Body Mass Manipulation in Taekwondo

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Abstract

The aim of study was to investigate does taekwondo athletes in Croatia reduce body mass for competition and whether exists a connection between body mass reduction and injuries in age 13-15. Data was collected by a questionnaire of 40 competitors (20 female and 20 male) all weight categories.Pearson`s coefficient correlation was used to determine correlation between variables body mass and body mass reduction for the competition and correlation inside of the groups according to degree of injury. All respondents reported that during the last week before the competition they reduced body mass at least one time in their sport career. The results showed that female athletes in average was reducing 1,75 kg, male 1kg of body mass in a week before the competition. On average, the respondents had little problems with the injuries, female slightly more than male. Obtained results showed negative correlation between variables body mass reduction and body mass (r=-0,47) in female athletes, while in male there was no statistically significant correlation between variables. The correlation between variables body mass and body mass reduction showed only in group 1 – no injuries, however, that group makes 62,1% of the total sample. For further research it is necessary to expand the sample on other age groups.

Keywords: *body reduction, competition, injury, taekwondo*

Introduction

Athletes in martial arts often manipulate with their body mass to compete in lower weight category which could provide them better chance of success. Weight categories have the role of grouping competitors with approximately similar muscle mass and strength, and hence the impact on injury prevention

[1]. Competitors in a fast and inadequate way reduce body mass, most often at the expense of losing body fluids. This problem goes years back. Extreme reduction of food and water, use of the sauna, diuretics [2], exercising in plastic suits are common features of athletes in martial arts to reduce body weight before weighting for competition [3]. In 1997, dehydration in the range of 7 to 10% of its body mass contributed to the deaths of three student wrestlers in the United States. This helped to move the weighing time at the University at 1-2 hours before the competition. Unfortunately, this rule did not spread to the European and International Federation of any martial art, and as a consenquence the reduction of body weight still dominates for weighing purpose [4]. American College of Sports Medicine has been suggesting for a long time that competitors should not lower their body weight below the weight where body fat is lower than 5% [5].Although the minimum weight category is usually established based on body fat estimation [6] still there is a lot of space to talk about the failure of educational programs, because around third of the athletes compete below their calculated minimum weight and are still successful [7]. Today we are witnessing various way of manipulating body mass which influences the health status of athletes, especially young people. Although there is a widespread negative conotation about the effects of rapid weight loss on health status, the distrubution of agressive and harmful forms of body mass reduction is very high in most martial arts such as wrestling [9], judo [10, 11],jiujitsu, karate, taekwondo[11], boxing [12].

On this topic there are various researches worldwide, while in Croatia there are none. The aim of this study is to investigate whether taekwondo athletes in Croatia reduce body mass for competition and whether exists a connection between body mass reduction and injuries in young taekwondo athletes (age 13-15).

Materials and methods

Data used in the research were obtained by a questionnaire of 40 competitors in taekwondo at the level of Croatia. The questionnaire was filled by 20 female and 20 male respondents born 2002.-2004. (age 13-15) about their sports career.Two female respondents did not answer on particular questions about injuries, so their results did not enter in to data processing which involve the variable „degree of severity of the injury“. Respondents are current medal holders on state championship in their categories and within their age group.

Variables from the questionnaire used for data processing:

Name and surname (athlete)/	Date of birth/ Gender/
Body height/	Body weight
At what age did you begin training?	How many hours per week do you train?
How many kilos you reduce before the competition (in a period of 7 days)?	Have you interrupted and continued your sports career?
If you stopped training because of the injury, how long did the break last?	If you stopped training, what was the cause of the break?
If you have been injured, have you been treated in consultation with a doctor?	Have you had any pain during your training?
Did you have any problems with injuries in your sports career (0. Other, some other cause, which; 1.I did not have any problems with injuries; 2. Overuse syndrome/tendinitis; 3. Strain; 4. Fracture)	

The results were analyzed using „Statistica 13“, the normality of distribution was evaluated using KS (Kolmogorov-Smirnov) test. All results are presented through arithmetic mean, standard deviation, median, minimum and maximum results of total sample and separated by gender. Pearson`s coefficient correlation was used to determine correlation between variables body mass and body mass reduction for the competition and correlation inside of the groups according to degree of injury.

Results and discussion

Female athletes on average are smaller and have fewer pounds, trained more than male per week and have less total years of training. Descriptive statistic showdifferences between data in total sample and sample divided by gender by reducing body mass and degree of injury. Female athletes reported

reducing body mass in average 1,75 kg, while male athletes reduced in average 1 kg. In average female athletes reported greater degree of injury (1,94) than male (Tables 1-3). In the total sample(Table 4) we can see correlation between variables „Body hight" and „body mass" (r=0,79), and variables „degree of injury" and „body mass reduction" (r=0,33). Samples separated by gender (Table 5 and 6) show different results. Female athletes indicate negative correlation between variables „body mass reduction" and „body mass" (r= - 0,47), while in male cadets there is no statistically significant correlation between those variables. Correlation between variables „body weight" and „body mass reduction" (r= - 0,42) is shown only in group 1 –I did not have any problems with injuries (Table 7).

Table 1. Descriptive statistics for the total sample: N (total number), AS (arithmetic mean), MED (median), MIN (minimum result), MAX (maximum result), SD (standard deviation), KS (Kolmogorov-Smirnov test)

	N	AS	MED	MIN	MAX	SD	KS
TV	40	166,67	170,00	142,00	186,00	12,02	0,13
TM	40	53,17	51,00	40,00	76,0	11,54	0,13
UKST	40	8,95	9,00	1,00	15,00	3,14	0,13
UKGT	40	7,62	8,00	3,00	12,00	2,16	0,14
REDKG	40	1,65	1,00	1,00	3,0	0,77	0,32
OZLJ	38	1,71	1,00	0,00	4,00	1,13	0,36

TV – body height, TM – body mass, UKST – total hours of training per week, UKGT – total years of training, REDKG – body mass reduction in kilos, OZLJ – degree of injury

Table 2. Descriptive statistics for female athletes (age 13-15): N (total number of examinees), AM (arithmetic mean), MED (median), MIN (minimum result), MAX (maximum result), SD (standard deviation), KS (Kolmogorov-Smirnov test)

	N	AS	MED	MIN	MAX	SD	KS
TV	20	164,25	164,50	142,00	184,00	10,31	0,11
TM	20	51,05	50,00	40,00	73,00	10,48	0,16
UKST	20	9,60	9,50	5,00	15,00	2,77	0,15
UKGT	20	7,40	7,50	3,0	12,00	2,43	0,16
REDKG	20	1,75	2,00	1,0	3,00	0,71	0,26
OZLJ	18	1,94	1,50	1,00	4,00	1,16	0,29

TV – body height, TM – body mass, UKST – total hours of training per week, UKGT – total years of training, REDKG – body mass reduction in kilos, OZLJ – degree of injury

Table 3. Descriptive statistics for male athletes (age 13-15): N (total number of examinees), AM (arithmetic mean), MED (median), MIN (minimum result), MAX (maximum result), SD (standard deviation), KS (Kolmogorov-Smirnov test)

	N	AS	MED	MIN	MAX	SD	KS
TV	20	169,10	175,50	143,00	186,00	13,35	0,22
TM	20	55,30	54,50	40,00	76,00	12,42	0,14
UKST	20	8,30	8,50	1,00	15,00	3,42	0,16
UKGT	20	7,85	8,00	5,00	11,0	1,90	0,13
REDKG	20	1,55	1,00	1,00	3,00	0,82	0,39
OZLJ	20	1,50	1,00	0,00	4,00	1,10	0,42

TV – body height, TM – body mass, UKST – total hours of training per week, UKGT – total years of training, REDKG – body mass reduction in kilos, OZLJ – degree of injury

Table 4. Correlation coefficient for total sample (N = 38), p< 0.05

	TV	TM	UKST	UKGT	REDKG	OZLJ
TV	1,00					
TM	0,79	1,00				
UKST	-0,15	-0,30	1,00			
UKGT	0,13	0,22	-0,30	1,00		
REDKG	-0,02	-0,21	0,12	0,02	1,00	
OZLJ	0,22	0,29	0,01	0,26	0,33	1,00

TV – body height, TM – body mass, UKST – total hours of training per week, UKGT – total years of training, REDKG – body mass reduction in kilos, OZLJ – degree of injury

Table 5. Correlation coefficient in female,

N=18, p<0,05N=20, p<0,05

	TV	TM	UKST	UKGT
REDKG	-0,2	-0,47	0,15	0,01
OZLJ	0,34	0,45	-0,07	0,22

Table 6. Correlation coefficient in male,

	TV	TM	UKST	UKGT
REDKG	0,12	-0,006	0,06	0,05
OZLJ	0,24	0,25	0,01	0,33

TV – body height, TM – body mass, UKST – total hours of training per week, UKGT – total years of training, REDKG – body mass reduction in kilos, OZLJ – degree of injury

Table 7. Correlation coefficient between variables „body mass" and „body mass reduction" of total sample per group. Group 1 (N=23) – I did not have problems with injuries, Group 2 (N=5) – Overuse syndrome/tendinitis, Group 3 (N=4) – strain, Group 4 (N=5) –fracture; p<0,05

	GRROUP 1		GROUP 2		GROUP 3		GROUP 4	
	TM	REDKG	TM	REDKG	TM	REDKG	TM	REDKG
AS	50,17	1,52	59,20	1,40	66,25	2,00	53,00	2,20
SD	12,09	0,66	10,98	0,54	4,71	1,15	6,36	1,09
r		**-0,42**		-0,76		-0,67		0,07

AS – arithmetic mean, SD – standard deviation, TV- body height; TM- body mass, REDKG- body mass reduction

In Table 7 are results of athletes divided into groups by degree of injury. First group represent group of athletes which "did not have problems with injuries". That group represents 62.1% of the total sample suggesting the direction in which goes body mass reduction among Croatian taekwondo competitors in cadet category. The same sample show negative correlation between variables „body mass" and „body mass reduction" (-0,42). Data was collected from whole sample because questionnaire was related on theirs sports career to discover is there body mass reduction between young taekwondo athletes in Croatia.Fast body mass reduction affects cognitive performance and mood [12], and those parameters are important in taekwondo because sport requires concentration, good evaluation and skill.

Conclusions

In the world there is widespread fact that competitors reduce their body mass in inadequate way for the needs of the competition. According to the responses in the survey questionnaire, Croatian competitors, (age 13-15 years), lose weight for the needs of competition. This research showed negative correlation between variables „body mass" and „body mass reduction" for competiton (r= - 0,42) of62.1% of respondents.The same group reported that they had no problems with injuries during training status. Respondents who had experience with injuries, according to the results, did not show correlation between mentioned variables. All athletes were included in the sample because there is a questionnaire about theirs body mass reduction in theirs sports career. The aim was to determine is it body mass reduction spread in Croatian taekwondo athletes aged 13-15. For further research it

is necessary to expand the sample on other age groups in the competition systems and determine their body composition (hydration, body mass, etc.) in a period without competition and on a day of the competition in order to determine whether they are subject of body mass reduction for the needs of the competition and on which way they reduce body mass.

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