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Challenges of Changes

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SATELITSKI SIMPOZIJ – HRVANJE / SATELLITE SYMPOSIUM – WRESTLING

REGULATION OF BODY WEIGHT IN WRESTLING – A REVIEW

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Invited lecture

ABSTRACT

Wrestlers, and other athletes in similar sports, try to achieve the best possible sports result by manipulating their body weight, i.e., to wrestle in the lowest possible weight category. Many scientific studies have been written on this topic, as many health issues are related to this habit. Review articles on this topic mainly cover all sports in which athletes have a problem with weight reduction. The aim of this study was to analyze the articles focused on weight manipulation exclusively on a sample of wrestlers. The Web of Science and Scopus databases were examined, using the key words: weight control, weight management, weight cycling, weight loss, and wrestling. Out of 285 papers, 70 papers met all the criteria. After analyzing the articles, it was established that the weight reduction habits did not lead to more serious psychological problems, and the methods used by wrestlers were generally harmful and dangerous. Opinions are divided on the issue of health as, according to some studies, weight reduction does not have a detrimental effect on health, and according to others, it has. This ambivalence also exists regarding the decline in skills during weight loss and the legal regulations by which national federations seek to regulate this problem. This study also emphasized the lack of information on healthy weight reduction methods and a healthy diet during this period. The literature on the regulation of body weight exclusively in wrestlers reveals a moderate attitude towards this problem, and on the most important issues the attitudes are divided.

Key words: *weight control, weight management, weight cycling*

INTRODUCTION

Regulation of body weight in wrestling is a problem about which many scientific articles have been written, just as in other sports that include weight categories. To gain an advantage in strength, wrestlers try to lose weight and wrestle in a lower weight category. The most common practice is to do this in a short time, a few days before the competition (Slacanac, Baic, & Karnincic, 2021). If more than 5% of body weight is lost in less than 7 days, it is a rapid weight loss (RWL) (Matthews, Stanhope, Godwin, Holmes, & Artioli, 2019). Another important term is rapid weight gain (RWG) (Matthews et al., 2019). In the period after the official weigh-in, wrestlers try to regain much of their lost body weight to have a weight advantage in a fight. Reduction of body weight, RWL and RWG, is accompanied by dangerous but also illegal methods: diets, dehydration, sauna, laxatives, diuretics, hot salt baths, infusions, etc.; these are just some of the harmful methods, and their number is constantly increasing (Kordi, Ziaee, Rostami, & Wallace, 2011). Large and frequent fluctuations in body weight are not healthy, and some wrestlers remain in this regimen for years. There are numerous questions related to this problem. Do reductions in body weight in periods of rapid growth and development hinder development? Can extensive reductions trigger psychological problems or eating disorders? What can severe dehydration cause in the body? Can you lose weight quickly without negatively affecting your skills and performance? Much of the scientific literature deals with this problem, but the studies also include athletes from other sports who have problems with weight regulation. Other sports with weight categories are generally quite different from wrestling regarding the rules. Sometimes the research findings do not apply to wrestling. The aim of this research is to analyze previous papers on the regulation of body weight exclusively on a sample of wrestlers.

METHODS

Two scientific databases were examined: Web of Science and Scopus. Filters were used that included scientific articles, review articles, and conference articles. To search only the articles that focus on sports topics, a filter was used that included the area of sports science. The key words were: weight control, weight management, weight cycling, weight loss, and wrestling.

Table 1. Database search by key words

Key word 1	Key word 2	Web of Science	Scopus
weight control	wrestling	31	9
weight management	wrestling	11	8
weight cycling	wrestling	14	5
weight loss	wrestling	96	42
Rapid weight loss	wrestling	45	24
Total		197	88
Web of Science + Scopus			285
Exclusion criterion: duplicate papers, not about weight regulation, not exclusively on a wrestler sample			70

After excluding the studies that were not done exclusively on the sample of wrestlers, those which did not relate to the regulation of body weight, and duplicate papers, 70 articles were included in the further analysis. The articles were classified according to the topics that were most often covered: Weight loss and health, Weight loss and performance, Weight loss habits, Weight loss psychology, and Weight loss and legal regulations. The studies were not comparable because they were done by different methods, on different samples, and in different circumstances, so the focus was on the conclusions of the articles.

DISCUSSION

Weight loss and health

The impact of harmful weight loss habits on health is the most widespread topic among scientific articles dealing with weight reduction in sports. The conclusions of scientific articles on this issue are ambivalent – from those reporting serious health problems to those reporting that RWL does not adversely affect health. Among the papers that do not detect a health problem related to weight reduction, we can highlight the papers dealing with growth and development in adolescence. Studies found that RWL does not affect the growth and development of adolescents (Housh et al., 1997; Housh, Johnson, Stout, & Housh, 1993). Another study reported changes in the hormonal status, with normalization in the postseason (Roemmich & Sinning, 1997). Studies report wrestlers' good adaptation to dehydration or rapid recovery through rehydration (Kukidome et al., 2008; Kutlu, Demirkan, & Ozbek, 2015). Wrestlers are able to make up for glycogen depletion in the short time between weighing and fights (Tarnopolsky et al., 1996). Reduction of body weight in wrestlers does not slow the progression of myocardial hypertrophy (Smith, Humphrey, Wohlford, & Flint, 1994),

does not affect blood biomarkers (Viveiros, Moreira, Zourdos, Aoki, & Capitani, 2015), does not develop eating disorders (Dale & Landers, 1999). Reduction of body weight does not affect the genetics associated with obesity/thinness (Nishimaki & Sakamoto, 2018). The metabolism of wrestlers that reduce body weight is the same as of wrestlers that do not reduce body weight (Daniel Schmidt, Corrigan, & Melby, 1993). In 2017, Talaei found that RWL has an effect on adipocytokines but these changes can be both harmful and beneficial (Talaei, Nazem, & Ranjbar, 2017). In 2012, Kordi reported that the number of wrestlers using RWL was high but that the percentage of adipose tissue in these wrestlers was higher than in those in the US, which is good in terms of health (Kordi, Nourian, Rostami, & Angus Wallace, 2012). A high-protein meal will not restore lost glycogen after RWL (Kondo, Shiose, et al., 2021). Among the articles that see RWL as a serious health problem, we should single out those that found that a large number of wrestlers suffered from high dehydration (Sossin, Gizis, Marquart, & Sobal, 1997; Zambraski, Foster, Gross, & Tipton, 1976), and that RWL slows down resting metabolism (Horswill, 1993; Kukidome, Aizawa, Okada, Tokuyama, & Kono, 2007) and sleep metabolism (Kukidome et al., 2007). Dehydrated wrestlers can have more severe consequences of a concussion (Weber et al., 2013). Scientists in Korea found that most injuries in wrestlers occur during RWL periods (Kim & Park, 2021). In a short time after the RWL, it is possible to regain weight, but the organism is still dehydrated (Güder, 2020). RWL increases the concentration of stress markers in urine (Yanagawa et al., 2010) and urine tests indicate possible renal ischemia (Zambraski et al., 1976). RWL causes changes in body composition (Karila et al., 2008; A. Utter, Stone, O'Bryant, Summinski, & Ward, 1998) and hormonal status, and the hormone leptin is lower in women during RWL (Yamaner, 2019). Myers reports that unregulated stimulants combined with RWL can be very dangerous (Myers, Guskiewicz, & Riemann, 1999). Although Dale and Landers argued in 1999 that RWL does not cause eating disorders, the rate of bulimia nervosa is higher in wrestlers who reduce weight than in the general population (Oppliger, Landry, Foster, & Lambrecht, 1993).

Weight loss and performance

Rapid weight loss is a harmful way to reduce body weight, but wrestlers do not give it up because they achieve better results. Is this really true? Nine scientific papers argue that RWL should not adversely affect the outcome: RWL does not affect the decline in skills (Buford, Rossh, Smith, O'Brien, & Pickering, 2006; Fogelholm, Koskinen, Laakso, Rankinen, & Ruokonen, 1993; Kraemer et al., 2001; A. C. Utter, O'Bryant, Haff, & Trone, 2002); the decline in skills is affected by a long competition season rather than by RWL (Buford et al., 2006); during RWL the isometric force does not decrease (A. Utter et al., 1998); glucose and creatine supplementation restores

performance after RWL (Oopik et al., 2002); RWL has little effect on strength and anaerobic performance (Horswill, 1992); wrestlers have a very fast recovery of skills after RWL (Pallares et al., 2016); a 5% weight reduction is the most effective (Kondo, Nishimaki, Yamashita, & Nakajima, 2021). The following eight scientific papers disagree with the claim that RWL does not diminish skills: RWL negatively affected the outcome or skills (Barbas et al., 2011; Hickner et al., 1991; Horswill, Scott, Dick, & Hayes, 1994; Webster, Rutt, & Weltman, 1990; Yang, Heine, Mester, & Grau, 2017); RWL negatively affected the sceletal muscle contractile properties (Garcia et al., 2016; Oopik et al., 1996); RWL negativelly affected the wrestling technique (Moghaddami, Gerek, Karimiasl, & Nozohouri, 2018).

Weight loss habits

Weight reduction habits refer to reduction methods, frequency of reduction, amount of reduced weight, and the length of the period in which body weight is reduced. Articles focusing on weight reduction habits are generally negative about wrestlers' weight loss practices. A large number of wrestlers reduce body weight (Oopik, Timpmann, Burk, & Hannus, 2013), reduce large amounts of body weight (Zambraski et al., 1976), and use too many harmful methods of weight reduction (Kordi et al., 2011; Matthews et al. al., 2019). Every adolescent wrestler uses at least one harmful method (Kiningham & Gorenflo, 2001), and collegiate wrestlers use rapid weight gain a lot (Scott, Horswill, & Dick, 1994), although rapid weight gain is not associated with wrestling success (A. Utter & Kang, 1998). Unhealthy weight reduction habits also exist in women but are less common than in men (Zaccagni, 2012). Wrestlers begin with large reductions in body weight too early (Sansone & Sawyer, 2005). There is a lack of information on healthier methods of weight reduction (de Abreu, Nascimento, Sales, Santos, & Ferreira, 2015) and diet during RWL (Sossin et al., 1997).

Weight loss and psychology

Five scientific articles were found that deal with the psychology of weight reduction in wrestlers, reporting that RWL is accompanied by mild depression (Isik & Dogan, 2017). In a 2011 study, Marttinen reported increased confusion, whereas other moods were normal (Marttinen, Judelson, Wiersma, & Coburn, 2011). More experienced wrestlers are mentally better adapted to RWL, in a better mood, and less anxious than younger wrestlers with less experience (Slacanac et al., 2021). In 2004, Finn found that adding carbohydrates to the diet does not significantly affect the outcome and mood of wrestlers during RWL (Finn, Dolgener, & Williams, 2004).

Weight loss and legal regulations

Since 1989, the United States has had weight reduction regulations for high school wrestlers. The Minimum Wrestling Weight (MWW) program was to be implemented in all U.S. states by 2005. The idea behind the program was to prevent unhealthy weight reduction practices. Ten scientific articles focus on the MWW program. Three articles bring negative views on the issue of legal regulation. Wrestlers try to evade this rule (Cutrufello & Dixon, 2014), 60% of wrestlers are below the recommended weight (Wroble & Moxley, 1998), and dietary attitudes have not changed significantly since the introduction of MWW (Shriver, Betts, & Payton, 2009). Three articles suggest a wider use of this legal regulation and urge the methods for estimating MWW to be improved (Clark & Oppliger, 1998; Cutrufello, Landram, Venezia, & Dixon, 2021; Gibbs, Pickerman, & Sekiya, 2009). Five articles reveal positive attitudes: MWW is respected and wrestlers abandon the practice of large reduction in body weight (Davis et al., 2002; Oppliger, Landry, Foster, & Lambrecht, 1998; Oppliger, Steen, & Scott, 2003). Changes in the amount of adipose tissue suggest that legal regulation provides results (A. C. Utter, 2001). One study states that rapid weight loss and rapid weight gain have decreased significantly since the introduction of legal regulation (Oppliger, Utter, Scott, Dick, & Klossner, 2006).

Limitations of the study

The review included all articles on weight reduction on a sample of wrestlers from two scientific bases considered the most relevant in Croatia. Among the articles, there are some very serious studies, but there are also those with a small sample or including amateur wrestlers. Due to the effort to present all articles, such articles were not removed from the research. Numerous serious studies in other sports that deal with this issue were not included in the study due to the effort to review only the studies on wrestlers.

CONCLUSION

Scientific papers on the psychology of RWL on wrestlers indicate mostly mild problems and wrestlers' good adaptation to RWL. Articles focused on weight reduction methods generally have a negative attitude towards the problem of weight loss and report extensive and frequent weight loss, short periods of reduction, and many harmful and even illegal methods by which wrestlers reach the desired weight. Scientific views are ambivalent regarding the following aspects: health, impact on skills, and legal regulation of this problem. If the reduction of body weight or RWL takes place in controlled conditions on well-adapted experienced fighters, the risk for health and skills, and ultimately for the result, is lower. This study also pointed to

the lack of information on healthy methods of weight reduction, a healthy diet during this period, and health aspects that could complicate the process of weight reduction.

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