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Weight Control and Wrestling

David D.B. Bates

Introduction

The issue of weight control among amateur wrestlers is of significant concern to healthcare professionals. It is found at all major levels, including high school, collegiate, and international ranks of competition.¹⁻³ During the 1997-98 competitive season, three collegiate wrestlers (ages 19, 21, and 22) died while attempting to undergo rapid weight loss (RWL).⁴ The causes of death were kidney failure combined with heart malfunctions, and a heart attack that resulted from dehydration and excessive exercise. The National Collegiate Athletic Association (NCAA) immediately put into effect short-term and long-term weight regulations to prevent potential future tragedies.

There is some ambiguity regarding the classification of behaviors employed by wrestlers to promote weight control. A 1999 study by Dale and Landers found that middle school and high school wrestlers are not at an increased risk for bulimia nervosa, as compared to their non-wrestler counterparts.⁵ This was confirmed in a 2003 survey of 741 college wrestlers.¹ As might be expected, in-season wrestlers showed elevated scores on the Drive for Thinness subscale more so than out-of-season wrestlers and non-wrestlers. The elevated scores for in-season wrestlers are above the cutoff point.

Clinicians, particularly pediatricians with patients who participate in wrestling, should be aware of some of the beliefs and practices of amateur wrestlers with regards to weight loss. Familiarity of the documented effects of weight cycling in this sport will also be useful in patient education.

Beliefs and Practices

Following the deaths of three collegiate wrestlers attempting to lose weight in 1997, the National Wrestling Coaches Association (NWCA) mandated a weight-certification program in an attempt to curb dangerous weight management practices among collegiate wrestlers.⁶ The program established a minimum allowed weight for each wrestler to be determined through analysis of body fat percentage and body mass when hydrated.

Since the implementation of the program in early 1998, 40% of wrestlers claim to have been influenced by the weight certification program, subsequently curbing their weight-cutting tendencies.¹ Similar programs have been implemented at the high school level during the scholastic season. The international styles (freestyle and Greco-Roman), however, still have no regulations and draw thousands of adolescent competitors after the scholastic season. The following is a review of weight reduction practices in high school, collegiate, and international levels of wrestling.

High school. In a 1994 survey, the beliefs, practices, and possible support systems pertaining to weight-loss methods were examined for a group of 197 wrestlers on 9 high school teams.² Not surprisingly, the survey found that most of the high school wrestlers believed “making weight” to be very important.

The authors found that a combination of decreased food intake and increased exercise was the most common method of weight loss, while more dangerous methods such as vomiting

and not drinking were less frequent. Older wrestlers, as well as those who consider wrestling to be their primary sport, engage in more drastic weight loss methods.

High school wrestlers cited peer influence (i.e. coaches, teammates), as well as the personal desire to win as primary reasons for weight loss. In addition to regarding coaches as a primary motivator to lose weight, wrestlers indicated coaches, as well as physicians, as the primary source of weight loss information.²

College. Despite the limited data available on the weight reduction practices of amateur wrestlers, Oppliger and his colleagues executed a comprehensive, large-scale survey of collegiate wrestlers. The survey was distributed to universities at all three divisional levels of competition, taking into account the success levels of teams selected.

Of the 47 schools agreeing to participate in the survey, 43 returned their responses. The surveys were distributed by the athletic trainers, without the coaches' involvement, and were completed anonymously by the athletes. Heavyweight wrestlers, who weigh anywhere from 89.55kg (197lbs) to 130.0kg (285lbs), were excluded from the survey, as they rarely undergo weight loss prior to competition.¹

In general, it was found that collegiate wrestlers significantly reduce weight prior to competition. This behavior parallels that of their novice wrestler counterparts (i.e. high-school wrestlers).

However, it was also found that collegiate wrestlers are more extreme in their "weight management" behaviors than high school competitors.¹ The most weight lost was defined as the most weight a wrestler lost for a season prior to a weigh-in for competition. The collegiate wrestlers averaged 5.3 ± 2.8 kg (11.66 ± 6.16 lbs), as opposed to the previously reported 3.2-3.3kg (7.04-7.26lbs) for high school competitors.¹

Freshman wrestlers, light weight wrestlers (125lbs, 133lbs, and 141lbs), and Division II wrestlers tended to be the most extreme when it comes to weight reduction prior to competition. Freshman wrestlers reported the most weight lost, as well as the greatest post-season weight gain. Lightweight wrestlers reported the most weight lost, the greatest weekly weight loss, and the greatest post-season weight gain. Finally, Division II wrestlers reported the same findings when compared to their Division I and Division III counterparts.¹

Lastly, the methods employed to reduce weight in college wrestlers were determined to be of concern. While the weight-reduction practices of the 1980's were much more extreme than those applied today, education is still necessary. The survey also found that approximately 27% of wrestlers exercise in rubber suits and make use of saunas to reduce weight. Both of these practices were made illegal following the three collegiate deaths in 1997.

Furthermore, approximately 55% report fasting at some point to reduce weight. Restriction of food is practiced by 87%, while fluid restriction is practiced by 71.4% of college wrestlers.

In spite of the dangerous behaviors found among college wrestlers seeking to reduce their weight, roughly 90% reported use of a gradual diet to obtain their weight goals. Of the 741 wrestlers who responded, only 5 (0.67%) met three or more of the criteria for bulimia nervosa.¹

International. The two international styles of wrestling, so-called "freestyle" and "Greco-Roman," are independent of scholastic regulation. As a result, there are currently no regulations for the weight-loss practices in the international styles. However, each spring and summer, thousands of high school, college, and senior level athletes participate in these styles. A 2004 study assesses the weight loss practices of high school wrestlers competing in the international styles in 1997 and 1998.³

The annual United States cadet and junior national wrestling championships is the largest wrestling tournament in the world, and attracts thousands of elite high school wrestlers each year. A strong showing at this event virtually guarantees a college scholarship to the successful young athlete. The authors chose the participants in this tournament for their sample.

The authors used a large sample (N=2638), which were competing in one of two age groups, cadet (15-16 year olds) and junior (17-18 years old). Participants were weighed randomly matside, immediately prior to competition. The rapid weight gain (since the weigh-in session prior to competition) was used to assess rapid weight loss.

The authors found through an additional survey (N=45) that a number of wrestlers experienced symptoms such as dizziness (44.4%), nausea (42.2%), and headache (46.7%) as a result of rapid weight loss. Less common, but nevertheless serious, symptoms included fever (17.8%) and increased heart-rate (4.4%).

The study found that the junior wrestlers gained significantly more weight (mean = 3.59kg) than their cadet counterparts (mean = 2.91kg). This is consistent with the findings of Marquadt that claim older high school wrestlers lose more weight than their underclassmen.² Furthermore, middleweights (103.5-167lbs for cadets and 114.5-191.5 for juniors) gained significantly more weight than lightweights (83.5-94.5lbs for cadets and 98-105.5 for juniors) and upperweights (182.5-242lbs for cadets and 220-275lbs for juniors). In fact, the most drastic weight-loss found was among participants in the 154-165lb weight classes.⁷

Lastly, and of significant concern, the wrestlers who achieved All-American status in the tournaments (those who finish in the top 8 of their weight class) lost significantly more weight (mean = 3.78kg) than nonplacers (mean = 3.05 kg) across the board. This may send the signal to young wrestlers that rapid weight loss is associated with strong performance, thus promoting the destructive cycle.⁷

Effects

There is a widespread belief among wrestling coaches and wrestlers that undergoing RWL in order to compete in a lower weight class will provide a distinct advantage over the competition. It is believed that this practice augments a wrestler's strength and leverage advantages during competition. A number of studies have examined the effects of rapid weight loss on wrestlers.

Physiology. In a review paper from 1987, Brownell, Steen and Wilmore examined the health and metabolic effects of weight regulation practices in athletes competing in a variety of sports. They found from one survey that, on average, collegiate wrestlers underwent rapid weight loss 15 times during the course of a season. Among the same group, 41% reported weight fluctuations of 5.0 to 9.1kg (11.0-20.02lbs) during each week of the season in order to make weight for competition.⁸

This type of short-term weight loss is the result of lost water, fat, protein, and glycogen. A less drastic reduction in caloric intake, combined with a longer duration of the weight reduction period, increases the loss of fat and decreases the loss of lean tissue.⁸ The rapid weight loss method commonly employed by wrestlers results in a considerable loss of lean tissue and water. The decrease in lean tissue results in a subtle alteration in lean to fat ratios with each cycle. This causes the need for a greater caloric restriction in future cycles to reduce weight.

In addition to the loss of lean tissue mass, other adverse physiological effects have been found to result from rapid weight loss. Since a large amount of the rapid weight loss that occurs is due to dehydration, there are substantial reductions in plasma volume and central blood volume. There is also a decrease in the distribution of blood to active tissue. This can result in an increased core temperature, which can have dangerous adverse effects on cardiac function.⁸

Furthermore, it has been shown that this type of “yo-yo” dieting can increase food efficiency. Consequently, weight is lost more slowly and re-gained more quickly with successive bouts of rapid weight loss and re-gain. Therefore, the more times an athlete undergoes rapid weight loss, the more difficult it will be to return to the lower weight in the future. The cycle of rapid weight loss thus becomes progressively more difficult over the course of a wrestling career due to the physiological effects of “yo-yo” dieting.⁸ This has been found empirically in both animals and humans.⁹

Performance. An ambitious empirical study by Kraemer et. al. examined the physiological and performance effects of typical weight loss techniques in amateur wrestlers.¹⁰ The experimenters responded to a survey finding that the majority of wrestlers consider a 5-6% body mass weight loss to be insignificant to performance and physiology.¹¹ The authors set out to test this belief in a simulated competition format.

The subjects were twelve Division I college wrestlers. Each wrestler lost 6% of their body mass in the week leading up to the competition. Since championships in wrestling at all levels are decided in a tournament format, the authors simulated a 2-day wrestling tournament following the week of weight loss. Each wrestler participated in 5 Olympic freestyle matches, with each match having a duration of 5 minutes. Heart rate, blood samples, anthropomorphic measures, reaction time, strength tests, isokinetic tests, and biochemical analyses were used to assess the effects of weight reduction on physiology and performance.¹⁰

The results of the study indicated that wrestlers who undergo a 6% decrease in body mass in the week leading up to competition do show considerable recovery to their baseline standards before the first match. However, contrary to popular belief among the athletes, a continuous decline in virtually all areas of performance occurred over the course of the 2-day tournament. The effects of weight-reduction are compounded over a series of matches, thus proving disadvantageous for the competitive athlete.¹¹

While this study was highly impressive in its methodology, it failed to provide a control variable. This makes it impossible to ascertain whether the continuous decline in performance was due to weight reduction or due to wrestling competition. A re-enactment of this study with a control sample of wrestlers who do not undergo weight-loss prior to competition is essential to verify the claims of the authors.

Cognition. In response to recent findings that collegiate wrestlers exhibit transitory inhibition of short-term memory following rapid weight loss, Landers et. al (2001) examined the cognitive effects of rapid weight loss in high school wrestlers.¹²

In Landers’ study, the experimental group consisted of wrestlers who lost at least 5% of their body mass during rapid weight loss prior to competition. The control was a group of wrestlers who lost less than 1% of their body mass prior to competition. Additionally, all participants were given cognitive tests one week prior to weight loss as a control measure.

The experimental group lost an average of 4.68 kg (10.30lbs), whereas the control group lost an average of 0.29 kg (0.64 lbs). The authors found no difference in cognitive performance on any of the tests among wrestlers in the experimental and control groups. The authors did find

affective disturbances associated with rapid weight loss. To assess affect, the authors administered the PANAS measure of mood along with the battery of cognitive tests.¹²

Conclusion

The widespread practice of rapid weight loss prior to competition in amateur wrestlers should be of concern to physicians. Awareness of the effects and risks can be beneficial to patients who participate in wrestling as they attempt to establish healthy dietary practices.

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