A STUDY ON ELITE WRESTLERS: WEIGHT LOSS AND DEPRESSION[5]

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ABSTRACT

Among weight-sports like wrestling where athletes are required to weigh-in before the competitions and their weights are measured; athletes generally lose weight rapidly. Athletes who carry out rapid weight loss through sweat room, liquid and nutrition restrictions undergo dehydration.

The current study was undertaken to examine the depressive status caused by dehydration among the elite wrestlers. 136 wrestlers who participated in Turkish Interuniversity Wrestling Championship were included in the study. Together with Beck's Depression Inventory (BDI) used to determine depression levels of the wrestlers; personal information forms that addressed age, height, weight, amount of weight lost before the competition and annual competition numbers were administered to the athletes one hour before weigh-in before competition.

For the data assessment; correlations among the variables were investigated with correlation analyses and Independent Samples T Test for two groups while one way variance analysis (One Way ANOVA) was used for the groups more than two groups.

As a result; when depression levels of the athletes who got dehydrated before a competition were examined; it was found out that there was a positive correlation between the amount of the weight lost and depression levels and as the amount of the weight lost increased so did depression levels ($p<0.001$).

Key Words: Depression, Weight Loss, Wrestling

ELiT GÜREŞÇiLER ÜZERiNE BiR ÇALIŞMA: AĞIRLIK KAYBI VE DEPRESYON

ÖZET

Güreş gibi yarışma öncesi müsabaka tartısı yapılan sıklet sporlarında, sporcular genellikle hızlı ağırlık kayıpları gerçekleştirmektedirler. Hızlı ağırlık kayıplarını sauna, sıvı ve besin kısıtlaması yaparak gerçekleştiren sporcular da dehidrasyona maruz kalmaktadırlar.

Bu çalışma dehidrasyonun elit güreşçiler üzerinde oluşturduğu depresif durumları incelemek amacı ile planlanmıştır. Çalışmaya üniversitelerarası Türkiye şampiyonasında mücadele eden 136 erkek elit güreşçi katılmıştır. Güreşçilerin depresyon düzeylerini belirleyebilmek için Beck Depresyon Ölçeği (BDÖ) ile birlikte; yaş, boy, vücut ağırlığı, müsabaka vücut ağırlığı kaybı miktarı ve yıllık müsabaka sayısını belirten kişisel bilgi formları müsabaka tartısından 1 saat önce uygulanmıştır.

Elde edilen verilerin değerlendirilmesinde değişkenler arasındaki ilişkiler korelasyon analizi ile incelenmiş olup, değişkenlerin karşılaştırılmasında iki grup için; Bağımsız Örneklem T Testi (Independent Samples T Test), ikiden fazla grup için; Tek Yönlü Varyans Analizi (One Way ANOVA) kullanılmıştır.

Sonuç olarak; Bir şampiyona öncesi dehidrate olan sporcuların depresyon düzeyleri incelediğinde kaybedilen ağırlık miktarı ile depresyon düzeyleri arasında pozitif yönlü ilişki olduğu, kaybedilen ağırlıık miktarı arttıkça depresyon düzeylerinin de arttığı tespit edilmiştir ($p<0,001$).

Anahtar Kelimeler : Depresyon, Ağırlık kaybı, Güreş

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INTRODUCTION

Wrestling is a combat sport which is performed under certain rules and basic and combined motor abilities as well as some sportive forms are used and it includes both sociologic and psychological factors (1). We can define wrestling as a weight-sport which is classified into seven weight classes for men by International Federation of Associated Wrestling Styles (FİLA).

Among weight-sports like wrestling where athletes are required to weigh-in before the competitions and their weights are measured; athletes generally lose weight rapidly. The athletes who carry out rapid weight loss through sweat room, diuretic drugs, liquid and nutrition restrictions undergo dehydration (2). This is compensated with nutrition and liquid intake during the recovery period (3).

However; body weight losses achieved in a short period lead to such symptoms as sleep disorders caused by fasting, irregular body temperature, vasoconstriction, muscle dysfunctions, low sexual performance, learning-memory-anxiety problems and depression (4). Depression is defined by Beck et al. as the specific alterations and increases in mood, whether sadness, apathy or loneliness; a negative self-image involving self-blame; a desire or disposition for self-punishment, desire to escape social activities, to hide or withdrawal and inaction; physical or physically expressed changes such as inaction, loss of libido or insomnia (5).

Kunst and Florescu determined that 40% of the main factors that affect wrestler's performance in wrestling are composed of psychological factors (6). The fact that wrestling is a combat sport and the wrestlers are dehydrated shortly before the competitions causes depressive conditions; which is thought to be affecting the performance negatively.

The aim of the study which was planned in light of the information above mentioned was to determine the effect of dehydration upon depressive conditions among the elite wrestlers.

MATERIAL AND METHOT

Participants: The sample of the study was consisted of 136 wrestlers who participated in Turkish Interuniversity Wrestling Championship. Besides; the athletes were classified into light weight (55-60 kg), middle weight (66-74-84 kg) and heavy weight (96-120 kg) in line with the literature (7).

Beck's Depression Inventory (BDI): It was developed by Beck to measure depression risk, its symptom levels and the change in depression severity among adults in 1961. The validity (r=74) and reliability (α=80) tests of the scale were performed by Hisli (1989). It is a four point Likert type self-report inventory with 21-question multiple-choice. A value of 0 to 3 is assigned for each item marked by the severity of the depression. Pathologic cut-off is 17 and total scores range between 0 and 63 (8). The scores of the inventory are as follows: 0–9: indicates no depression; 10–16: indicates mild depression; 17–24: indicates moderate depression and 25 ≥ indicates severe depression (9).

Data Collection: Prior to this study, the participants were informed of the purpose of the research and the inventory. Together with Beck's Depression Inventory (BDI); personal information forms that addressed age, height, weight, amount of weight lost before competition and annual competition numbers were administered to the athletes one hour before weigh-in before the competition.

Statistical Analyses of the data: For the data analyses; correlations among the variables were investigated with correlation analyses and Independent Samples T Test for two groups while one way variance analysis (One Way ANOVA)

was used for the groups more than two groups. Also; in order to determine what caused the differences obtained as the result of variance analysis; Bonferroni test, which is one of the multiple comparison tests, was employed. Results were considered significant with a 95% confidence interval and results below $p<0.05$ were considered as significant.

RESULT

Table 1: Demographic Characteristics of the Participant Athletes

N=136	Means / Standard Deviation
Age (years)	22.24±2.45
Height (cm)	171.22±8.33
Body Weight (kg)	74.24±16.23
Sports Age(years)	9.79±2.45

The study was conducted with elite athletes whose mean age was 22.24±2.45 (years), whose mean height was 171.22±8.33 (cm), whose weight was 74.24±16.23 (kg) and whose sports age was 9.79±2.45 (years).

Table 2: Correlation between Amount of Weight Lost and Depression

Variables	Depression Score	
Amount of Weight lost	Correlation Coefficient (r)	0.829
	P	**.000*****
	N	136

***0.001

When Table 2 was examined; it was understood that there was a strong and positive correlation between amount of weight lost and depression score ($p<0.001$).

Table 3: Difference between Groups of Amount of Weight Lost and Mean Depression Scores

Variables			Depression Score			
Groups of Amount of Weight Lost	Groups (kg)	N	Means ($\bar{X}$)	Standard Deviation (±Sd)	F	P
	0 – 1.99	26	5.04[d]	4.98	79.55	**.000*****
	2 – 3.99	49	14.90[c]	5.87		
	4 – 5.99	39	26.41[b]	8.52		
	6 ≤ …	22	32.09[a]	8.45		

***0.001, abcd represents the differences among the groups.

When Table 3 was investigated; it was seen that a statistically significant difference existed between groups of amount of weight lost and depression score ($p<0.001$). Accordingly; as the amount of weight lost increased so did depression scores.

Table 4: Comparison tests performed for Groups of Amount of Weight Lost

Groups of Amount of Weight Lost		Mean Differences	Standard Deviation	P
1.00	2.00	-9.859	1.706	**.000*****
	3.00	-21.372	1.781	**.000*****
	4.00	-27.052	2.037	**.000*****
2.00	3.00	-11.512	1.509	**.000*****
	4.00	-17.193	1.805	**.000*****
3.00	4.00	-5.681	1.875	**.018***

***0.001 *0.05

When the comparison results presented on Table 4 were investigated; it was noted that there was statistically significant difference among all groups of amount of weight lost ($p<0.05$). The differences among the groups were represented using different letters (abcd) on Table 3.

Table 5: Difference between Groups of Amount of Weight Lost Annually and Mean Depression Scores

Variables			Depression Score			
Groups of Amount of Weight Lost Annually	Groups (kg)	N	Means ($\bar{X}$)	Standard Deviation (±Sd)	F	P
	… < 15	91	13.43[a]	8.21	66.761	**.000*** **
	15-29	31	28.68[b]	8.70		
	30 ≤ …	14	34.71[b]	7.87		

***0.001, ab represents the differences among the groups.

When Table 3 was examined; it was seen that a statistically significant difference existed between groups of amount of weight lost annually and depression score ($p<0.001$).

Table 6: Comparison tests performed for Groups of Amount of Weight Lost Annually

Groups of Amount of Weight Lost Annually		Difference in means	Standard Deviation	P
1.00	2.00	-15.249	1.725	**.000*** **
	3.00	-21.286	2.381	**.000*** **
2.00	3.00	-6.037	2.671	**.076**

***0.001

When the comparison results on Table 6 were examined in terms of groups of amount of weight lost annually; no statistically significant difference was found between the 2nd group (15-29kg) and 3rd group (30 ≤ …) while it was seen that a statistically significant difference existed between other groups ($p<0.001$). The differences among the groups were represented using different letters (ab) on Table 5.

Table 7: Difference between Weight Classifications and Percentages of Weights Lost

Variables			Percentages of Weights Lost			
Weight Classifications	Groups	N	Means ($\bar{X}$)	Standard Deviations (±Sd)	F	P
	Light	57	6.16[a]	2.88	17.192	**.000*** **
	Middle	62	3.93[b]	2.62		
	Heavy	17	2.43[b]	2.08		

***0.001, ab represents the differences among the groups.

When Table 7 was examined; it was seen that there was statistically significant difference between weight classifications and percentages of weights lost ($p<0.001$).

Table 8: Comparison Tests Performed for Weight Classifications

Weight Classifications		Difference in means	Standard Deviation	P
Light	Middle	2.231	.491	**.000*** **
	Heavy	3.732	.739	**.000*** **
Middle	Heavy	1.500	.732	**.127**

***0.001

When the comparison results on Table 8 were questioned; it was found out that there was no statistically significant difference between middle weight and heavy weight whereas there was statistically significant difference between other weight classifications (p<0.001). The differences among the groups were represented using different letters (ab) on Table7.

Table 9: Difference between Weight Classifications and Depression Scores

Variables			Depression Scores			
	Groups	N	Means ($\bar{X}$)	Standard Deviation (±Sd)	F	P
Weight Classifications	Light	57	20.72	10.728	1.096	**.337**
	Middle	62	18.29	12.138		
	Heavy	17	16.59	12.753		

When the differences between weight classifications and depression scores presented on Table 9 were examined; it was seen that there was no statistically significant difference (p>0.05). However; it was computationally noted that as the weights increased, mean percentages of weight lost decreased (Table 7) and therefore so did relevant depression scores.

Table 10: Difference between Groups of Weight Loss of Percentage and Depression Scores

Variables			Depression Scores			
	Groups	N	Means ($\bar{X}$)	Standard Deviations (±Sd)	t	P
Weight Loss of Percentage	… < %5	79	12.63	8.52	-10.043	**.000*** **
	%5 ≤ …	57	28.05	9.26		

***0.001

When Table 10 was examined; it was seen that there was statistically significant difference between groups of weight loss of percentage and depression scores (p<0.001).

DISCUSSION

Human body is designed to move and act and exercises have served to prevent many health problems that occur in relation with life style (10). As rehabilitative practices; it is a scientific fact that exercises produce not only physiological benefits but also psychological benefits (11).

Physical exercises and sports affect central nervous system and increase brain monoamines -such as dopamine or adrenalin and serotonin (happiness hormone)- which are connected with mood

state (12). Again; aerobic-walk exercises are employed in restoring health and wellness in many areas. Some of these health conditions are cardiovascular conditions, hyperlipidemia, fibromyalgia, diabetes and many psychological disorders. However; aerobic-walk exercises have been proved to be effective most upon the treatment of depression (13). That low levels of 5-Hydroxyindoleacetic acid (5-HIAA) -which is the basic metabolite of serotonin hormone in cerebrospinal fluid- were found among the depressive patients demonstrated that serotonin (5-HT) played a role in pathogenesis of depression. Particularly; the studies made upon those who died by suicide demonstrated that levels of 5-HT and 5-HIAA were very low; which supported the above mentioned conclusion (14).

Dehydration often occurs among the athletes due to the exercises done by them and it is compensated with food and liquid intake during recovery period (3). The studies on dehydration are generally related with the effect of dehydration upon functioning and performance losses (15,16,17,18).

Maughan and Shirreffs reported that a body mass loss of 2%–7% results in 7%-60% performance decrease. Yet, it was observed that body fluid loss of 1-2% did not have any significant effect upon performance during an endurance exercise lasting < 90 minutes whereas performance was negatively affected by body fluid loss of ≥ 2% during an endurance exercise lasting > 90 minutes (19). In another study; it was found out that 1.9% dehydration of body weight and exercises caused a decrease by 10% in VO_2 max. while 4.3% dehydration of body weight and exercises caused a decrease by 22% in VO_2 max. It was also pointed out that any 5% loss of body weight will result in 45% decrease in performance (20).

In a study conducted by Burge, Carey and Payn in which the effect of dehydration by 2% was investigated upon running speed during 1.500 m, 5.000 m and 10.000 m running tests; it was detected that blood plasma volume reduced by 11% and mean running speed decreased by 3% in 1.500 m running test while mean running speed decreased by 6% in 5.000 m and 10.000 m running tests (21).

There are studies that examine psychological outcomes of dehydration that occur before weigh-in before the competition in weight-sports. But; Kunst and Florescu argued that main factors that affected wrestling performance was composed of athlete's psychology by 40 % and that athlete's psychology was composed of determination by 40%, of concentration by 30% and of initiative by 30% (6).

In this sense; because wrestling is a weight-sport and dehydration occurs among the athletes shortly before the competitions; it is thought that dehydration results in depressive conditions and thus affects performance negatively. In this study, too, when depression levels of the athletes who got dehydrated before a championship were examined; it was detected that there was a strong, positive correlation between the amount of body weight lost and depression levels and that as the amount of body weight lost so did depression levels ($p<0.001$; Table 2).

When the amount of body weight lost in a championship was classified; it was noted that no depression occurred among the athletes who lost 0-1.99 kg; mild depression occurred among the athletes who lost 2-3.99 kg; severe depression occurred among the athletes who lost 4-5.99 kg and ≥ 6 kg. ($p<0.001$; Table 3).

On the other hand when the numbers of the championships in which athletes participated, the amount of body weight lost and average amount of weight lost annually were investigated; it was

detected that mild depression occurred among the athletes who lost 0-14.99 kg annually; severe depression occurred among the athletes who lost 15-29.99 kg annually and severe and high depression occurred among the athletes who lost ≥30 kg. annually ($p<0.001$; Table 5).

When the difference between weight-classes and percentages of weight lost was questioned; light weight athletes (55-60 kg) were weighted in after getting dehydrated by 6.16% of their body weight; middle weight athletes (66-74-84 kg) were weighted in after getting dehydrated by 3.93% of their body weight and heavy weight athletes (96-120 kg) were weighted in after getting dehydrated by 2.43% of their body weight ($p<0.001$; Table 7).

When the depression status was investigated in terms of weight-classes; it was understood that no statistically significant difference existed among the depression scores of the light weight athletes, middle weight athletes and heavy weight athletes ($p>0.05$) but it was computationally found out that depression scores decreased because percentages of body weight lost decreased as weight classes increased (Table 9). Judging by these results; it was concluded that average body weight lost of the athletes increased as weight-classes decreased (Table 7).

Finally; when the differences between body dehydration percentages and depression scores were examined; it was seen that athletes whose dehydration percentages were below 5% suffered from mild depression whereas athletes whose dehydration percentages were higher than 5% suffered from severe depression ($p<0.001$; Table 10).

The US Centers for Disease Control and Prevention (CDC) reported the deaths of 3 collegiate wrestlers due to loss of 15% of body weight through fasting and dehydration. After these incidents; National Collegiate Athletic Association (NCAA) took and promoted new measures in order to prevent unsafe weight losses. As the most practical and effective measurement tool; NCAA uses urine specify gravity (Usg) in order to determine dehydration status during weight-classification. Accordingly; The NCAA accepts 1.020 1.020 g/cm³ Usg and smaller values as the limit criteria for euhydration condition (normal total body water level). Short-term weight losses and fluid losses will cause not only physiological and psychological problems but also a decrease in tournament performance. Besides, it is thought that it is important to eliminate physiological and psychological problems by approving athletes' matches after getting urine specify gravity before weigh-in for the athletes who do weight-sports and as well as to allow the athletes to demonstrate a healthy and maximum performance.

As a conclusion; in the current study it was determined through a psycho-social test that dehydration led to depressive conditions ($p<0.001$). However; it was interpreted that these depressive conditions may not only be psychotic behaviors but may result from physiological neuromuscular dysfunctions, too.

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