearly 10,000 students enrolled in public schools in Connecticut who completed the statewide survey of adolescent health. This study found that 7.4% of girls and 3.1% of boys reported disordered eating, which consisted of vomiting, or use of diet pills, laxatives or diuretics, prior to the survey [9]. Girls in the highest BMI group (>95th percentile) were at the highest risk of engaging in disordered eating [9]. Another study, completed in the Minneapolis-St. Paul metropolitan area with a relatively small sample size (n=806), also found body dissatisfaction to be a risk factor for eating disorders [10].

In general, overweight adolescent girls tended to have more negative responses to weight-based teasing, have lower body satisfaction and have the highest risk for engaging in unhealthy eating behaviors [8, 9]. Engagement in unhealthy eating behaviors may be influenced by the body image pressures girls face in contemporary society [4].

It was acknowledged that recognition of teens at risk for unhealthy weight maintenance and weight loss practices because their behaviors may lead to health problems or become severe eating disorders later on. Clearly, the earlier a problem was identified, the more likely treatment would be successful [8].

The aim of the present study was to examine whether students' BMI classification (underweight, healthy weight, overweight or obese) and their weight perception (underweight, normal weight or overweight) is related to being bullied, either electronically or on school property, and whether being bullied mediates the students' likelihood of engaging in unhealthy weight management and weight loss behaviors. We hypothesized that: (1) if a student is classified as overweight or obese based upon BMI, they will more frequently report being bullied and therefore likely engage in more unhealthy weight management and weight loss behaviors as compared to those students of underweight or healthy weight, as classified by BMI and (2) if a student perceives themselves to be overweight, they will more frequently report being bullied and therefore be more likely to use more unhealthy weight management and weight loss behaviors as compared to those students who do perceive themselves as normal weight or underweight.

CHAPTER 2. METHODS

2.1 Sample

This study was a secondary data analysis using Youth Risk Behavior Surveillance System (YRBSS) 2011 data. The YRBSS is an epidemiologic surveillance system maintained by the Centers for Disease Control and Prevention (CDC). The population-of-interest consisted of all public, Catholic, and private school students in grades 9 through 12. This self-reported data was collected from 15,425 students in 158 schools from across the United States [11].

2.2 Measures

Weight status was examined with two separate independent variables. The first independent variable was BMI which was calculated using self-reported height and weight. Height and weight were first recorded using feet and inches, and pounds, respectively, which were then converted into meters and kilograms. [Meters and kilograms were then used to calculate BMI using the following formula: $BMI = \text{kg}/\text{m}^2 = \text{Weight (in kg)}/[\text{Height (in m)}^2]$]. Weight status was classified based on gender and age-specific BMI percentile defined by the CDC growth charts: obese = $\geq 95^{\text{th}}$ percentile; overweight = 85^{th} - 95^{th} percentile; normal weight = 5^{th} - 85^{th} percentile; and underweight

= \leq 5th percentile [11]. These data were then used to form a dichotomous variable of overweight/obese or normal.

A weight perception variable was also created and used as separate independent variable. The weight perception variable consisted of students who described themselves as slightly overweight or very overweight.

The dependent variable was unhealthy weight management and weight loss behaviors, defined as students responding “yes” that they had engaged in one or more of the following behaviors: (1) had gone without eating for 24 hours or more to lose/keep from gaining weight during the past 30 days, (2) had used pills, powders and liquids without doctor’s advice to lose/keep from gaining weight during the past 30 days and (3) had vomited or taken laxatives to lose/keep from gaining weight during the past 30 days.

A mediator variable was also included in this study. The mediator variable was a report of being bullied. Being bullied was defined as a student reporting yes to either one of the following questions: 1) having been bullied on school property in the past twelve months or 2) having been electronically bullied in the past 12 months [11].

Covariates included age (12 or younger through 18 or older), grade level (9th grade-12th grade or ungraded/other), race (American Indian or Alaska Native, Asian, Black or African American, Native Hawaiian or Other Pacific Islander, White), ethnicity (Hispanic or Latino or not) and sex (female or male) and were selected based upon previous literature.

2.3 Data Analysis

Descriptive analyses and logistic regression were performed using SAS 9.3 [12]. The three-stage cluster sample design employed by the YRBSS was accounted for before beginning data analyses. This included accounting for stratification, clustering and unequal selection probabilities, making the estimates representative of students in grades 9-12 in public and private schools in the United States [13]. Logistic regression was used to estimate associations between weight status (using two distinct variables: BMI category and perception of weight) with unhealthy weight management and weight loss behaviors. Unadjusted, age-adjusted and fully-adjusted models were estimated. Fully-adjusted models controlled for age, sex and race.

Mediation analyses, utilizing Baron and Kenny's approach [14], were used to examine if being bullied mediated the relationship between unhealthy weight management and weight loss behaviors.

CHAPTER 3. RESULTS

3.1 Participant Characteristics

Participant characteristics can be found in Table 1. The sample size was 15,425 students. In this sample, 13.7% of students in grades 9 through 12 were obese and 15.8% were overweight. Out of all students surveyed, 16.7% reported engaging in unhealthy weight management and weight loss behaviors. Also important to note was that 24.4% of all students reported being bullied either electronically or on school property during the 12 months before the survey [11].

Table 1: Participant Characteristics

<i>Characteristic</i>	<i>n</i>	<i>%</i>
Race		
White	7574	58.1
Black or African American	3048	23.4
Asian	563	4.3
American Indian or Alaskan Native	620	4.8
Native Hawaiian/Other Pacific Islander	342	2.6
Other	890	6.8
Hispanic or Latino		
Yes	4708	30.5
No	10,717	69.5
Sex		
Male	7686	49.8
Female	7739	50.2

Table 1: Continued.

Age		
≤12	45	0.3
13	24	0.2
14	1567	10.2
15	3485	22.6
16	4077	26.4
17	3936	25.5
≥18	2291	14.8
Grade		
9 th	3798	24.6
10 th	3717	24.1
11 th	4160	27.0
12 th	3724	24.1
Other	28	0.2
BMI		
Overweight	2439	15.8
Obese	2115	13.7
How do you describe your weight?		
Very Underweight	353	2.3
Slightly Underweight	1842	11.9
About the Right weight	8603	55.8
Slightly Overweight	3966	25.7
Very Overweight	662	4.3
What are you trying to do about your weight?		
Lose weight	7236	46.9
Gain weight	2650	17.2
Stay the same weight	2804	18.2
Not trying to do anything	2735	17.7
Bullied on school property or electronically	3759	24.4
Engaged in unhealthy weight management/loss behaviors	2582	16.7

3.2 YRBS BMI Category

Step one in mediation analysis was to determine whether the independent variable (BMI) was associated with the dependent variable (unhealthy weight management and weight loss behaviors). In unadjusted, age-adjusted and fully-adjusted models, being overweight or obese based on BMI percentile was significantly associated with an increased odds of participating in unhealthy weight management and weight loss behaviors (see Table 2). In the fully-adjusted model, overweight or obese students were 2.60 (2.09-3.24, 95% CI) more likely to engage in unhealthy weight management and weight loss behaviors than their normal weight counterparts. Step two in the mediation analysis was designed to determine whether the independent variable (BMI) was associated with the mediator (being bullied). There was no significant correlation between BMI and reported bullying with an odds ratio of 0.90 (0.71-1.14, 95% CI) in the fully-adjusted model (see Table 3). Since there was no significant correlation between BMI and reported bullying, mediation could not be established.

3.3 Self-Perception of Weight

Mediation analysis was completed a second time using self-perception of weight as the independent variable. Step one in mediation analysis was conducted in order to determine whether the independent variable (self-perception of weight) was associated with the dependent variable (unhealthy weight management and weight loss behaviors). There was a significant correlation between perceived weight and unhealthy weight management and weight loss behaviors. Students who perceived themselves to be

overweight were 2.02 (1.67-2.45, 95% CI) times more likely to engage in unhealthy weight management and weight loss behaviors than those who perceived themselves as normal or underweight (see Table 2). Step two in mediation analysis attempted to determine whether the independent variable (self-perception of weight) was associated with the mediator (being bullied). There was not a significant correlation between perceived weight and being bullied, with an odds ratio of 1.25 (0.99-1.57, 95% CI) (see Table 3). Therefore, bullying did not appear to mediate the relationship between perceived weight and use of unhealthy weight management and weight loss behaviors.

Table 2: Associations between weight status and unhealthy weight management and weight loss behaviors

	Model 1 ^a	Model 2 ^b	Model 3 ^c
YRBS BMI Category (overweight/obese)	1.72 (1.53-1.94)*	1.73 (1.53-1.96)*	2.60 (2.09-3.23)*
Perceived weight (overweight/obese)	2.40 (2.16-2.67)*	2.40 (2.16-2.68)*	2.02 (1.67-2.45)*

^aUnadjusted; ^bAge-adjusted; ^cAdjusted for age, sex and race; *Statistically significant at $p < 0.05$

Table 3: Associations between weight status and reported bullying

	Model 1 ^a	Model 2 ^b	Model 3 ^c
YRBS BMI Category (overweight/obese)	0.99 (0.90-1.09)	0.99 (0.89-1.09)	0.90 (0.71-1.14)
Perceived Weight (overweight/obese)	1.31 (1.19-1.45)*	1.31 (1.18-1.46)*	1.25 (0.99-1.57)

^aUnadjusted; ^bAge-adjusted; ^cAdjusted for age, sex and race; *Statistically significant at $p < 0.05$

3.4 Associations between unhealthy weight management and weight loss behaviors

Although mediation could not be established, significant associations were found in all fully-adjusted models between reported bullying and unhealthy weight management and weight loss behaviors. Students who reported being bullied were 2.90 (2.32-3.63, 95% CI) times more likely to engage in unhealthy weight management and weight loss behaviors compared to their peers who did not report being bullied.

3.5 Covariates

Although being bullied did not seem to mediate the relationship between weight status and unhealthy weight management and weight loss behaviors in the above three models, some of the covariates appeared to have associations with both unhealthy weight loss and weight management behaviors and a self-report of being bullied. Twelve year old students were 5.5 (2.86-10.60, 95% CI) times more likely to engage in unhealthy weight loss and weight management behaviors and 4.3 (2.6-7.3, 95% CI) times more likely to report being bullied compared to those students who were ≥ 18 years old. Also important to note was that males were less likely to report: unhealthy weight loss, weight management behaviors and being bullied compared to females.

CHAPTER 4. DISCUSSION

4.1 Discussion

The purpose of this study was to examine the relationship between BMI (as well as self-perceptions of weight), unhealthy weight management and weight loss behaviors and being bullied as the mediator variable. It was hypothesized that adolescents classified as overweight and obese would be more likely to report being bullied and therefore more likely to engage in unhealthy weight management/loss behaviors.

The second hypothesis was that students who perceived themselves as overweight would be more likely to report being bullied and therefore more likely to engage in unhealthy weight management/loss behaviors.

Although neither hypothesis was fully supported, significant relationships were found between many of the variables, including the covariates. Both younger and female students were more vulnerable to bullying and unhealthy weight management and weight loss behaviors than male and older students. Statistically significant relationships between both BMI and self-perception of weight with unhealthy weight management and weight loss behaviors were found. Statistically significant relationships between bullying and unhealthy weight management and weight loss behaviors were also found. Further research needs to explore the importance of self-esteem in relation

to bullying, overweight and obesity, and unhealthy weight management and weight loss behaviors. Adolescents with low self-esteem may perceive themselves to be overweight more often than adolescents with higher self-esteem and therefore may be more susceptible to the negative effects of bullying and coping in unhealthy ways. Focusing interventions on challenging social contexts that overweight and obese adolescents potentially face every day could be a more effective approach than emphasizing diet and physical activity alone.

Future studies should also examine the usefulness of applying a theory or a model to this issue to search for more potential predictors of unhealthy weight management and weight loss behaviors. For example, the social ecological model [15] could be applied to examine how not only an adolescent's perceptions influence their likelihood of engaging in unhealthy weight management and weight loss behaviors, but also how their family, peers, teachers, schools, communities and the media all influence how an adolescent views their weight. It would also be beneficial if future studies conducted a multivariate analysis in order to better compare males to females and students of different ages.

4.2 Limitations

The first limitation of this study was that the data used in this study was based on the self-report of students, which could result in the possible underestimation of the prevalence of overweight and obesity among this sample. The second limitation was

that the over-reporting and under-reporting of some behaviors could exist, although the YRBSS has good test-retest reliability. The perception of what was considered bullying could also vary, not only between students, but also between schools and states. The fourth limitation was that this sample was only representative of those adolescents who attend school. It did not account for those who were home schooled or dropped out. Another limitation was the difference in the time frame for the questions regarding unhealthy weight management and weight loss behaviors (in the past 30 days) and reported bullying (in the past 12 months). Lastly, there could also be some variability in what questions were included on the survey, since not all states and school districts are required to include all standard questions in the YRBSS.

4.3 Conclusion

This study could lend support to the effective program design for interventions with adolescents in many ways. First, it could help those working with this age group to understand the challenges overweight and obese students face in school and in their relationships with their peers. Second, it could help students overcome these obstacles and improve their overall well-being, not just their physical health. Third, it could allow interventions to be created at the social level in schools to help overweight and obese adolescents cope with bullying in a healthier way. Lastly, this study could help identify unhealthy weight management and weight loss behaviors before they become full

eating disorders such as anorexia nervosa or bulimia nervosa, which can be very difficult to treat.

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