

# **Relationship between team sport participation and weight control behaviors in adolescents**

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## **I. Introduction**

The nutritional status of adolescents may be affected by weight control behaviors and can result in negative outcomes (APA, 2022). Additionally, according to numerous studies, disordered eating and weight control behaviors among adolescents are commonplace (Neumark-Sztainer et al. 2011; Westerberg-Jacobson et al. 2012). The nutritional status of adolescent athletes, specifically, is of considerable importance due to increased nutritional needs resulting from high activity levels (Jager et al, 2019; Vitale et al 2019). Various studies showing less than adequate caloric intake and nutrient status have been found among adolescent athletes (Braun et al. 2018; Civil et al. 2019; Silva & Silva, 2018; Lounge et al. 2020). The implications of these studies relating to correlations between adolescents participating in sports and behaviors regarding weight control deserve to be explored in greater detail. This study examines the relationship between the desire to control weight as an adolescent and participation in a sport.

## **II. Literature Review**

### *Sports Participation During Adolescence: Implications for Eating Behaviors and Health*

Adolescence is an important developmental life stage as the choices made and habits formed will have an effect on the course of their life (Weinstein et al., 2014). It is also a time of increased independence in regard to food and activity choices (Tsai et al., 2016). Choices regarding many types of physical activity are offered in schools such as team sports, physical education classes, and after-school programs. Estimates of team sports participation between the ages of 6 and 18 reach nearly 30 million in the United States and are close to 60 million for other types of organized athletics (Popkin et al. 2019). The annual High School Athletic Association survey found an estimated 8 million high school students participate in sports each year, which is an increase of about 95,000 students from the 2015-16 school year (NFHS, 2017). Additionally, physical activity in adolescents has been found to have great benefits for mental health (Taliaferro et al., 2011) and physical health (Hallal et al., 2006).

Although there are positive effects of physical activity in adolescents, body image and concerns about weight and shape have been found to be related to underlying reasoning behind participation in sports and other forms of physical activity among adolescents (Frank et al., 2018; Jáuregui-Lobera et al., 2018). Involvement in sports and physical activity due to these motivations have been shown to lead to exercise addiction and poor eating behaviors (Weinstein et al., 2014; Mancine et al., 2020). If poor eating behaviors become extreme, they may be classified and diagnosed as a variety of different types of eating disorders.

### *Disordered Eating and Behaviors: Identification and Risk Factors*

The Diagnostic and Statistical Manual of Mental Disorders (DSM) authored by the American Psychiatric Association (APA, 2022) provides diagnostic criteria for six different diagnoses: pica, rumination disorder, avoidant/restrictive food intake disorder, anorexia nervosa, bulimia nervosa, and binge-eating disorder. Another disorder that is mainly prevalent in adolescent boys compared to girls (Phillips et al., 2010) is muscle dysmorphia, which is a disorder in which a person views themselves as too small or as not having enough muscle (APA, 2022). In many cases, this disorder leads to a harmful obsession with dieting, exercising, and excessive weight-lifting in order to gain muscle (Phillips et al., 2010).

Each type of disorder has its own risk factors contributing to its development. The development of avoidant/restrictive food intake disorder may be more common in those with anxiety, obsessive-compulsive disorder, autism spectrum disorder, or attention-deficit disorder (Cooney et al. 2018; Field et al. 2003). The American Psychiatric Association (APA, 2022) states that anorexia nervosa is especially prevalent in environments and activities that value a small, thin body such as modeling and athletics. Additionally, there is an increased risk for anorexia nervosa development due to genetic factors such as biological relation to someone who has the disorder (Baker et al. 2017). There are many risk factors that are associated with bulimia nervosa such as weight concerns, anxiety, depression, idolization of a thin body, and the experience of childhood sexual or physical abuse (APA, 2022). Finally, the development of binge-eating disorders is believed to have genetic links as a result of the disorder having familial trends (Kessler et al. 2017). With motivations such as achieving a smaller or more muscular body, as described above, there may be a link between unhealthy eating behaviors and increased use of exercise to help achieve an adolescent's desired body image.

The data on the prevalence of eating disorders varies based on factors such as the availability of studies and gender (APA, 2022). Of children 15 years or older in an Australian study, avoidant/restrictive food intake disorder had a prevalence of 0.3% (Hay et al. 2017). Anorexia nervosa is a disorder that is similarly prevalent in adolescent girls and boys (0.3%) (Swanson et al. 2011). By contrast, the same study by Swanson et al. (2011) found differences in the adolescent prevalence of bulimia nervosa (1.3% in girls; 0.5% in boys).

Furthermore, disordered eating behaviors in adolescents outside the context of diagnosed eating disorders have been assessed and found to be highly prevalent. Neumark-Sztainer et al. (2011) reported on these trends in adolescents from the Project EAT study and found that 57% of girls and 22% of boys participate in dieting and 60% of girls and 28% of boys use unhealthy weight control behaviors such as fasting, eating very little food, using a food substitute, skipping meals, or smoking cigarettes. A major finding of this study was that these behaviors were high among adolescents and either remained unchanged or increased as time went on (Neumark-Sztainer et al. 2011). Other studies have found increases in bulimic symptoms from ages 14 to 16 (Abebe et al. 2012), a high prevalence of weight and body shape dissatisfaction in

early adolescence (Lam and McHale, 2012), and desires to have a thinner body resulting in weight control behaviors in girls 7 to 18 years old. (Westerberg-Jacobson et al. 2012).

Screening tools have been used to assess the risk for eating disorders in high school athletes and found approximately half of young athletes were at risk (Magee et al. 2023). The screening tool assessed young athletes' responses to feeling guilty after overeating, having the desire to be thinner, thinking their stomachs were too big, being satisfied with the shape of their bodies, and current and previous attempts to lose weight. The screening tool found an overwhelmingly high proportion of participants to be at risk for eating disorders, especially in girls (Magee et al. 2023). Female adolescent athletes have been studied extensively in the literature and found to be a population in which eating disorder symptoms and menstrual irregularity are common problems (Ravi et al. 2021; Xanthopoulos et al. 2020). Just as female athletes are a high-risk group for developing eating disorders, adolescent boys involved in endurance, power, or technical sports are also a high-risk group (Geil et al. 2016). Furthermore, athletes of any gender involved in sports that are heavily dependent on weight are at increased risk (Geil et al. 2016).

### *Adolescent Nutrition for Growth and Development*

Each eating disorder described has the common undesirable consequences of impaired social functioning, academic failure, significant weight loss, and nutritional deficiencies (APA, 2022). This is especially concerning due to the fact that nutritional needs during adolescence are considerably higher than during most other life stages and are closely related to health later on in life (Christian et al. 2018; Norris et al, 2022). In addition, it is recommended that carbohydrate and protein intake should be increased when continuous moderate to intense physical activity is undertaken in order to improve athletic performance and decrease risks of injury (Jager et al, 2019; Vitale et al, 2019).

Based on data from Project EAT (Eating Among Teens), Croll et al. (2006) reported that adolescents involved in weight-related and team sports activities had better nutrient intake than those who were not involved in sports. However, among each group that was studied, the intake of certain nutrients was below the recommended levels based on Dietary Reference Intakes and the Healthy People 2010 Nutrition and Health Objectives. Other studies have found trends in which adolescent athletes have persistent energy deficits of up to 300 kcals per day (Cherian et al. 2018; Civil et al. 2019; Lounge et al. 2020). Research shows a high proportion of young athletes are consuming less than adequate amounts of carbohydrates and protein; 31% of athletes consume less than 5 g/kg of carbohydrates and 34% consume less than 1.2 g/kg of protein (Braun et al. 2018). In addition to micronutrient deficiencies of young athletes, there are many studies in which micronutrients, such as magnesium, boron, vitamin D, calcium, and iron are lacking in both boys and girls (Braun et al. 2018; Silva & Silva, 2017; Silva et al. 2018). One study found the proportion of adolescent athletes with an inadequate intake of iron to be 69%, calcium to be 59%, and vitamin D to be 100% (Braun et al. 2018). Adequate intake of calcium

and iron is particularly important during adolescence due to the rapid bone growth and muscle development happening during puberty, while vitamin D is required for the absorption of calcium and the development of bone tissue (Savarino et al. 2021). These studies did not examine what the possible cause of inadequate nutrition might be.

This study will add to the current knowledge of adolescent behaviors regarding weight control by assessing whether or not adolescents who participate in different classes of team sports differ from those that do not. Many studies involving adolescent athletes have shown energy and nutrient deficits (Braun et al. 2018; Cherian et al. 2018; Civil et al. 2019; Lounge et al. 2020; Silva & Silva, 2017; Silva et al. 2018). This study will compare two adolescent team sports groups, power team sports and weight-related team sports, to a group of adolescents who do not participate in team sports. The study will address two research questions: 1) Do adolescents who participate in team sports have a higher prevalence of weight control behaviors than those that do not?; 2) Are there differences between power team sports and weight-related team sports in relation to weight control behaviors among adolescents?

### *Research Aims*

In summary, this literature review outlines the current body of research regarding eating behaviors and nutritional status of adolescent athletes. The research shows that disordered eating behaviors in adolescents are widespread with half of adolescent athletes at risk for developing eating disorders. Additionally, many adolescent athletes do not meet the nutritional requirements for their age group. Much of the research focuses on the current status of adolescent nutrition and behavioral patterns in athletes while the significance of participation in sports on these developments is not explored. The aim of this study is to investigate the relationship between sport participation and weight control behaviors among adolescents in order to broaden the perspective on the current understanding of this topic.

## **III. Methods**

### **Study Design and Population**

The current analysis uses data on 1,272 adolescents who participated in the EAT 2010 (Eating and Activity in Teens) study. EAT 2010 was designed to examine dietary intake, physical activity, weight control behaviors, weight status, and factors associated with these outcomes in adolescents. Surveys and anthropometric measures were completed by a total of 2,793 adolescents during the 2009-2010 academic year. All study procedures were approved by the University of Minnesota's Institutional Review Board Human Subjects Committee and by the research boards of the participating school districts.

The study population includes adolescents from 20 public middle schools and high schools in the Minneapolis/St. Paul metropolitan area of Minnesota, which serve socioeconomically and racially/ethnically diverse communities. Surveys were administered and height and weight of adolescents were measured by trained research staff during selected health, physical education, and science classes. Measurements were completed in a private area, while the EAT 2010 survey and physical activity survey were administered during two class periods. Following survey completion, participants were given a \$10 gift card. Adolescents were given the opportunity to assent only if their parent/guardian did not return a signed consent form indicating their refusal to have their child participate. Among adolescents who were at school on the days of survey administration, 96.3% had parental consent and chose to participate.

### Adolescent Survey Development

The EAT 2010 survey is a 235-item, self-report instrument assessing a range of factors of potential relevance to weight status and weight-related behaviors among adolescents. Survey development was initially guided by a review of the previous Project EAT surveys (Croll et al., 2006). The EAT 2010 survey was pretested by 56 adolescents with diverse backgrounds and pilot tested with a separate sample of 129 middle school and high school students to examine the test-retest reliability of measures over a one-week period.

The supplementary EAT 2010 Physical Activity survey was developed based on an established tool for assessing types of physical activity and time spent participating in each activity (Berkey et al. 2003; Rifas-Shiman SL, Gillman MW, Field AE et al. 2001). The survey focused on physical activity in three categories: for transportation purposes, for physical education classes, and for their free time. Participation in free time activities did not include transportation-related activity or activity during a physical education class. It was first assessed with a “yes” or “no” question of whether or not they engage in that activity. Participants were then prompted to provide the amount of time they spent participating in that activity per week for each season of the year.

### Independent Variables

#### *Involvement in Team Sports*

Participants were asked about the frequency they performed a number of different activities. For each activity, the participants were first asked the yes or no question “Did you do this activity?”. If yes, they were asked, “How much did you do it each season”. For each season the response options were “None/Zero”, “Less than ½ hrs/wk”, “½ to less than 2 hrs/wk”, “2-3 hrs/wk”, “4-6 hrs/wk”, “7-9 hrs/wk”, or “10+ hrs/wk”.

The following criteria were used for identifying involvement in a team sport. Power team sports were considered volleyball, basketball, baseball/softball, hockey, football, soccer, and tennis. Weight-related team sports were considered dancing/aerobics, cheerleading/gymnastics, wrestling, and swimming. To be categorized as participating in a power team or weight-related team sport, a participant reported doing an activity for at least 4-6 hours per week in one or more seasons. The comparison group, not involved in team sports, was defined by not doing a weight-related team sport or power team activity for at least 4-6 hours per week in any season. Those who participated in both power team sports and weight-related team sports were excluded from the analysis. The test-retest reliability for hours of sports activities ranged from  $r=0.66-0.90$ .

## Dependent Variables

### *Body Weight Goals*

Adolescents self-reported their current weight-related goals and intentions by responding to the survey question “Are you currently trying to:” with possible choices of “Lose weight”, “Stay the same weight”, “Gain weight”, or “I am not trying to do anything about my weight”. The test-retest agreement for this measure was 82%.

### *Any Unhealthy Weight Control Behaviors*

Participants were asked the question: “Have you done any of the following things in order to lose weight or keep from gaining weight during the past year?” (yes/no for each method). The methods assessed were 1) fasted, 2) ate very little food, 3) used a food substitute (powder or a special drink), 4) skipped meals, 5) smoked more cigarettes, 6) took diet pills, 7) made myself vomit, 8) used laxatives, and 9) used diuretics. For analysis, those who responded “yes” for one or more methods were coded as users of unhealthy weight control behaviors (test-retest agreement= 85%).

### *Use of Exercise to Lose Weight or Keep from Gaining Weight*

The use of exercise to lose weight or keep from gaining weight was assessed using the survey item “How often have you done each of the following things in order to lose weight or keep from gaining weight in the past year?” Response options for the prompt “Exercise” were “Never”, “Rarely”, “Sometimes”, and “On a regular basis”. The test-retest reliability of this measure was strong ( $r=0.76$ ).

### *Use of Exercise to Increase Muscle Size or Tone*

The use of exercise to increase muscle size or tone was assessed using the survey item “How often have you done each of the following things in order to increase your muscle size or tone in the past year?” Response options for the prompt “Exercise more” were “Never”, “Rarely”, “Sometimes”, and “On a regular basis”. The test-retest reliability of this measure was modest ( $r=0.64$ ).



## Covariates

### *Age, Sex, BMI, and Body Weight Goals*

Age of the participants was derived from the survey prompt to provide a birthdate. The sex of the participants was obtained with the item “Are you [Female/Male]?”. BMI was calculated through self-reported height and weight items: “How tall are you?” and “How much do you weigh?”.

## Statistical Analysis

First, the description of adolescent sport participation in a power team sport, weight-related team sport, or not involved in team sport was done by generating percentages for each category of involvement among the full sample using the criteria for identifying sport participation for females (n for power team sports=166, n for weight-related team sports=182, n for not involved in team sport=350) and males (n for power team sports=284, n for weight-related team sports=61, n for not involved in team sport=229). There were then three separate dichotomous variables that were established for the use of exercise to lose weight or keep from gaining weight, the use of exercise to increase muscle size or tone, and the use of unhealthy weight control behaviors. The two categories were never/rarely and sometimes/on a regular basis. For each category of sport participation, percentages were calculated to describe the distribution of each behavior in the sample. Chi-squared tests were used to test differences in the distribution of variables.

## **IV. Results**

### Demographics

For both males and females, there were statistically significant differences in age between the three groups, power team sports, weight-related team sports, and non-team sports involved (Table 1). Around half of high school and middle school females were not involved in either power team sports or weight-related team sports. Over half of the high school boys were involved in power team sports. There were no statistically significant differences in BMI across the three groups for males or females. Among females with a relatively even distribution between groups were those that were White and Asian. There were half or more females that were Black/African American, Hispanic/Latino, Hawaiian/Pacific Islander, and American Indian/Native American that were non-team sports involved. Among males, there were half or more participants that were White, African/American, and Hispanic/Latino who participated in power-team sports.

Table 1: Demographic analysis by participation in power team sports, weight-related team sports, and non-team sports groups in the EAT 2010 (Eating and Activity among Teens) study

	Females			Males		
	Power team sports (n=166)	Weight-related team sports (n=182)	Not involved in team sports (n=350)	Power team sports (n=284)	Weight-related team sports (n=61)	Not involved in team sports (n=229)
Age group						
High school	29.4	20.5	50.1	55.1	9.5	35.4
Middle school	18.3	31.7	50.0	43.9	11.8	44.2
BMI groups						
Not overweight	22.2	26.1	51.7	48.8	10.4	40.8
Overweight	26.8	26.0	47.2	49.6	11.0	39.5
Race/ Ethnicity						
White	27.0	37.8	35.1	51.9	9.8	38.3
Black/African American	25.9	24.1	50.0	53.8	9.7	36.5
Hispanic/Latino	20.8	22.9	56.2	50.5	36.4	13.1
Asian	22.3	21.7	21.7	44.4	10.3	45.3
Hawaiian/Pacific Islander	0	0	100	33.3	0	66.7
American Indian/Native American	30.8	19.2	50.0	47.6	14.3	38.1
Mixed/other	19.8	34.1	46.1	42.9	10.7	46.4

### Weight Control Goals

As shown in Table 2, there were no overall significant differences in weight control goals between groups for males ( $P=0.09$ ) or females ( $P=0.65$ ). The most prevalent weight control goal among females in all three groups was to lose weight while the least prevalent goal was to gain weight. The most prevalent goal among males involved in weight-related team sports was to lose

weight. It was more common for males in the power team sports involved group and not involved in team sports group to not be trying to do anything about their weight.

Table 2: Percentage of adolescents with weight control goals across power team sports, weight-related team sports, and not involved in team sports groups in EAT 2010 (Eating and Activity among Teens) study

	Females			Males		
Currently trying to:	Power team sports	Weight-related team sports	Not involved in team sports	Power team sports	Weight-related team sports	Not involved in team sports
Lose weight	44.0	45.9	40.7	24.6	36.1	28.5
Stay the same weight	21.7	23.2	24.9	18.0	19.7	23.7
Gain weight	5.4	8.3	8.6	21.8	14.7	13.2
Not trying to do anything about weight	28.9	22.6	25.8	35.6	29.5	34.6

### Weight Control Behaviors

As shown in Table 3, there were no overall significant differences in the frequency of using exercise to lose weight or keep from gaining weight across the team-sport groups- for males ( $P=0.77$ ) or females ( $P=0.10$ ). The majority of males and females in each group reported using exercise to lose or keep from gaining weight at a frequency of sometimes or on a regular basis. The groups with the highest percentage of this behavior were males and females involved in power team sports.

Table 3: Percentage of adolescents who have used exercise to lose weight or keep from gaining weight across power team sports, weight-related team sports, and not involved in team sports groups in the EAT 2010 (Eating and Activity among Teens) study

	Females			Males		
Use exercise to lose weight or keep from gaining weight:	Power team sports	Weight-related team sports	Not involved in team sports	Power team sports	Weight-related team sports	Not involved in team sports
Never/rarely	19.3	20.3	26.6	19.8	22.9	21.9
Sometimes/on a regular basis	80.7	79.7	73.3	80.2	77.0	78.1

### Muscle Building Behaviors

The percentages of adolescents who have used exercise to increase muscle size or tone is shown in Table 4. Statistical overall differences in prevalence were found between the three team-sport groups among females ( $P=0.003$ ), but not in males ( $P=0.12$ ). Using exercise to increase muscle size or tone (sometimes or on a regular basis) was more prevalent among females who participated in either power team sports or weight-related team sports compared to females not involved in team sports. Although there were no significant differences between groups for males, the majority of the male participants reported having used exercise to increase their muscle size or tone sometimes or on a regular basis.

Table 4: Percentage of adolescents who have used exercise to increase muscle size or tone across power team sports, weight-related team sports, and not involved in team sports groups in the EAT (Eating and Activity among Teens) study

	Females			Males		
Use exercise to increase muscle size or tone:	Power team sports	Weight-related team sports	Not involved in team sports	Power team sports	Weight-related team sports	Not involved in team sports
Never/rarely	29.7	28.2	41.1	17.0	28.1	21.4
Sometimes/on a regular basis	70.3	71.8	58.9	83.0	71.9	78.6

### Unhealthy Weight Control Behaviors

As shown in Table 5, there were no statistically significant overall differences between groups for the use of unhealthy weight control behaviors in males ( $P=0.10$ ) or females ( $P=0.32$ ). Each of the three groups of females had a relatively even split between having participated in this behavior never/rarely or sometimes/on a regular basis. Among the three groups of males, those in weight-related team sports had the highest percentage of having used one or more unhealthy weight control behavior. In addition, among males there were more than half of all three groups participated in this behavior never/rarely.

Table 5: Percentage of adolescents who have used unhealthy weight control behaviors across power team sports, weight-related team sports, and non-team sports groups in the EAT 2010 (Eating and Activity among Teens) study

	Females			Males		
Have used unhealthy weight control behaviors:	Power team sports	Weight-related team sports	Not involved in team sports	Power team sports	Weight-related team sports	Not involved in team sports
Never/rarely	54.8	47.0	52.2	66.7	53.3	60.5
Sometimes/on a regular basis	45.2	53.0	47.8	33.3	46.7	39.5

## V. Discussion

This study was designed to determine whether participation in a team sport or weight-related team sport is related to weight control behaviors among adolescents. The findings from this study indicate that there are no significant differences in weight control goals or behaviors between adolescents who participate in power team sports, weight-related team sports, or no team sport at all. While much of the current research focuses on either adolescent athletes or the adolescent population as a whole, this study allowed further knowledge to be gained by comparing adolescents who were involved in sports and adolescents who were not. Although there were no differences between groups, there were considerably high prevalences of weight loss goals and weight loss behaviors among each group, which may be suggestive of a high degree of body dissatisfaction among these adolescents. These results are in line with current research in this area, as adolescents with body dissatisfaction are particularly susceptible to dieting and eating disorder behaviors such as the unhealthy weight control behaviors assessed in the EAT 2010 (Eating and Activity among Teens) study (Almenara et al, 2014; Contreras et al, 2015; Loth et al, 2014). These findings suggest that weight-related goals and behaviors affect adolescents at high rates regardless of sport participation.

In this study, it was found that between 70 and 80 percent of adolescent girls and boys in each group used exercise to lose weight or keep from gaining weight sometimes or on a regular basis. In addition, between 60 and 80 percent of adolescents in each group used exercise to increase muscle size or tone sometimes or on a regular basis. These findings align with other studies that found high prevalences of body dissatisfaction in adolescents (Carvalho et al, 2020; Miranda et al, 2021; Tebar et al, 2020). One recent study by Zaccagni et al. (2019) found that, among adolescent girls who participate in either rhythmic gymnastics or no competitive sport, each group had the desire for a thinner body. However, it was found that girls involved in rhythmic gymnastics had a desire for a skinnier body than the girls in the control group

(Zaccagni et al, 2019). By contrast, Toselli et al. (2022) compared two groups of adolescents that either play volleyball or do not. This study found that females that did not play a sport had the highest level of body dissatisfaction, while the lowest levels were among sports-playing males (Toselli et al, 2022). Dissatisfaction with one's body may cause one to want to lose weight or desire a smaller body. Additionally, the desire to increase the size of one's muscles may be linked to a similar dissatisfaction. Exercise is a method that is used to try to achieve those goals for a large group of adolescents in this study. Although this study did not find evidence of differences related to sport participation in using exercise to lose weight or increase muscle size or tone, existing literature suggests that adolescent body dissatisfaction is highly prevalent. This phenomenon may be exacerbated by certain types of physical activity where body weight and appearance are historically perceived to be important factors (Krentz & Warschburger, 2013).

Another finding of this study is that the most prevalent weight control goal among both female and male weight-related team sports groups was to lose weight. Further, females and males who participated in weight-related team sports had a high prevalence of unhealthy weight control behaviors sometimes or on a regular basis ranging from 46.7 to 53 percent. Boudreault et al. (2022) conducted a study aimed at finding the prevalence of extreme weight control behaviors in adolescent athletes and weight-related maltreatment from parents and coaches. Their findings are closely related to the findings of this study, which found that 44% of weight-related team sport athletes adopted extreme weight control behaviors once or more in their athletic career (Boudreault et al, 2022). Other studies have found similar results relating to these behaviors (Geil et al, 2016; Martinsen et al, 2010; Rosendahl et al, 2009).

The specific focus on team sport participation compared to solo exercise is significant due to external factors that influence a team sport athlete. One factor that may influence an athlete to maintain a certain lower body weight is the belief that it may lead to better performance outcomes. A study by Krentz and Warschburger (2013) found that among adolescent athletes participating in aesthetic sports, there was a higher risk of unhealthy weight control behaviors if they believed that achieving a certain body weight would enhance their sports performance. It is possible that the pressure to enhance performance is due to a higher competitive nature of a team sport compared to solo exercise. Another external factor influencing adolescent team sport athletes is parents and coaches. Boudreault et al. (2022) found that 8.4% of girls and 4.7% of boys experienced weight-related psychological violence or neglect from coaches or parents while participating in their sport. This finding may provide insight into understanding why adolescent athletes in team sports may participate in harmful weight control behaviors.

Study strengths include the high number of participants to power the study. Also, this study was conducted throughout numerous public schools in Minnesota which helps to generate diversity among participants. A limitation of this study is that the data collection comes from just one state in the U.S.; enrolling participants from multiple locations in the country would help expand the generalizability of the results. One additional limitation is that the assessment of participation in team sports resulted in smaller group sizes due to the exclusion of those that

participated in both weight-related team sports and power-team sports. Furthermore, it was assumed that participants played a team-based sport based only on self-reporting a predetermined number of hours doing the activity associated with the sport. For future studies, it would be beneficial to use a method that more directly assesses team sport participation.

To conclude, the understanding that dieting, weight loss goals, and weight control behaviors occur across multiple groups within the adolescent population is important when developing interventions for adolescents at risk for eating disorders. It is important to understand that both young athletes and non-sport involved adolescents are similarly motivated to adjust their diet and exercise to control their weight. Neither group should be overlooked when developing interventions and recommendations relating to health and supervision and surveillance research. It also may be beneficial to develop new qualitative research methods to look into specific reasons for weight loss goals and behaviors among adolescents participating in different forms of team sports as the environment for each form of team sport may impact the athlete in different ways.

In particular, future research should focus on the implementation of interventions to reduce the prevalence of unhealthy weight control behaviors among adolescents. These types of interventions may focus on promoting positive body image, and nutrition counseling to teach about adequate nutrition requirements for adolescents. Additionally, parent/coach involvement regarding nutrition education and the prevention of weight-related psychological violence could be an intervention focus as positive influences from adults could help to improve the health and performance of adolescent athletes.

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