

## THE EFFECTS OF WEIGHT LOSS METHODS IN EDUCATIONAL COMBAT SPORTS AND MARTIAL ARTS

Feyzullah Koca<sup>1</sup>, Osman Imamođlu<sup>2</sup>, Mehmet Türkmen<sup>3</sup>

<sup>1</sup>Erciyes Üniversitesi Spor Bilimleri Fakültesi, Kayseri,

<sup>2</sup>OMÜ Yaşar Dođu Spor Bilimleri Fakültesi, Samsun,

<sup>3</sup>MUŞ Alparslan Üniversitesi Beden Eğitimi ve Spor Yüksekokulu, **TÜRKİYE**

### ABSTRACT

*In this study, the effects of the weight loss methods on the students in the Combat sports and Martial Arts field were investigated. Sport Weight Loss Methods and Effects Scale were filled by a total of 208 university students who received sports education. Mann Whitney U and Kruskal Wallis tests were performed statistically.*

*According to this study, while falling to the weight of the competition, 3% of their body weights and 2.91% of women have fallen. There was a statistically significant difference in fluid loss, physiological and psychological sub-dimensions of the scale according to the sex ( $p < 0, 05$  and  $p < 0,001$ ). Significant differences were found in relation to diet, ergogenic, physiological and psychological sub-dimensions according to the branches ( $p < 0.05$  and  $p < 0.001$ ).*

*As a result, the students who played sports were generally affected by diet. While male students were more affected by fluid loss than female athletes, they were less affected by physiological and psychological care. A more comprehensive scale should be developed to determine weight loss methods in the elite level Combat sports and Martial Arts athletes. In addition, nutrition support should be provided.*

**Keywords:** Sports, Weight Loss, Scale

### INTRODUCTION AND PURPOSE

Struggle sports (wrestling, boxing, judo, taekwondo, karate, etc.) are sports branches where body weights are divided into categories. Athletes in this branch must obtain a certain body weight (weight class) before competing in a particular competition. The aim of the weight classes is to pair equal-sized athletes to create an equal level of play and minimize the risk of injury among competitors (Lakin et al., 1990). Some athletes will necessarily lose weight when the body weight is between two weight. Generally, athletes competing in a subcategory lose weight

tactically (Artioli et al., 2010), depending on reasons such as being less strong, faster, more durable than themselves, or having good competitors in their category. Acute rapid weight loss can lead to excessive water loss. Dehydration or excessive body water loss has adverse physiological consequences which can impair performance and at the same time be detrimental to health. These adverse effects include impaired glycogen use, central nervous system impairment, increased body temperature, and cardiovascular system stress (Cheuvront et al., 2003).

Since the 1970s, it has been known to lose up to 10% of body weight to fight in a lighter weight class, to severely limit the athletes' food and fluid intake, to increase exercise intensity, to use rubber and plastic clothing, to lose weight on the saunas, diet pills, diuretics or laxatives and vomiting (Artioli et al., 2010a; Artioli et al., 2010b; Sundgot-Borgen and Garthe, 2011; Turocy et al., 2011). When losing weight is being performed by athletes, some of the athletes lose weight in a short period of time, close to the race contest, while others perform this process in the long run. However, athletes to achieve the target weight in a short time; (Barley et al., 2017), they use a variety of methods, such as reducing food and fluid consumption, vomiting consumed foods, laxatives (diuretics), diet pills, diuretic pills, intensive exercise and long stay in the sauna. Health risks that may arise due to rapid weight loss include poor nutritional status, physical performance, growth and developmental disability (Berkovich et al., 2016). It has been determined that loss of fast body weight negatively affects athletes' performances in the near future. In these studies; (high pulse rate, low pulse volume and low cardiac minute volume) in submaximal exercise, decrease in oxygen consumption, impairment of heat regulation mechanisms and electrolyte imbalance, decrease in blood glucose level in liver glycogen storage (Alpay et al., 2015; Rossow et al., 2013; Yang et al., 2015). In addition, athletes dealing with combat sports use one or more of the weight loss methods for many competitions. It is also seen that the average age of participating in the contest is 12-13 years of age and that the average age of starting to lose weight is 13-15 and they lose weight on average 15 times during the season (Oppliger et al., 2003, Barley et al., 2017). The frequent occurrence of these adversities hampers growth and development, so the risk of losing weight increases exponentially with respect to performance and health. The most striking example of this is the 1997 deaths caused by 3 university wrestlers in the United States who lose weight and lose 15% of their final body weight (6.7% to 10% water loss) Oppliger et al., 2003, Çatıkkaş, 2016).

Physiological effect: While the weight of the athlete in weight falls, muscle spasms, heart attack, respiratory distress, etc. the degree of physiological effect is measured. Psychological Impact: As the weight falls, the athlete is measuring his / her psychological feelings about how to play sports, performance, stress,

nervousness and fatigue levels. Ergogenic aids: This sub-dimension measuring weight loss methods, weight loss diet pills, diuretic, etc., measures the use of chemical substances. Diet: This sub-dimension measures the level of carbohydrate consumption, fat consumption and food consumption in general as a weight loss of the athlete while eating weight. Liquid loss: In this sub-dimension, it is measured how the athletes try to lose weight by spitting as they lose weight, sweating by entering the saunas, and running by wearing raincoats (Yarar et al., 2016). Families, sports and health professionals are concerned with methods used to rapidly lose weight (Imamoglu et al., 2017), such as severe fluid loss, calorie restriction, diuretics, dietary pills, diarrheal medications, nylon training wear, vomiting and other methods.

This study is important in terms of providing information to interested persons and institutions in order to show how sports education is affected by weight loss in field-fighting athletes at university level.

## **METHOD**

A total of 208 students who were dealing with fighting sports from the School of Sport Sciences and Sport Schools in the Black Sea Region were filled with the "Sport Weight Loss Methods and Effects Scale". Participants are 108 females and 100 females. The questionnaires were filled on a voluntary basis.

Sport Weight Loss Methods and Effects Scale: The scale consists of 5 sub-dimensions and 19 items. These; "Physiological Effects" (10,12,13,14,11), "Psychological Effects" (19,17,18,15,16), "Ergogenic Help" (8,9,7), Diet (2,3, 1) and Liquid Loss (6,5,4) sub-dimensions. In the evaluation of scales, the five-point rating type (1 = never, 2 = rarely, 3 = Intermediate, 4 = lax and 5 = always) was used to assess the scale. The alpha value of total scale was found to be  $\alpha = 0.74$  (Yarar et al., 2016).

### **Statistical operations:**

SPSS 21 package program was used for statistical procedures. Mann Whitney U and Kruskal Wallis in multiple comparisons were performed on the scale scores, since the data were not normally distributed according to the Kolmogorov Smirnov test. Subscale consistency coefficients of the scale; Diet: 0,81, liquid 0,71, ergogenic 0,81, physiological 0,71 and psychological 0,70 were found. The internal consistency coefficient of total scale was found to be 0.71.

## RESULTS

**Table 1.** Anthropometric characteristics according to sex

	Gender	n	Mean	St deviation	t-test
Age (years)	Male	108	18,72	4,10	0,04
	Voman	100	18,70	3,65	
Length (cm) Height	Male	108	174,35	8,99	10,57**
	Voman	100	163,22	5,68	
Body weight (kg)	Male	108	72,24	16,89	5,99**
	Voman	100	61,92	8,77	
Weight in Game (kg)	Male	108	70,10	15,61	5,96**
	Voman	100	60,12	9,37	

\*\* $p < 0,001$

**Table 2.** Participants' Normal and Competitive Body Weight Situations and Weight Reductions

Gender	Normal weight	Competition weight	Weight lost	% Of body weight per body weight
Male	72,24 kg	70,10 kg	2,17 kg	3,00
Voman	61,92 kg	60,12 kg	1,80	2,91

**Table 3.** Scale sub-dimensions according to sex Mann Whitney U test results

Sub scales	Gender	N	Order average	Sum of squares	Z	p
Diet	Male	108	104,85	11324,00	-,088	,930
	Voman	100	104,12	10412,00		
Liquid	Male	108	112,59	12160,00	-2,039	,041*
	Voman	100	95,76	9576,00		
Ergogenic	Male	108	107,87	11650,00	-1,641	,101
	Voman	100	100,86	10086,00		
Physiological	Male	108	89,30	9644,00	-3,820	,000**
	Voman	100	120,92	12092,00		
Psychological	Male	108	93,89	10140,00	-2,660	,008*
	Voman	100	115,96	11596,00		

\* $p < 0,05$

**Table 4.** Scale subscale scores according to the branches Kruskal Wallis

Sub scales	Branch	N	Rank Average	X <sup>2</sup>	p
Diet	Boxing	42	114,79	12,439	,014*
	Tae-kwon-do	40	122,05		
	Wrestling	46	110,11		
	Barbell	40	81,90		
	Maytansine	40	92,30		
Liquid	Boxing	42	105,69	1,715	,788
	Tae-kwon-do	40	103,95		
	Wrestling	46	102,20		
	Barbell	40	113,90		
	Maytansine	40	97,05		
Ergogenic	Boxing	42	94,50	15,962	,003*
	Tae-kwon-do	40	99,40		
	Wrestling	46	117,50		
	Barbell	40	109,95		
	Maytansine	40	99,70		
Physiological	Boxing	42	78,12	29,850	,000**
	Tae-kwon-do	40	113,15		
	Wrestling	46	139,63		
	Barbell	40	83,75		
	Maytansine	40	103,90		
Psychological	Boxing	42	99,60	16,593	,002*
	Tae-kwon-do	40	83,85		
	Wrestling	46	132,54		
	Barbell	40	94,00		
	Maytansine	40	108,55		

**Table 5.** Average scores of survey participants' subscale

	N	Average	St deviation	The lowest and highest scores on the questionnaire	Survey %
Diet	208	9,29	3,30	3-15	61,93
Liquid	208	6,35	2,75	3-15	42,33
Ergogenic	208	3,33	1,35	3-15	22,20
Physiological	208	8,33	2,76	5-25	33,32
Psychological	208	10,63	3,67	5-25	42,52

## DISCUSSION AND CONCLUSION

The age of the participating students was 18,72 years for males and 18,70 years for females. Body weights were 72,24 kg for males and 61,92 kg for females, while the weight for competition was 70,10 kg for males and 60,12 kg for females. There was a statistically significant difference between height and body weights

according to sex ( $p < 0.001$ ). According to this study, 3% (2.17 kg) of their body weight and 2.91% (1.80 kg) of women are falling for the weight of the competition from normal weight.

In the study, statistically significant difference was found in the fluid loss, physiological and psychological sub-dimensions of the scale sub-dimensions according to sex ( $p < 0,05$  and  $p < 0,001$ ). According to this study, male students who were fighting sports were more affected by fluid loss than female sportsmen, but were less affected by physiological and psychological care. More influences of the loss of liquids may be attributed to the fact that they may have done more with activities such as sweating and running in the rain while entering the sauce while the weight is dropping (Yarar et al., 2016). On the physiological and psychological dimension, the females are less affected than the females; can be attributed to their being more resistant to muscle cramps, heart attack, respiratory distress, sporting desire, performance, stress, nervousness and fatigue.

In this study, mean scores from the subscales of the scale were found to be 9.26 for diet and 6.35 for liquid and 3.33 for ergogenic. Again, a mean of 8.3 points in physiological dimension and 10.63 points in psychological dimension were determined. In the sub-dimensions, taking 3 points from the diet, fluid and ergogenic state is not affected at all and 15 points are always affected. In the physiological and psychological dimensions, 5 points are not affected at all and 25 points are always affected. According to the questionnaire scores according to their responses, most were affected by the diet. More support is needed for sportsmen on nutrition and diet.

In scale question scoring, 1 refers to never, 2 to rarely, 3 to 4, 4 to 5 and 5 to always. Since dietary, fluid and ergogenic dimensions are composed of 3 questions, 3 points in these dimensions mean that they are never affected by that dimension. Accordingly, a total of 3,3 points (never and rarely a total of 3) from the three questions in the ergogenic dimension are not affected by this dimension. In the liquid dimension, it is rarely and occasionally a value of 6.35 points (6 points for rare and 9 points for intermittent option) while the lowest 3 points. In the diet dimension, the lowest score is 3 points, rarely 6 points in the category and 9 points in the intercourse category. The score is 9.2 (Graph 1). He may then say that the Diet is influenced from time to time by the substances in its dimension. In physiological and psychological dimensions, the lowest score was 5 points, rarely 10 points were required for categorization, and the score was 8.33 and 10.63 (Graph 2). In that case, it is rare to be affected in physiological and psychological dimensions.

As a result, students who competed in combat sports were generally affected by the dietary dimension. While male students were more affected by fluid loss than female athletes, they were less affected by physiological and psychological

care. A more comprehensive scale should be developed to determine weight loss methods in the elite level fighting athletes. In addition, nutrition support should be provided.

## REFERENCES

- 1) Alpay C.B., Ersöz Y., Karagöz Ş., Oskuei M.M., (2015). Elit Güreşçilerde Müsabaka Öncesi Ağırlık Kaybı, Vücut Kompozisyonu ve Bazı Mineral Seviyelerinin Karşılaştırılması, *International Journal of Science Culture and Sport (IntJSCS)*. Special Issue on the Proceedings of the 4th ISCS Conference – PART B August.
- 2) Artioli, G.G., Gualano, B., Franchini, E., Scagliusi, F.B., Takesian, M., Fuchs, M., & Lancha Jr, A.H., (2010a). Prevalence, magnitude, and methods of rapid weight loss among judo competitors. *Med Sci Sports Exerc*, 42(3), 436-442.
- 3) Artioli G.G., Franchini E., Nicastro H., Sterkowicz S., Solis M.Y. & Lancha A.H. Jr (2010b). The need for a weight management control program in judo: a proposal based on the successful case of wrestling. *J Int Soc Sports Nutr* 7: 15
- 4) Barley O.R., Chapman D.W., Abbiss C.R., (2017). Weight Loss Strategies in Combat Sports and Concerning Habits in Mixed Martial Arts, <https://doi.org/10.1123/ijspp.0715>
- 5) Berkovich B.E., Eliakim A., Nemet D., Stark A.H. & Sinai T., (2016). Rapid weight loss among adolescents participating in competitive judo. *Int J Sport Nutr Exerc Metab* 26(3): 27684.
- 6) Chevront, S.N., Carter, R., and Sawka, M.N., (2003). Fluid balance and endurance exercise performance. *Curr Sports Med Rep* 2: 202–208.
- 7) Çatıkkaş F., (2016). Genç Taekwondo Sporcularının Sağlıksız Kilo Verme Davranışları, *CBÜ Bed Eğt Spor Bil Dergisi / CBU J Phys Edu Sport Sci*, 11(2), sh.125-130.
- 8) Imamoğlu O., Soyguden A., Türkmen M., (2017). Comparison of Female Wrestler and Female Judokas Weight loss Situations, *International Scientific and Professional Conference on Wrestling “Applicable Research in Wrestling, Proceedings Book, Zagreb/Novi Sad*, pp.181-187.
- 9) Lakin, J.A., Steen, S.N., and Oppliger, R.A. (1990). Eating behaviors, weight loss methods, and nutrition practices among high school wrestlers. *J Community Health Nurs* 7: 223-234.
- 10) Oppliger, R.A., Case, H.S., Horswill, C.A., Landry, G.L., & Shelter, A.C., (1996). ACSM position stand: Weight loss in wrestlers. *Medicine & Science in Sports & Exercise*, 28(10), 135-138.

- 11) Sundgot-Borgen J. & Garthe I. (2011). Elite athletes in aesthetic and Olympic weightclass sports and the challenge of body weight and body compositions. *J Sports Sci* 29(Suppl 1): S101-114.
- 12) Rossow L.M., Fukuda D.H., Fahs C.A., Loenneke J.P., Stout J.R., (2013). Natural Bodybuilding Competition Preparation and Recovery: a 12-month case study. *Int J Sports Physiol Perform*, 8:582–592.
- 13) Turocy P.S., DePalma B.F., Horswill C.A., Laquale K.M., Martin T.J., Perry A.C., Somova M.J., Utter A.C. & National Athletic Trainers' Association (2011). National Athletic Trainers' Association position statement: safe weight loss and maintenance practices in sport and exercise. *J Athl Train* 46(3): 32236.
- 14) Yang W.H., Heine O., Pauly S., Kim P., Bloch W., Mester J., Grau M., (2015). Rapid rather than gradual weight reduction impairs hemorheological parameters of Taekwondo athletes through reduction in RBC-NOS activation. *PLoS One*. 10:e0123767
- 15) Yazar, H., Erođlu, H., Uzun, H., & Polat, E. (2016). "Sporcu Kilo Düşme Yöntemleri ve Etkileri Ölçeđi": Geçerlik ve güvenilirlik çalışması. *Journal of Human Sciences*, 13(3), 6164-6175. doi:10.14687/jhs.v13i3.421