



## COMPARISON OF LIPID AND LIPOPROTEIN VALUES OF DIFFERENT WRESTLERS

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### **Abstract:**

The aim of this study was to compare some lipid and lipoprotein values of wrestlers and to examine the risks of cardiovascular diseases. In order to achieve this purpose, 38 male of the National Turkish Wrestlers (age of the wrestlers A: 22.5 year and age of the wrestlers B: 19.3 years) participated in the study. Triglyceride (TG), Total Cholesterol (TC), HDL-C and LDL-C levels were determined by Hitachi 717 autoanalyser. To determine the differences between groups “independent t” tests were performed. Significance level was taken as  $p < 0.05$ . TC and LDK-C values of wrestlers A were significantly high when compared with the same values of wrestlers B (95.95 and 130.63 mg/100cc opposed to 92.05 and 118.47mg/100cc). No significant differences were found in TG and HDL-C values between wrestlers groups ( $p > .05$ ). Although the group A wrestlers’ training levels were always higher than group B Wrestlers’, the TG and HDL-C values were not found to be different. But the HDL-C levels of group A wrestlers were found to be better than group B Wrestlers. This result shows that medium and high level of exercises did cause little differences in lipid and lipoprotein levels. Lipid and lipoprotein values of the two groups have indicated that the individuals in these groups would not be exposed to danger of cardiovascular diseases.

**Keywords:** gender, exercise, blood parameters

### **1. Introduction**

Cross-sectional studies support a significant incremental effect of exercise on blood lipids and lipoproteins in men (Durstine et al., 2001; Cinar et al., 2010). Observational data provide stronger evidence for lower TG (Total Triglyceride) and higher HDL-C

levels in physically active individuals (Fritz, 1987). As a result of a meta-analysis about the effects of physical activity on lipid and lipoprotein metabolism; TC (Total Cholesterol), LDL-C, TG and TC/HDL-C ratio significantly decreased after exercise (Tran et al., 1983). It has reported that the changes in HDL-C levels with exercise training were inversely related to baseline HDL-C levels. These findings suggested that individuals with the lowest HDL-C levels would exhibit the greatest increases in HDL-C with exercise (Durstine et al., 2001). The quantity of observed changes about these values belong to age, sexuality, body weight, body fat ratio, duration and intensity of exercise (Fritz, 1987; Baydil, 2013).

There is substantial, consistent and strong evidence that physical activity is a deterrent for developing many forms of cardiovascular disease (Imamoğlu et al., 2005). Many researches show that the cholesterol is related with coronary heart disease (CHD). LDL-/HDL-C ratio can show arteriosclerosis disease risk. There is substantial, consistent and strong evidence that physical activity is a deterrent for developing many forms of cardiovascular disease. In general, blood lipids and lipoprotein profiles of physically active groups reflect a reduced risk for the development of cardiovascular with their inactive counterparts (Fletcher et al., 1992; Durstine et al., 2001; Stambler et al., 1986). Cardiovascular disease (CVD) is the leading cause of death worldwide (Cutler, 2006). Low blood levels of high-density lipoprotein cholesterol (HDL-C) are an independent risk factor for CVD (Franceschini, 2001; Boden, 2000). Regular exercise has positive effects on physical, physiological, motoric features, balance (Mayda et al., 2016; Mahmood et al., 2017; Yilmaz et al., 2017). However, it have been reported that one of the most important positive effects of regular exercise is on blood biochemistry. Regular and well-tuned intensity aerobic exercise reduces total cholesterol, LDL cholesterol, triglycerides, blood lipid levels, while increases HDL cholesterol levels when estimated (Koç, 2011). It has been seen that exercises have a positive effect on lipid and lipoprotein metabolism (Bedir et al., 1998).

In this study, it is aimed to compare lipid and lipoprotein values of wrestlers who have different training levels and to examine the risks of cardiovascular diseases.

## **2. Material and Methods**

### **2.1 Subjects**

19 male wrestlers (Group A) who do sports for 11 years ( high intensity exercise), 19 male wrestler (Group B) students who do sports at least 5.9 years (intermediate intensity exercise) group, total 38 subjects participated in this study. The group A wrestlers are the national team senior athletes. The group B wrestlers are not the national team athletes.

## 2.2 Lipid and Lipoprotein Measurement

Fasting blood samples were taken in the morning. TG, TC, HDL-C, LDL-C levels were determined by Hitachi 717 Autoanaly ex (BMI) = Body Weight (kg) / Height (m)<sup>2</sup> = (kg/m<sup>2</sup>)

## 2.3 Analysis of Data

Analysis was performed on SPSS 22 version. Kolmogorov-Smirnov test was used to evaluate the normality of parameters. Comparison of age and height were used in this study with the independent t-test. To determine the differences between groups "independent t" tests were performed. Significance level was taken as p<0, 05.

## 3. Results

Physical anthropometric and motoric characteristics were given in Table 1. Comparison of serum lipid values between groups were given in Table 2 and cardiovascular risk status of groups were given in Table 3.

**Table 1: Physical Characteristics of Wrestlers**

Parameters	Wrestlers (A)	Wrestlers (B)	t
Age (year)	23.05±1.77	19.90±1.85	5.36**
Height (cm)	173.37±6.92	173.47±6.51	-0.06
Body Weight (kg)	75.63±12.3	70.42±8.6	1.52
BMI (kg/m <sup>2</sup> )	25.08±3.24	23.33±1.62	2.10*
Age of training (year)	11±2.4	5.9±3.5	5.87**

\*p<0.05

As it is seen age, time of training, and BMI of the group A were higher than the subjects of the group B Wrestlers (p <0.001 and p<0.05).

**Table 2: Comparison of Serum Lipid Values of Wrestling Groups**

Mg/100cc	Groups	n	Mean	SE	t
TC	Wrestlers (A)	19	180.79	14.34	3.76**
	Wrestlers (B)	19	163.74	13.60	
TG	Wrestlers (A)	19	95.95	14.95	0.88
	Wrestlers (B)	19	92.05	12.14	
HDL-C	Wrestlers (A)	19	53.32	2.85	1.66
	Wrestlers (B)	19	51.47	3.89	
LDL-C	Wrestlers (A)	19	130.63	14.43	2.57*
	Wrestlers (B)	19	118.47	14.63	

\*p<0.05, \*\*p<0.01

There were significant differences in plasma TC, LDL-C values between two groups ( $p < .05$ ). There were no significant differences in plasma TG, HDL-C values between two groups ( $p > .05$ ). TC and LDL-C values of group A wrestlers were significantly high when compared with the same values of group B wrestlers (95.95 and 130.63 mg/100cc opposed to 92.05 and 118.47mg/100cc).

**Table 3: Cardiovascular Diseases of Wrestling Groups**

Mg/100cc	Groups	N	Mean	SE	t
TC/HDL-C	Wrestlers (A)	19	3.41	0.38	1.48
	Wrestlers (B)	19	3.22	0.36	
LDL-C/HDL-C	Wrestlers (A)	19	2.40	0.28	0.11
	Wrestlers (B)	19	2.39	0.34	

#### 4. Discussion

In this study, it is evaluated that wrestlers A exercised approximately in maximal level for 11 years. The Wrestlers B exercised in intermediate level for 5.9 years.

In one study, 42 healthy and active subjects were divided into two groups. One group performed endurance training and the other group did not perform endurance training. At the end of the training TG and TC levels did not differ between two groups (Friedmann, and Kindermann, 1987). Most cross-sectional studies indicate smaller, non-significant differences in TC and LDL-C levels between exercise-trained and sedentary individuals (Wood, 1996). In our study, TG and HDL-C levels were not found to be different between the groups.

In this study, İmamoğlu et al (2005) stated that there found no significant differences in plasma TC and TG values between the groups of wrestlers and students. No significant differences were found in HDL-C and LDL-C values between wrestlers and male students. Friedmann and Kindermann (1987), found HDL-C levels higher in endurance training male group than inactive group. In our study, these values were not found to be significantly different between the groups. Because male wrestlers perform mostly nonaerobic exercises and strength training, the exercises like these did not increase the HDL-C levels. A lot of studies support that aerobic exercises increase the HDL-C levels. In other words, it is emphasized that aerobic exercise is important for the athletes who attend to the strength training, too (Higuchi et al., 1989).

Koç (2011) found significant reductions in the exercise-induced triglyceride, cholesterol, and LDL cholesterol and increase in HDL levels. Majority of the studies showed that decreased triglycerides, cholesterol and LDL cholesterol levels, and increased HDL were the result of applied training when severity of exercise, duration

and frequency were approved. In the end of the study which aimed to investigate the effects of aerobic exercise on blood lipids, it was reported that the exercise has no effect on triglyceride and cholesterol parameters, but caused an increase in HDL cholesterol level and reduction in LDL cholesterol level (Leon and Sanches, 2001). When literature was reviewed about effects of exercise on plasma lipids, lipoproteins, results indicated that moderate and low intensity exercises are of great importance. These events show increase of HDL-C, Decrease of LDL-C and increase protective effects to arteriosclerosis (Imamoğlu et al., 1998). In this study; although the group A wrestlers' training levels were always higher than group B Wrestlers, the TG and HDL-C values were not found to be different. But the HDL-C levels of group A wrestlers were found to be better than group B Wrestlers. This can be the result of intense training and nutrition.

The people who have HDL-C cholesterol levels under 40 mg/100cc have more than three times of risk of cardiovascular diseases than people who have high HDL-C levels. Although it is true that death rates from coronary heart disease are substantially higher for men than for women at earlier ages, after age 65 that rates become similar for the two sexes (Wood, 1986). The periodic risk of heart disease can estimate by dividing TC to HDL-C. As a result of the estimation 4.5-5 levels show important cardiovascular disease risk, 3.8-4 levels show low cardiovascular disease risk (Rosato and Frank, 1990; Werner et al., 1990). In another, the risk factor is high if TC/HDL-C ratio is higher than 5; the risk factor is low if the ratio is lower than 3.5 (Edward et al., 1992). İmamoğlu et al (2005) in a study, mentioned that lipid and lipoprotein values of the four groups have indicated that the individuals in these groups would not be exposed to danger of cardiovascular diseases. In our study, the cardiovascular risk ratios (TC/HDL-C) were found to be 3.41 mg/100cc in wrestlers A, 3.22 mg/100cc in wrestlers B, 3.32 mg/100cc. The cardiovascular risk ratio of wrestlers is higher than other groups. Athletes engaging in aerobic sports at a high level particularly favored with respect to their low overall risk of coronary heart disease and, in particular, to their highly favorable plasma lipoprotein pattern (Durstine et al., 2001). High-intensity aerobic training results in improvement in high-density lipoprotein cholesterol (Tambalis et al., 2008). But the wrestlers' training form was mostly anaerobic.

## 5. Conclusion

Although the A group wrestlers' training levels were always found to be higher than the wrestlers of group B, TG and HDL-C values were not found to be different. But the TC, TG and LDL-C levels of wrestler of the group B were found better than wrestlers in group A. This result shows that medium and high level of exercises did cause little differences in lipid and lipoprotein levels. Lipid and lipoprotein values of the two

groups have indicated that the individuals in these groups would not be exposed to danger of cardiovascular diseases.

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