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ORIGINAL SCIENTIFIC PAPER

Determination of Some Physical Fitness and Body Composition Characteristics of Young Bocce Players in Turkish National Team

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Abstract

Bocce is gaining popularity throughout the world and is a game that is dominated by aerobic and anaerobic power-capacity, endurance, and strength and body composition. These are all important factors in order to reach a successful performance in Bocce. The purpose of this study was to determine some physical fitness and body composition characteristics of young Bocce players in Turkish national team. A total of 26 six (14 female age 21.00 ± 8.47 and 12 male age 19.58 ± 3.34) Bocce players from National Team of Turkey participated in this study voluntarily. Subjects' height, body weight, body mass index and body fat percentage were measured. Body fat percentage was determined by Yuhasz formula, and isometric dynamometer was used in order to determine knee, back, grip strength. The sit and reach test was used for the determination of flexibility. Results indicated that Bocce players have normal body mass index and body fat percentage and ectomorphy-mesomorphy properties. Results of the isometric knee, back, right-left grip strength values of Bocce players was 77.54 ± 24.8 kg, 90.54 ± 26.85 kg and 36.10 ± 9.91 - 34.27 ± 10.08 respectively and have normal flexibility (32.5 ± 5.86). As a conclusion, the findings of the present study indicated that Bocce players have almost average body fat percentage, isometric strength and flexibility function.

Key words: *physical fitness characteristics, body composition, bocce players, strength, endurance, flexibility*

Introduction

The physiological demands of Bocce require players to be competent in several aspects of fitness, which include aerobic and anaerobic power, muscle strength, balance, flexibility and body composition (muscle fiber distribution, muscle cross sectional area, leg volume-mass, etc). These fitness components often vary with the individual player, the positional role in the team and the team's style of play. In addition body composition, aerobic and anaerobic performance, muscle strength, power, and speed are important physiological characteristics of Bocce players in order to perform in a Bocce game. Therefore it is clear that aerobic-anaerobic performance, balance and muscular strength play a major role in optimal performance in Bocce. In particular, anaerobic performance and muscle strength of the lower limbs are significantly associated

with vertical jump height and sprinting performance (Wisloff, Castagna, Helgerud, Jones, & Hoff, 2004). Previous investigators have shown significant differences in muscle strength, anaerobic performance, sprint performance and vertical jump between team players of different ages (Çakır, Sönmez, & Yılmaz, 2009), muscle fiber distribution (Esbjornsson, Sylven, Holm, & Jansson, 1993), muscle cross sectional area (Rosene, Fogarty, & Mahaffey, 2001), leg volume, leg mass (Chelly et al., 2010), intensity of training, levels of competition (Hencken & White, 2006) and Bocce teams of different divisions (Wisloff et al., 2004; Gissis et al., 2006).

Muscle strength can be defined as the amount of force a muscle group can exert against a resistance in one maximal effort and is closely related with anaerobic performance (Çakır et al., 2009). Muscle strength of the lower limbs in particular



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is of concern in Bocce because during relevant Bocce activities lower limb muscles must generate high forces for dribbling, turning and change of pace (Badic, Badic, Pasalic, & Markovic, 2009).

Body composition (body size and somatotype) is another factor that is generally accepted to have a great influence on athletic performance (Reilly, Bangsbo, & Franks, 2000). Specifically body fat and fat free mass have been accepted as a crucial component of aerobic-anaerobic performance (Mayhew, Hancock, Rollison, Ball, & Bowen, 2001), strength and sprint performance (Dowson, Nevill, Lakomy, Nevill, & Hazeldine, 1998). For instance, Mayhew et al. (2001) reported that body composition component was one of the major factors explaining the anaerobic power and sprint performance.

Sprint performance is another fundamental activity for many sports and consists of a number of components such as the start, acceleration and maximum speed phases. It is known that sprinting requires high force production. Previous research has identified force production capabilities of legs to be a key component in sprinting (Kin İşler, Arıburun, Özkan, Aytar, & Tandoğan, 2008).

Bocce has many similarities with any other sports disciplines. It can be played by individuals, pairs, or teams of three. It is gaining popularity throughout the world and is a game that is dominated by aerobic and anaerobic power-capacity, endurance, strength, flexibility, and balance and body composition. These are important factors for successful Bocce performance. Bocce, which is known as “Boules” or “Petanque” in French and “Bowls” in English, has been a very popular sport in Turkey during last 10 years after the establishment of the national federation in 2005. It has been adopted as one of the school sports in 2013, and got popularity in schools all around Turkey. Bocce is a very typical sport, as it includes both individual and team competitions, and has traditional strategic games played against opponent teams, and fast flowing, endurance and strength demanding disciplines played against time (Turkmen, 2011; Turkmen, Bozkus, & Altintas, 2013). Thus, it would represent both individual and team sports and require both mental and physical competencies. Therefore the findings of this study would normally be applicable to many other similar sport disciplines. To date, no studies have been reported that specifically investigated the relationship between aerobic, anaerobic performance, strength, balance, locomotor capacity and speed of action. The purpose of the present study was to investigate some physical fitness and body composition characteristics of young Bocce players representing Turkish national Bocce team, which is the first study so far on Bocce players; therefore it will have an important effect on scientific studies focusing on Bocce in near future.

Methods

Subjects and Experimental Approach

A total of twenty six (14 female age 21.00 ± 8.47 and 12 male age 19.58 ± 3.34) Bocce players who were selected for junior and espoirs national teams in 2016, participated in this study voluntarily. The subjects were informed about the possible risks and benefits of the study and gave their informed consent to participate in this study. The study was conducted over a five days period, during which the players did not participate in any other training or matches. Subjects' height, body weight, body mass index and body fat percentage were determined. Body fat percentage was determined by Yuhasz

formula. Isometric Dynamometer was used for the determination of knee, back, grip strength. The sit and reach test was used for the determination of flexibility.

Procedures

Anthropometric Measurements

Subjects reported to the laboratory at 8:00 am. First, body height (cm), body mass (kg), and percentage of body fat (PBF) measurements were taken for each subject. The body height of the Bocce players was measured by a stadiometer with an accuracy of ± 1 cm (SECA, Germany), and while electronic scales (Tanita BC 418, Japan) accurate to within 0.1 kg were used to measure body mass and percentage of body fat (Lohman, Slaughter, Boileau, Bunt, & Lussier, 1984). Skinfold thickness was measured with a Holtain skinfold caliper (Holtain, UK) which applied a pressure of 10 g/mm² with an accuracy of ± 2 mm. Gulick anthropometric tape (Holtain, UK) with an accuracy of ± 1 mm was used to measure the circumference of extremities. Diametric measurements were determined by Harpenden callipers (Holtain, UK) with an accuracy of ± 1 mm. The Bocce players' somatotypes were then calculated using the Heath-Carter formula.

Vertical Jump Measurements

Vertical jump performance was measured using a portable force platform (Newtest, Finland). Players performed countermovement (CMJ) and squat jumps (SJ) according to the protocol described by Bosco, Luhtanen, & Komi (1983). Before testing, the players performed self-administered sub-maximal CMJs and SJ (2-3 repetitions) as a practice and specific additional warm-up. They were asked to keep their hands on their hips to prevent any influence of arm movements on the vertical jumps and to avoid coordination as a confounding variable in the assessment of the leg extensors (Bosco et al., 1995). Each subject performed 3 maximal CMJs and SJs, with approximately 2 minutes' recovery in between. Players were asked to jump as high as possible; the best score was recorded in centimeters (Bosco et al., 1995).

Flexibility measurement

Flexibility was evaluated by the sit and reach test which is the most common flexibility test used in health related fitness test batteries. The subjects sat with their feet approximately hip-width against the testing box. They kept their knees extended and placed the right hand over the left, and slowly reached forward as far as they could by sliding their hands along the measuring board. Reaches short of the toes were recorded as negative forward reach scores, and reaches beyond the toes were recorded as positive forward reach scores in centimetre to the nearest 0.5 cm using the scale on the box (Kayihan, Ersöz, & Özkan, 2013).

Strength measurement

Isometric Dynamometer was used for the determination of knee, back, grip strength. Muscular strength was assessed using a Takei strength dynamometer (Takei Scientific Instruments, Tokyo, Japan).

Statistical analyses

Means and standard deviations are given as descriptive statistics and the relationship among body composition, isometric strength and vertical jump performance in Bocce play-

ers was evaluated by Pearson product Moment Correlation analysis. All analysis were executed in SPSS for Windows version 17.0 and the statistical significance was set at $p < 0.05$.

Results

The body composition, anaerobic performance (vertical

jump) and isometric strength measurements of the Bocce players in the study are presented in Tables 1, 2, and 3; and the correlations are presented in Table 4, 5, and 6 respectively.

As can be seen from Table 1, Bocce players have normal body mass index, body fat percentage, and ectomorphy-mesomorphy properties.

Table 1. Body Composition of Bocce Players (mean \pm sd)

	Body Height (cm)	Body Mass (kg)	Body Fat (%)	BMI	Endo	Meso	Ecto
Players (n=26)	168.9 \pm 7.40	61.53 \pm 10.40	15.07 \pm 5.7	21.45 \pm 2.65	1.52 \pm 1.32	2.90 \pm 1.42	4.57 \pm 1.21
Female (n=14)	164.15 \pm 5.53	54.95 \pm 6.52	18.60 \pm 4.33	20.24 \pm 2.07	1.78 \pm 1.12	2.74 \pm 1.32	3.65 \pm 1.40
Male (n=12)	174.55 \pm 4.98	61.53 \pm 10.40	10.91 \pm 4.15	22.89 \pm 2.61	1.42 \pm 1.58	3.25 \pm 1.56	4.78 \pm 1.36

Both Table 2 and 3 conveys that Bocce players have average anaerobic, flexibility, and isometric strength performances.

According to Table 4, the Pearson Product Moment Correlation analyses indicated that significant correlations existed

Table 2. Anaerobic Performance and Flexibility Performance Values of Bocce Players (mean \pm sd)

	Counter Movement Jump			Squat Jump			Flexibility
	Absolute (CMJ) (Watt)	Relative (RCMJ) (W \cdot kg $^{-1}$)	Jump Height (CJH) (cm)	Absolute (SJ) (Watt)	Relative (RSJ) (W \cdot kg $^{-1}$)	Jump Height (SJH) (cm)	Sit and Reach (cm)
Players (n=26)	794.8 \pm 117.5	13.2 \pm 0.6	36.2 \pm 2.3	742.8 \pm 141.2	12.3 \pm 0.4	33.1 \pm 2.37	32.75 \pm 6.01

CMJ: Counter movement jump, RCMJ: Relative counter movement jump, SJ: Suquat jump, RSJ: Relative squat jump

between body composition and anaerobic performance values. Therefore, it can be said that body composition plays a deter-

minant role in anaerobic performance in Turkish national Bocce players. On the other hand, body composition, anaero-

Table 3. Isometric Strength Performance of Bocce Players (mean \pm sd)

	Isometric Strength					
	Back	Knee	Right Grip	Left Grip	Total	Relative
Players (n=26)	90.54 \pm 26.85	77.54 \pm 24.81	36.10 \pm 9.91	34.27 \pm 10.08	238.46 \pm 85.94	3.84 \pm 0.81

bic and strength performance had no significant relation with flexibility ($p > 0.05$).

According to Table 5, the Pearson Product Moment Correlation analyses indicated that significant correlations existed

Table 4. Correlations between Body Composition and Flexibility with Anaerobic Performance

	CMJ	RCMJ	CJH	SJ	RSJ	SJH	Flexibility
Body Weight	.635*	.512**	NS	NS	.733**	-.597**	NS
Body Mass	.612**	.540*	NS	NS	.655**	-.539**	NS
Body Fat	NS	.512*	.878**	NS	-.575*	-.670*	NS
BMI	.512*	NS	NS	NS	NS	-.586*	NS
Endomorfism	.878**	NS	NS	NS	NS	NS	NS
Mesomorfism	NS	NS	NS	NS	NS	NS	NS
Ectomorfism	NS	NS	NS	NS	NS	NS	NS

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

between isometric strength and body composition. Therefore, it is concluded that body composition is a crucial component

in strength performance of Bocce players.

According to Table 6, the Pearson Product Moment Cor-

relation analyses indicated that significant correlations existed between anaerobic performance and isometric strength.

On the other hand, none of the measurements of anaerobic and strength performance values were significantly related to

Table 5. Correlations between Body Composition and Isometric Strength Performance

Strength	Body Height (cm)	Body Mass (kg)	Body Fat (%)	BMI	Endomorf	Mesomorf	Ectomorf
Back	.433*	.713**	NS	.610**	-.733**	-.597**	NS
Knee	.515*	.740**	NS	.577**	-.655**	-.539**	NS
Right Grip	.775**	.829*	-.448*	.631**	-.575*	-.670*	NS
Left Grip	.605*	.719**	-.524**	.658**	NS	-.586*	NS
Total	.803*	.597**	-.407*	.661**	NS	NS	NS
Relative	NS	NS	-.440**	NS	NS	NS	NS

* $p < 0.05$ – ** $p < 0.01$

flexibility ($p > 0.05$). Therefore, it is concluded that strength is a crucial component in anaerobic performance of bocce players,

but flexibility has no significant relation with anaerobic performance

Table 6. Correlations between Anaerobic Performance and Flexibility with Isometric Strength

Strength	CMJ	RCMJ	CJH	SJ	RSJ	SJH	Flexibility
Back	.540*	.450*	.760*	NS	.948*	NS	NS
Knee	.650**	.550*	NS	NS	NS	NS	NS
Right Grip	.590*	.620**	.913**	NS	.813**	NS	NS
Left Grip	.680*	NS	NS	NS	NS	NS	NS
Total	NS	NS	NS	NS	NS	NS	NS
Relative	NS	NS	NS	NS	NS	NS	NS

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

Discussion

The major finding of the present study is the existence of significant relation between body composition, anaerobic power, flexibility and isometric strength. This result is consistent with the results of previous studies. For instance Pyne, Duthie, Saunders, Petersen and Portus (2006) highlighted anthropometric measures of upper-body power, arm length and static jump as good correlates of peak ball speed in junior and senior fast bowlers. And Pyne et al. (2006) also have outlined the role of lower-body power as a partial predictor of ball release speed in senior bowlers, while Portus, Mason, Elliot, Pfitzer and Done (2004) have reported front knee bracing action and higher braking forces were related to higher ball speeds, which might be accounted for faster run up speeds. Taken in context of the current results, these findings highlight the importance of physical conditioning to improve peak running and potentially run-up speed. Moreover, training should also include the ability to tolerate increased bracing forces and transfer momentum from front-foot contact, through the trunk to the ball, to improve bowling performance (either throughout a spell or on specific balls). Consequently, as a player improves speed and strength it might result in a more efficient delivery stride and increase optimal speed. However, it must be noted that while an increased run-up speed might be of some benefit, there will be a point where increased speed results in a loss of control (Duffield, Carney, & Karppinen, 2009). On the other hand, Baker and Nance (1999) investigated the relationship between strength and power in rugby players and determined a strong positive correlation between maximum strength and maximum power. In another study Thorland, Johnson, Cisar,

Housh and Tharp (1987) determined significant strong correlation between isokinetic knee strength and anaerobic power and capacity of female sprinter and middle distance runners. According to Mayhew et al. (2001) leg extension strength strongly predicted anaerobic power in healthy college students; and Arslan (2005) also found that peak and mean power of university students who exercise regularly were correlated with explosive leg strength. As known muscular strength is one of the important factor that has a major role in anaerobic performance because with increased muscular strength the ability of muscles to generate muscular contraction in short-term high intensity activity also increases.

Newman, Tarpenning and Marino (2004) found that concentric isokinetic knee extension and flexion strength measures were significantly correlated to single-sprint performance in football players. On the other hand, Cronin and Hansen (2005) determined no association between knee flexion and extension strength and single-sprint performance that was determined over 5 m, 10 m and 30 m in rugby players. A plausible explanation for the lack of association between isokinetic knee strength and single-sprint performance in the present study might be due to subjects' characteristics. Bocce is a developing sport branch in Turkey and is played at the league level. Hence, the subjects of the present study are young players with a short background and low-level training experience. Having low training experience may be one of the reasons for the lack of association between body composition and physical fitness. Another possible explanation for the lack of association may be the different energy systems that each measure demands. To conclude, the findings of the present study indicated that

body composition play a determinant role in anaerobic performance, strength and flexibility performance in Bocce players. In addition, strength performance was found to be an important factor in anaerobic performance of Bocce players.

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Conflict of Interest

The authors declare there are no conflict of interest.

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ORIGINAL SCIENTIFIC PAPER

Relationship between Foot Length Measurements and Body Height: A Prospective Regional Study among Adolescents in Eastern Region of Kosovo

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Abstract

The purpose of this research is to examine standing height in both Kosovan genders in the Eastern Region as well as its association with foot length, as an alternative to estimating standing height. A total of 364 individuals (185 male and 179 female) participated in this research. The anthropometric measurements were taken according to the protocol of ISAK. The relationships between body height and foot length were determined using simple correlation coefficients at a ninety-five percent confidence interval. A comparison of means of standing height and foot length between genders was performed using a t-test. After that a linear regression analysis were carried out to examine extent to which foot length can reliably predict standing height. Results displayed that Eastern Kosovan male are 178.79 ± 6.07 cm tall and have a foot length of 26.03 ± 1.21 cm, while Eastern Kosovan female are 164.60 ± 4.72 cm tall and have a foot length of 23.38 ± 0.94 cm. The results have shown that both genders made Eastern-Kosovans a tall group, but a little bit shorter than general Kosovan population. Moreover, the foot length reliably predicts standing height in both genders; but, not reliably enough as arm span. This study also confirms the necessity for developing separate height models for each region in Kosovo as the results from Eastern-Kosovans don't correspond to the general values.

Key words: prediction, measurement, stature, foot length, Kosovan

Introduction

According to Komunat e Kosovës (2013), Kosovo is a democratic, multi-ethnic and secular republic which administratively is subdivided into seven districts (Ferizaj, Gjakova, Gjilan, Mitrovica, Peja, Pristina and Prizren) and five regions (Eastern, Western, Northern, Southern and Central). This study analyzes the standing height and its estimation utilizing foot length measurements in adolescents in eastern region which contains two districts (Ferizaj and Gjilan) and eleven municipalities (Ferizaj, Hani i Elezit, Kaçanik, Štimlje/Shtime, Štrpce/Shtërpçë, Gjilan, Kamenica, Klokot, Partesh, Ranilug and Vitina). This region (Figure 1) covers the area of 2,236 square kilometers and has population of 366,589 inhabitants, while average density per square kilometer is 255 inhabitants

(Komunat e Kosovës, 2013). Although Kosovo doesn't have too big territory, it has a very varied relief that mostly belongs to Dinarides range and the author assumed this fact might influence the main objective of this study, because of the type of the soil as well as other socio-economical and geographical characteristics as a potential influencing factors (Arifi, 2013; Arifi, Sermaxhaj, Zejnullahu-Raçi, Alaj, & Metaj, 2017b).

There are lots of scientific findings which confirms that the measurement of standing height is a vitally important variable when assessing nutritional status (Arifi et al., 2017a; DattaBanik, 2011; Popovic & Bjelica, 2016), as well as when assessing the growth of children, evaluating the basic energy requirements, adjusting the measures of physical capacity and predicting the drug dosage and setting standards of physio-



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Figure 1. Geographical Location of Eastern Region in Kosovo

logical variables such as muscle strength, metabolic rate, lung volumes and glomerular filtration (Golshan, Amra, & Hoghogi, 2003; Golshan, Crapo, Amra, Jensen, & Golshan, 2007; Mohanty, Babu, & Nair, 2001; Ter Goon, Toriola, Musa, & Akusu, 2011). However, according to Quanjer and his collaborators (2014), the exact standing height cannot always be identified and resolved in the usual way (e.g. paralysis, fractures, amputation, scoliosis and pain). Because of these factors, an estimate of standing height has to be acquired from other reliable anthropometric indicators such as hand and foot lengths, knee height, length of the forearm, length of the sternum, vertebral column length, sitting height, length of scapula, arm span as well as cranial sutures, skull, facial measurements et cetera (Gardasevic, Rasidagic, Krivokapic, Corluka, & Bjelica, 2017; Popovic, 2017). Therefore, all these anthropometric indicators, which are used as an alternative to estimate standing height, are very important in predicting loss in standing height connected with aging. Also, to diagnose individuals with disproportionate growth abnormalities and skeletal dysplasia or standing height loss during surgical procedures on the spine (Mohanty et al., 2001), as well as to anticipate standing height in many older people as it is very difficult to measure it precisely, and sometimes impossible because of mobility problems and kyphosis (Hickson & Frost, 2003). Lastly, it is important to state that this knowledge finds its importance in sport science the standing height represents a significant factor which influences the success in various sport disciplines (Popovic, 2017).

Several researches have reported the benefit of using various body parameters in predicting standing height, and arm span happened to be one of the most reliable ones in adults (Mohanty et al., 2001; Ter Goon et al., 2011; Hickson & Frost, 2003; Jalzem & Gledhill, 1993), while foot length measurement is the most reliable predictor during adolescent age, due to the fact that ossification and maturation occurs earlier in the foot than the long bones and standing height could be more accurately predicted from foot measurement as compared to long bones during adolescent age (Singh, Kumar, Chavali, & Harish, 2012). In addition, the relationship of long bones and standing

height was found to vary in different ethnic and racial groups (Bjelica et al., 2012; Brown, Feng, & Knapp, 2002; Popovic, Bjelica, Georgiev, Krivokapic, & Milasinovic, 2016; Popovic, Bjelica, Molnar, Jaksic, & Akpinar, 2013; Popovic, Bjelica, Tanase, & Milasinovic, 2015; Masanovic, 2017; Reeves, Varakamin, & Henry, 1996; Steele & Chenier, 1990) as well as various regions (Arifi, 2013; Arifi et al., 2017b; Milasinovic, Popovic, Matic, Gardasevic, & Bjelica, 2016a; Milasinovic, Popovic, Jaksic, Vasiljevic, & Bjelica, 2016b). Hence, researchers have derived a specific formula for calculating standing height from long bones for each ethnic/race group. The mentioned variations might be the case with foot length predictions too, mostly due to the fact that the Dinaric Alps population has specific body composition than national as well as regional point of view (Popovic, 2017). Even though many studies with this essence are available on neighboring countries as well as worldwide population, only narrow data is available on Kosovan subjects, just one conducted by Popovic, Arifi and Bjelica (2017a; Popovic & Bjelica, 2017) that has covered whole Kosovan population, and one regional analyses that confirmed Western-Kosovans have specific standing height/foot length ratio, comparing to general population in Kosovo (Popovic, Gardasevic, Masanovic, Arifi, & Bjelica, 2017b; Masanovic, Gardasevic, & Arifi, 2018). Considering rather sparse recent scientific literature, the purpose of this research was to examine the standing height in both Eastern-Kosovan genders and its association with foot length.

Methods

The nature of this research gave extension to the 364 high-school students last year (185 male and 179 female) from Eastern Region of Kosovo to be subjects. Two reasons which qualified the selected individuals are: the first is related to the fact that the growth of an individual ceases by this age, while the second is related to the fact that there is no age-related loss in standing height at this age. The average age of the male subject was 18.20 ± 0.40 years old (range 18-19 years), while the average age of the female subject was 18.15 ± 0.36 years old (range 18-19 years). It is important to underline that the researchers have excluded from the data analysis of the individuals with physical deformities as well as those without informed consent. The exclusion criterion was also being non-Eastern Kosovan.

The anthropometric measurements, including standing height and foot length, were taken according to the protocol of the International Society for the Advancement of Kinanthropometry (Marfell-Jones, Olds, Stew, & Carter, 2006). The trained measurers have measured selected anthropometric indicators (same measurer for each indicator), while the quality of their performance was evaluated against the prescribed "ISAK Manual". Lastly, the age of the each subject was reached directly from the birthdays.

The analysis were performed by using the Statistical Package for Social Sciences (SPSS) version 20.0. Means and standard deviations (SD) were obtained for both anthropometric variables. A comparison of means of standing height and foot length between genders was performed using a t-test. The relationships between standing height and foot length were determined using simple correlation coefficients at ninety-five percent confidence interval. Then a linear regression analysis were carried out to examine the extent to which the foot length can reliably predict standing height. Statistical significance was set at $p < 0.05$.

Results

A summary of the anthropometric measurements in both genders is shown in Table 1. The mean of the standing height for male was 178.79 ± 6.07 centimeters and foot length was 26.03 ± 1.21 centimeters, while for female the standing height

was 164.60 ± 4.72 centimeters and foot length was 23.38 ± 0.94 centimeters. The sex difference between standing height and foot length measurements was statistically significant (standing height: $t=24.951$; $p<.000$, and foot length: $t=23.389$; $p<.000$).

Table 1. Anthropometric Measurements of the Study Subjects

Subjects	Body Height Range (Mean \pm SD)	Foot Length Range (Mean \pm SD)
Male	161.4-193.8 (178.79 \pm 6.07)	22.40-29.50 (26.03 \pm 1.21)
Female	153.3-177.5 (164.60 \pm 4.72)	21.50-26.80 (23.38 \pm 0.94)

In Table 2, the simple correlation coefficients and their ninety-five percent confidence interval analysis between the anthropometric measurements are displayed. The associa-

tions between standing height and foot length were significant ($p<0.000$) and high in this sample, regardless of gender (male: 0.681; female: 0.626).

Table 2. Correlation between Body Height and Foot Length of the Study Subjects

Subjects	Correlation Coefficient	95% confidence interval	Significance p-value
Male	0.681	0.550–0.755	<0.000
Female	0.626	0.493–0.716	<0.000

The results of the linear regression analysis are shown in Table 3. The first of all models were extracted by including age as a covariate. However, it was found that the contribution of age was insignificant and therefore the age was dropped and estimations were derived as a univariate analysis. The high val-

ues of the regression coefficient (male: 0.681; female: 0.626) signify that foot length notably predicts standing height in both Eastern-Kosovan genders (male: $t=12.58$, $p<0.000$; female: $t=10.69$, $p<0.000$), which confirms the R-square (%) for the male (46.4) as well as for the female (39.2).

Table 3. Results of Linear Regression Analysis Where the Foot Length Predicts the Body Height

Subjects	Regression Coefficient	Standard Error (SE)	R-square (%)	t-value	p-value
Male	0.681	4.456	46.4	12.58	0.000
Female	0.626	3.690	39.2	10.69	0.000

The associations between foot length measurements and standing height among the above models is sketched as a scat-

ter diagrams (Figure 2).

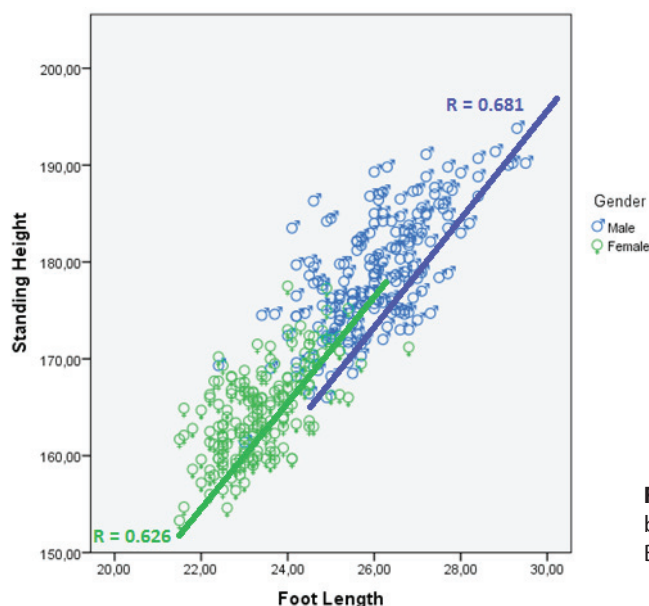


Figure 2. Scatter Diagram and Relationship between Foot Length Measurements and Body Height among Both Genders

Discussion

The assessment of standing height using various anthropometric measures is very typical from the past centuries and it has been attempted to be studied by many researchers. However, it is important to underline that the arm span has been obtained as the most reliable body indicator for predicting the standing height of an individual (Mohanty et al., 2001; Ter Goon et al., 2011), while foot length is was very close (Singh et al., 2012; Uhrova et al., 2015; Cheng et al., 1998). In parallel, it is important to emphasize that the individual and ethnic variations referring to standing height and its association with foot length might vary from ethnic group to ethnic group as well as race to race, because the racial and ethnic differences are affective on these measures and reduce the possibility of generalizing (Bjelica et al., 2012). This fact confirms the study conducted by Chinese authors (Cheng et al., 1998) who confirmed a very high linear correlation between standing height and foot length in both genders, as well as in another study which confirmed that foot length can explain up to 77% variations in standing height (Uhrova et al., 2015), while the research study conducted by Uhrova and her collaborators (2015) shows significant correlation between standing height and all measure anthropometric parameters in both genders of Slovak population. The highest correlation coefficient in this population was found for foot length in males ($r=0.71$) as well as in females ($r=0.63$).

All above-mentioned have confirmed the necessity for developing separate standing height models for each population on account of ethnic differences and the recent study conducted by Popovic and his collaborators (Popovic et al., 2017a; Popovic & Bjelica, 2017) who have analyzed the entire Kosovan population and have found specific correlation coefficient in Kosovan male ($r=0.669$) and female ($r=0.625$) population; however, some recent studies have also confirmed the regional differences between the same ethnic groups too (Arifi, 2013; Arifi et al., 2017b; Milasinovic et al., 2016a; Milasinovic et al., 2016b; Popovic et al., 2017b), which caused the need for additional caution, mostly due to the reason one of them was sampled by Western-Kosovans. Therefore, the main goal of this research was to test the hypothesis if above-mentioned facts are true for the Eastern-Kosovans, that is, for the one of five Kosovan regions. Hence, in the present research it was remarked that the foot length/standing height ratio in Eastern-Kosovan male is bigger (male: 46.4%; female: 39.2%) comparing to entire Kosovan (male: 44.3%; female: 38.6%) and Western-Kosovans (male: 40.2%; female: 39.4%) as well as smaller comparing to other available population that estimate over 70% each and more in male population, while female population is much more in parallel to previously measured populations. As the correlation between foot length and standing height was significant in both Eastern-Kosovan genders, the foot length measure therefore seems to be a reliable indirect anthropometric indicator for estimating standing height in both genders of Eastern-Kosovan population. Even though these relations are similar, the estimation equations, which are obtained in the Eastern-Kosovans, considerably differ from entire Kosovan, Western-Kosovans and other available populations.

The results of the study conducted by Popovic and his collaborators (Popovic et al., 2017a; Popovic & Bjelica, 2017) confirm the necessity for developing separate standing height models for both genders in Kosovo but the authors of the same study have recommended that further studies should consid-

er dividing the population of this country to regional subsamples and analyze it separately, just to be sure there are no geographical differences (such as type of the soil) influencing the average standing height in both Kosovan genders as well as its association with foot length. This concern was based on the fact that entire Kosovo doesn't fall into Dinaric Alps racial classification. In parallel, this study confirms the assumption mentioned above and also confirms that it is necessary to develop separate standing height models for each population on account of regional variations in Kosovo.

Next to highlighted issue, the obvious constraint of this research might also be the composition of the measured sample that consisted of high school students. This limitation is based on the fact there are some studies which assumed the growth of an individual doesn't cease by this age (Grasgruber, 2016; Jurak, 2017). This assumption might be supported by the fact that university-educated individuals have been founded to be taller than the high school population in Bosnia and Herzegovina (Gardasevic et al., 2017; Grasgruber et al., 2017), Poland (Wronka & Pawlinska-Chmara, 2009) and Hungary (Szollosi, 1998). On the other hand, this wasn't the truth in Montenegro (Popovic, 2016) and comparing the average standing height measures of this study to the results of some study sampled by university students might give the science much precise conclusions. One more obvious limitation of this study is also the fact that both genders of Kosovo did not reach their full genetic potential yet, since various environmental factors controlled their development. Further continuous monitoring is necessary, mostly due to the reason it is expected the secular changes influencing standing height will ascend in the following two or three decades.

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Conflict of Interest

The authors declare there are no conflict of interest.

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ORIGINAL SCIENTIFIC PAPER

The Relationship between Transformational Leadership of Immediate Superiors, Organizational Culture, and Affective Commitment in Fitness Club Employees

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Abstract

In an uncertain global business environment, effective human resource management is a crucial element in improving organizational effectiveness. However, relatively little research has examined the characteristics of transformational leadership and the types of organizational culture suitable for improving organizational effectiveness in the sport management field. Thus, the purpose of this study was to examine the relationship between transformational leadership of immediate superiors, organizational culture, and affective commitment in fitness club employees. For this purpose, a survey was given to a convenience sample of 300 employees of fitness clubs working in the Gwangju and Dae-gu metropolitan cities in South Korea. The data were then analyzed using descriptive statistics, correlations, and multiple regression analysis. The major findings of this study were as follows. First, transformational leadership had a significant effect on the organizational culture in fitness clubs. Second, transformational leadership had a significant effect on affective commitment of employees of the fitness clubs. Third, organizational culture had a significant effect on affective commitment of employees in fitness clubs. The findings of this study may be helpful for fitness clubs to determine the characteristics of transformational leadership and the types of organizational culture needed to improve affective commitment of employees.

Key words: *affective commitment, fitness clubs in South Korea, organizational culture, transformational leadership*

Introduction

In today's increasingly complex business environment, many companies strive to gain competitive advantages to meet the demands of diverse consumers and to survive and develop in the intense competition between companies. Although concerted efforts are needed to improve organizational performance under these conditions, the first strategy companies can consider is efficient management of human resources. Given that leadership is conceptualized as a series of activities that integrate and coordinate the efforts of organization members, motivate them, and exert their influence in the manage-

ment process to achieve the goals of the organization (Bass, 1998), leadership can be considered a key factor for efficient human resource management.

Because transformational leadership is perceived as a leadership style suitable for uncertain or crisis situations (Yukl & Howell, 1999), there have been many studies of the relationship between transformational leadership and organizational effectiveness in a variety of areas. For example, Walumbwa, Orwa, Wang, and Lawler (2005) used financial firms in the United States and Kenya to conduct a comparative cultural study of the effects of transformational leadership on job sat-



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isfaction and organizational commitment. Njoroge, Gachunga, and Kihoro (2015) examined the mediating effects of employee participation in the relationship between transformational leadership and organizational commitment by using instructors of technical schools in Kenya.

A rapidly changing market environment is challenging for any organization, and sports organizations are no exception. Sports organizations have limited human and material resources internally and should be able to compete infinitely in the global market externally. Thus, as part of efficient HR management, several recent studies in sport management have dealt with the effects of transformational leadership on organizational effectiveness, such as job satisfaction, athlete satisfaction, and organizational commitment (Hallajy, Janani, & Falah, 2011; Kent & Chelladurai, 2001). As Wallace and Weese (1995) pointed out, however, empirical studies on the causal relationship between transformational leadership and organizational effectiveness in sport management are inadequate.

Additionally, based on the results of previous studies that concluded that establishing management strategy suitable for organizational culture type and for understanding organizational culture accurately play a key role in enhancing organizational effectiveness (Acar, 2012; Shoaib, Zainab, Maqsood, & Sana, 2013), further research is required to empirically examine the relationship between transformational leadership, organizational culture, and organizational effectiveness, in order to establish a comprehensive and systematic strategy for the survival and development of sports organizations in a rapidly changing business environment. Accordingly, this study sought to explore the relationship between transformational leadership of immediate superiors, organizational culture, and affective commitment of employees working at fitness clubs in South Korea.

Regarding the relationship between transformational leadership, organizational culture, and affective commitment, relevant literature shows that transformational leadership directly or indirectly affects organizational culture. Acar (2012) argued that charisma, one sub factor of transformational leadership, had a significant effect on hierarchical culture, that inspirational motivation had a significant effect on clan culture and hierarchical culture, and that individualized consideration had a significant effect on clan culture. Rasid, Manaf, and Quoquab (2013) suggested the importance of mediating effect of organizational culture because leadership influenced organizational commitment indirectly through organizational culture. Also, the relationship between the two variables has been found in the sports field. In a study of taekwondo leaders in Korea, (a) the idealized influence had a significant influence on the consensus culture and rational culture; (b) the individualized consideration had a significant influence on the consensus culture, rational culture and innovation culture; and (c) the inspirational motivation had a significant influence on bureaucracy culture (Park, 2011). Based on this literature, this study formulated the following research hypothesis in terms of the relationship between transformational leadership and organizational culture.

Hypothesis 1: Transformational leadership of immediate superiors in fitness clubs will have an effect on organizational culture.

In relation to the relationship between transformational leadership and affective commitment, it has been found that transformational leadership has a positive influence on affective commitment in various fields. In a comparative study of financial institutions in Kenya and the United States, a significant positive relationship was found between the two variables (Walumbwa, Orwa, Wang, & Lawler, 2005). Also, in a study of Egyptian workers in seven industries (e.g., telecommunications, education, energy, manufacturing, pharmaceuticals, business services, and financial services), transformational leadership was found to have a positive effect on affective commitment (ElKordy, 2013). Furthermore, in a study of employees working at a college physical education department in the Midwest of the United States, sub dimensions of transformational leadership, including intellectual stimulation, charisma, and individualized consideration, showed a significant positive correlation with affective commitment (Kent & Chelladurai, 2001). Based on the results of those studies, this study formulated the following research hypothesis concerning the relationship between transformational leadership and affective commitment.

Hypothesis 2: Transformational leadership of immediate superiors in fitness clubs will have an effect on the employee's affective commitment.

No consensus has been reached on the relationship between organizational culture and affective commitment. Kim (2007) said that consensus culture, developmental culture, and rational culture did not have a significant effect on organizational commitment, but that the hierarchical culture had a significant positive influence on organizational commitment. Acar (2012) argued that clan culture and market culture made unique contributions to affective commitment, but that hierarchical culture and market culture had no significant effects on affective commitment. Shoaib, Zainab, Maqsood, and Sana (2013) suggested that only clan culture among the organizational culture types had a positive correlation with affective commitment. Based on the results of these studies, this study formulated the following research hypothesis regarding the relationship between organizational culture and affective commitment.

Hypothesis 3: The organizational culture of a fitness club will have an effect on affective commitment of its employees.

Methods

Participants

The subjects of this study were selected from employees working at fitness clubs in Gwangju and Dae-gu metropolitan cities in South Korea. Based on a convenience sampling method, a total of 300 valid questionnaires were used for data analysis, 152 from private fitness clubs and 148 from public fitness clubs. Of the 300 respondents, 166 (55.3%) were men, and 134 (44.7%) were women. Those between 20 and 30 years of age represented higher percentage than other age groups, accounting for 40% and 44%, respectively. The majority of the respondents (68%) had attained a bachelor's degree. In terms of their current job position, 192 (64%) described it as fitness instructor, 76 (25.3%) as regular worker, and 26 (8.7%) as manager.

Measures

A survey instrument was used to measure transformational leadership, organizational culture, and affective commitment. The questions were measured with a Likert scale of 5 points, from 1=strongly disagree to 5=strongly agree. To establish content validity, a panel of experts was asked to verify the ap-

propriateness and the representativeness of the questionnaires. The construct validity and reliability of the questionnaires were verified through exploratory factor analysis and internal consistency analysis, respectively.

The Multifactor Leadership Questionnaire (MLQ) developed by Avolio and Bass (2004) was adapted into Korean and modified for use to measure the transformational leadership of immediate superiors in fitness clubs. The transformational leadership questionnaire consisted of three factors: charisma, intellectual stimulation, and individualized consideration. Each factor was comprised of six items. Principal component analysis with varimax rotation revealed that the three factors explained a total of 69.023% of the variance. Two items of the intellectual stimulation factor were excluded, so a total of 16 items was used to measure the transformational leadership questionnaire. The alpha values for the 16 items ranged from 0.810 to 0.912, which indicates that the transformational leadership questionnaire was proven to have sufficient reliability.

Additionally, the questionnaire originally developed by Quinn and McGrath (1995) was adapted into Korean and modified for use to measure organizational culture. The organizational culture questionnaire consisted of four factors: developmental culture, consensus culture, rational culture, and hierarchical culture. Each factor had four items. According to principal component analysis with varimax rotation, all of the items derived from the previous study were converged, and the four factors accounted for a total of 73.626% of the variance. The reliability of the organizational culture questionnaire was found to be sufficient with the alpha values between 0.778 and 0.919.

Finally, the questionnaire used by Goo (2014), Meyer and Allen (1991), Shim and Choi (2014) was modified for use to measure affective commitment. The affective commitment questionnaire was composed of five items as a single factor.

Data analysis

The 300 valid questionnaires collected in this study were analyzed with the SPSS 23.0 statistical program. To determine the levels of transformational leadership, organizational culture, and affective commitment, a descriptive statistics analysis was run. Also, the relationship between each variable was verified through correlations analysis and multiple regression

analysis. All statistical significance tests of this study were verified at $\alpha=0.05$ level.

Results

Descriptive statistics and correlations results

In terms of descriptive statistics results, the dimensions of transformational leadership were ranked in order of intellectual stimulation ($M=3.48$), charisma ($M=3.37$) and individualized consideration ($M=3.32$). The most common type of organizational culture was hierarchical culture ($M=3.64$), followed by consensus culture ($M=3.60$), rational culture ($M=3.59$), and developmental culture ($M=3.53$). Regarding correlations between the study variables, the dimensions of transformational leadership had significant correlations with affective commitment, and the strongest positive correlation was between individualized consideration and affective commitment, $r=0.53$, $p<0.001$. Additionally, the factors of organizational culture had significant correlations with affective commitment, and consensus culture had the strongest positive correlation with affective commitment, $r=0.65$, $p<0.001$.

Results of multiple regression analysis

As for the effects of transformational leadership on organizational culture, the dimensions of transformational leadership had statistically significant effects on the types of organizational culture. As shown in Table 1, transformational leadership of immediate superiors explained 26.4% of the variance in consensus culture ($R^2=0.26$, $p<0.001$), and individualized consideration ($\beta=0.34$, $p<0.001$) made the strongest unique contribution to explaining consensus culture. Some 36.4% of the variance in developmental culture was explained from transformational leadership of the immediate superior ($R^2=0.36$, $p<0.001$), and individualized consideration ($\beta=0.36$, $p<0.05$) made the strongest unique contribution to the prediction of developmental culture. The transformational leadership accounted for 26% of the variance in rational culture ($R^2=0.26$, $p<0.001$), and individualized consideration ($\beta=0.29$, $p<0.001$) had the strongest unique contribution to predicting rational culture. Some 24.2% of the variance in hierarchical culture was explained from the transformational leadership ($R^2=0.24$, $p<0.001$), and charisma had the strongest unique contribution for explaining hierarchical culture ($\beta=0.33$, $p<0.001$).

Table 1. Multiple Regression Analysis Summary for Charisma, Intellectual Stimulation, and Individualized Consideration Predicting Organizational Culture

Variable	Consensus			Developmental			Rational			Hierarchical		
	B	SEB	β	B	SEB	β	B	SEB	β	B	SEB	β
Charisma	0.142	0.069	0.161*	0.333	0.077	0.315***	0.197	0.074	0.208***	0.294	0.071	0.329***
IntStim	0.068	0.083	0.065	0.019	0.092	0.015	0.074	0.089	0.066	0.015	0.085	0.014
IndCon	0.312	0.068	0.339***	0.394	0.075	0.357***	0.289	0.073	0.292*	0.181	0.070	0.194*
R^2	0.264			0.364			0.260			0.242		
F	34.393***			55.280***			34.012***			30.908***		

Note. IntStim: intellectual stimulation; IndCon: individualized consideration; * $p<0.05$. *** $p<0.001$

Regarding the effects of transformational leadership of the immediate superior on affective commitment of employees, the dimensions of transformational leadership had statistically significant effects on affective commitment. As shown in Table 2, transformational leadership explained 32.7% of the variance in affective commitment ($R^2=0.33$, $p<0.001$), and individual-

ized consideration made the strongest unique contribution to the prediction ($\beta=0.33$, $p<0.001$).

Finally, in relation to the effects of organizational culture on affective commitment of employees, the dimensions of organizational culture had statistically significant effects on affective commitment. As shown in Table 3, the organizational

Table 2. Multiple Regression Analysis Summary for Charisma, Intellectual Stimulation, and Individualized Consideration Predicting Affective Commitment

Variable	Affective Commitment		
	B	SEB	β
Charisma	0.153	0.067	0.171*
IntStim	0.148	0.080	0.139
IndCon	0.305	0.066	0.327***
R ²		0.327	
F		46.963***	

Note. IntStim: intellectual stimulation; IndCon: individualized consideration; * $p < .05$. *** $p < .001$

culture accounted for 54% of the variance in affective commitment ($R^2 = 0.54$, $p < 0.001$), and consensus culture ($\beta = 0.24$, $p < 0.001$) had the strongest unique contribution to explaining affective commitment, followed by developmental culture ($\beta = 0.24$, $p < 0.001$), rational culture ($\beta = 0.20$, $p < 0.01$), and hierarchical culture ($\beta = 0.19$, $p < 0.001$).

Table 3. Multiple Regression Analysis Summary for Consensus, Developmental, Rational, and Hierarchical Cultures Predicting Affective Commitment

Variable	Affective Commitment		
	B	SEB	β
Consensus	0.242	0.062	0.242***
Developmental	0.203	0.058	0.240***
Rational	0.184	0.055	0.198***
Hierarchical	0.192	0.054	0.194***
R ²		0.535	
F		84.367***	

*** $p < .001$

Discussion

This study was conducted to empirically examine the effects of transformational leadership of immediate superiors and organizational culture on affective commitment of employees in fitness clubs in South Korea. The following discussion is presented based on the results of this study and previous studies. Transformational leadership of the immediate superior had positive effects on organizational culture. Especially, this study shows that the charisma leadership of immediate superiors made the largest unique contribution to forming the hierarchical culture. This result may indicate that the type of hierarchical culture that features control, efficiency, and stability can be further strengthened when a fitness club's immediate superior provides specific goals and ideals and directs the employees to follow the proposed vision.

Additionally, it was found that the individualized consideration leadership made the strongest unique contribution to forming consensus, developmental, and rational culture types. This result is in accordance with the findings of Lee's study (2014). However, the individualized consideration level ($M = 3.32$) perceived by current employees of fitness club was found to be the lowest as compared to the levels of charisma

($M = 3.37$) and intellectual stimulation ($M = 3.48$). This may suggest that to improve consensus, developmental, and rational culture types in fitness clubs, leaders should be actively interested and caring for their members, and should strengthen direct contact and two-way communication.

On the other hand, the intellectual stimulation leadership had no statistically significant effects on all sub factors of organizational culture. This result is similar to what Acar (2012) presented. This may occur because dominant culture types in the fitness clubs that were studied were hierarchical culture ($M = 3.64$) and consensus culture ($M = 3.60$). As Kim (2007) pointed out, a more controllable leadership style is required in the case of an organization with a strong hierarchical culture type that focuses on seeking efficiency on a stable basis, whereas a leadership type that encourages commitment to the organization through active care and consideration for individuals is required in an organization with a strong consensus culture type that emphasizes the development of human resources. In this manner, intellectually stimulating leadership, a way for leaders to help the members approach their own problems through new ways when they face a problem, does not seem to be suitable for the organizational culture of the current fitness club.

As for the effects of transformational leadership on affective commitment, transformational leadership of the immediate superior had positive effects on the affective commitment of the employee. Specifically, only individualized consideration and charisma were contributing to explaining the employees' affective commitment. This result shows that the level of psychological attachment to the organization felt by the employees of the fitness clubs can be changed according to the degree to which the clubs' superiors care about employees individually by identifying their needs and that employees of fitness clubs also can increase their psychological attachment to the organization when they recognize that the immediate superior has a specific vision for the organization.

Finally, the dimensions of organizational culture were found to affect the employee's affective commitment. This result is consistent with what Acar (2012) and Shoaib, Zainab, Maqsood, and Sana (2013) presented. The type of organizational culture that made the strongest unique contribution to the prediction of affective commitment was consensus culture. This result may occur because consensus culture ($M = 3.60$) was one of the main types of organizational cultures that employees of the current fitness club recognized. Thus, to enhance the emotional commitment of fitness club employees, fitness clubs need to implement personnel management strategies suitable for strengthening the consensus culture elements that emphasize human relations and the atmosphere, morale, and teamwork within the organization.

Also of note in terms of the effects of organizational culture on affective commitment is the relationship between hierarchical culture and affective commitment. Considering that the organization with a relatively strong hierarchical culture type has an attribute that emphasizes compliance with rules and procedures (Kim, 2007), it was expected that hierarchical culture would have a negative impact on affective commitment. However, this study found that the hierarchical culture of fitness clubs had a positive effect on the employees' affective commitment. This may be due to the internal and external business environments of Korean fitness clubs (Kim, Lee, & Jung, 2007; Kim & Sul, 2002). Internally, fitness clubs in Ko-

rea have difficulties securing new consumers due to intensified competition among companies, aging of facilities and equipment, small size, and limitations of human and material resources. Externally, domestic economic depression makes it difficult for consumers to dispend, and the appearance of a foreign brand of fitness club with a strong capital base leads to a decline in operating profit and to profitability deterioration. In this context, employees of fitness clubs seem to have positively embraced a hierarchical culture that emphasizes control or coordination of the organization for the stability and survival of the organization.

The results of this study are meaningful in providing the basic data needed to determine the characteristics of transformational leadership and the types of organizational culture necessary for improving the emotional engagement of employees of fitness clubs by applying the results of previous research related to management strategy that identifies the causal relationship between transformational leadership, organizational culture, and affective commitment to sport management. However, due to some limitations in the design and methodological aspects of the study, several things need to be supplemented in further research. First, this study was conducted with fitness club employees working in the Korean metropolitan cities of Gwangju and Daegu. Thus, the results of this study may not be directly applicable to fitness clubs in other countries. Future research is recommended to investigate the causality between transformational leadership, organizational culture, and affective commitment by using a sample of fitness club employees in other countries. Second, given that this study focused on a cross-sectional study that analyzed the degree of emotional involvement of fitness club workers at a particular time in connection with transformational leadership and organizational culture types, it would be necessary to carry out an empirical analysis through longitudinal research in future research. Finally, this study limited the measurement of organizational commitment to affective commitment. Thus, future research is recommended to classify organizational commitment into three sub factors, such as normative commitment, continuance commitment, and affective commitment.

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Conflict of Interest

The authors declare there are no conflict of interest.

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ORIGINAL SCIENTIFIC PAPER

The Impact of the Preparation Period on Endurance at Football Players U16

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Abstract

The main aim of the research was to identify a level of quantitative changes of the endurance with U16 football players under the influence of the programmed football training of a six weeks preparation period. The training programme covered forty-four training units. The research was made on a sample of 120 football players U16. To estimate the endurance three tests have been used: Cooper test, Running 15 m long distance for 90 s, and Pin running persistence. In the area of comparative statistics, we used discriminant parametric procedure t-test for big paired samples. It can be concluded that there are statistically significant differences in all three variables to estimate the endurance. This confirmed the hypothesis that the expected significant positive quantitative changes of endurance influenced by the proposed model of training in preparation period with football players U16. The authors were guided by the fact that this kind of training program in preparation period is very effective in terms of raising the endurance level with football players U16. The obtained results can be directed towards innovation plans and programs in the preparation period, and the adaptation of the same needs of the respective population.

Key words: football, preparation period impact, endurance

Introduction

Football is a sport that is characterized by numerous and varied complex dynamic kinesiology activities that are characterized by a large number of cyclic and acyclic movements (Gardašević, & Goranović, 2011; Gardašević, & Bjelica, 2013; Sermahaj, Popovic, Bjelica, Gardasevic, & Arifi, 2017; Corluka, & Vasiljevic, 2018). It is evident that all four moments of play (Gardašević, Bjelica, & Popović, 2015; Gardasevic, 2015), possession of the ball, the opponent's possession of it, the transformation after winning the ball and the transformation after losing the ball depends on the ability of players to perform certain movements of varying intensity, in different directions and the different sections of the field (Gardašević, Georgiev, & Bjelica, 2012; Gardašević, Bjelica, & Vasiljević, 2016a; Gardasevic, Bjelica, & Vasiljevic, 2017a; Gardašević et al., 2015). They must have developed basic and specific motor abilities (Vasiljević, Gardašević, & Bojanić, 2013; Bjelica, Popović, & Gardašević, 2016a). One of the basic motor skills, which should be at a high level, is endurance. Most of the

elements in football game, especially those with the ball, are very complex (Gardašević, Bjelica, & Vasiljević, 2016b; Gardasevic, Bjelica, Milasinovic, & Vasiljevic, 2016). For their improvement and impeccable application in the game, it is necessary first to have the whole motor preparations (Gardašević, Vasiljević, & Bojanić, 2015; Gardašević, & Vasiljević, 2016). The physical strength has a great importance in football (Gardašević, & Bjelica, 2014a; Gardasevic, & Bjelica, 2014b; Bjelica, Popović, & Gardašević, 2016b). A specific strength with football player is reflected by the strength reflection while jumping, the pushing strength with sprint, strength of stopping and pushing while changing the moving direction, strength of kicking by foot and with a head, strength of throwing the ball with a hand, stability on the ground and in the air, in duels (Gardašević, & Bjelica, 2014). One of the factors that affect the strength is the football players is their age (Bjelica, 2003; 2004; 2005). In child's development the strength increases with increasing a muscle size. Psychomotor strength, primarily static and repetitive, according to some authors is 50% innate, and



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systematic training can have a significant effect on it.

The endurance of football players may be the most important ability (Gardašević, 2010). It is defined as the ability to perform an activity for a long time period without reducing the effectiveness of this activity, i.e. the ability of endure a physical effort for a long time. The coefficient of inheritance of this ability is 70-80%. The endurance is based on the efficiency of the functioning of the regulatory mechanisms which are manifested in energy reserves (ATP, creatine phosphate and oxygen) and functional quality of energy potential (energy processes). We distinguish three types of endurance to a man: Aerobic endurance (from 5 min to several hours), Anaerobic lactate endurance (from 3 to 5 minutes) and Anaerobic alactate endurance (from 15 to 20 seconds). The main objective of this study was to determine the level of quantitative changes of endurance in football players U16, under the influence of a programmed football training which included one preparatory period of forty-two days.

Methods

This was a longitudinal study with an aim that in the two time-varying points determine quantitative changes of endurance in football players (15 year \pm 6 months) under the influence of programmed training process, which included a summer preparation period for the competition season in a unique cadet league of Montenegro and the cadet league middle region of Montenegro. The training program lasted 42 days and was carried out on the auxiliary football field of FC Sutjeska Niksic. The training program included 44 training units, within which 8 friendly matches were played. For data processing only the results of those respondents who have undergone a complete program of work and who have joined the initial and final measurement are taken. This study included a sample of 120 young football players U16 of 4 teams, all from Niksic. Before programmed work all respondents had passed medical check-ups to make sure they could access the training process. When selecting the instruments (tests) it was taken into account that they meet the basic metric characteristics (Gardašević, & Bjelica, 2012; Gardašević, Bjelica, Georgiev, & Popović, 2012; Bjelica, Gardasević, Georgiev, Popović, & Petković, 2012), which means the appropriate age and objective material and spatial conditions. For the assessment of endurance the following tests were used: 1. Cooper test (MCPT), 2. Running 15 m long distance for 90 s (MRLD), 3. Pin running persistence (MPRP).

Considering that these are a cadet age players (15-year olds \pm 6 months), in a sensitive period of psychophysical development, program is tailored specifically to their age, taking into account the time spent in the previous training process. Time structure of the training ranged from 60 to 120 minutes, depending on the goals and objectives of the training unit and it was divided into 3 phases:

- Introductory-preparatory part (25-30% of the duration of training)
- The main part (60-65% of the duration of the training)
- The final part (up to 10% of the duration of training)

In the introductory-preparatory part of the training the emphasis was on raising the operating temperature in children. As a tool a various elementary games with a ball were used that enabled work on the elementary basics of technique and tactics, also the various polygons with exercises coordination were used. A variety of games and exercises to increase joint mobility and strengthen muscles also applied at this stage. At the first stage of the main part of the training the intensity is slightly increased compared to the warm-up phase and the training program was implemented through a variety of ball games. With a game method the respondents were taught and practiced football skills through a large number of repetitions. At the second stage of the main part of the training the players mostly had a free game on two goals that allowed them a creative activities and highlight of individual, imagination, independent thinking and hard work, applying the elements that teach by the method of the game from the first stage of the main part, and thus strengthening the willing quality. At this stage of the training the intensity was the greatest. At the final part of the training the task was lowering the physiological curve to an optimum level, and low-intensity activities were used: stretching and relaxation exercises, competitive game of penalty kicks, free kicks.

Data obtained from the survey were analyzed using descriptive and comparative statistics. In the area of descriptive statistics for each variable both in the initial and the final state central and dispersion parameters were processed as well as measures of asymmetry and flatness. The hypothesis of normal distribution of results was tested on the basis of Kolmogorov and Smirnov test. In the area of comparative statistics, to determine differences in the variables used to estimate the endurance at the start (initial state) and at the end (final state) of the training program in the preparation period, we used the discriminative parametric procedure t-test for large dependent samples.

Results

In Tables 1 and 2 are shown the basic descriptive statistical parameters of variables for estimations of the endurance in the initial and final measurement, where the values of central and dispersion tendency were calculated: arithmetic mean (Mean), standard deviation (Std. D.), standard error of arithmetic mean (Std. E.), minimum (Min) and maximum (Max) values, the range of results (Range), the curvature coefficient (Skewness) and elongation (Kurtosis), as well as the values of Kolmogorov and Smirnov test (K-S test). First the central and dispersion parameter of variables for assessing endurance in the initial state were analyzed (Table 1).

Table 1. Central and depression parameter of variables for assessing endurance in the initial state

Variables	Mean	Std. D.	Std. E.	Min.	Max.	Range	Skewness	Kurtosis	K-S test
MCPTI	2689.50	169.09	15.44	2310	3050	740	0.10	-0.60	0.80
MRLDI	307.86	16.64	1.52	270	335	65	-0.21	-0.92	0.05
MPRPI	1816.67	125.19	11.43	1540	2060	520	-0.05	-0.87	0.31

By analyzing the central and dispersion parameters of variables for assessing the endurance in the initial state-it can be noticed that the results belong to extremely homogeneous sets in all three variables. The negative values of the skewness with variable Running 15 m long distance for 90 s (MRLD) and variable Pin running persistence (MPRP) showing a negative asymmetry and the inclination to better results in the sample. Negative values of

kurtosis in all three variables talking about mild platykurtic curve which the results of all these three variables form. Values of Kolmogorov and Smirnov test shows that the results are normally distributed.

Central and dispersion parameters of variables for estimation of the endurance in the final measurement showed the following values (Table 2)

Table 2. Central and dispersive parameters of variables for estimation of the endurance in the final measurement

Variables	Mean	Std. D.	Std. E.	Min.	Max.	Range	Skewness	Kurtosis	K-S test
MCPTF	2848.63	151.35	13.82	2570	3220	650	0.22	-0.53	0.84
MRLDF	322.60	15.35	1.40	290	350	60	-0.14	-0.80	0.10
MPRPF	1905.17	131.79	12.03	1600	2165	540	-0.08	-0.81	0.42

By analyzing the central and dispersion parameters of variables for estimation of the endurance in the final stage-it can be noticed that here as well the values of arithmetic means in all three variables are at a higher level than in the initial state. The results belong to extremely homogeneous sets in all three variables. The values of skewness and kurtosis are in the range of -1 to +1, which means that the inclination and elongation of the results do not deviate statistically significantly from the normal schedule. The values of Kolmogorov and Smirnov test shows that the results are

normally distributed in all three variables.

To determine the statistical significance (significance) of differences in arithmetic means (partial quantitative changes) of variables for estimation of the endurance, the t-test was applied to for large dependent samples. The values of t-test were on the level of significance (Sig.) from 0.01 ($p \leq 0.01$) in all the variables for the evaluation of endurance. The differences of arithmetic means of the initial and the final measurement of variables for evaluating endurance are shown in Table 3.

Table 3. The values of t-test between the arithmetic means of the initial and the final measurement of variables for evaluating endurance

	Variables	Mean	Std. D.	Std. E.	Correlation	t-test	Sig.
Par 1	MCPTI	2689.50	169.09	15.44	0.91	-24.31	0.00
	MCPTF	2848.63	151.35	13.82			
Par 2	MRLDI	307.86	16.64	1.52	0.98	-46.34	0.00
	MRLDF	322.60	15.35	1.40			
Par 3	MPRPI	1816.67	125.19	11.43	0.99	-42.99	0.00
	MPRPF	1905.17	131.79	12.03			

Based on the results gained it can be noted that there are statistically significant differences in all variables for estimation of the endurance, and therefore can be said that there was a statistically significant positive partial effects of the training program in the preparation period, and the t-test values were significant at the reliability level $p < 0.01$ for all variables for estimation of the endurance.

Discussion

On the basis of the obtained parameters it can be concluded that the statistically significant partial quantitative effects (changes) in all the variables for estimation of the endurance obtained as a result of the training program applied in the preparation period. The method of work that has been applied in this training program abounds running with varying intensity, so that the positive transformations are not unexpected (Gardašević, & Bjelica, 2014; Gardašević, Bjelica, Popović, & Milašinović, 2016; Gardasevic, Popovic, & Bjelica, 2016; Gardasevic, Bjelica, & Vasiljevic, 2017b). In this age it comes to an increase in biological growth and development of muscles, increase of muscle cross-section, which can certainly contribute to positive results (Gardasevic, Bjelica, & Vasiljevic, 2016). Based on the results of t-test for large dependent samples, with the variables for estimation of the endurance the statistically significant differences were determined in all pairs of variables between the initial and final states, at the level of statistical significance (significance), $p < 0.01$. In this research the authors were guided by the fact that such a training program of work in preparation period is a very efficient way of working in terms of raising the level of endurance with football players U16 (Vasiljevic, 20017). The authors conclude that the summer period of 42 days, at football players U16, with such training work program, is optimal for lifting the endurance to the level required for the competition. The gained results can be directed towards innovation of plans and programs of work in the preparation period, and adjusting the same to the needs of the population concerned.

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Conflict of Interest

The authors declare there are no conflict of interest.

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ORIGINAL SCIENTIFIC PAPER

Differences in Motor Abilities of Younger School Children based on their Sex

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Abstract

The aim of this research is to determine whether there is any statistically significant difference in motor abilities of boys and girls of younger school age. The sample includes 76 examinees with 37 males and 39 females. All are 5th and 6th graders of primary school. The evaluation of motor abilities is based on 5 tests. Multivariate analysis of variance is applied for determination of differences within the whole system of motor tests, whereas univariate analysis of variance is used for determining differences in each motor test. According to the findings, statistically significant differences in motor abilities between boys and girls at the studied age can be noticed in the test 20 m running from flying start, which is in favour of boys and in the test sit and reach, in favour of girls, while the differences in other tests are not statistically significant. Considering the evaluation of motor abilities, boys have statistically much better results in the speed of alternative movements and explosive strength, whereas girls have achieved much better results in the test for flexibility. It has also been concluded that 5th and 6th graders have statistically better results in the space of coordination and explosive strength, whereas girls are much better in the field of flexibility and suppleness.

Key words: motor abilities, pupils, boys, girls

Introduction

Physical education is part of general education. Nowadays, physical education is part of physical culture aside from sport and sport recreation. There are many definitions of physical education but they overall agree that this is a planned and directed process of forming human personality and primarily human's physical structure i.e. biomotor potential. In former socialist countries, physical education was understood as an integral part of general education with the first objective being comprehensive preparation and training people for work and personal defense. In our region, physical education is considered to be an integral and unalienable part of general education. Physical education is considered to be an integral part of general education with the objective of strengthening and improving health, encouraging proper growth and development, increasing the level of physical abilities, forming motor abilities and habits without disregarding the functions typical

for other forms of education.

Physical development represents the process of changes in morphological and functional human properties during an individual life. Each period of life (prenatal, early postnatal, childhood, youth, adulthood and senior age) are characterised by particular changes in the form and functional possibilities of the organism.

Physical education is directed towards the young people's health, development of physical strength without disregarding the spirit and certain intellectual qualities. This is a process of applying physical exercises and teachers' methodology for the purpose of forming, maintaining and improving motor abilities, psychological traits and social adaptation of personality. Physical development and physical education of a child contain the inclination of a child to question, discover, try and thus examine the space and the surroundings, enabling the acquisition of certain experience. Development of motor



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abilities is possible to realise via the teaching process of physical exercise which is to be implemented in a planned, rational and organised manner and therefore, it should be planned and programmed, and later realised and controlled (Findak, 1999). By testing certain motor abilities and comparing them with the existing norms, a better overview of the entire classes' abilities is possible.

Since motor skills develop from birth, their development is also experiencing some changes that occur during adolescence and go back to old age. Their development, especially in youth, is not always the same for boys and girls. For each motor skill, there is some sensible period in which the development is at its best. Individual differences in the dynamics of growth are a significant source of variability in form, function and capabilities of the human body. Turbulent and complex phenomenon of growth and development is a regular process, in which we can define a series of principles within which the individuality of the rate of change arouses special interest, particularly the demands exerted on the body through physical activity (Mišigoj-Duraković, 2008). At the beginning of school age, most of the nerve structures have been developed and the basic form of movement has been established thus making this age ideal for practising basic skills. The effects of exercise on the development of these skills can be observed earlier. During the middle and older school-age, basic skills training turns into a specific exercise, and combinations thereof, according to the requirements of each sport/discipline (Mišigoj-Duraković, 2008). Motor skills increase with maturation. Girls achieve motor skills plateau around the age of 14 and boys a few years later. Biologically more mature boys are more sensitive to the impact of training, which is not the case among girls (Malina, 1994). Knowledge of the principles of growth and development as well as morphological and functional and physiological changes that occur in youth is essential for anyone who directs a child to physical activity. If physical exercise is well chosen and dosed, it can be a stimulating factor in the growth and development, but excessive and/or age inappropriate physical activity can have a negative impact (Mišigoj-Duraković, 2008).

Previous researches show that the level of motor abilities development of pupils of both sexes within the assessed developmental period is different in relation to the respective sex. Conducted researches mostly indicated the superiority of boys in terms of motor abilities development. Based on the obtained results, any authors are concluded that there is a statistically significant difference between the subsamples defined according to gender at the level of motor skills. Boys are more dominant in the abilities that develop under the influence of physical exercise, while girls show much better results in flexibility. It can be concluded that irregular physical exercise results in poorer motor development among girls compared to boys (Badric, 2011).

The objective of this research is to determine whether there is a statistically significant difference in terms of motor abilities between boys and girls of younger school age.

Methods

Data obtained in the research of differences in motor abilities of younger school children of different sex, are controlled and prepared for processing in accordance with the set research objective. Data bases were organised based on the monitored traits and prepared for the planned statistical pro-

cessing. Results obtained through the statistical processing are shown in the tables and they were assessed according to the associated logical units. Overall, the overview of the research results enabled perception of total differences in motor abilities of younger school children of different sex via availability of explanation of certain connections, in accordance with the objective of the research, i.e. it contributes to a clear determination based on the expected application of the obtained results in practice.

Based on the nature of scientific researches, this research belongs to the category of empirical studies, whereas in terms of the objective of implementation it represents an applicative research with the purpose of obtaining new knowledge and information required for practical use in the teaching practice in the educational institutions (Bala, 2007).

As for the time definition, this research has a transversal character, and it is consisted of a single measuring of appropriate motor abilities indicators pertaining to younger school children of different sex.

As for the level of control, this research belongs to the category of field researches conducted under natural living conditions (Bala, 2007).

Sample of examinees

The sample of examinees was composed of 76 examinees, or more precisely 37 boys, with the average age of 11.76 years and 39 girls, with the average age of 11.99 years. The examinees were the pupils attending the fifth and sixth grades of the Elementary School „Dusan Radovic“ from Nis.

Sample of tests for assessing motor abilities

Assessment of motor abilities was conducted by the use of 5 (five) tests:

1. Backward polygon (for coordination assessment);
2. Hand tapping (for assessment of alternative movements speed);
3. Standing long jump (for explosive strength assessment);
4. High start 20 m run (for speed assessment);
5. Seated forward bend (for suppleness assessment)

Data assessment methods

Data assessment statistics contains descriptive statistics: arithmetic mean and standard deviation. Multivariate analysis of variance (MANOVA) was also applied for determining differences in the entire system of motor tests between boys and girls as well as the univariate analysis of variance (ANOVA) for determining differences in each motor test. SPSS program 20.0 for Windows was used for analysing the collected data.

Results

Based on the presented basic descriptive statistics of motor tests in boys and girls (Table 1), it is noticeable that better average test results with the focus on coordination, speed of alternative movements and explosive strength were achieved by boys, whereas girls were better in the test assessing flexibility which might have been assumed.

Based on the presented results of the univariate analysis of variance between boys and girls and the results of the multivariate analysis of variance (Table 2), it is noticeable that the results of the multivariate analysis of variance $p=0.000$, indicate the existence of a statistically significant difference in motor abilities between boys and girls of the respective age. By

Table 1. Descriptive statistics of motor tests assessing boys and girls

Tests	AM		SD	
	B	G	B	G
Backward polygon	162.43	171.12	42.456	38.178
Hand tapping	18.67	18.67	2.157	1.876
Standing long jump	168.23	166.54	20.878	21.176
High start 20 m run	42.87	44.88	3.211	3.129
Seated forward bend	51.12	63.68	10.220	11.392

Legend: AM–arithmetic mean; SD–standard deviation; B–boys; G–girls

applying the procedure of the univariate analysis of variance (ANOVA) it was determined that there were statistically significant differences in favour of boys regarding the test High start 20 m run, whereas in the test Seated forward bend there was a statistically significant difference in favour of girls. In all other tests there were differences which do not hold statistical significance. The obtained differences were determined based on the level of statistical significance $p < 0.05$.

Table 2. Significance of differences (ANOVA) between sexes

Tests	f	p
Backward polygon	3.358	0.058
Hand tapping	0.421	0.513
Standing long jump	0.670	0.411
High start 20 m run	19.329	0.000
Seated forward bend	81.989	0.000

$F = 15.144$, $P = 0.000$

Legend: f–univariate analysis of variance test; p–level of significance of differences between groups within a single test; F–multivariate analysis of variance test; P–level of significance of differences between groups within a system of applied tests

Discussion

Based on the obtained and analysed results of the multivariate analysis of variance and the univariate analysis of variance it can be deduced that there is a statistically significant difference among the examinees defined by the sex concerning the level of their motor abilities. Having analysed individual tests based on the univariate analysis of variance statistically significant differences were observed between boys and girls in the following tests: 20 m run, in favour of boys and Seated forward bend in favour of girls. As for the other tests, there were some observed differences; however, they held no statistical significance.

The assessment of motor abilities showed that boys scored statistically more significant results regarding the speed of alternative movements (tapping) and explosive strength (long jump), whereas the girls realised statistically better results in the test assessing flexibility (seated forward bend with legs apart) (Cvetkovic, Obradovic & Krneta, 2007).

In the research of differences in motor abilities among pupils attending the fifth and sixth grades, where the used sample included 213 girls and 224 boys from elementary schools, it was noted that the boys in both grades scored better results

in the domain of coordination and explosive strength, whereas girls scored better in the domain of flexibility or suppleness (Badric, 2011).

Over the last decades, motor abilities were one of the most frequent subjects in the field of physical culture. Motor abilities development level of pupils significantly conditions their regular growth and development. Unfortunately, over the last two decades we have been witnesses of all the more conspicuous tendency in reduction of physical activity of children which is not the scenario occurring only in our region but also in the surrounding countries (Siljeg, Zecic, Mrgan & Kevic, 2009). There are probably several reasons for such a situation, and some of them derive from the absence of the desire to start with physical exercises being exceptionally beneficial for the human being, which is again the result of the total lack in knowledge of values and irresponsibility for your own body, as well as the negligence of its needs, we associate men with technological innovations telling them that the need for any type of movement–exercising, is a tiresome waste of time and as such absolutely unnecessary (Zivanovic, 2009).

This research derives a conclusion on the existence of statistically significant differences between two assessed group, i.e. boys and girls. Similar researches indicate that the level of motor abilities of boys and girls within the assessed developmental period is different in relation to the examinees' sex. Conducted research mostly indicated the superiority of boys in terms of motor abilities.

It is never too soon to start with the adoption of healthy habits and education on the importance of physical activity. Studies show that most children practicing a sport and being physically active in their childhood, retain such habits in their adult years. Physical activity also makes a positive impact on development–children practicing sport activities from their earliest years, develop work habits and self-discipline early in their life. On the other hand, it also has a positive role in the emotional development of children since it facilitates the process of their socialisation. Conversely, an inactive childhood can pose a serious hazard to health when the child turns into adulthood.

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Conflict of Interest

The authors declare there are no conflict of interest.

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ORIGINAL SCIENTIFIC PAPER

How to Increase Motivation for Physical Activity among Youth

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Abstract

The primary aim of the present study was to explore motivational profiles for physical activity (PA) in current students of secondary schools. The participants of the study were (N=526; males=267 and females=259), 8th grade, and 9th grade students from the four secondary schools in the central and northern part of Kosovo. Data were collected through focus group discussions for students, during the month of May and June 2014/2015 school year, in order to gather qualitative data regarding students' perceptions of motivation and participation in Physical Education (PE) and extracurricular PA activities. Based on study findings Kosovo schools are not creating supportive and attractive school environment for children and adolescents in doing (PA) and sports in daily basis. Many schools (PE Teachers) make a mistake requiring every child to become an athlete, by suppressing child motivation and enjoyment for sport and creative physical activities. PE and sports module school based should offer the opportunities for different physical activities that people can do for a life time. PE and sports curricula should be focused on giving the opportunity to every child to excel their own skill level, and integrate teaching strategies for "maximum movement for maximum kids".

Key words: motivation, participation, barriers, Physical Education (PE), Physical Activity (PA)

Introduction

Increasing the youngsters motivation for Physical Activities (PA) and recreation (indoor and/or outdoor activities) is not an easy task. Physical Education (PE) Teachers and sport practitioners have to work closely and find a successful qualitative strategy, and programs according to the children and/or youth needs and abilities. Play is an activity that young children and teenagers do every day. The research shows that play is very important tool to youngster's learning. What can we do to help youngsters to get the most learning from their play on daily basis, especially during the time they are at school? The rate of change in the world demands that we re-imagine and restructure the foundational learning relationship among students, teachers, and knowledge. The main goal of this research study was to discover what Kosovo schools (PE teachers) are doing in order to prepare students for an evolving future. However, as we grow as a human race we slowly gain the capability and comfort zone to raise the standard and we

already have the tools necessary to change the system so that it is directed towards all individuals. This remains the problem however, how do we change the whole system because it obviously isn't working at the moment as a lot of Kosovans, unfortunately literally „hate“ their schools (PE too). According to the study findings, Kosovo youngsters showed the tendency of decreased motivation for doing PE and sports. Health and wellbeing is highly ranked in list of basic human rights, to be a good defender of children and youth rights; there is a need for a jointly efforts in raising awareness for children and youth health. In today hectic lifestyle, keeping fit and exercising seems to be the last thing on young generation's priority list. What they don't understand exactly is that health doesn't mean only the absence of the chronic disease, it means physical, mental and social health balance. It has been well documented that engagement in PA decreases during adolescence (Currie, Gabhainn, & Godeau, 2008; Dumith, Hallal, Reis, & Kohl, 2011). During the adolescent developmental period,



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there are a multitude of psychological, physical and social factors which may influence the decrease in PA patterns (Sallis, Prochaska, & Taylor, 2000). The development of motivation is a process which takes time (Deci & Ryan, 2000).

In a recent literature review, Bassett et al. (2013) found that physical education contributes to children achieving an average of 23 minutes of vigorous-or moderate-intensity physical activity daily. However, the time spent in vigorous-or moderate-intensity PA could be increased by 6 minutes if the physical education curriculum were to incorporate a standardized curriculum such as SPARK (Bassett et al., 2013). Thus, it is possible for physical education to contribute to youth meeting at least half (30 minutes) of their daily requirement for vigorous-or moderate-intensity physical activity. To help children grow holistically, however, physical education needs to achieve other learning goals when children are active. To this end, physical education programs must possess the quality characteristics specified by National Association of Sport and Physical Education-NASPE (2007; 2009a; 2009b).

Designing and implementing a PE program with these characteristics in mind should ensure that the time and curricular materials of the program enable students to achieve the goals of becoming knowledgeable exercisers and skillful movers who value and adopt a physically active and healthy lifestyle. Because PE is part of the curriculum in schools, its quality should be judged only by whether and to what extent children have learned and benefited from it. In a landmark document on learning goals, *Moving into the Future: National Standards for Physical Education* (NASPE, 2004) proposes six student learning standards specifying both conceptual and behavioral characteristics that a physically educated person must possess and display.

These characteristics encompass knowledge, skill, behavior, and confidence critical to the development and maintenance of health and the enjoyment of a physically active and healthful lifestyle. A high-quality PE program can help youth meet the guideline of at least 60 minutes of vigorous-or moderate-intensity physical activity per day. This increase in PA should be balanced with appropriate attention to skill development and to national education standards for quality PE. What about Kosovo national standards for quality PE!? In spite of the fact that according to the Ministry of Education Science and Technology (MEST) people in charge, they are working hardly on establishing national standards for PE, the secondary school students, pre service and in service PE teachers in Kosovo have no clue about these standards!?

The purpose of this study is to examine two research questions: 1) What are students' perceptions of motivation and participation in PE and extracurricular PA and sport activities? and 2) What are the motivational triggers for PA and recreational activities?

Methods

The participants of the study were (N=526; males=267 females=259) 8th grade and 9th grade students from the four secondary schools in the central and northern part of Kosovo. The average age of the participants was 14.28 (SD=1.47). Students carried out motivational and participation of self reported questionnaires to gather quantitative data regarding students' perceptions of motivation and participation in PE. Sport Anxiety Test (SCAT) (Martens et al., 1990) is a 15-item self-report measure of sport competition anxiety level for stu-

dent participation in physical activity (PA), PE, answering the stem question (before I compete, I worry about not performing well...): When I compete, I worry about making mistakes), (before I compete, I get a queasy feeling in my stomach), (just before competing, I notice my heart beats faster than usual), (before I compete I am nervous), (Team sports are more exciting than individual sports). Each item uses a 5-point Likert scale ranging from 1=strongly disagree to 5=strongly agree. Also, the participants were asked to state the number of days engaging in physical activity during a typical week and how important/useful/interesting exercise is for them, rated in a 5-point Likert scale ranging from 1=nothing at all to 5=very much. Self-report measure of motives for participation in PA. Students showing lack of motivation for doing PA/PE activities were members of the focus group discussions moderated by the researcher. Each item uses a 5-point Likert scale ranging from 1=strongly disagree to 5=strongly agree. Data were also collected through focus group discussions for less motivated students for being engaged in PA and PE activities, during the month of May and June 2014/2015 school year, in order to gather qualitative data regarding students' perceptions of motivation and participation in PE and extracurricular Physical and sport activities. Participants were also asked to state their motivation for doing PE activities, what are their preferences about sports and recreational activities? What is their opinion about the PE teacher? What is the number of days engaging in physical activities during a typical week and how important/useful/interesting exercise is for them?, rated in a 5-point Likert scale ranging from 1=nothing at all to 5=very much.

Data collection

Questionnaire items were designed by the author to reflect the research questions. Items sought information on student perceptions about their motivation for voluntary engagement in PE, PE teachers' role in their motivation for engagement in school based PE/Sport activities. Possible opportunities to transform students motivation for physical activity into motivation. Additional items included information related to curricular contents youngsters prefer to learn in school based PE. Focus group interview questions were modelled after the questionnaire so that the same topics were probed and answered in greater detail. Students were informed of the purpose of the study and the confidential treatment of the data. The study was explained by the researcher at the beginning of each class and questionnaires were distributed to every student who participated in the study. In general, questionnaires were completed in about 15-20 minutes.

Data analysis

Questionnaire data were analyzed using three computerized programs. Quantitative data was analyzed using SPSS 21, a predictive analytic applications software, to provide mean and standard deviations derived from the five Likert-scaled questions. Excel was used to organize data from the open-ended questions.

Results

In this study results bring attention to the daily reality in Kosovo public schools over the past 20 years. In the new-born country (Kosovo), unfortunately, based on study participants; there has been a gradual but overall dramatic decline in teenager's freedom to play with other peers, without adult

direction. Over this same period, there has been a gradual but overall dramatic increase in anxiety, depression, feelings of helplessness, and narcissism in children and adolescents due to traditional way of Teaching PE, not applying student centered methodologies and strategies of Teaching PE school based.

Study findings show that: Children and adolescents in the Republic of Kosovo schools cannot become more physically active and fit if they don't have a wide range of accessible, safe and affordable opportunities to be active. These study results are in accordance with similar study research assessing secondary school students motivation for PE/PA activities, Mehmeti (2015) adolescents are not motivated enough by PE teachers by not reflecting positively as a good role-model for them. The term role model is defined as a person whose behavior, example, or success is or can be emulated by others, especially younger people (Random House Dictionary). Basketball was more anxiety-arousing than other team sports in school. Some of the youngsters experienced extremely high levels of stress before competitive activities, regardless of the sport. The majority of study respondents (89%), declared they are not intrinsically motivated to be engaged regularly in PE school based activities. Also, (91%) of them declared that they don't know that there is any sport club doing practices and representing school, at municipality level or at regional and state level. Negative peer pressure seems to be one of the larger barrier mentioned by the students when it comes to the students engagement in school based PE activities, seventy-eight percent of students declared that... if we have no school gym, it's not fair to be forced for doing PE regularly, on weekly basis. PE teachers are not doing their best to teach students basics of PE and sports according to study participants, 68% of students declared that their PE teacher was never engaged during the PE classes with students.

Previous research on children and adolescents' self-reported barriers to participation in PE and physical activity has reported changing attitudes to activity and PE, adolescents' decision making favoring more sedentary activities. Similar to our study findings, (71.8%) percent (219), stated that their PE teachers, focus on too many traditional and team sports, like football, basketball, and volleyball. By analyzing a student's response to a series of statements about how she/he feels in a competitive situation it is possible to determine their level of anxiety. A test that provides such functionality is the Sport Anxiety Test (SCAT)(Martens et al., 1990).

Theoretically, the 21st century schools are supposed to be also the places where students are able to express their opinions and be part of creating a healthy safe supportive climate in their schools. PE classes are the perfect setting for implementation of the theory into practice, PE curriculum content is not just physical activity, competitive sports, highly structured activities, lack of teacher support, it's a kind of puzzle' pieces.

Discussion

It is interesting to think why play is declining in most countries, not only in Kosovo. It is hard to understand that in Kosovo where kids grew up 20-30 years ago, where a school age children were playing outdoor, street ball, football, volleyball and lots of plays, but today, we are almost not seeing youngsters playing outdoors.

Focus group transcript:

Tony (pseudonym): I am a child, 14 nearly 15 in secondary school, year 8 (Bologna Education System). A lot of the time,

even right now I feel physically sick when I think about school and homework. I talked to my friends and they said they feel that way too. I don't understand how they (Ministry of Education Science and Technology (MEST), and Teachers) think this is a good educational system for children, children are sick with worry about school. But, we need an educational system when children look forward to school instead of thinking that the only good thing is your friend which is how I feel. This is all coming from a child who is fourteen years old and is within the Kosovo's educational system right now... One last thing we have much less "creative" lessons during PE classes than for e.g. Physics and English language etc.

Alex (pseudonym), 32 years of experience in teaching Physical Education. Yes, the students' motivation in PE has decreased a lot nowadays: If I compare it to my first year of teaching, it's white and black. I think we PE teachers have to work harder, finding the ways by using creativity and be more open minded teachers in order to increase student motivation in school based PE classes...

School aged children and youth are evaluated these days mainly on the basis of the student's test performance. Nowadays, students are increasingly encouraged or required to take teacher (adults)-directed lessons (sports) even out of school, rather than to play unconventional games freely. What matters in today's educational world is performance, (88%) of the secondary school students declared that PE teachers all what they do is assessing students physical fitness, time to time, and that's all (88% of respondents) These results than can be scored and compared across students, across schools, municipalities, and at the state level, and even across nations to see who is the best? This shows us that PE teachers are mainly focused on sport performance rather than strategies for increasing students motivation for doing physical activities in their daily routine.

However, this study provides further insights, demonstrating that there is a long list of different barriers that teachers may encounter when providing PE in Kosovo secondary schools. Participation barriers including those imposed by the students themselves; lack of affordable school facilities, no gym sports, unsafety school yards, lack of sport equipment and requisites, large class sizes, traditional teaching methodologies (teacher centered teaching, PE/sports not priorities in the school (PE ranked on the bottom of list of priorities), focus on too many traditional sports, competitive team sports, repetitive/not attractive learning topics, negative peer pressure, strict PE teacher/instructional strategies, past negative experiences of students during PE classes.

This study results are in same line with research of McKenzie (2007), the study has made clear that certified PE specialists can provide more and longer opportunities for students to meet physical activity guidelines compared with classroom teachers trained to teach PE. Getting younger adolescents active on a daily basis is crucial to their overall health and development. PE class should not serve to be a "break" from academics. Play and physical activity is learning and very important learning at that. The benefits are well researched and documented as to the importance of youngsters getting daily physical activity. Our schools are a major let down and we need people involved who realize the importance of living a healthy lifestyle on a daily basis. School should be the place where students learn balanced way of living, and develop good habits for healthy lifestyle in the future. School should be the place where students find

healthy, safe, supportive climate, in case we want to fulfil the goal of increasing students' motivation for physical activity on daily basis. Republic of Kosovo schools are not creating supportive and attractive school environment for children and adolescents in doing PA and sports in daily basis. Many schools (PE Teachers) make a mistake requiring every child to become an athlete, by suppressing child motivation and enjoyment for sport and creative physical activities. PE Teachers can help the students they care about healthier life by serving as a good role model by making physical activity (PE classes), and extracurricular activities (intramural sports) and healthy eating their priorities of daily routine. Enhancing youngsters physical activities and playing activities, we tend to enhance students possibilities of fulfilling the goals and objectives of secondary school curriculum. By increasing youth engagement and enhancement of their playing time, but this leads directly to overall advancement of students' development.

Definitely, there is an urgent need for PE teachers to apply a variety of activities to do it with children and kids if we really want to increase their motivation for engagement in PE classes, regular PA is important factor for students health. Some of the main findings of this study where there is a need for PE teachers to design and implement programs to create a learning environment that emphasizes skill development, personal and team success and having fun, and reduce performance-destrorying anxiety and fear of failure.

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Conflict of Interest

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ORIGINAL SCIENTIFIC PAPER

Impact of Home Fitness Program on Anthropological Characteristics of Physically Active and Physically Inactive People

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Abstract

Main purpose of this work is presentation of a complex program that consists of simple program content focusing towards targeted change of important anthropological characteristics. To achieve the objective, authors created "stay at home" fitness program with simple exercise content which is adjusted for both trainees based on their fitness level. The sample is defined as a pattern of two trainees. One exerciser is male and physically inactive and the other is female and physically active. The initial and final state of the subjects is determined with 4 tests for assessment of morphological characteristics and 6 tests for assessment of motor abilities. For comparison of the measured results of the initial and final state of the respondents we used the method of calculating the difference expressed as a percentage, using the "Microsoft Excel". After completing treatment, we've observed positive changes in all measures for the assessment of anthropological status, for trained and untrained persons.

Key words: fitness, female, male, anthropological characteristics

Introduction

Studies in countries across Europe show low levels of overall physical activity of different populations. Degree of health is one of the main determinants of the level of life quality. Sedentary lifestyle causes reduction of physical activity and thus leads to a threat to public health and normal functioning of one's organs and organ systems (Hollmann & Hettinger, 2000).

Results of previous studies have shown that regular, properly planned and programmed physical exercise has a positive impact on high blood pressure (Faggard & Tipton, 1994), blood fat levels (Berg, Frey, Baumstark, Halle, & Keul, 1994) and elevated body mass index (Mišigoj-Duraković, Heimer, Gredelj, Heimer, & Sorić, 2007). However, regardless of the fact that physical exercise has beneficial effects on human health, there is still a relatively small number of people who continuously engage in recreational physical exercise.

Main purpose of this work is presentation of a complex program that consists of simple program content focusing towards targeted change of important anthropological characteristics.

To achieve this objective, authors created a "stay at home" fitness program with simple exercise content which is adjusted for both trainees based on their fitness level.

Fitness activity can be divided into two groups: health-related fitness and skill-related fitness (Oja & Tuxworth, 1995). A Home fitness program implies a collection of training contents which can be executed in living spaces, such as a house or an apartment. It is suitable for use to exercisers of all fitness levels. This type of program is not intended for exercisers which have not overcome technique of execution of all elements planned for carrying out the program and elementary knowledge about dosage of energy-related components of training load. All contents have to be chosen by a kinesiologist or other qualified individual, such as a physiotherapist or a doctor. Otherwise, exercisers could suffer from an acute or chronic injury which would have a negative impact on performance and motivation of exercisers during training, or could even lead to drastic reduction and even to withdrawal from physical activities during their free time.



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Home fitness program can be executed:

- independently
- under trainer or other qualified individual surveillance
- in pair or in a small group
- with an audio or video projection

Advantages of a home fitness program

Training execution at home has many advantages of which the most prominent one is accessibility to exercisers of all ages, financial state, gender and fitness level because it does not demand a specially arranged space of large dimensions, numerous props and equipment which can be expensive and complicated to use. That form of training is highly attractive for people who do not have free time, and by training at home they conserve time needed for travelling to and from a fitness center. In addition, it is suitable for all those that do not prefer crowded places and noise. Also, there are exercisers that feel uncomfortable when training in front of other people or trainers because they are insecure with their appearance or abilities, and familiar space offers them security.

Disadvantages of a home fitness program

Primary disadvantage of execution of a home program is training without surveillance of a qualified individual. Because of that reason, this program is not recommended for beginners and people who have not acquired a high level of automated movement structures needed for execution of a certain training. Moreover, people who decide to implement this program need to be acquainted with training load dosage. These processes can be demotivating and negatively influence health status of exercisers who are not qualified for proper training execution.

Methods

The sample is defined as a pattern of two trainees. One exerciser is male and physically inactive and the other is female and physically active.

Physically active exerciser

Date of birth: 28.1.1987.

Gender: female

Profession classification: belongs to group C and D.

Daily routine is characterized by dynamic responsibilities dominated by activities in which walking and weight carrying prevail, and subject belongs to employees with high energy consumption. In addition to everything that was specified, subject was involved in professional sport activities for 15 years until she injured her knee, after which she has undergone a surgical procedure (two years before execution of the program).

Physically inactive exerciser

Date of birth: 28.1.1987

Gender: male

Profession classification: belongs to group A and B.

Daily routine is characterized by static responsibilities dominated by standing and sitting positions and those positions also prevail during his free time. Subject was never involved in sports, or any other type of continuous, organized recreational physical activity, and was never a participant of a fitness program.

Description of executed fitness program

Fitness is not a sport, recreation or rehabilitation; fitness is a specific approach to a healthy lifestyle through sport, recreation and rehabilitation, which is realized with physical activities, rest and nutrition, considering gender, age, fitness and other characteristics (Nićin, 2003; custom translation).

Home fitness program contains simple program contents which are available and adapted to exercisers and their different levels of adoption of training knowledge, different levels of functional and motor abilities and completely different requirements on their workplace.

Duration of training process is in a period of two months, that is, nine weeks (Table 1). It is important to emphasize that selection of training contents and training load is focused on alteration of morphological characteristics of exercisers, and on development of specific motor abilities, primarily because of effects on health, and improvement of level of working abilities.

Primary goal of the program is reduction of subcutaneous fatty tissue and increase of power, primarily core muscles. Both exercisers have conducted equal program contents with adapted absolute load in relation to individual characteristics and fitness level, but with approximately equal relative load during the whole period.

Beside subcutaneous fatty tissue reduction, program is focused on development of power of bigger muscle groups in arms and shoulder region, core muscles and lower extremity muscles, and improvement of functional abilities.

This complex program consists of simple movement structures, aerobics dance steps, strength exercises with exercisers own weight, strength exercises with a prop (one weight of 4 kilograms, two dumbbells of 1 kilogram, wheel with handles, exercise mat), stretching and muscle relaxation exercises.

For purposes of main A and B part in which circular methodical form was conducted, a program that generates a sound every 30 seconds with which a change of contents during exercise is announced was used. Besides parts of the program where aerobics steps were used, where music is a mandatory segment (120-130 bpm), it is advisable to use music through the whole training because it has a positive effect on motivation of exerciser and helps in rhythmic execution of exercises.

Duration of program

As mentioned before, home fitness program for achieving effects occurs in a period of two months (Table 1). Overall number of days planned for actualizing the program is 61 days. Number of training days and days needed for conducting diagnostics of condition within that period is 42 days (39+3), and 19 days of rest. Number of training days per week gradually increases, with first week having 3 training days, from second to sixth week 5 training days are conducted, and during the last week, 6 training days are conducted. Every training day consists of only one training, with duration progressively increasing throughout the program.

Training duration is 45 minutes in first three weeks, then subsequently 60 minutes (1 hour) until the last week and 70 minutes in the last week (1 hour and 10 minutes).

Initial and final state of the subjects is determined with 4 tests for assessment of morphological characteristics and 6 tests for assessment of motor abilities. Tests for evaluation of morphological characteristics:

Table 1. Display of training days per week and in total

Duration of training period	01.04 – 01.06.2015
Weeks with 3 trainings	1
Weeks with 4 trainings	4
Weeks with 5 trainings	2
Weeks with 6 trainings	1
Total number of weeks	9
Total number of training days	39
Number of days for diagnostics	3

- Body mass- measured with home scale
- Percentage of fatty tissue - evaluated with Omron BF306 device
- Circumference: chest, waist, stomach, hips, upper leg, lower leg, upper arm, forearm - measured with tailor meter
- Body mass index - (BMI) was calculated directly on the basis of recorded values of body mass and height, with the formula $BMI = \text{body mass (kg)} / \text{body height (m}^2\text{)}$.

Tests for evaluation of motor abilities:

- Execution of push-ups in 15 seconds - for evaluation of repetitive strength of arms and shoulder region
- Lying leg raises, repetitions until exhaustion- for evaluation of anterior core muscle power
- Wall squat test, on time measured until exhaustion - for evaluation of static strength of leg muscles
- Lying trunk extension hold, time measured until exhaustion - for evaluation of static strength of back muscles
- Hold in plank position with support on elbows ("plank")- for evaluation of static strength of muscles responsible for torso stabilization

- In kneeling position, frontally, rolling of wheel with handles away and towards self on the floor until exhaustion - for evaluation of repetitive strength of muscles responsible for torso stabilization

For comparison of measured results of initial and final state of the respondents we used the method of calculating the difference expressed as a percentage, using "Microsoft Excel".

Results

Besides the noticeable improvement in execution of all tests after the program has finished, trainees have advanced the most in tests which required a certain type of strength which is not specific for their professions (Table 2).

Physically active exerciser had a less noticeable improvement in tests 1 (push-ups/15 sec) and 6 (lying trunk extension), because she falls into a group of dynamic professions where weight carrying is represented, and those topological regions have a certain level of strength already on a higher level.

Physically inactive exerciser had a less noticeable improvement in the test for evaluation of strength of lower extremities/ test No. 5 (wall squat), because it falls into a group of static professions where standing is a dominant activity.

Table 3 displays differences of individual and final testing expressed with a percentage which displays how much subjects have advanced in individual motor tests. Results show that subjects have achieved advancement in execution of all tests for strength evaluation which were used for evaluation of state of subjects in this paper.

Morphological characteristics were not displayed in percentages, because almost all scales of measurement and measurement units are equal, so the advancement of subjects can be noticed with inspection of initial and final state in Table 2.

Table 2. Display of initial, transit and final state of both subjects

	physically inactive exerciser			physically active exerciser		
	1.4.2015.	1.5.2015	1.6.2015.	1.4.2015.	1.5.2015.	1.6.2015.
date	initial	transit	final	initial	transit	final
body mass index	23.7	23.1	22.7	23.6	23.0	22.3
body mass	79.5 kg	77.4 kg	76.0 kg	66.5 kg	65.0 kg	62.5 kg
% fatty tissue	17.2%	16.9%	15.0%	21.0%	19.9%	19.2%
chest circumference	96.1 cm	98.0 cm	95.2 cm	93.0 cm	91.2 cm	89.2 cm
waist circumference	86.6 cm	86.0 cm	84.3 cm	74.3 cm	73.0 cm	70.0 cm
stomach circumference	92.3 cm	90.0 cm	88.5 cm	82.5 cm	80.0 cm	77.5 cm
upper leg circumference	57.5 cm	58.0 cm	57.0 cm	61.0 cm	60.0 cm	60.0 cm
lower leg circumference	38.1 cm	37.5 cm	38.0 cm	36.0 cm	36.0 cm	36.5 cm
upper arm circumference	33.0 cm	32.6 cm	34.5 cm	29.2 cm	29.5 cm	28.5 cm
forearm circumference	28.5 cm	27.5 cm	27.5 cm	25.0 cm	25.5 cm	24.5 cm
hips circumference	102.2 cm	100.5 cm	99.7 cm	101.0 cm	99.2 cm	98.0 cm
push-ups/15 sec	11x	16x	20x	16x	18x	18x
wheel (repetition)	10x	17x	25x	7x	21x	34x
lying leg raises	16x	32x	48x	25x	35x	64 x
plank	41 sec.	1:28 min.	1:52 min.	57 sec.	1:20 min.	2:14 min.
wall squat	34 sec.	2:46 min.	3:23 min.	1:35 min.	3:45 min.	6:31 min.
lying trunk extension	45 sec.	1:30 min.	2:11 min.	55 sec.	1:30 min.	2:14 min.

Table 3. Display of acquired results of motor tests expressed in percentages

motor tests	physically inactive exerciser	physically active exerciser
push-ups in 15 seconds	82%	12,5%
wheel	150%	385%
lying leg raises	200%	156%
plank	173%	135%
wall squat	497%	311%
lying trunk extension	191%	143%

Discussion

After completing the treatment, positive changes have been observed in all measures used for assessment of anthropological status, for trained and untrained subjects.

Changes are mainly related to decrease in percentage of body fat, volume of specific body parts and to improve results in certain tests for physical abilities of physically active or inactive trainee to primarily improve their health, and secondly to get their training abilities to higher levels of performance.

In physically active trainees, whose normal day is dominated by physical activity (work in the fitness center) a very small progress of 12.5% in development of power of arms and shoulders (test: number of push-ups in 15 seconds) was measured, while with physically inactive trainees, ones with professions with no physical activity, impressive improvement of 82% compared to the initial state was *measured*. Then, in evaluation of static strength of lower extremities (endurance in squat position against the wall) with physically inactive trainees, who when carrying out daily duties are mostly in standing position, an improvement of 497% was measured, which is much lower than in physically active exercisers who achieved improvement of 311%. Home fitness program has achieved visible effects that show improvement of the status of active and inactive trainees.

Applying the planned content of physical exercise has shown improvement in power of different topological regions that are essential for daily performance of interest, especially for those who were less active on a daily basis.

Because of difficult everyday obligations, both trainees felt

tiredness, and often also pain in different areas of body, caused by peculiarities of their professions. After the conducted exercise program at home, pain has disappeared, and discomfort and tiredness have gradually decreased. Achieved effects of conducted training process confirm that it is necessary to exercise in free time to increase operational capabilities and improve health status for the purpose of performing work related obligations more easily, and therefore self-content feeling. Noticeable effects which indicate improvement of condition of active and inactive subject have been achieved with the home fitness program. Improvement in various topological regions which are important for everyday performance in professions has been achieved with the use of program contents, especially for improvement of those topological regions which are less active during everyday obligations. Results have also shown that subcutaneous fatty tissue has been successfully reduced in both subjects, which in overall shows efficiency of the "Home fitness program", and that the goal of this paper is satisfied and realized.

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Conflict of Interest

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ORIGINAL SCIENTIFIC PAPER

Monitoring of Some Strength Parameters in Handball

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Abstract

Handball is a sport, which requires high physical preparation as well as technical and tactical skills. Being tough sport scrolled with multiple players, it has huge power requirements, as well as a certain level of intelligence for solving of complex situations in the game. The aim of this research was monitoring of some strength parameters. The sample of subjects consists of 14 handball players, members of Handball Club Pristina. Subjects were female, aged 20 ± 2 years old. The measurements were made during the training sessions, in the sports gym where they train, during the 2008/09 season, initial measurement was made in the first micro cycle of preparatory period, while the final measurement was done after the end of the championship. Paired T-test were calculated for in initial and final measurement. The majority of variables have no statistically significant differences, and this should have come as a result of inadequate dosage of training loads and lack of proper training program.

Key words: Handball players, female, strength, competition

Introduction

All Strength and conditioning experts around the world agree that, for time spent in the gym to have a positive impact on your sports performance, you must ensure the exercises you perform – and the way you perform them – are related to your sporting movements in competition (Jonathan, 2009). Morphological characteristics of the body and motor abilities certainly have a great influence on an outstanding performance in handball (Šibila, Mohrič, Pori, 2009). Modern handball team consists of intense and intermittent activities such as running, sprinting, jumping as well as fights between players (i.e. holding, pushing etc.) (Kvorning, 2006). Strength is one of the main skills in physical abilities (Bompa & Karrera, 2005). One of the current tendencies is to introduce in the structure of the power training sessions specific “kinetic muscle chains” training elements, meant to improve the specific strength and power indices of the handball players (Acsinte, Alexandru, & Milon, 2009).

Assessment of power and strength could be multidimensional. Strength, while having potentially multiple definitions, is probably best defined as “the maximum amount of force of

a muscle or a group of muscles that can generate in a specific movement pattern at a specific velocity of movement (Knuttgen & Kraemer, 1987; as cited in Reiman & Manske, 2009). Handball consists of intensive game, swift (sprint), jump, decline, and “battles” within official rules of the game, and where permitted, that are catching, drawing, pushing and holding the opponent player. All these elements make the Handball very tough sport. The match shows who is stronger, faster, more stable, more powerful. So handball game requires players with high anthropometric parameters and with good motor skills like strength, speed, coordination etc. Having in mind all these qualities that characterize the game of handball, the most important and sensitive element is programming the loads of exercise. In a sample of a research that is conducted with top handball woman players, indicates the great potential of development of motor skills during the preparatory period (Srhoj & Rogulj, 2001). All this requires systematic and persistent work in selection and development of young handball players.

The purpose of this paper is monitoring of some strength parameters of handball during a competitive season in Women Handball Super League of Kosovo, by examining the impact of



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competitive strength in the outcome of competition, the objectives of the club were achieved by winning the National Championship, but real impact was shown on international level of competition. The Team that dominated against local teams, even up to 22 goals lead, failed to succeed in the qualifying competitions for the "Winners' Cup. Pristina team held only five minutes the pressure of stronger team from Holland, while the difference at the end of two matches reaches - 47 goals.

Methods

The sample of subject consists of 14 handball players, members of Handball Club Prishtina. Subjects were female, aged 20 ± 2 years old. The measurements were made during the training sessions, in the sports gym where they train, during 2008/09 championship. The championship consists of two seasons, autumn season (September-November) and spring season (March-May). Initial measurement was made in the first micro cycle of preparatory period of spring season, while the final measurement was done after the end of the championship. The preparatory period consisted of 20 training sessions while a week consisted of 5 training sessions with 90 minutes for each session. Within spring season there were played 13 matches which included the total number of 65 trainings.

Data analysis was performed using the Statistical Package for the Social Sciences (SPSS version 21.0). T-test were calcu-

lated for same groups in initial and final measurement.

Sample of variables

- Throwing the medicine ball from standing position (MHTOPM)
- Long Throwing the ball after triple steps (MHT3HL)
- Bench press-20 kg (MB20KG)
- Heart rate before the jump (PULQET)
- High jump after three steps with the ball in hand 5x5 jump (MK3HTO)
- Heart rate after jump (PULNGA)

Results

In Table 1 are shown results of descriptive statistics, mean and standard deviation of motor variables at initial and final measurement. Handball players have improved result ($M=161.14$, $SD=29.99$) in final measurement in comparison to the initial measurement ($M=153.64$, $SD=34.62$) in variable (MHTOPM) throw of medicine ball in distance, for around 8 metres. Second best improvement is achieved in hitting on the goal after three steps, with about 4 metres (initial measurement $M=242.36$, $SD=60.66$, final Measurement $M=246.62$, $SD=55.5$). In other motor variables differences between two measurements are very small. Differences between two measurements will be tested with paired sample T-test.

Table 1. Descriptive statistics for motor variables initial and final measurement

	Initial measurement				Final measurement		
	N	Mean	Std. Deviation		N	Mean	Std. Deviation
MHTOPMI	14	153.64	34.02	MHTOPMF	14	161.14	29.99
MHT3HLI	14	242.36	60.66	MHT3HLF	14	246.62	55.5
MB20KGI	14	24.5	12.02	MB20KGF	14	25.24	10.77
PULQETI	14	78.71	6.28	PULQETF	14	80.9	6.12
MK3HTOI	14	240.79	13.13	MK3HTOF	14	241.9	14.63
PULNGAI	14	164.57	20.9	PULNGAF	14	167.52	18.89

In Table 2 are shown the differences between the initial and final measurement. Initial measurement was made in the first micro cycle of preparatory period of spring season, while the final measurement was done after the end of the championship. According to the results (Table 2) there was found on-

ly one variable where are significant differences between two measurements $p=.047$. The majority of variables have no statistically significant differences, and this should have come as a result of inadequate dosage of training loads and lack of proper training program.

Table 2. Paired Simple T-test

		Mean	Std. Deviation	T	df	Sig. (2-tailed)
Pair 1	MHTOPMI-MHTOPMF	-.9071	1.6021	-2.119	13	.054
Pair 2	MHT3HLI-MHT3HLF	-.8143	1.6133	-1.888	13	.081
Pair 3	MB20KGI-MB20KGF	-2.7571	5.5438	-1.861	13	.086
Pair 4	PULQETI-PULQETF	2.1430	3.6550	2.193	13	.047
Pair 5	MK3HTOI-MK3HTOF	-7.3500	12.9065	-2.131	13	.053
Pair 6	PULNGAI-PULNGAF	-4.4290	16.9780	-.976	13	.347

Discussion

The aim of this research was monitoring of some strength parameters of woman handball players of Super League of Kosovo. According to the results there was no any improvement of force parameters in handball women players between initial and final measurement even some progressive transformation was expected. The amount of training in the preparato-

ry period, only 20 training, is not sufficient for achievement of workforce development at the desired level. Preparatory period with 41 trainings, can affect to achieve the force (Vuleta, Milanovic, & Gruic, 2002). Also, the number of only five training sessions within a week was insufficient. Regarding mentioned training parameters the quality of teams in the Kosovo league is weak, as the club of this research has dominated all other

teams of Super League and easily won the National Championship, but has failed in international competitions.

Training loads by individual characteristics and specific skills in the game is a problem in itself that must have greater attention. Training loads should be done by adapting to the anthropometric status and motor abilities for each athlete individually.

There are many factors that could affect players' motivation as well as financial support plays important role in the level of responsibility, as well as coaching the game.

Therefore the recommendations are to increase the number of exercises in the preparatory period as well as in competition phase, training program should be based on anthropometric characteristics and motor abilities motivation will influence to increase responsibility and competition within the team.

We think that by taking account on mentioned factors would short the difference in quality in international competitions.

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Conflict of Interest

The authors declare there are no conflict of interest.

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SHORT REPORT

Effect of a Volleyball Course on Health-Related Fitness Components of University Students

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Abstract

Physical educators need to evaluate the physical education (PE) curriculum they provide to their students. One way is through regular health-related fitness assessments. Physical education programs have improved fitness levels of schoolchildren, but such data is rare for university students. The aim of this study was to determine the effect of a volleyball course on the health-related fitness of male university students. The participants were non-PE majors from King Fahd University of Petroleum & Minerals. They registered for a volleyball course which was done twice a week for eight weeks (31 October-29 December 2016, 50 minutes per session). The parameters assessed were as follows: 1) body composition through body mass index (BMI), 2) muscular endurance through the 60s curl-up test, 3) flexibility through the sit and reach test, 4) leg explosive strength through standing long jump, and 5) cardiovascular endurance through a 1.6 km run. Pre and post measurements were taken and the data were analyzed using descriptive statistics and paired t-test with SPSS 16. P-values for statistical significance was set at <0.05 while a Cohen- $d > 0.2$ was considered of practical significance. Data from 145 students were analyzed (mean (SD) age=20.8 (0.64) years). There were improvements from pre to post in all variables except body mass and BMI. The data shows evidence that the volleyball course improved the health-related fitness variables of the students. This shows a course designed for non-PE majors may improve their fitness levels if well designed.

Key words: volleyball, university students, health-related fitness, physical education

Introduction

Physical educators need to evaluate the physical education (PE) curriculum they provide to their students. This is important as PE can contribute in giving the required amount of physical activity needed by students. This, in turn, can reduce the prevalence of physical inactivity existing among students, thus contributing in countering the obesity growth reported by the World Health Organization (2016). One way to evaluate a PE curriculum is through health-related fitness assessments.

PE programs have improved fitness levels of schoolchildren (Jarani et al., 2016; Kriemler et al., 2011; Siegrist, Lammel, Haller, Christle, & Halle, 2013). But such studies are rare for university students. Moreover, there are no studies that determine the effect of volleyball training on non-athletic university students. This is of interest as volleyball is a competitive sport that relies mainly on explosive strength and en-

durance to perform techniques such as blocking and smashing (Marques, van den Tillaar, Gabbett, Reis, & González-Badillo, 2009). Thus, the aim of this study was to determine the effect of a volleyball course on the health-related fitness of male university students.

Method

Participants

The participants were students from King Fahd University of Petroleum & Minerals (KFUPM) who registered for the volleyball course provided by the university. The participants were non-PE majors.

Ethics

The study conformed to the Declaration of Helsinki. This study was approved in advance by the Ethical Committee of the



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Physical Education Department of KFUPM and KFUPM. Each participant voluntarily provided written informed consent before participating. The privacy of their results was guaranteed.

Course activities

The volleyball course was done twice a week for eight weeks (31 October-29 December 2016, 50 minutes per class). Each class began with a 10 minutes warm-up. After the warm-up, the students were asked to jump in the same position and to do some sit ups and pushups.

After these exercises, the students were taught fundamental volleyball rules and skills. The skills taught included overhead pass, dig, overhand serve, underhand serve, block, and smash. Basic footwork was taught to the students in order to move around the court and to play the ball correctly using the skills they were taught. All of these lessons were practically demonstrated to the students.

Matches among the students were played in five classes and a practical test was given to them after the matches. The aim of the matches and the practical test were to test their mastery of the skills. The practical test required students to perform correctly the underhand and overhand serves, and the overhead pass. The matches among the students were played in five classes and a practical test was done in the last two classes.

Health-related fitness assessment

The following health-related fitness parameters were assessed before and after the course: 1) body composition through body mass and body mass index (BMI), 2) muscular endurance through the 60s curl-up test, 3) flexibility through the sit and reach test, 4) leg explosive strength through standing long jump, and 5) cardiovascular endurance through a 1.6 km run. The students were asked to give their best effort when performing the fitness tests and they were assured that the results of the tests will not affect their final grade.

Data analysis

Data were analyzed using descriptive statistics and paired t-test with SPSS 16. P-values for statistical significance was set at <0.05 while a Cohen- $d > 0.2$ was considered of practical significance.

Results

There were 145 students with complete data after the completion of the course. The results are shown in Table 1. There were statistical improvements in all parameters before and after the course. But the improvements in body mass and BMI were not of practical significance.

Table 1. Pre and post health-related assessment (N=145)

Test	Pre	Post	p-value	95 % Confidence interval	Percent improvement	Cohen d
Age (years)	20.8 (0.64)	–	–	–	–	–
Height	173.2 (6.24)	–	–	–	–	–
Body mass (kg)	76.1 (17.3)	75.5 (16.7)	0.039*	[-1.16, -0.03]	0.780	0.173
BMI (kg/m ²)	25.35 (5.52)	25.15 (5.27)	0.041*	[-0.40, -0.01]	0.797	0.171
60s Curl ups (repetitions)	35 (8)	41 (10)	0 [†]	[5, 7]	16.5	0.931
Sit & reach (cm)	28 (7)	31 (7)	0 [†]	[2, 4]	10.6	0.744
Standing Long Jump (cm)	178 (27)	190 (28)	0 [†]	[9.5, 14.6]	6.76	0.777
1.6 km run (s)	10.99 (2.55)	9.88 (2.14)	0 [†]	[-1.33, -0.89]	10.1	0.836

Note. Values in Mean (standard deviation); * $p < 0.05$, $†p < 0.001$

Discussion

The aim of the study was to determine the effect of a volleyball PE course on the health-related fitness of male university students who were non-PE majors. All the parameters except body composition improved from pre to post. The improvements in 60s curl ups, sit and reach, standing long jump, and the 1.6 km run show that the following health-related fitness parameters of the students improved, respectively: muscular endurance, flexibility, explosive strength, and cardiorespiratory fitness. This could be due to the exercises the students performed in each session.

Volleyball requires the players to move in various directions to get the ball. Performing such movements require a good flexibility (Taware, Bhutkar, & Surdi, 2013) and muscular endurance. The drills and matches most likely improved the flexibility and muscular endurance of the students. The regular sit ups most likely contributed to the improved muscular endurance of the participants.

The explosive leg strength was most likely improved because of the blocking and smash drills given to the students. Blocking requires that the defending team prevents the ball

from entering their side, while a smash requires one to hit the ball with force into the opposing team's side. These techniques require one to jump in order to be performed (Schmidt, 2015). Regular jumping due to these drills most likely improved the explosive leg strength of the students. Adolescent non-athletes have also experienced an improvement in explosive leg strength due to volleyball training (Kousi, Papadopoulou, Bassa, Ikonou, & Lazaridis, 2014). Moreover, because volleyball has both an aerobic and anaerobic component (Taware et al., 2013), the aerobic component of the course most likely improved the cardiorespiratory fitness of the participants.

The absence of significant improvements in body mass and BMI after the program was possibly due to the short duration and intensity of the course. The intensity was low to moderate as the students needed to go for the other classes they had during the day without being tired.

A limitation of this study is that there was no control group. Moreover, the study was conducted on male university students. It will be important to know the effect of such a program on female university students.

Despite the limitations of the study, there is evidence that volleyball designed for physical education can improve the health-related fitness of university students.

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Conflict of Interest

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SHORT REPORT

Structural Characteristics of Sport Organizations in Kosovo

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Abstract

Sport in the Constitution of the Republic of Kosovo is defined as a special category of social interest and is funded from the budget of the Republic of Kosovo. Subject of this study will be 35 Sports Federations, 867 sports clubs, 67,583 male athletes and 13,458 females. Based on the data of Kosovo Statistical Agency, current condition for sports organizations, clubs, associations, Sports federations as well as sport activities and we will present through the tables underway that will give us a real data for the current condition of the total number of Sports federations, participants in sport activities. For this reason, it is imperative to start with planning and systematic investments in establishing legal infrastructure and structure of sport organizations would be one of the main priorities of the development sports in Kosovo, as another purpose of this paper will be the autonomy of sports and its political neutrality according to international standards, constitutes another priority of the structural organization of organizations or Sports Federations in Kosovo.

Key words: *structure, clubs, sports organizations, Kosovo*

Introduction

Sport in the Constitution of the Republic of Kosovo is defined as a category of special social interest and is funded from the budget of the Republic of Kosovo. The Government of Kosovo and its highest bodies should determine goals, criteria and priorities for increasing the share of budgetary resources for sport. Republic of Kosovo consists of about 1,820,631 resident citizens (apart from immigrants living abroad), of whom 50.3% are males and 49.6% females. Kosovo is a multiethnic country, consisted of 92.9% Albanian and other minor communities: 1.6% Bosnian, 1.5% Serbian, 1.1% Turkish and 2.3% Roma, Ashkali, Egiptian and Gorani. Population of Kosovo is very young, with an average of 30.2 years, according to the 2011 data of the Kosovo Statistics Agency.

Based on the current state of Kosovo Sport infrastructure is not in the level of which require international criteria, and this reduces the possibility of athletes, youth and children for the development of professional sport. At the same time it

does not allow citizens to be active in the recreational training programs and sports for all. Without sufficient facilities for game and training, there is no proper development of sports, whereas sports facilities also represent an opportunity for future generations to get involved with sport. For this reason, it is imperative to start with systematic planning and investment in the construction of sports infrastructure, legal and promotion of sport organizations will be one of the main priorities of the development of sports in Kosovo. As another purpose of this work would be the organizational structure of sports organizations, since after the was until now, most of them operate as NGO (non-governmental organisation), Clubs, Sport Federations, various Associations etc. (Gomez, Opazo, & Marti, 2007), autonomy of sport and its political neutrality according to international standards, constitutes another priority of the structural organizations of sports organizations, sports clubs, sports Federations, the Olympic Committee of Kosovo, various sports associations, scientific researches in sports.



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Methods

The subject of this study is the organizational structure of sport in Kosovo, registered are 35 sport Federations, 867 sport clubs, 67,583 male athletes and 13,458 females. Based on data from the Kosovo Statistics Agency, the current situation for sport organizations, clubs, associations, sports Federations and sports activities will be presented through the processing results which gives us a realistic picture of the current state of the overall number of sports Federations, participants in sports activities, sports infrastructure. Based on these data we need to develop a strategy that will fulfill closely the structuring of all sports organizations for getting involved in sports activities in our country with the required standards by the relevant international institutions. The above mentioned methodology will contribute to obtain concrete information from stakeholders in the field of sport, as required in order to answer the questions of the study which we have compiled, in particular to have good overview of what are the concrete needs in the

sports sector in Kosovo. Results will be processed with statistical package SPSS 20.00.

Results

In Table 1 are presented the results of sports organizations in Kosovo, number of Federations are calculated only 31 sports Federations because 4 from them are registered but are not active with athletes, number of clubs, number of matches for one year, number of males participating in the Federations and number of females in the Federations. Based on the results presented in the table for both sexes from 31 Federations we have minimum and maximum 5-374 clubs, whereas the average 28.25 ± 65.41 , for 31 federations we have minimum and maximum 3-2,393 clubs, whereas the average 254.80 ± 465.12 , males active participants minimum and maximum 33-26,208 in each sports Federation, whereas the average $2,180.09 \pm 5,397.18$, whereas female active participants minimum and maximum 0-8,386 in each sports Federation, whereas the average $434.12 \pm 1,502.10$ per Federation.

Table 1. Sports Federations

Subjects	Federations	Minimum	Maximum	Mean \pm SD	Sum
Clubs	31	5.00	374.00	28.25 \pm 65.41	876.00
Matches	31	3.00	2,393.00	254.80 \pm 465.12	7,899.00
Male	31	13.00	26,208.00	2,180.09 \pm 5,397.18	67,583.00
Female	31	0	8,386.00	434.12 \pm 1,502.10	13,458.00

In this graphical presentation (Figure 1) is reflected in a graphical way the real situation of 31 sports Federations in total where number of clubs is 867, number of matches played in all Federations is 7,899 number of male athletes 67,583 or 83.39% from the total number and number of female athletes is 13,458 or 16.60%.

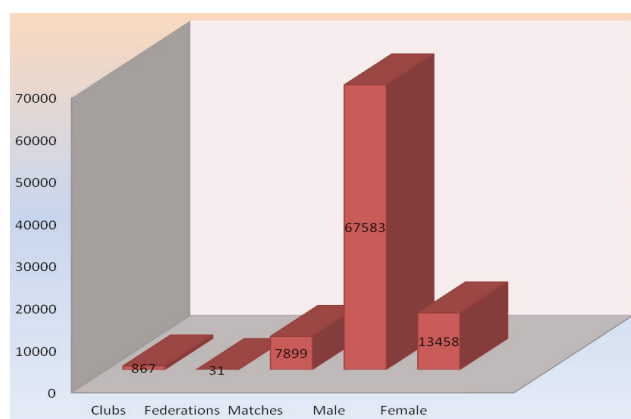


Figure 1. Graphical Presentation of Data in Total

Discussion

Through this work we have managed to identify all the deficiencies and advantages of sports organizations in our country and as well as organizational structure (Skoric & Bartoluci, 2011) of functioning within a sports organization, Club, Federation or Association. After the acceptance of the Kosovo Olympic Committee in International Olympic Committee and Sports Federations in relevant International Institutions we think that the situation must change while adapting to all relevant institutions under which they operate, in which case they must adopt their statutes and regulations in conformity with International Organizations. Especially clubs that maybe from

their statutes of NGO should act in various forms in compliance with laws and statutes of International Organizations, in order to function as semi-professional organizations or fully professional and to generate financial means to function in a better way.

The report of percentage between males and females is very high 83.39% to 16.60% and especially the worrying part is the active participation of the population which in general report is only 4.45 % which deals with active sport even though are missing data of those that are dealing with recreational sport. The new system of sports in Kosovo should be oriented towards the athletes and citizens that are dealing with physical activity. The period for the implementation of the strategy (Alaj, 2016) for sport will include a wide range of changes in legislative and financial system of sport in the Republic of Kosovo. This will be the period when the priorities will be education of personnel in the field of sport and the opportunity to utilize potential financing, familiarizing with EU standards in the field of politics and sport (Kiriemadis & Theakou, 2007), putting of biographic data (records) and categorization of sports, athletes, sport experts, sports facilities, physical education teachers. The period of setting of a new system within the structuring of sports organizations (Gomez, et al. 2007) must comply with the needs and requirements of Kosovo society and in compliance with EU criteria and higher sports institutions, such as: FIFA, UEFA, FIBA, IAAF, EHF FIVB, etc.

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Conflict of Interest

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1. UNIFORM REQUIREMENTS

1.1. Overview

The *Sport Mont Journal* (SMJ) applies the Creative Commons Attribution (CC BY) license to articles and other works it publishes.

The submission with SMJ is free of charge but author(s) has to pay additional 250 euros per accepted manuscript to cover publication costs. If the manuscript contains graphics in color, note that printing in color is charged additionally.

SMJ adopts a double-blind approach for peer reviewing in which the reviewer's name is always concealed from the submitting authors as well as the author(s)'s name from the selected reviewers.

SMJ honors six-weeks for an initial decision of manuscript submission.

Authors should submit the manuscripts as one Microsoft Word (.doc) file.

Manuscripts must be provided either in standard UK or US English language. English standards should be consistent throughout the manuscripts accordingly.

Format the manuscript in A4 paper size; margins are 1 inch or 2.5 cm all around.

Type the whole manuscript double-spaced, justified alignment.

Use Times New Roman font, size eleven (11) point.

Number (Arabic numerals) the pages consecutively (centering at the bottom of each page), beginning with the title page as page 1 and ending with the Figure legend page.

Include line numbers (continuous) for the convenience of the reviewers.

Apart from chapter headings and sub-headings avoid any kind of formatting in the main text of the manuscripts.

1.2. Type & Length

SMJ publishes following types of papers:

Original scientific papers are the results of empirically- or theoretically-based scientific research, which employ scientific methods, and which report experimental or observational aspects of sports science and medicine, such as all clinical aspects of exercise, health, and sport; exercise physiology and biophysical investigation of sports performance; sport biomechanics; sports nutrition; rehabilitation, physiotherapy; sports psychology; sport pedagogy, sport history, sport philosophy, sport sociology, sport management; and all aspects of scientific support of the sports coaches from the natural, social and humanistic side. Descriptive analyses or data inferences should include rigorous methodological structure as well as sound theory. Your manuscript should include the following sections: Introduction, Methods, Results, and Discussion.

☒ Open Submissions

☒ Indexed

☒ Peer Reviewed

Original scientific papers should be:

- Up to 3000 words (excluding title, abstract, tables/figures, figure legends, Acknowledgements, Conflict of Interest, and References);
- A structured abstract of less than 250 words;
- Maximum number of references is 30;
- Maximum combined total of 6 Tables/Figures.

Review papers should provide concise in-depth reviews of both established and new areas, based on a critical examination of the literature, analyzing the various approaches to a specific topic in all aspects of sports science and medicine, such as all clinical aspects of exercise, health, and sport; exercise physiology and biophysical investigation of sports performance; sport biomechanics; sports nutrition; rehabilitation, physiotherapy; sports psychology; sport pedagogy, sport history, sport philosophy, sport sociology, sport management; and all aspects of scientific support of the sports coaches from the natural, social and humanistic side.

☒Open Submissions

☒Indexed

☒Peer Reviewed

Review papers should be:

- Up to 6000 words (excluding title, abstract, tables/figures, figure legends, Acknowledgements, Conflict of Interest, and References);
- A structured abstract of less than 250 words;
- Maximum number of references is 100.

Editorials are written or commissioned by the editors, but suggestions for possible topics and authors are welcome. It could be peer reviewed by two reviewers who may be external or by the Editorial Board.

☐Open Submissions

☒Indexed

☒Peer Reviewed

Editorials should be:

- Up to 1000 words (excluding title, abstract, tables/figures, figure legends, Acknowledgements, Conflict of Interest, and References);
- A structured abstract of less than 250 words;
- Maximum number of references is 10.

Short reports of experimental work, new methods, or a preliminary report can be accepted as two page papers. Your manuscript should include the following sections: Introduction, Methods, Results, and Discussion.

☒Open Submissions

☒Indexed

☒Peer Reviewed

Short reports should be:

- Up to 1500 words (excluding title, abstract, tables/figures, figure legends, Acknowledgements, Conflict of Interest, and References);
- A structured abstract of less than 250 words;
- Maximum number of references is 15.

Peer review - fair review provides authors who feel their paper has been unfairly rejected (at any journal) the opportunity to share reviewer comments, explain their concerns, and have their paper reviewed for possible publication in SMJ.

☒Open Submissions

☒Indexed

☐Peer Reviewed

Peer review - fair review should be:

- Up to 1500 words (excluding title, abstract, tables/figures, figure legends, Acknowledgements, Conflict of Interest, and References);
- A structured abstract of less than 250 words;
- Maximum number of references is 15.

Invited papers and award papers include invited papers from authors with outstanding scientific credentials. Nomination of invited authors is at the discretion of the SMJ editorial board. SMJ also publishes award papers selected by the scientific committee of the International Scientific Conference on Transformation Processes in Sport.

☐Open Submissions

☒Indexed

☐Peer Reviewed

Invited papers and award papers should be:

- Up to 3000 words (excluding title, abstract, tables/figures, figure legends, Acknowledgements, Conflict of Interest, and References);
- A structured abstract of less than 250 words;
- Maximum number of references is 30;
- Maximum combined total of 6 Tables/Figures.

1.3. Submission

SMJ only accepts electronic submission to the e-mail of the Journal Office: **sportmont@ac.me**.

Submitted material includes:

- A manuscript prepared according to the Guidelines for the Authors;
- A signed form that states the study was not previously published, nor has been submitted simultaneously for consideration of publication elsewhere, that states that all of the authors are in agreement with submission of the manuscript to SMJ, and that, for studies that use animal or human individuals, authors must include information regarding their institution's ethics committee, and which identifies the official approval number;
- A signed form that there is no conflict of interest.

Name the files according to the family name of the first author. Authors submitting revised versions of the manuscript can use the identification number of their manuscript as provided by the Journal Office. *See example:*

- ✓ FAMILY NAME-manuscript.doc – (main manuscript file)
- ✓ FAMILY NAME-statement.PDF – (authorship statement)
- ✓ FAMILY NAME-declaration.PDF – (declaration of potential conflict of interest)
- ✓ FAMILY NAME-fig1.tiff – (Figure 1)

1.4. Peer Review Process

A manuscript submitted for publication will be submitted to the review process as long as it fits the following criteria:

- The study was not previously published, nor has been submitted simultaneously for consideration of publication elsewhere;
- All persons listed as authors approved its submission to SMJ;
- Any person cited as a source of personal communication has approved the quote;
- The opinions expressed by the authors are their exclusive responsibility;
- The author signs a formal statement that the submitted manuscript complies with the directions and guidelines of SMJ.

The editors-in-chief and associate editors will make a preliminary analysis regarding the appropriateness, quality, originality and written style/grammar of the submitted manuscript. The editors reserve the right to request additional information, corrections, and guideline compliance before they submit the manuscript to the ad-hoc review process.

SMJ uses ad-hoc reviewers, who volunteer to analyze the merit of the study. Typically, one or two expert reviewers are consulted in a double-blind process. Authors are notified by e-mail when their submission has been accepted (or rejected). Minor changes in the text may be made at the discretion of the editors-in-chief and/or associate editors. Changes can include spelling and grammar in the chosen language, written style, journal citations, and reference guidelines. The author is notified of changes via email. The final version is available to the author for his or her approval before it is published.

1.5. Open Access License and Publisher Copyright Policies



SMJ applies the Creative Commons Attribution (CC BY) license to articles and other works it publishes. If author(s) submit its paper for publication by SMJ, they agree to have the CC BY license applied to their work. Under this Open Access license, the author(s) agree that anyone can reuse their article in whole or part for any purpose, for free, even for commercial purposes.

Anyone may copy, distribute, or reuse the content as long as the author(s) and original source are properly cited. This facilitates freedom in re-use and also ensures that SMJ content can be mined without barriers for the needs of research. On the other hand, the author(s) may use content owned by someone else in their article if they have written permission to do so. If the manuscript contains content such as photos, images, figures, tables, audio files, videos, et cetera, that the author(s) do not own, SMJ will require them to provide it with proof that the owner of that content has given them written permission to use it, and has approved of the CC BY license being applied to their content. Otherwise, SMJ will ask the author(s) to remove that content and/or replace it with other content that you own or have such permission to use. SMJ provides a form the author(s) can use to ask for and obtain permission from the owner.

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license. Other publishers use licenses that allow reuse only if the same license is applied by the person or publisher reusing the content. If the article was published under a CC BY license or another license that allows free and unrestricted use, the author(s) may use the content in the submitted manuscript provided that the author(s) give proper attribution, as explained above. If the content was published under a more restrictive license, the author(s) must ascertain what rights they have under that license. SMJ advises the author(s) not to include any content in the submitted manuscript which they do not have rights to use, and always give proper attribution.

The editors of SMJ consider plagiarism to be a serious breach of academic ethics. Any author who practices plagiarism (in part or totality) will be suspended for six years from submitting new submissions to SMJ. If such a manuscript is approved and published, public exposure of the article with a printed mark (“plagiarized” or “retracted”) on each page of the published file, as well as suspension for future publication for at least six years, or a period determined by the editorial board. Third party plagiarized authors or institutions will be notified, informing them about the faulty authors. Plagiarism will result in immediate rejection of the manuscript.

SMJ only publishes studies that have been approved by an institutional ethics committee (when a study involves humans or animals). Failure to provide such information prevents its publication. To ensure these requirements, it is essential that submission documentation is complete. If you have not completed this step yet, go to SMJ website and fill out the two required documents: Declaration of Potential Conflict of Interest and Authorship Statement. Whether or not your study uses humans or animals, these documents must be completed and signed by all authors and attached as supplementary files in the originally submitted manuscript.

1.6. After Acceptance

After the manuscript has been accepted, authors will receive a PDF version of the manuscripts for authorization, as it should look in printed version of SMJ. Authors should carefully check for omissions. Reporting errors after this point will not be possible and the Editorial Board will not be eligible for them.

Should there be any errors, authors should report them to the Office e-mail address **sportmont@ac.me**. If there are not any errors authors should also write a short e-mail stating that they agree with the received version.

1.7. Code of Conduct Ethics Committee of Publications



SMJ is hosting the Code of Conduct Ethics Committee of Publications of the COPE (the Committee on Publication Ethics), which provides a forum for publishers and Editors of scientific journals to discuss issues relating to the integrity of the work

submitted to or published in their journals.

2. MANUSCRIPT STRUCTURE

2.1. Title Page

The first page of the manuscripts should be the title page, containing: title, type of publication, running head, authors, affiliations, corresponding author, and manuscript information. *See example:*

Talented High School Football Players' Perception of Talent Identification Criteria

Original Scientific Paper

Talent Identification Criteria

Vazjwar Matin¹ and Stig Arve Sæther¹

¹University of Science and Technology, Department of Sociology and Political Science, Trondheim, Norway

Corresponding author:

S. A. Sæther

Norwegian University of Science and Technology

Department of Sociology and Political Science

Dragvoll, 7491 Trondheim, Norway

E-mail: stigarve@ntnu.no

Word count: 2,946

Abstract word count: 236

Number of Tables: 3

Number of Figures: 0

2.1.1. Title

Title should be short and informative and the recommended length is no more than 20 words. The title should be in Title Case, written in uppercase and lowercase letters (initial uppercase for all words except articles, conjunctions, short prepositions no longer than four letters etc.) so that first letters of the words in the title are capitalized. Exceptions are words like: "and", "or", "between" etc. The word following a colon (:) or a hyphen (-) in the title is always capitalized.

2.1.2. Type of publication

Authors should suggest the type of their submission.

2.1.3. Running head

Short running title should not exceed 50 characters including spaces.

2.1.4. Authors

The form of an author's name is first name, middle initial(s), and last name. In one line list all authors with full names separated by a comma (and space). Avoid any abbreviations of academic or professional titles. If authors belong to different institutions, following a family name of the author there should be a number in superscript designating affiliation.

2.1.5. Affiliations

Affiliation consists of the name of an institution, department, city, country/territory (in this order) to which the author(s) belong and to which the presented / submitted work should be attributed. List all affiliations (each in a separate line) in the order corresponding to the list of authors. Affiliations must be written in English, so carefully check the official English translation of the names of institutions and departments.

Only if there is more than one affiliation, should a number be given to each affiliation in order of appearance. This number should be written in superscript at the beginning of the line, separated from corresponding affiliation with a space. This number should also be put after corresponding name of the author, in superscript with no space in between.

If an author belongs to more than one institution, all corresponding superscript digits, separated with a comma with no space in between, should be present behind the family name of this author.

In case all authors belong to the same institution affiliation numbering is not needed.

Whenever possible expand your authors' affiliations with departments, or some other, specific and lower levels of organization.

2.1.6. Corresponding author

Corresponding author's name with full postal address in English and e-mail address should appear, after the affiliations. It is preferred that submitted address is institutional and not private. Corresponding author's name should include only initials of the first and middle names separated by a full stop (and a space) and the last name. Postal address should be written in the following line in sentence case. Parts of the address should be separated by a comma instead of a line break. E-mail (if possible) should be placed in the line following the postal address. Author should clearly state whether or not the e-mail should be published.

2.1.7. Manuscript information

All authors are required to provide word count (excluding title page, abstract, tables/figures, figure legends, Acknowledgements, Conflict of Interest, and References), the Abstract word count, the number of Tables, and the number of Figures.

2.2. Abstract

The second page of the manuscripts should be the abstract and key words. It should be placed on second page of the manuscripts after the standard title written in upper and lower case letters, bold.

Since abstract is independent part of your paper, all abbreviations used in the abstract should also be explained in it. If an abbreviation is used, the term should always be first written in full with the abbreviation in parentheses immediately after it. Abstract should not have any special headings (e.g., Aim, Results...).

Authors should provide up to six key words that capture the main topics of the article. Terms from the Medical Subject Headings (MeSH) list of Index Medicus are recommended to be used.

Key words should be placed on the second page of the manuscript right below the abstract, written in italic. Separate each key word by a comma (and a space). Do not put a full stop after the last key word. *See example:*

Abstract

Results of the analysis of

Key words: *spatial memory, blind, transfer of learning, feedback*

2.3. Main Chapters

Starting from the third page of the manuscripts, it should be the main chapters. Depending on the type of publication main manuscript chapters may vary. The general outline is: Introduction, Methods, Results, Discussion, Acknowledgements

(optional), Conflict of Interest (optional). However, this scheme may not be suitable for reviews or publications from some areas and authors should then adjust their chapters accordingly but use the general outline as much as possible.

2.3.1. Headings

Main chapter headings: written in bold and in Title Case. *See example:*

- ✓ **Methods**

Sub-headings: written in italic and in normal sentence case. Do not put a full stop or any other sign at the end of the title. Do not create more than one level of sub-heading. *See example:*

- ✓ *Table position of the research football team*

2.3.2 Ethics

When reporting experiments on human subjects, there must be a declaration of Ethics compliance. Inclusion of a statement such as follow in Methods section will be understood by the Editor as authors' affirmation of compliance: "This study was approved in advance by [name of committee and/or its institutional sponsor]. Each participant voluntarily provided written informed consent before participating." Authors that fail to submit an Ethics statement will be asked to resubmit the manuscripts, which may delay publication.

2.3.3 Statistics reporting

SMJ encourages authors to report precise p-values. When possible, quantify findings and present them with appropriate indicators of measurement error or uncertainty (such as confidence intervals). Use normal text (i.e., non-capitalized, non-italic) for statistical term "p".

2.3.4. 'Acknowledgements' and 'Conflict of Interest' (optional)

All contributors who do not meet the criteria for authorship should be listed in the 'Acknowledgements' section. If applicable, in 'Conflict of Interest' section, authors must clearly disclose any grants, financial or material supports, or any sort of technical assistances from an institution, organization, group or an individual that might be perceived as leading to a conflict of interest.

2.4. References

References should be placed on a new page after the standard title written in upper and lower case letters, bold.

All information needed for each type of must be present as specified in guidelines. Authors are solely responsible for accuracy of each reference. Use authoritative source for information such as Web of Science, Medline, or PubMed to check the validity of citations.

2.4.1. References style

SMJ adheres to the American Psychological Association 6th Edition reference style. Check "American Psychological Association. (2009). Concise rules of APA style. American Psychological Association." to ensure the manuscripts conform to this reference style. Authors using EndNote® to organize the references must convert the citations and bibliography to plain text before submission.

2.4.2. Examples for Reference citations

One work by one author

- ✓ In one study (Reilly, 1997), soccer players
- ✓ In the study by Reilly (1997), soccer players
- ✓ In 1997, Reilly's study of soccer players

Works by two authors

- ✓ Duffield and Marino (2007) studied
- ✓ In one study (Duffield & Marino, 2007), soccer players
- ✓ In 2007, Duffield and Marino's study of soccer players

Works by three to five authors: cite all the author names the first time the reference occurs and then subsequently include only the first author followed by et al.

- ✓ First citation: Bangsbo, Iaia, and Krstrup (2008) stated that
- ✓ Subsequent citation: Bangsbo et al. (2008) stated that

Works by six or more authors: cite only the name of the first author followed by et al. and the year

- ✓ Krstrup et al. (2003) studied
- ✓ In one study (Krstrup et al., 2003), soccer players

Two or more works in the same parenthetical citation: Citation of two or more works in the same parentheses should be listed in the order they appear in the reference list (i.e., alphabetically, then chronologically)

- ✓ Several studies (Bangsbo et al., 2008; Duffield & Marino, 2007; Reilly, 1997) suggest that

2.4.3. Examples for Reference list

Journal article (print):

- Nepocatych, S., Balilionis, G., & O'Neal, E. K. (2017). Analysis of dietary intake and body composition of female athletes over a competitive season. *Montenegrin Journal of Sports Science and Medicine*, 6(2), 57-65. doi: 10.26773/mjssm.2017.09.008
- Duffield, R., & Marino, F. E. (2007). Effects of pre-cooling procedures on intermittent-sprint exercise performance in warm conditions. *European Journal of Applied Physiology*, 100(6), 727-735. doi: 10.1007/s00421-007-0468-x
- Krstrup, P., Mohr, M., Amstrup, T., Rysgaard, T., Johansen, J., Steensberg, A., Bangsbo, J. (2003). The yo-yo intermittent recovery test: physiological response, reliability, and validity. *Medicine and Science in Sports and Exercise*, 35(4), 697-705. doi: 10.1249/01.MSS.0000058441.94520.32

Journal article (online; electronic version of print source):

- Williams, R. (2016). Krishna's Neglected Responsibilities: Religious devotion and social critique in eighteenth-century North India [Electronic version]. *Modern Asian Studies*, 50(5), 1403-1440. doi:10.1017/S0026749X14000444

Journal article (online; electronic only):

- Chantavanich, S. (2003, October). Recent research on human trafficking. *Kyoto Review of Southeast Asia*, 4. Retrieved November 15, 2005, from <http://kyotoreview.cseas.kyoto-u.ac.jp/issue/issue3/index.html>

Conference paper:

- Pasadilla, G. O., & Milo, M. (2005, June 27). *Effect of liberalization on banking competition*. Paper presented at the conference on Policies to Strengthen Productivity in the Philippines, Manila, Philippines. Retrieved August 23, 2006, from <http://siteresources.worldbank.org/INTPHILIPPINES/Resources/Pasadilla.pdf>

Encyclopedia entry (print, with author):

- Pittau, J. (1983). Meiji constitution. In *Kodansha encyclopedia of Japan* (Vol. 2, pp. 1-3). Tokyo: Kodansha.

Encyclopedia entry (online, no author):

- Ethnology. (2005, July). In *The Columbia encyclopedia* (6th ed.). New York: Columbia University Press. Retrieved November 21, 2005, from <http://www.bartleby.com/65/et/ethnolog.html>

Thesis and dissertation:

- Pyun, D. Y. (2006). *The proposed model of attitude toward advertising through sport*. Unpublished Doctoral Dissertation. Tallahassee, FL: The Florida State University.

Book:

- Borg, G. (1998). *Borg's perceived exertion and pain scales*: Human kinetics.

Chapter of a book:

- Kellmann, M. (2012). Chapter 31-Overtraining and recovery: Chapter taken from *Routledge Handbook of Applied Sport Psychology* ISBN: 978-0-203-85104-3 *Routledge Online Studies on the Olympic and Paralympic Games* (Vol. 1, pp. 292-302).

Reference to an internet source:

- Agency. (2007). Water for Health: Hydration Best Practice Toolkit for Hospitals and Healthcare. Retrieved 10/29, 2013, from www.rcn.org.uk/newsevents/hydration

2.5. Tables

All tables should be included in the main manuscript file, each on a separate page right after the Reference section.

Tables should be presented as standard MS Word tables.

Number (Arabic) tables consecutively in the order of their first citation in the text.

Tables and table headings should be completely intelligible without reference to the text. Give each column a short or abbreviated heading. Authors should place explanatory matter in footnotes, not in the heading. All abbreviations appearing in a table and not considered standard must be explained in a footnote of that table. Avoid any shading or coloring in your tables and be sure that each table is cited in the text.

If you use data from another published or unpublished source, it is the authors' responsibility to obtain permission and acknowledge them fully.

2.5.1. Table heading

Table heading should be written above the table, in Title Case, and without a full stop at the end of the heading. Do not use suffix letters (e.g., Table 1a, 1b, 1c); instead, combine the related tables. *See example:*

- ✓ **Table 1.** Repeated Sprint Time Following Ingestion of Carbohydrate-Electrolyte Beverage

2.5.2. Table sub-heading

All text appearing in tables should be written beginning only with first letter of the first word in all capitals, i.e., all words for variable names, column headings etc. in tables should start with the first letter in all capitals. Avoid any formatting (e.g., bold, italic, underline) in tables.

2.5.3. Table footnotes

Table footnotes should be written below the table.

General notes explain, qualify or provide information about the table as a whole. Put explanations of abbreviations, symbols, etc. here. General notes are designated by the word *Note* (italicized) followed by a period.

- ✓ *Note.* CI: confidence interval; Con: control group; CE: carbohydrate-electrolyte group.

Specific notes explain, qualify or provide information about a particular column, row, or individual entry. To indicate specific notes, use superscript lowercase letters (e.g. ^{a,b,c}), and order the superscripts from left to right, top to bottom. Each table's first footnote must be the superscript ^a.

- ✓ ^aOne participant was diagnosed with heat illness and n = 19.^bn = 20.

Probability notes provide the reader with the results of the tests for statistical significance. Probability notes must be indicated with consecutive use of the following symbols: * † ‡ § ¶ || etc.

- ✓ *P<0.05,†p<0.01.

2.5.4. Table citation

In the text, tables should be cited as full words. *See example:*

- ✓ Table 1 (first letter in all capitals and no full stop)
- ✓ ...as shown in Tables 1 and 3. (citing more tables at once)
- ✓ ...result has shown (Tables 1-3) that... (citing more tables at once)
- ✓in our results (Tables 1, 2 and 5)... (citing more tables at once)

2.6. Figures

On the last separate page of the main manuscript file, authors should place the legends of all the figures submitted separately.

All graphic materials should be of sufficient quality for print with a minimum resolution of 600 dpi. SMJ prefers TIFF, EPS and PNG formats.

If a figure has been published previously, acknowledge the original source and submit a written permission from the copyright holder to reproduce the material. Permission is required irrespective of authorship or publisher except for documents in the public domain. If photographs of people are used, either the subjects must not be identifiable or their pictures must be accompanied by written permission to use the photograph whenever possible permission for publication should be obtained.

Figures and figure legends should be completely intelligible without reference to the text.

The price of printing in color is 50 EUR per page as printed in an issue of SMJ.

2.6.1. Figure legends

Figures should not contain footnotes. All information, including explanations of abbreviations must be present in figure legends. Figure legends should be written below the figure, in sentence case. *See example:*

- ✓ **Figure 1.** Changes in accuracy of instep football kick measured before and after fatigued. SR – resting state, SF – state of fatigue, * $p > 0.01$, † $p > 0.05$.

2.6.2. Figure citation

All graphic materials should be referred to as Figures in the text. Figures are cited in the text as full words. *See example:*

- ✓ Figure 1
- × figure 1
- × Figure 1.
- ✓ ...exhibit greater variance than the year before (Figure 2). Therefore...
- ✓ ...as shown in Figures 1 and 3. (citing more figures at once)
- ✓ ...result has shown (Figures 1-3) that... (citing more figures at once)
- ✓ ...in our results (Figures 1, 2 and 5)... (citing more figures at once)

2.6.3. Sub-figures

If there is a figure divided in several sub-figures, each sub-figure should be marked with a small letter, starting with a, b, c etc. The letter should be marked for each subfigure in a logical and consistent way. *See example:*

- ✓ Figure 1a
- ✓ ...in Figures 1a and b we can...
- ✓ ...data represent (Figures 1a-d)...

2.7. Scientific Terminology

All units of measures should conform to the International System of Units (SI).

Measurements of length, height, weight, and volume should be reported in metric units (meter, kilogram, or liter) or their decimal multiples.

Decimal places in English language are separated with a full stop and not with a comma. Thousands are separated with a comma.

Percentage	Degrees	All other units of measure	Ratios	Decimal numbers
✓ 10%	✓ 10°	✓ 10 kg	✓ 12:2	✓ 0.056
× 10 %	× 10 °	× 10kg	× 12 : 2	× .056
Signs should be placed immediately preceding the relevant number.				
✓ 45±3.4	✓ p<0.01	✓ males >30 years of age		
× 45 ± 3.4	× p < 0.01	× males > 30 years of age		

2.8. Latin Names

Latin names of species, families etc. should be written in italics (even in titles). If you mention Latin names in your abstract they should be written in non-italic since the rest of the text in abstract is in italic. The first time the name of a species appears in the text both genus and species must be present; later on in the text it is possible to use genus abbreviations. See example:

✓ First time appearing: *musculus biceps brachii*

Abbreviated: *m. biceps brachii*



ISSN 1451-7485

Sport Mont Journal (SMJ) is a print (ISSN 1451-7485) and electronic scientific journal (eISSN 2337-0351) aims to present easy access to the scientific knowledge for sport-conscious individuals using contemporary methods. The purpose is to minimize the problems like the delays in publishing process of the articles or to acquire previous issues by drawing advantage from electronic medium. Hence, it provides:

- Open-access and freely accessible online;
- Fast publication time;
- Peer review by expert, practicing researchers;
- Post-publication tools to indicate quality and impact;
- Community-based dialogue on articles;
- Worldwide media coverage.

SMJ is published three times a year, in February, June and October of each year. SMJ publishes original scientific papers, review papers, editorials, short reports, peer review - fair review, as well as invited papers and award papers in the fields of Sports Science and Medicine, as well as it can function as an open discussion forum on significant issues of current interest.

SMJ covers all aspects of sports science and medicine; all clinical aspects of exercise, health, and sport; exercise physiology and biophysical investigation of sports performance; sport biomechanics; sports nutrition; rehabilitation, physiotherapy; sports psychology; sport pedagogy, sport history, sport philosophy, sport sociology, sport management; and all aspects of scientific support of the sports coaches from the natural, social and humanistic side.

Prospective authors should submit manuscripts for consideration in Microsoft Word-compatible format. For more complete descriptions and submission instructions, please access the Guidelines for Authors pages at the SMJ website: <http://www.sportmont.ucg.ac.me/?sekcija=page&p=51>. Contributors are urged to read SMJ's guidelines for the authors carefully before submitting manuscripts. Manuscripts submissions should be sent in electronic format to sportmont@ac.me or contact following Editors:

Dusko BJELICA, *Editor-in Chief* – dbjelica@ac.me
Zoran MILOSEVIC, *Editor-in Chief* – zoranais@eunet.rs
Jovan GARDASEVIC, *Managing Editor* – jovan@ac.me

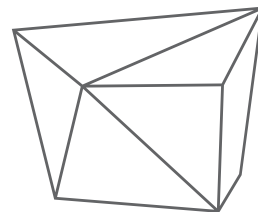
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Univerzitet Crne Gore

UNIVERZITET CRNE GORE
ARHITEKTONSKI FAKULTET

UNIVERSITY OF MONTENEGRO
FACULTY OF ARCHITECTURE



The goal of establishment of our institution is the education highly qualified professional cadre based on the best knowledge of the theory and practice in the world, and its application to the development and implementation of plans and projects in the space - as a basic condition for the quality valorization, programming, management and protection of natural and inherited built environment. In this way conceptual-

ized school forms internationally experts in all areas of creativity - in the field of urban planning, architecture, construction and design - which includes the ability to create useful objects, architectural forms of all categories, urban and vacant space at different levels. Such qualified cadre are the spiritus movens of development of culture and technology in the modern world.

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*We follow the highest academic
and professional standards*

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The University of Montenegro is the leading higher education and research institution in Montenegro. It is a public institution, established by the state, operating as a unique legal entity represented by the Rector. It is an integrated university organized on the model of the most European universities. Organizational units are competent for provision of study programmes, scientific-research and artistic work, use of allocated funds and membership in professional associations.

Since its foundation, the University of Montenegro has continuously been conducting reforms in the area of education and research, while since 2003 in line with the trends in EHEA. After adoption of the Bologna Declaration, University of Montenegro organized systematic preparation of documents aligned with it. Already in 2003, the experimental teaching programme started and today, all studies are organised in line with the Bologna principles. During the last two years systematic reforms of the University's study programmes have been conducted in order to harmonize domestic higher education system with European standards and market needs to highest extent.

The University of Montenegro has unique academic, business and development objectives. It comprises 19 faculties and two research institutes. The seat of the UoM is in Podgorica, the capital city, while university units are located in eight Montenegrin towns. The University support services and centers (advisory services, accounting department, international cooperation, career orientation) are located in the Rectorate.

Academic community of University of Montenegro is aware of the importance of its functioning for further development of the state and wider region. It has been so far, and will be in the future, the leader in processes of social and cultural changes, along with the economic development.

In the aspect of attaining its mission, University of Montenegro is oriented towards the priority social needs of the time in which it accomplishes its mission; open for all the students and staff exclusively based on their knowledge and abilities; dedicated to preservation of multicultural and multi-ethnic society in Montenegro; entrepreneurial in stimulating social and economic application of supreme achievements within the scope of its activities.

In 2015/16 there were a total of 1.192 employees at UoM, 845 of which were engaged in teaching. In the same year there were 20.236 students registered at all three cycles of studies.

Internationalization is high on the agenda of UoM priorities, thus it has participated in a number of international projects – over 50 projects funded under the Tempus programme, over 15 Erasmus Mundus Action 2 projects for student mobility, a number of projects under FP7 funding scheme or IPA supported projects, Erasmus + capacity building and International credit mobility projects and other.

For more information about University of Montenegro, please visit our website www.ucg.ac.me or send e-mail to pr.centar@ac.me.





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CRNOGORSKI OLIMPIJSKI KOMITET
MONTENEGRIN OLYMPIC COMMITTEE





**Faculty for sport
and physical education
NIKŠIĆ**

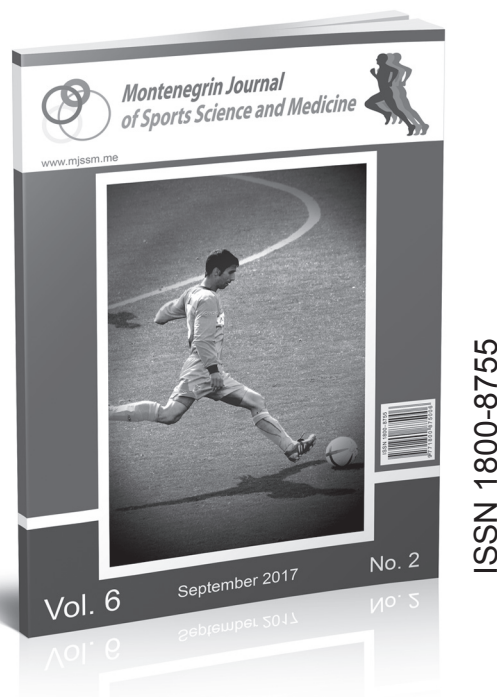


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Znanje i zdravlje!



MONTENEGRIN JOURNAL OF SPORTS SCIENCE AND MEDICINE



CALL FOR CONTRIBUTIONS

Montenegrin Journal of Sports Science and Medicine (MJSSM) is a print (ISSN 1800-8755) and electronic scientific journal (eISSN 1800-8763) aims to present easy access to the scientific knowledge for sport-conscious individuals using contemporary methods. The purpose is to minimize the problems like the delays in publishing process of the articles or to acquire previous issues by drawing advantage from electronic medium. Hence, it provides:

- Open-access and freely accessible online;
- Fast publication time;
- Peer review by expert, practicing researchers;
- Post-publication tools to indicate quality and impact;
- Community-based dialogue on articles;
- Worldwide media coverage.

MJSSM is published biannually, in September and March of each year. MJSSM publishes original scientific papers, review papers, editorials, short reports, peer review - fair review, as well as invited papers and award papers in the fields of Sports Science and Medicine, as well as it can function as an open discussion forum on significant issues of current interest.

MJSSM covers all aspects of sports science and medicine; all clinical aspects of exercise, health, and sport; exercise physiology and biophysical investigation of sports performance; sport biomechanics; sports nutrition; rehabilitation, physiotherapy; sports psychology; sport pedagogy, sport history, sport philosophy, sport sociology, sport management; and all aspects of scientific support of the sports coaches from the natural, social and humanistic side.

Prospective authors should submit manuscripts for consideration in Microsoft Word-compatible format. For more complete descriptions and submission instructions, please access the Guidelines for Authors pages at the MJSSM website: <http://www.mjssm.me/?sekcija=page&p=51>. Contributors are urged to read MJSSM's guidelines for the authors carefully before submitting manuscripts. Manuscripts submissions should be sent in electronic format to office@mjssm.me or contact following Editors:

Dusko BJELICA, Editor-in Chief – dbjelica@ac.me
Stevó POPOVIC, Editor-in Chief – stevop@ac.me
Selçuk AKPINAR, Executive Editor – sakpinar@nevsehir.edu.tr

Publication date: Spring issue – March 2018
Autumn issue – September 2018

In addition to maritime education in navigation and marine engineering, University of Montenegro - Maritime Faculty in Kotor also provides additional training for professional seafarers in:

- Different IMO model courses
- DP - Dynamic positioning courses
- Offshore courses

From 2015 runs the newly established joint training center with partners from NTNU - Aalesund in Norway, being one of the most experienced and most successful in providing offshore and DP training courses worldwide. The up-to-date bridge simulator, ac-

companied by AB simulations and instructor station, enables the organization of all the courses held as in the Norwegian training centers, with the same team of instructors and certificates. So far, a series of courses have been organized related to the operation of complex offshore equipment and team work in these demanding operations, both for students and international crews. In addition, the Kotor/Aalesund training center has recently been awarded with the Nautical Institute accreditation for holding DP (Induction and Simulator) trainings and so far has successfully launched several groups of DP operators.



OSC offshore simulator at Maritime Faculty Kotor, Montenegro



Univerzitet Crne Gore

UNIVERZITET CRNE GORE PRAVNI FAKULTET – PODGORICA

UNIVERZITET
CRNE GORE



PRAVNI
FAKULTET
PODGORICA



Pravni fakultet u Podgorici osnovan je 27. oktobra 1972. godine kao nastavno-naučna i obrazovna ustanova u kojoj se organizuje i razvija obrazovni i naučno-istraživački rad u o oblasti pravnih i njima srodnih društvenih nauka. U skupštini Socijalističke Republike Crne Gore, prilikom donošenja Zakona o osnivanju Pravnog fakulteta, istaknuto je da se „osnivanje ove visokoškolske Ustanove nameće kao neophodno sa stanovišta ukupnih društvenih potreba Republike“. Pravni fakultet je jedan od utemeljivača Univerziteta Crne Gore.

U svom četrdesetpetogodišnjem postojanju, Fakultet je izrastao u modernu, savremenu, obrazovnu naučno-istraživačku jedinicu. Na njemu se školovalo 45 generacija. Upisalo se oko 17.000 studenata. Diplomiralo je 4285. Oko 15% studenata bilo je van Crne Gore. Dio najboljih studenata stručno usavršavanje, kroz poslijediplomske studije i doktorate, nastavljalo je u drugim i svijetu poznatim univerzitetskim centrima. Većina bivših studenata životno je vezana za Crnu Goru. Na Fakultetu je radilo 88 nastavnika i saradnika, od čega je 26 bilo gostujućih. Sada uglavnom nastavu izvode i gro kadra predstavljaju bivši studenti fakulteta.

Fakultet organizuje osnovne i poslijediplomske studije.

Postoje zakonske i kadrovske mogućnosti za organizovanje specijalističkih i doktorskih studija u svim oblastima prava.

Kao univerzitetna jedinica, u okviru Univerziteta Pravni fakultet realizuje znatan dio svojih programskih ciljeva i zadataka i rješava mnoga važna pitanja organizaciono-kadrovske, tehničke i materijalne prirode. Posredstvom Univerziteta, fakultet u velikoj mjeri razvija mrežu svoje međunarodne saradnje.

Fakultet prati svjetske trendove i dostignuća u oblasti visokog školstva s ciljem da sopstvenu djelatnost uskladi sa evropskim i svjetskim zahtjevima. Sa ovom školskom godinom, čine se prvi koraci realizacije Bolonjske deklaracije. Svojim kadrom Fakultet opslužuje kompletan nastavno-obrazovni proces.

Nastao kao izraz potreba dostignutog nivoa u društveno-ekonomskom, političkom, kulturnom i socijalnom razvoju Crne Gore, fakultet je tokom cijelog svog postojanja dijelio sudbinu crnogorskog društva. Činiće to i u buduće praveći, naravno, iskorake u novu praksu i odnose primjenom modernih trendova razvijene Evrope.

Fakultet je sada postao složena organizacija i upravljačka struktura.

Faculty of Economics

University of Montenegro

The Faculty of Economics celebrated its 57th anniversary this year, and it is the oldest higher education institution in the country. Since its establishment, 8,630 students graduated at our Faculty.

Today, Faculty of Economics is a largely interdisciplinary institution, characterized by expressed dynamism in its work. Employees at the Faculty are dedicated to constant improvements and enhancements, all in accordance with the needs brought by the changes.

We provide our students with the best theoretical and practical knowledge, enabling them to develop critical spirit in approaching economic phenomena and solving concrete problems in daily work. From September 2017, at the Faculty, the new generation will start a 3 + 2 + 3 study, which will improve the quality of studying.



Development of Faculty of Economics in the coming period will follow the vision of development of the University of Montenegro, pursuing full achievement of its mission

Comprehensive literature, contemporary authors and works have always been imperative in creation of new academic directions at Faculty of Economics, which will form the basis of our future.

Faculty and its employees are dedicated to developing interest in strengthening the entrepreneurial initiative, creative and interdisciplinary approach among young people, using modern teaching and research methods. In this regard, the Faculty has modern textbooks and adequate IT technology, which supports the objectives set.





UNIVERSITY OF MONTENEGRO FACULTY OF MECHANICAL ENGINEERING Podgorica

www.ucg.ac.me/mf

Mechanical engineering studies in Montenegro started during the school year 1970/71. On April 15th, within the Technical Faculty, the Department of Mechanical Engineering was formed. The Department of Mechanical Engineering of the Technical Faculty was transformed in 1978 into the Faculty of Mechanical Engineering, within the University "Veljko Vlahović". Since 1992 the Faculty of Mechanical Engineering is an autonomous University unit of the University of Montenegro. It is situated in Podgorica.

The University of Montenegro is the only state university in the country, and the Faculty of Mechanical Engineering is the only faculty in Montenegro from the field of mechanical engineering.

Activities of the Faculty of Mechanical Engineering can be divided into three fields: teaching, scientific-research work and professional work.

Two study programmes were accredited within the Faculty of Mechanical Engineering:

- Academic study programme MECHANICAL ENGINEERING
- Academic study programme ROAD TRAFFIC

The study programmes are realised according to the Bologna system of studies in accordance to the formula 3+2+3.

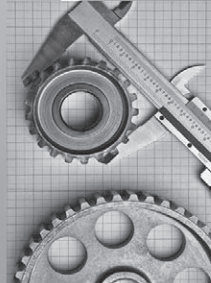
On the study program Mechanical Engineering it is possible to study next modules:

- Mechanical Engineering – Production
- Applied Mechanics and Construction
- Energetics
- Energy Efficiency
- Mechatronics
- Quality



At the Faculty of Mechanical Engineering, as organisational units, there are centres and laboratories through which scientific-re- search and professional work is done:

- Centre for Energetics
- Centre for Vehicles
- Centre for Quality
- Centre for Construction Mechanics
- Centre for Traffic and Mechanical Engineering Expertise
- Centre for transport machines and metal constructions
- 3D Centre
- Didactic Centre – Centre for Automation and Mechanomics training
- European Information and Innovation Centre
- Cooperation Training Centre
- Laboratory for Metal Testing
- Laboratory for Turbulent Flow Studies
- Laboratory for Vehicle Testing
- Laboratory for Attesting of Devices on the Technical Examination Line



www.fkmladost.me



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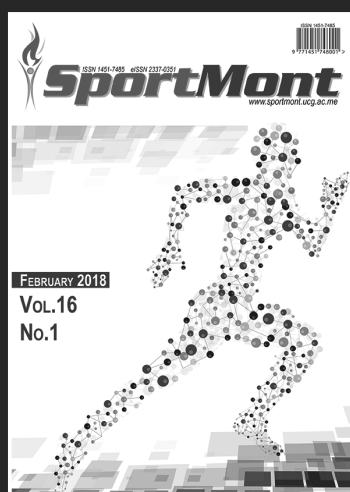
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Look Inside!



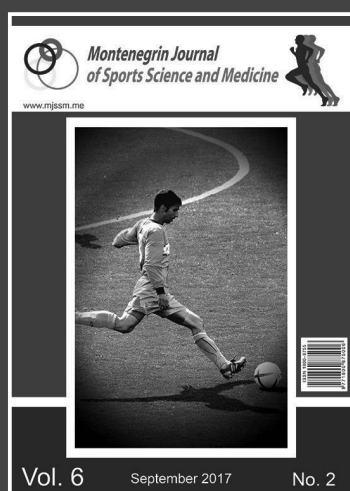
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www.mjssm.me

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15th International Scientific Conference on Transformation Processes in Sport



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SPORT PERFORMANCE

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