



Original Article

Assessment and Comparison of Rapid Weight Loss Methods and its Complications in Various Weight Groups of Adult Elite Wrestlers

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ABSTRACT

Background: The prevalence of rapid weight loss methods among wrestlers has raised concerns about their health and performance. This study aimed to assess and compare rapid weight loss methods and its general effects on various weight groups of adult elite wrestlers.

Methods: In this analytical-descriptive study, the sample consisted of 40 elite wrestlers with mean age of 24.77 years (12 lightweight, 16 middleweight and 12 heavyweight wrestlers), all having experience of playing in the national team of the Islamic Republic of Iran for at least three years. The methods and the effects of rapid weight loss were evaluated using the validated Persian version of the Oppliger questionnaire (ICC>0.65). Finally, Kruskal-Wallis and Chi-square tests were used to examine the differences between the 3 weight groups using SPSS 21 ($P \leq 0.05$).

Results: The results of this study showed that the most commonly used methods for weight loss in all three weight groups included increased exercise (79%) and Intense dieting (76.7%). The results also showed that dizziness (74.4%) and muscle cramp (69.7%) were the most frequent complications observed in various weight groups following rapid weight loss. Moreover the results showed that no significant differences existed between the methods of rapid weight loss and its complications in various weight groups of wrestlers ($P > 0.05$).

Conclusion: According to the results of this study it seems that the methods of rapid weight loss and its complications are similar in various weight groups of adult elite wrestlers. Therefore it seems necessary that adequate information about appropriate weight loss methods should be provided for wrestlers in order to prevent the complications of rapid weight loss.

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Introduction

Wrestling is one of the oldest activities familiar to humans and has been an important sport in the ancient Olympics. Today, due to its specific characteristics and attractions, wrestling has taken its roots in various

parts of the world and has attracted many enthusiasts, so that many national, continental, world, and Olympic competitions are held in this field of sport every year [1].

When dealing with wrestling issues, one of the most important subjects for preparing athletes is usually “the weight loss indicator”, or “reaching the considered weight” which is commonly referred to by the wrestlers. In this regard, wrestlers try to control and maintain their weight in a certain range in accordance with their own physical situation, or to lose weight using different

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methods [2]. Despite all the obvious evidence of the disadvantages of weight loss, rapid weight loss is still a common method used by wrestlers, which has become a concern among instructors, physicians and sports professionals. Concerns about this were aggravated when, during the months of November to December, 1997, three university wrestlers lost their lives in various countries as a result of weight loss [3]. Most wrestlers incorrectly believe that a variety of weight loss techniques will increase their success in sports and will provide them with better and improved performance. The main motive for this group of athletes to lose weight is to be able to participate in a lower weight class in order to have more opportunities, according to their perception for success. As a result, they try to lose a lot of weight in a short period of time by restricting the intake of food and liquids. Moreover they try to lose weight through unhealthy behaviors such as vomiting, the intake of laxatives and diuretic medications, hunger and too-much exercise [4-6]. In general, the use of non-standardized weight loss methods can lead to complications such as irritability, muscle cramps, dizziness, and reduced concentration in wrestlers [4, 5]. Moreover it has been shown that weight loss in wrestlers result in non-optimal performance due to damage to strength, endurance, and reaction time, collapse in the balance of electrolytes and minerals, and acidosis experiences [7]. Early fatigue, decreased muscle endurance, increased movement time, early onset of lactate threshold, early discharge of phosphocreatine and glycogen sources, and decreased activity of enzymes in energy reactions are other negative consequences reported for rapid weight loss in wrestlers [8, 2]. It should be noted that some studies have reported the effects of rapid weight loss beyond all of the above, and it is believed that rapid weight loss has an adverse effect on both physical growth and mental activity [9].

As earlier mentioned, the use of non-principled methods threatens the health of wrestlers and reduces the duration of their championship due to the negative consequences for wrestlers. On the other hand, because wrestling is a sport in which more medals can be earned and it has always brought a lot of honors for Iranian sports community in the various competitions, a rapid loss of weight could have a negative impact on the performance of Iranian wrestlers in the international tournaments and consequently a negative impact on this championship sport in Iran.

In general, considering the fact that earlier research has mainly focused on weight loss methods for young and adolescent wrestlers, the question arises whether adult wrestlers (who have better knowledge and experience than teens and young people) make use of rapid weight loss methods or not? Therefore, the present study aimed to investigate the methods of rapid weight loss and its complications in adult elite wrestlers and compare these variables among various weight groups of wrestlers.

Methods

Participants

This was an analytical-descriptive study. The statistical

population of the study included adult elite wrestlers with at least three years wrestling experience in the Men's National Team camp of the Islamic Republic of Iran. The samples of this research were selected randomly and the questionnaire was made available for the wrestlers of all weight groups. Therefore, 40 qualified individuals (with mean age of 24.77 years) were randomly selected as the participants of study from among 44 wrestlers who participated in the national team camp during the recent year. Then, participants underwent subsequent evaluations. It should be noted that the sample size in the present study was calculated using the Cochran formula [10]:

$$n = \frac{\frac{z^2 pq}{d^2}}{1 + \frac{1}{N} \left(\frac{z^2 pq}{d^2} - 1 \right)} = \frac{\frac{1.96^2 (0.25)}{(0.05)^2}}{1 + \frac{1}{44} \left(\frac{1.96^2 (0.25)}{(0.05)^2} - 1 \right)} = 39.6$$

Data Collection

In the next step, information about rapid weight loss was obtained using Oppliger's standard questionnaire (ICC>0.65) [11]. Validity of the questionnaire was approved by North University of Michigan and the translation of this questionnaire was also validated by Mirzaei et al. (2011) [5]. The questionnaire consisted of 31 questions in four parts. The first part included personal information of the wrestlers (7 questions), the second part consisted of the history and dietary patterns of the wrestlers (17 questions), the third part was related to the methods and effects of rapid weight loss (3 questions) and the fourth part examined the amount and manner of receiving nutrition and weight loss information of wrestlers (4 questions).

Before answering the questions, how to fill out the questionnaire and its questions were explained to all participants who finally filled out the questionnaire with adequate knowledge. All measurements were carried out in the wrestling camp of Azadi Sports Complex in Tehran. It should be noted that in order to access the documentary and actual data, the researchers preferred to be present at the venue until all questionnaires were completed in order to provide sufficient explanations about the questionnaire, if necessary. Finally, for analyzing the collected data, the wrestlers were divided into 3 weight classes of lightweight (less than 67 kg), middleweight (67 kg to 86 kg) and heavyweight (above 86 kg). In this way, 12 wrestlers were assigned to the lightweight group, 16 wrestlers to the middleweight group, and 12 wrestlers to the heavyweight group. It should be noted that all participants in the present study had a history of participating in international tournaments; so that 66.7% of lightweight wrestlers, 57.9% of the middleweight wrestlers, and 91.7% of the heavyweight wrestlers had championship titles in the national championship competitions.

Statistical Analysis

The data were analyzed using descriptive statistical methods. In addition, verification of the normal distribution of data was made using Smirnov test, and Kruskal Wallis and Chi-Square Pearson tests were used

to examine the difference between the three weight groups at a significant level of $P < 0.05$. Moreover the charts were plotted using Excel and all analyses were done using SPSS 21 (IBM SPSS Statistics for Windows, Version 21.0. Armonk, New York, USA).

Results

Personal and demographic information of wrestlers such as age, normal weight, age of starting wrestling, and weight loss information are presented in Table 1.

Rapid Weight Loss Information

From the results, 8.3% of the lightweight wrestlers and 41.7% of heavyweight wrestlers had no weight loss during the last season. Also, 66.7% of the lightweight wrestlers, 36.8% of the middleweight wrestlers and 33.3% of the heavyweight wrestlers thought that they were overweight. The study of frequencies used in weight loss methods indicated that wrestlers are more likely to use increased exercise, Intense dieting, and elimination of one meal to lose weight (Table 2). Non-parametric Kruskal-Wallis test was used to compare the use of various methods of weight loss among the lightweight, middleweight and heavyweight wrestlers. From the results, no significant difference existed between the uses of different weight loss methods by different weight groups of adult elite wrestlers ($P > 0.05$). Moreover the results indicated that none of the wrestlers used unhealthy methods such as the use of diuretic and laxative medications, enema and vomiting for weight loss, while another abnormal

method such as spitting was prevalent among lightweight wrestlers, with 8.3% prevalence rate. The average length of hunger for weight loss was 12.99 hours among lightweight wrestlers and 7.57 hours among middleweight wrestlers, but heavyweight wrestlers did not use this weight loss method at all.

Effects of Rapid Weight Loss

The evaluation of complications experienced by wrestlers after a rapid weight loss indicated that the most commonly observed complications were dizziness (74.4%), muscle cramp (69.7%), irritability (55.8%), and increased heart rate (30.2%).

All observed complications were compared in the three weight groups using Kruskal Wallis test. Comparison of all observed complications in different weight groups of adult elite wrestlers showed that no significant difference existed between the groups during the season [of competitions] ($P > 0.05$). In Table 3, the effects of rapid weight loss can be seen in all three weight groups.

Dietary Disorders-Related Information

The results of this study showed that 66.7% of lightweight wrestlers, 69.4% of middleweight wrestlers, and 93.3% of heavyweight wrestlers were overeating. The highest amount of overeating among the lightweight wrestlers was observed after weighing, among middleweight wrestlers after the race (competition), and among heavyweight wrestlers was observed during the out-of-competition season. These wrestlers usually turn to intense exercise after overeating.

Table 1: Personal and demographic data of the wrestlers

	Lightweight	Middleweight	Heavyweight
Age (years)	24.25±2.86	25.05±3.17	24.92±3.80
Normal weight (kg)	62.87±2.78	79.47±7.81	100±10.96
BMI (kg/m ²)	21.31±1.42	24.82±1.30	28.68±2.56
Onset of wrestling (years)	11.17±2.20	11.42±2.24	12.83±2.82
Onset of weight loss (years)	14.42±1.62	14.42±1.86	15.92±1.97
Maximum weight lost (kg)	5.42±1.73	5.42±1.46	3.42±3.20
Frequency of weight loss during the year	4.83±2.94	6.53±2.50	4.58±4.69
Fluctuation of weight in a week (kg)	1.33±0.49	1.52±0.85	2.04±1.09

Table 2: Methods of rapid reduction of weight among wrestlers

Methods of rapid weight loss	Light-weight	Middle-weight	Heavy-weight	Total	Chi square value	df	P value
Increased exercise	91.7%	84.2%	58.3%	79%	0.674	2	0.714
Intense dieting	91.7%	73.7%	66.7%	76.7%	1.710	2	0.425
Elimination of a meal	75%	78.9%	58.3%	72%	2.617	2	0.270
Saunas	75%	78.9%	50%	69.7%	4.281	2	0.118
Diet supplements	75%	63.2%	58.3%	65.1%	0.012	2	0.994
Heated practice room	66.7%	73.7%	41.7%	62.7%	3.479	2	0.176
Rubber/Plastic suits	75%	47.4%	33.3%	51.1%	3.105	2	0.212
Restricting fluids	50%	36.8%	33.3%	39.5%	0.608	2	0.738
Intense hunger	50%	42.1%	16.7%	37.2%	2.817	2	0.244
Spitting	8.3%	0%	0%	2.3%	2.583	2	0.275
Diet pills	8.3%	0%	0%	2.3%	2.583	2	0.275
Laxatives	0%	0%	0%	0%	0	2	1
Diuretics	0%	0%	0%	0%	0	2	1
Enemas	0%	0%	0%	0%	0	2	1
Vomiting	0%	0%	0%	0%	0	2	1

Table 3: Effects of rapid weight loss in three weight groups

Negative effects of rapid weight loss	Light-weight	Middle-weight	Heavy-weight	Total	Chi square value	df	P value
Dizziness	75%	68.4%	83.3%	74.4%	0.842	2	0.656
Muscle cramp	66.7%	84.2%	50%	69.7%	4.060	2	0.131
Mood swing / Irritability	58.3%	63.2%	41.7%	55.8%	1.378	2	0.50
Increase of heart rate	50%	26.3%	16.7%	30.2%	3.329	2	0.189
Decreased concentration	16.7%	36.8%	16.7%	25.5%	2.215	2	0.330
Feverish	8.3%	15.8%	8.3%	11.62%	0.560	2	0.756
Hot flashes	16.7%	15.8%	0%	11.62%	2.145	2	0.342
Disoriented	8.3%	10.5%	8.3%	9.3%	0.059	2	0.971
Headaches	16.7%	0%	8.3%	6.9%	3.121	2	0.210
Nausea	0%	5.3%	8.3%	4.6%	0.946	2	0.623
Nosebleeds	0%	0%	0%	0%	0	2	1

Information on Body Composition and Nutrition

Based on the findings, it was discovered that all lightweight wrestlers, 94.7% of middleweight wrestlers and 91.7% of heavyweight wrestlers paid special attention to their diet (nutrition) and weight control (Figure 1).

The studies showed that 91.7% of the lightweight wrestlers, all middleweight wrestlers and 83.3% of heavyweight wrestlers believed that they had received the necessary information about weight loss. When asked

about who the most important source of information on weight loss and nutrition was to them, all wrestlers in the three weight groups believed that it was their coach (63.6% of the lightweight wrestlers, 68.4% of middleweight wrestlers and 70% of heavyweight wrestlers) (Figure 2).

Moreover the results of the study showed that 97.6% of wrestlers believed that the experienced wrestlers and then the coaches were the most effective sources in the field of their weight loss.

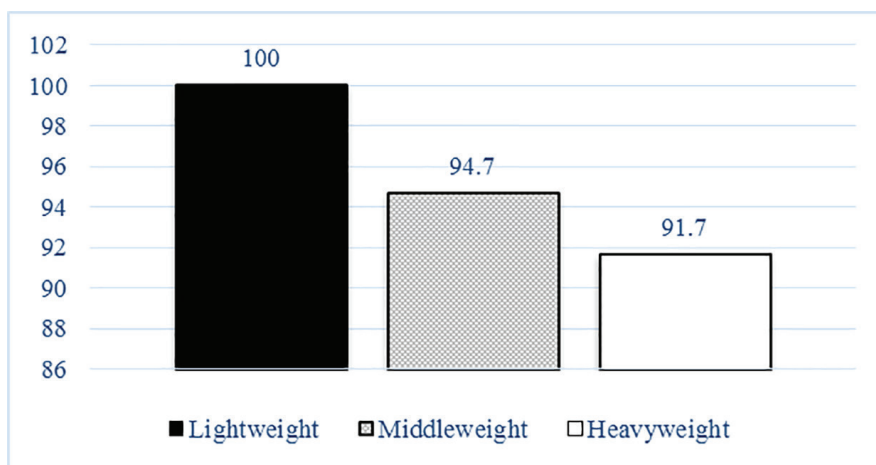


Figure 1: The level of attention to nutrition and weight control.

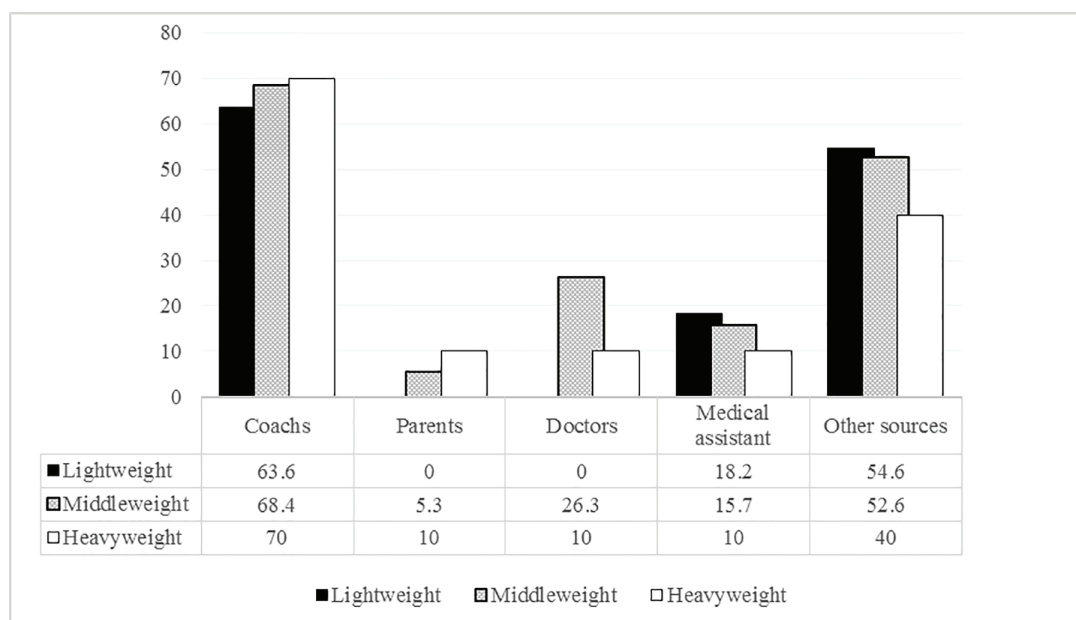


Figure 2: The amount and manner of receiving information on weight loss.

Discussion

The aim of this study was to assess and compare the rapid weight loss methods and its complication in various weight groups of adult elite wrestlers. The analysis of the data obtained showed that the most commonly used methods for weight loss were too-much exercise (79%), intense dieting (76.7%), and elimination of a meal (72%), respectively which was consistent with most previous studies conducted in this field [4, 5, 11-13]. These results, however, are inconsistent with the findings of Alderman et al. (2004) and Marquardt (1994), which is likely due to the differences in the type of questionnaire used in the research, which considered different methods such as running, cycling, and swimming for weight loss [14, 15]. It should be noted that no significant difference existed between the methods of weight loss used by the participants in the three weight groups.

Moreover the results showed that the highest weight loss by adult elite wrestlers was about 5 kg, so that a weight loss of 5.42 kg was reported for the lightweight and middleweight wrestlers and a weight loss of 3.42 kg was reported for heavyweight wrestlers. Comparing these results with previous studies shows that the amount of weight loss obtained in this study is greater than most of reports that have been prepared so far [4, 5, 12, 13, 16-18]; for example, in a study, Farhan et al. (2014) reported that the highest rate of weight loss in elite juvenile wrestlers was about 3 kg [18]. Moreover Kinningham et al. (2001) reported that the most weight loss in the surveyed wrestlers was about 2.5 kg [13]. It should be noted that the highest weight loss among the lightweight and middleweight wrestlers studied in the present research was 2 kg more than that of heavyweight wrestlers, and unlike some researchers who believe that heavyweight wrestlers lose more weight than the other wrestlers [5, 14], the values obtained in the present study were much higher among the lightweight and middleweight wrestlers. The results of the present study are consistent with the results reported by Oppliger et al. (2003), as well as Alderman et al. (2004) [11, 14]. Regarding the difference between the highest weight loss among wrestlers in the present research and previous reports, the findings of this study suggest that the amount of weight loss among adult wrestlers is somewhat higher than adolescent wrestlers [5]. Therefore, given that the participants studied in the research of Farhan et al. (2014), as well as that of Kinningham et al. (2001) were all teenagers, it seems that age differences in wrestlers can be considered as one of the main factors affecting the difference in the results [13, 18]. In fact, it seems that even elite wrestlers are not properly justified about the inappropriate ways of weight loss and complications resulting from it. This is the factor that makes the wrestlers rely on the wrong belief that rapid weight loss methods increase their sport success even if they are full grown adults and have gained more experience [4-6].

Regarding the weekly weight variation during the season, the results of the present study showed that the mean of these values were 1.61 kg for adult wrestlers,

which is somewhat lower than that by Oppliger et al. (2003) [11]. The average frequency of weight loss during the year was also reported to be 5.51 times in the present study, which is more than that obtained in some previous studies [3]; the possible causes for such a difference can be due to the participation of the subjects (participants) of the present study in the long and regular leagues; so that the wrestlers were forced to lose weight more often in order to reach the desired weight [5].

Moreover the results showed that the greatest complications of rapid weight loss among adult elite wrestlers were dizziness (74.4%), muscle cramp (69.7%) and irritability (55.8%), which was found to be consistent with the results of the studies conducted by Amirsassan et al. (2013), as well as Farhan et al. (2014) [3, 18]. One of the possible reasons for justifying this consistency could be the use of similar methods for weight loss by the participants, which has the same consequences for them.

Evaluating the amount of overeating in adult elite wrestlers showed that 72.1% of participants had overeating. By comparing the three weight groups, it was observed that with increasing weight, overeating of the wrestlers was significantly increased (66.7% in the lightweight wrestlers, 69.4% in the middleweight wrestlers and 93.3% in the heavyweight wrestlers). It is likely that this increase in the amount of overeating is due to the level of attention given by each weight group to its nutrition and weight control. It should be noted that this level of attention is lower in lightweight and heavyweight wrestlers (Figure 1).

Regarding the amount of wrestlers' information on nutrition and weight loss, the analysis of the data obtained from the present study showed that 67.5% of the wrestlers who believed that they had received the necessary information about nutrition and weight control, identified their coaches as the most important source for receiving this information. Consultation with experienced wrestlers, the Internet and books were subsequent most important sources of information about nutrition and weight control, while the parents, with a share of 5%, had the lowest contribution in transferring this information to the adult wrestlers. These results are consistent with most of the previous reports that have identified coaches as the most important source of information about nutrition and weight loss [3, 5, 18].

Conclusion

In general, the results of this study showed that the prevailing patterns of rapid weight loss and its complications among Iranian adult elite wrestlers are not significantly different with that of other wrestlers. Moreover, the results showed that the methods of rapid weight loss and its complications are similar in various weight groups of adult elite wrestlers. The findings also suggest that experienced coaches and wrestlers are the most important source of information on weight loss and nutrition of the wrestlers. Therefore, it seems that it is possible for a great step to be taken in order to prevent the complications of rapid weight loss by holding scientific

workshops for coaches and even for elite wrestlers. This will not only help to preserve our current human capital in wrestling, but also, with the knowledge that these elite wrestlers will become models for younger wrestlers in the future, it can promote the culture of using appropriate weight loss methods and prevent the complications of rapid weight loss among wrestlers.

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