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COMPARISON OF BLOOD PARAMETERS AND SOME MOTOR PERFORMANCE VALUES IN A FACULTY OF SPORT SCIENCES STUDENTS

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Abstract:
In this study is proposing to compare lipid and lipoprotein values in faculty of sport sciences students in order to investigate cardiovascular disease risks. The research included sports-educated college students. They were 20 wrestlers, 25 judo athletes and 30 soccer players. Comparison of age and height were used in the research and, to identify the differences among groups, one-way Anova and Scheffe tests were performed. In this study, vertical jumping value was not found statistically significant among the groups ($p > 0.05$). In this study, aerobic and anaerobic power of the educated wrestlers and judo athletes were found to be different than the soccer players ($p < 0.05$). In our study, wrestlers and judo athletes' values are clearly higher than the values soccer players group in terms of total cholesterol (TC), triglyceride (TG), low density lipoprotein (LDL-C) amounts ($p<0.01$). In our study, wrestlers and judo athletes' values are found to be significantly lower than the values soccer players in terms of high-density lipoprotein (HDL-C) amounts ($p<0.01$). The ratio TC / HDL-C and LDL-C / HDL-C of educated judo athletes and wrestlers is higher than soccer players ($p<0.05$). **Conclusion:** Faculty of sport sciences students who wrestlers, judo athletes and soccer players were found to be different in blood fat values. This difference in bloods fat are thought to be due to their training. Healthy risk factors for cardiovascular diseases of all three branch athletes were found to be low. Wrestler and Judo players were recommended to include more aerobic activities in their trainings.

Keywords: lipid, lipoprotein, wrestlers, judo athletes, soccer players

1. Introduction

Soccer is a team sport in which behaviors aiming at scoring and goal blocking a goal are displayed as a result of running with different tempo and movements that can be controlled with a ball that can be predicted where to go (Kılıç & Toşur, 2018). Atan et al.

(2012) in a study, the total physical activity levels of teachers and health professionals were not different and insufficient. Soccer is a fitful sport in which players need to perform many technical, physical, and tactical actions and previous research suggests that agility, reaction capacity, power development, repeated sprint ability and endurance capability shows determinant issues for success in soccer and other sports (Chtara et al., 2017; Yılmaz et al., 2019; Özaslan et al., 2017). Soccer is defined as a multiple-sprint sport, reflecting the need for players to continuous running during a match (Abrantes et al., 2004). According to the duration of the competition and due to its vigorous physical activity, the wrestling is primarily an anaerobic sport that wrestlers utilize just about ninety percent of energy needed from the ATP-CP and lactic-acid energy systems (Dawes & Roozen, 2012, Aksoy et al., 2020a). Wrestling and Judo are complicated sports branches that involve integrated actions and activities (Bostanci et al., 2017; Ermiş et al., 2019). Aerobic and anaerobic systems are needed together in wrestling and Judo (Ermiş et al., 2019, Aksoy et al., 2020b). The aerobic system in the athletes who use the speed and the maximum power in the anaerobic system in the competition or match supports the recovery in the fields where the effort is decreased in order to ensure the continuation of the struggle (Franchini et al., 2009). Atan et. al (2015) in study, it was found that the best performance which includes activities of aerobic endurance has been shown in the afternoon hours. Atan and Alaçam (2015) in study, was found that the effect of aerobic and anaerobic exercise on hematologic blood parameters was similar except for several parameters. In addition, previous study showed that the circulation parameters had been affected by aerobic and anaerobic exercises positively (Tahhan et al., 2018a; Tahhan et al., 2018b).

Both anaerobic and aerobic training can decrease total cholesterol, increase high-density lipoprotein cholesterol values, and lower the total cholesterol/high-density lipoprotein cholesterol ratio. Among elite athletes, exercise continues to enhance favorable lipoprotein profiles (Çetin et al., 2019). Studies have shown that increasing risk factors in coronary heart diseases are high cholesterol, triglycerides, low-density lipoprotein cholesterol values and low high-density lipoprotein cholesterol values in blood parameters (Demirel et al., 2018). Positive effects of applied long regular exercises on physiological, physical, psychological and motoric features have been noticed and one of the most prominent positive effects of regular physical activate is on blood biochemistry (Pancar et al., 2018). Normal and well-tuned intensity aerobic exercise reduces blood lipid levels, total cholesterol, LDL cholesterol, triglycerides, while raises HDL cholesterol levels when estimated (Koç, 2011). Judo and wrestling have a very vigorous physical activity in sport branches. They also focused on that hypercholesterolemia and low levels of HDL-C were more uttered in power sports and anaerobic sports. A great number of studies show that the cholesterol is related with coronary heart disease (Çetinkaya and İmamoğlu, 2018; Güllü et al., 2013). Latest studies have shown that the dosed individually and programmed physical activity leads to raise the concentration of HDL cholesterol, and triglyceride, total and LDL cholesterol and other blood parameters (Labović et al., 2015; Pancar et al., 2018). However, investigators

report contradictory findings related to the density and the training style that produce alterations in the lipid metabolism (Menevşe et al., 2014). LDL-/HDL-C ratio can show raised rate of arteriosclerosis disease. Low blood levels of HDL-C are a detached risk factor for cardiovascular disease (Boden 2000; Franceschini, 2001). Many parameters such as strength, speed, balance, flexibility, reaction time and endurance and mental ability are required to succeed in wrestling competitions (Pancar et al., 2016; Ermiş et al., 2019). Wrestling and judo are similar sport branches. Many factors influence the success of athletes, except motor performance capacities such as aerobic and anaerobic capacity. Again, many different parameters affect the success of soccer players. Blood fat values can also have an impact on success (Keskin et al., 2019).

In this study, it is aimed lipid and lipoprotein values of in faculty of sport sciences students to investigate cardiovascular disease risks. It is thought that there is a similar between lipid and lipoprotein values of wrestlers and judo athletes. Lipid and lipoprotein values of soccer players are thought to be different from wrestlers and judo athletes. Soccer players do aerobic training in their regular training more than wrestlers and judo athletes. This study is important in terms of comparing lipid and lipoprotein values of wrestlers, judo athletes, and soccer players. In addition, cardiovascular risk status of athletes was also studied.

2. Material and Method

2.1. Subjects

In this study, 20 wrestlers, 25 judo athletes and 30 soccer players were included. Participants are students who are studying in faculty of sport sciences.

2.2. Measurements and Tests

Anthropometric and motor performance measurements related to body compositions have been done in Sports facilities.

a. Measurement of Height and Body Weight: Body weights have been measured in kilograms via electronic scales (premier) with a t-shirt, a tight and bare feet. Heights have been measured in centimeters in the upright position with bare feet via Rodi Super Quality (Aslan and Ziyagil, 2020).

b. MaxVO$_2$: With a 12-minute running test; MaxVO$_2$ (ml/kg/min) = Distance travelled /12 (m/min) x(0.2+3.5)= ml/kg/min.

c. Anaerobic Power (P): Bounce measure have been made via jump meter that has a measurement range between 5 cm - 99 cm, that is affixed in the waist and that shows digitally the bounced distance .

Anaerobic Power (P) = $\sqrt{4.9}$ x Body Weight x $\sqrt{}$ D =kgm/sec

D = vertically jumped distance (m.)

d. BMI (Body Mass Index) = BW (Body Weight) kg / BH (Body Height) m^2 = (kg/m^2)

e. Measurement of the Blood Biochemical: Blood samples have been taken (12 hours later) in the mornings on an empty stomach without changing three week the diet of the

men. The results of counting have been analyzed by using 5 ml blood samples taken from forearm antecubital region in Hitachi 717 auto analyzer. The data obtained from the measurements have been recorded immediately after every measurement.

2.3. Statistical Analysis

Analyses were made on SPSS 23.00 version. Kolmogorov-Smirnov test was used in order to assess the normality of parameters. Comparison of age and height were used in this study and, to determine the differences between groups one-way Anova and Scheffe tests were performed. Statistical significances were accepted at $p<0.05$.

3. Results

Table 1: Comparison of anthropometric properties of subject

Variables	Group	n	Mean	Standard deviation	F / Scheffe
Age (year)	Wrestling (1)	20	22.44	0.29	1.66
	Judo (2)	25	23.38	0.32	
	Soccer (3)	30	22.79	0.23	
Height (cm)	Wrestling (1)	20	173.32	1.50	0.60
	Judo (2)	25	173.94	1.31	
	Soccer (3)	30	172.99	0.73	
Body Weight (kg)	Wrestling (1)	20	76.50	2.31	4.12* 1,2>3
	Judo (2)	25	76.46	1.93	
	Soccer (3)	30	73.81	1.34	
BMI (Kg/m^2)	Wrestling (1)	20	25.47	0.60	3,18* 1,2>3
	Judo (2)	25	25.25	0.93	
	Soccer (3)	30	24.55	0.97	

$p<0.05$*

The age of the wrestlers has been detected as 22.44 years, Judo athletes 23.38 years, and soccer players 22.79 years, their height has been detected as wrestlers 173.3 cm, Judo athletes 173.94 cm, and soccer players 171.99 cm. It was found BMI values 25.47 kg/m^2 for wrestlers, 25.25 kg/m^2 for judo athletes, and 24.55 kg/m^2 for soccer players.

Table 2: Comparison of aerobic and anaerobic power of subject

Variables	Groups	n	Mean	Standard deviation	F / Scheffe
Vertical jump (cm)	Wrestling (1)	20	62.10	5.61	1.24
	Judo (2)	25	62.00	5.92	
	Soccer (3)	30	61.00	9.64	
Aerobic power (Max VO_2) ml/kg/min	Wrestling (1)	20	53.63	3.09	5.06* 3>1,2
	Judo (2)	25	53.72	3.17	
	Soccer (3)	30	55.83	4.42	
Anaerobic power (kg-m/sec)	Wrestling (1)	20	133.92	3.71	6.89* 1,2>3
	Judo (2)	25	133.85	4.53	
	Soccer (3)	30	127.58	6.42	

$p<0.05$*

Vertical jump has been found 62.10 cm for wrestlers, 62.00 cm for judo athletes, and 61.00 cm for soccer players. Wrestlers' Max VO_2 and anaerobic power has been found 53.63 ml/kg/min and 133.92 kg-m/sec respectively. Judo athletes' Max VO_2 and anaerobic power has been found 53.72 ml/kg/min and 133.85 kg-m/sec respectively. Soccer players Max VO_2 and anaerobic power has been found 55.83 ml/kg/min and 127.58 kg-m/sec respectively.

Table 3: Comparison of serum lipid levels of subject

Variables	Groups	Mean	Standard deviation	F / Scheffe
Total cholesterol (mg/dl)	Wrestling (1)	187.31	2.82	12.58** 1,2>3
	Judo (2)	185.56	3.68	
	Soccer (3)	158.52	3.15	
Triglyceride (mg/dl)	Wrestling (1)	132.64	4.35	39.46** 1,2>3
	Judo (2)	130.14	4.41	
	Soccer (3)	84.84	2.12	
LDL-C (mg/dl)	Wrestling (1)	120.55	2.15	31.23** 1,2>3
	Judo (2)	119.95	5.67	
	Soccer (3)	101.62	5.54	
HDL-C (mg/dl)	Wrestling (1)	49.76	1.62	3.15* 1,2<3
	Judo (2)	49.24	1.28	
	Soccer (3)	56.64	1.76	

$p<0.05$* $p<0.01$**

In this study, it found Total cholesterol values on wrestlers 187.31 mg/dl, judo athletes 185.56 mg/dl, and soccer players 158.52 mg/dl. In this study, it found triglyceride values on wrestlers 132.64 mg/dl, judo athletes 130.14 mg/dl, and soccer players 84.84 mg/dl. In this study, it found LDL-C values on wrestlers 120.55 mg/dl, judo athletes 119.95 mg/dl, and soccer players 101.62 mg/dl. In this study, it found HDL-C values on wrestlers 49.76 mg/dl, judo athletes 49.24 mg/dl, and soccer players 56.64 mg/dl.

Table 4: Cardiovascular risk factors of subject

Mg/dl	Groups	Mean	Standard deviation	F/Sheffe
TC/HDL-C	Wrestlers	3.77	0.12	5.12* 1,2>3
	Judo athletes	3.76	0.13	
	Soccer players	2.80	0.11	
LDL-C/HDL-C	Wrestlers	2.44	0.14	4.16* 1,2>3
	Judo athletes	2.42	0.13	
	Soccer players	1.79	0.10	

TC/HDL-C ratios found to be 3.76 mg/dl for judo athletes, 3.77 mg/dl for wrestlers, and 2.80 mg/dl for soccer players. LDL-C/HDL-C ratios found to be 2.42 mg/dl for judo athletes, 2.44 mg/dl for wrestlers, and 1.79 mg/dl for soccer players.

4. Discussion and Conclusion

In this study, we have not found significant differences between age and height of the three groups ($p>0.05$). Body weight and body mass index values of the soccer players were significantly lower than judo and wrestlers ($p<0.05$). In this study, wrestlers and judo athletes were weight than soccer players. This suggests that wrestlers and judo athletes have more muscular structure than soccer players. In classification for BMI: BMI categories were normal weight (22–23.9 kg/m^2, the referent) and overweight (24–26.9 kg/m^2), (Hsu et al., 2018). In general, if the body mass index is up to 25 kg/m^2, everybody is considered as healthy and after 25 kg/m2 as sick (Turgut et al., 2018). But this classification is for sedentary people. In a study of Turkish footballers, the average body mass index of professional footballers was found to be 23.46 kg / m^2 and 22.87 kg / m^2 for amateurs (Kılıç and Toşur, 2018). Wittich et al. (1999) reported that the average BMI of 24 professional footballers in their study was 24.5 kg / m^2. Bayraktar and Kocak (2017) in a study, İt found Olympic level Greco-Roman and Freestyle wrestlers BMI 27.7 kg/m^2. In this study, Body Mass index values were found to be around 25 kg / m^2. Since they are athletes in all three groups, they should not be considered as risky in health category.

Lower body anaerobic power has been assessed through a vertical jump test with counter-movement. The national male freestyle team of United States in 1997 had an average of 60 cm (Utter et al., 2002). Unpublished data from the US Olympic Committee (Callan et al., 2000) showed that male wrestlers of Greco-Roman team had an average counter-movement vertical jumps of 62 cm. Data provided by Podlivaev for Russian athletes ranged 56.70 cm to 66.10 cm (https://simplifaster.com/articles). In a study on Turkish footballers, the vertical jump value of professional soccer players was 59.08 cm and for amateur players was 55.25 cm (Kılıç and Toşur, 2018). İri et al. (2017) stated that the average vertical jump of elite soccer player was 51.40 cm. Aslan and Koç (2015) found the average vertical jump of amateur soccer players to be 58.49 cm. In this study, vertical jump value was found to be around 60 cm in all three groups. Vertical warming value was not found statistically significant among the groups ($p> 0.05$).

Trainers were providing athletes with VO_2 max's 60-70+ ml/kg/min (Sharratt, 1984). Reilly et al. (2000) assert that VO_2max is not a unique factor of performance capability in soccer and claims that VO2max >60 mL/kg/ min provides the lowest limit to have the physiological skills for success in men's elite soccer. In contrast, Stølen et al (2005) claim that it may be acceptable to expect about 70 ml/kg/ min for a 75-kg professional soccer player, a value similar to that in elite middle-distance athletes. Tonnessen et al. (2013) in a study, it found national team 50. 2 ml/kg /min, 1st division 49.0 ml/kg / min, and 2nd division 48.2 ml/kg / min on soccer for Norwegian. Ergün et al. (2005) in a study, it found VO_2max values is 50.6 ml/kg/min- 63.7 ml/kg/min for soccer. The maximum oxygen intake for elite soccer players has been found in many researches and it ranges between 56-70 ml/kg/min, which is partly associated with the standard of play and different positions (Ergun et al., 2005). In a study on Turkish soccer players, it found Aerobic Capacity (MaxVO2) of professional players 52.47 ml / kg / min and 53.94

ml / kg / min for amateurs (Kılıç & Toşur, 2018). Iri et al. (2017) reported that aerobic capacity of elite footballers was 52.65 ml / kg / min. Aslan and Koç (2015) stated the average MaxVO_2 of amateur football players as 50.01 ml / kg / min. Zi-Hong et al. (2013) in a study, the major results were VO2max: 50.58 ml/kg/min. In general, elite male wrestlers shows the highest $V0_2$ values of between 50.4 and 62.4 ml/kg/min (Horswill, 1992). Yoon (2002) found that national and international wrestlers who took part in international competitions had the maximal oxygen uptake between 53 and 56 (ml/kg/min). An article published by Huber-Wozniak (2009) found an average VO_2 in male elite wrestlers was 59.8 ml/kg/min, and females were 49.7 ml/kg/min. İmamoğlu et al. (1999a) in a study, it found judo athlete's average relative Max VO2 44.37 ml / kg / min. The value of MaxVO_2 in the study of Imamoğlu et al. (2001) was 50.29 ml / kg / min; the MaxVO2 value in the study of Ağaoğlu et al. (2001) was 51.28 ml / kg /min. In a study of Max VO2 and anaerobic power of the wrestlers have been found 52.4 ml/kg/min and 127.89 kg-m/sec respectively İmamoğlu et al. (2005). Maximal oxygen uptake of the wrestlers in international competitions is around 53 and 56 ml/kg/min (İmamoğlu et al., 2005). In a research on Turkish soccer players, anaerobic power value of professional soccer players was determined to be 128.90 kg-m / sec and anaerobic power value of amateur soccer players was determined as 117.21 kg-m / sec (Kılıç and Toşur, 2018). Iri et al. (2017) reported the average anaerobic power of elite soccer players 127.60 kg-m / sec. Aslan and Koç (2015) found that the average anaerobic power of amateur soccer players was 119.07 kg-m / sec.

In another study, Aslan et al. (2010) stated that the average anaerobic power of professional soccer players was 131.52 kg-m / sec. Anaerobic performances of a freestyle wrestler are more similar to power athletes such as sprinters, throwers, weightlifters than endurance athletes. Similarly, the anaerobic power of the upper and lower body of male wrestlers is much greater than the corresponding values in non-athletic men of similar age (Horswill, 1992). By İmamoğlu et al. (2001) in a study, anaerobic power was found to be 132.00 kg-m/ sec for judo athletes. By Ağaoğlu et al. (2001) in a study, anaerobic power was found to be 130.09 kg-m / sec for judo athletes. Anaerobic power of University wrestlers has been found 115.67 kg-m/s (Akkuş ve İnal, 1999). Crawford (1996) stated that there is a correlation between weight and anaerobic power, and that there is an increase in anaerobic power with the increase in weight. Caglar et al. (1997) stated that anaerobic power increases as body weight increases. Besides, in the study of İmamoglu et al. (1999), it was found that the increase in weight shows parallelism with the increase in anaerobic power. İmamoğlu et al. (1999b) in a study, it found anaerobic power to increase, as the weight increases. In this study, aerobic power of soccer players found high than wrestlers and judo athletes. Anaerobic power of soccer players is lower than wrestlers and judo athletes. In this study, aerobic and anaerobic power of the wrestler and judo athletes were found to be different than the soccer players ($p < 0.05$). This is due to the fact that the bodyweight of the wrestlers and judo player is higher than the soccer players and the 12-minute running distances are lower. It is recommended that wrestlers and judo athletes give more space to aerobic activities throughout trainings.

Total cholesterol and triglyceride laboratory reference interval are 0 - 200 mg/dl (Menevşe et al., 2013). Total cholesterol and triglyceride values is to be higher with sedentary people according athletes (Koç, 2011). In other a study, found that athletes' serum Total cholesterol and levels are significantly lower than the levels of sedentary people (Turgut et al., 1998). In our study, wrestlers and judo athletes' values are found to be significantly higher than the values soccer players group in terms of total cholesterol and triglyceride amounts ($p<0.01$).

Laboratory reference interval is 0-160 mg/dl for LDL-C (Menevşe et al., 2014). In a study, between athletes and sedentary there found no significant difference in terms of LDL levels (Turgut et al., 1998). In our study, wrestlers and judo athletes' values are found to be significantly higher than the values soccer players group in terms of LDL-C amounts ($p<0.01$).

Laboratory reference interval is 25-75mg/dl for HDL-C, and 0-160 mg/dl for LDL-C (Menevşe et al., 2014). LDL-C level is with sedentary people and HDL-C level is high with athletes (Koç, 2011). In a study on wrestlers and sedentary people, showed that HDL-C level is significantly higher with wrestlers, but LDL-C level is lower (Yamaner et al., 2010). In our study, wrestlers and judo athletes' values are found to be significantly lower than the values soccer players in terms of HDL-C amounts ($p<0.01$).

LDL -C/HDL C ratio and LDL C/HDL C ratio can show arteriosclerosis disease risk (Akyol and İmamoğlu, 2019). The risk factor is elevated if the cardiovascular risk ratios (TC/HDL-C) is advanced than 5; the risk factor is falling if the ratio is under than 3.5 (Lemieux et al., 2001). In this study, ratio TC / HDL-C and in LDL-C / HDL-C ratio for judo athletes, wrestlers, and soccer players were not risk factor. Also, in this study, is meaningful that the ratio TC / HDL-C and LDL-C / HDL-C of judo athletes and wrestlers is higher than soccer players ($p<0.05$). Wrestling and Judo are classified as a power-anaerobic based sport on the basis of its character of training, match times. Wrestlers and Judo athletes may be advised to include more aerobic activities in training.

In conclusion, faculty of sport sciences students who wrestlers, judo athletes and soccer players were found to be different in blood fat values (TC, TG, LDL-C, and HDL-C). Wrestlers and judo athletes have higher levels of harmful blood fat more than soccer players. HDK-K values, which are considered as beneficial cholesterol, are higher in footballers than in wrestlers and judo athletes. This difference in bloods fat are thought to be due to their training. Healthy risk factors for cardiovascular diseases of all three branch athletes were found to be low. Wrestler and Judo players were recommended to include more aerobic activities in their training. It is thought that blood fat values are normal due to the participants' sports education and trainings.

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