SPORTSKE NAUKE I ZDRAVLJE

SPORTS SCIENCE AND HEALTH

Volume 8 Issue 2

Naučno-stručni časopis iz oblasti sportskih i medicinsko-rehabilitacionih nauka
Scientific Journal in Sports and Medical-Rehabilitation Science

ISSN 2232-8211 (Print)
ISSN 2232-822X (Online)

Godina 8 • Broj 2
Decembar 2018.
Republika Srpska
Bosna i Hercegovina

Volume 8 • Issue 2
December 2018
The Republic of Srpska
Bosnia and Herzegovina

UDC: 612
UDC: 613
UDC: 796

www.siz-au.com

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SPORTSKE NAUKE I ZDRAVLJE

SPORTS SCIENCE AND HEALTH

Naučno-stručni časopis iz oblasti sportskih i medicinsko-rehabilitacionih nauka

Scientific Journal in Sports and Medical-Rehabilitation Science

Izdavač/Published by *Panevropski univerzitet "Apeiron" Banja Luka/ Pan-European University "Apeiron" Banja Luka, Bosnia and Herzegovina*

Urednik izdavača/Editor of University Publications Aleksandra Vidović, *Pan-European University "Apeiron" Banja Luka, Bosnia and Herzegovina*

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Sekretar i tehnička podrška/ Secretariat and Technical Support Oliver Krička, Bosnia and Herzegovina
Lektura/Text editing Tanja Aničić, Tijana Vasiljević
Dizajn/Design Sretko Bojić
Web dizajn/Web Design Miloš Pašić
Štampa/Printed by Art print, Banja Luka
Tiraž: 300 kom. /Printed in 300 copies/

Tematske oblasti/Themes:

- Predškolsko vaspitanje u funkciji razvoja djece
- Savremeno školsko fizičko vaspitanje u funkciji pravilnog rasta i razvoja djece i omladine
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UDC 612
UDC 613
UDC 796

SPORTS SCIENCE AND HEALTH is registered with the Ministry of Science and Technology of the Republic of Srpska by serial registration code 07.030-053-85-2/11, date 08.02.2011., number 612.
SPORTS SCIENCE AND HEALTH (ISSN 2232-8211) is an international journal published two time a year.

ISSN 2232-8211 (Print)
ISSN 2232-822X (Online)

SPORTSKE NAUKE I ZDRAVLJE

SPORTS SCIENCE AND HEALTH

Vol. 8(2018) No. 2 (113-192)

Sadržaj / Contents

Godišnja pretplata 30 EUR-a /Annual subscription is 30 EUR
Full-text available free of charge at http://www.siz-au.com

Poštovani čitaoci,

Sa posebnim zadovoljstvom ističemo da je naš Časopis stigao i u azijski dio svijeta, o čemu svedoči originalni naučni članak kolege iz Iraka!

Kažu da se „dobra riječ daleko čuje“, pa Izdavački tim vjeruje da naš Časopis iz godine u godinu biva sve prepoznatljiviji na našim prostorima, ali i u svijetu, a prije svega kvalitetnim radovima VAS, autora radova iz pet zemalja (Hrvatska, Irak, Slovenija, Srbija i Bosna i Hercegovima).

Od dvanaest prispjelih radova, recenzenti i Redakcija, odabrali su osam radova, od kojih: 4 originalna naučna članka, 2 pregledna rada i 2 kratka saopštenja. Problematika obrađena u radovima u ovom broju Časopisa je iz: sportske gimnastike, korektivne gimnastike, fizičkog vaspitanja, fizičke aktivnosti romske populacije, biomehanike-futsala i medicine.

Kriterijumi Ministarstva za naučno-tehnološki razvoj, visoko obrazovanje i informaciono društvo RS, postaju sve strožiji u kategorisanju stručnih, naučno-stručnih i naučnih publikacija, pa i časopisa, tako da nas u buduće, očekuju novi, sve zahtjevniji zadaci i rigorozumi u izdavaštvu.

Izdavački tim moli buduće autore da na to obrate pažnju, o čemu će biti objavljeno obavještenje na našoj web stranici www.siz-au.com i da se pridržavaju datih uputstava, jer radovi koji ne budu u skladu sa zahtjevima Uredništva, neće moći biti publikovani.

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Pozivamo naše dosadašnje saradnike, a posebno nove, mlade koleginice i kolege, da svojim radovima daju doprinos nastojanju da sportske nauke budu sve značajniji faktor dobrog zdravstvenog stanja ljudi, a posebno mladih.

I na kraju, podsjetimo se jedne misli Abrahama Linkolna: ***„ Ako postoji nešto što čovjek može dobro da uradi, neka to uradi. Dajte mu priliku“.***

UREDNIŠTVO ČASOPISA

DearReaders,

It is with great pleasure that we can stress that our Journal has also arrived in the Asian part of the world, as evidenced by the original scientific article from a colleague from Iraq!

They say that “a good word is heard far away”, so the Publishing Team believes that our Journal is becoming more and more recognizable not only in our region, but also in the world, above all due to the articles written by YOU - the authors from five countries (Croatia, Iraq, Slovenia, Serbia and Bosnia and Herzegovina).

Out of the 12 received papers, the reviewers and the Editorial Board selected eight papers, of which: 4 original scientific articles, 2 review papers and 2 short announcements. The subjects discussed in the articles in this issue of the Journal are: sports gymnastics, corrective gymnastics, physical education, physical activity of the Roma population, biomechanics-futsal and medicine.

The criteria of the Ministry of Science, Technology and Higher Education and the Information Association of RS are becoming stricter in the categorization of professional, professional-scientific and scientific publications, as well as journals, therefore in the future we may expect new, more demanding tasks and rigorous publishing.

The publishing team asks the future authors to pay attention to this, as it will be published on our website www.siz-au.com, and comply with the instructions given, since papers that do not comply with the requirements of the Editorial Board can not be published.

We thank all the authors who have enriched our professional and scientific periodicals with their articles, who will continue to be our collaborators in the joint effort to make the scientific word find its theoretical and practical application.

We invite our current associates, and especially new, young colleagues, to contribute to the efforts to make sports science an important factor in people’s, especially young people’s health.

Finally, let us recall a quote by Abraham Lincoln: “***If there is anything that a man can do well, I say let him do it. Give him a chance.***”

EDITORIAL BOARD OF THE JOURNAL

DOI: 10.7251/SSH1802117L
Original scientific paper

UDC: 613.72/.7:618.88-055.1
Originalni naučni rad

Physical Activity and Sexual Health in Men

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Abstract: *The primary aim of the study was to examine the correlation between the physical activity level and three factors of sexual health in men (sexual desire, sexual function and sexual satisfaction). The sample consisted of 509 male students aged 18 to 30 (M=19.70; SD=1.38). The results suggest a significantly better erectile function and sexual satisfaction in sufficiently physically active compared to insufficiently physically active men, while no significance was found in sexual desire and premature ejaculation. The findings indicate that the level of physical activity is positively related to sexual health factors, regardless of whether the dominant aerobic or anaerobic type of physical activity is practiced. Men with higher number of exercise hours on weekly basis have higher sexual desire and better erectile function. Men who are more satisfied with their own body image, have better erectile function. Although previous studies point to positive correlation between physical activity and sexual health in older age groups, this study points to better sexual health of physically active men already in the student age.*

Keywords: *exercise, sport, sexual desire, erectile function, sexual satisfaction.*

Introduction

During the past decades, a certain number of studies indicated a positive correlation between physical activity and sexual health (Leoni et al., 2014; Leško et al., 2016). Sexual difficulties involve frequent problems which cause stress and/or dissatisfaction in sexual life (Basson et al., 2000). They may be organic, psychosocial, developmental, personal or interpersonal aetiology, as well as their combination. The importance of sexual health quality and its research is reflected in the results of studies, which indicate that the quality of sexual function is of significant importance in the overall quality of men's life (Wilcox et al., 2014). From a biological point of view, sexual reactions are the consequence of a coordinated activity of the sympathetic system, parasympathetic system and somatic innervation driven by complex emotional and cognitive stimuli, as well as those related to the context which are processed in the limbic part of the forebrain (Purves et al., 2011). A hypothalamus, which integrates information from the forebrain, truncus encephali, spinal cord, and intrinsic chemo sensitive neurons, is important in regulating sexual function. Important roles in sexual functioning and behaviour have hormonal regulation and function of neurotransmitters. Testosterone is considered a hormone with a significant effect on libido in women and men (Basson et al., 2010; Isidori et al., 2005). Other hormones such as estrogens and progesterone are also present in both genders. The most common sexual disturbances in men are sexual desire disorder, erectile dysfunction and premature ejaculation, with less comorbidity compared to women (McCabe et al., 2016b). In the aetiology of hypoactive sexual desire is often hormonal imbalance (Bartlik et al., 2010), mainly low testosterone and high prolactin, imbalance of inhibitors and excitators (Janssen & Bancroft, 2006), as well as stress, interpersonal difficulties, certain psychological problems such as depression or mood disorders, and taking certain medicines. Also, lack of sexual desire may be caused by the physical inability of a partner. There are many potential causes of erectile dysfunction such as nerve damage, hormonal imbalance, previous surgery, diabetes, the use of drugs such as antidepressants, and are also often psychologically conditioned (mental difficulties, stress, anxiety associated with sexual activity, dissatisfaction with one's own body image, etc.). Erectile dysfunction shares risk factors with cardiovascular and metabolic diseases, and is often associated with lifestyle factors such as sedentary lifestyle, cigarette, alcohol and drug consumption. The causes of

premature ejaculation are still not clearly confirmed and are associated with drastic increase of hormone levels and/or neurotransmitters, anxiety, depression, previous sexual experiences etc. (Gajjala & Khalidi, 2014; McMahon et al., 2016). In the practice of sexual psychotherapy, the estimate of sexual satisfaction is one of the standard indicators of sexual health (Graziottin et al., 2006). Sexual satisfaction is a measure of satisfaction with sexual life, which includes different factors. Štulhofer & Buško (2008), whose instrument for assessing sexual satisfaction was used in this study, have explained sexual satisfaction as a complex construct of five dimensions: sexual feelings/experience, sexual focus, sexual intercourse, emotional attachment or closeness/intimacy, and sexual activities.

By comparing the results of recent studies, McCabe et al. (2016a) estimate the prevalence of erectile dysfunction to 1%-10% in men under 40. According to Selvin et al. (2007), erectile dysfunction affects approximately 18 million men in the United States (18.4%). PE is often considered a more frequent difficulty than erectile dysfunction. The prevalence of PE is usually 8% to 30%, observing all sexually active age groups (McCabe et al., 2016a), and according to some authors is estimated at 20-40% (Althof et al., 2014; Kalejaiye et al., 2017). Prevalence of hypoactive sexual desire of men is estimated at 15% to 25% at age up to 60 (Corona et al., 2005; Moreira et al., 2006; Nicolosi et al., 2004; Nolazco et al., 2004), after which it is further increased (Korfage et al., 2008). Analysing sexual function in adolescents and young adults, at least one sexual problem was observed in 51% of Canadians between the 16 and 21 (O'Sullivan et al., 2014). Data on prevalence of sexual disorders in Croatia point to a significant number of men facing sexual disturbances, with significant incidence of such disorders in the youth as well. According to Ivanković et al. (2015), male heterosexuals aged between 18 and 28 had the following difficulties: lack of sexual desire (28.8%), PE (22.7%), and erectile dysfunction (17.2%).

Examining the causes of sexual dysfunction in men, seems that some of them may be reduced by regular physical activity or exercise. Some of the causes of sexual problems such as low testosterone, imbalance of other hormones, stress, anxiety, depression, mood disorders, body image dissatisfaction, diabetes or obesity, may be prevented and reduced by regular physical activity (Barić et al., 2014; Hughes, 1984; Mišigoj-Duraković et al., 1999). Some of the immediate effects of physical activity and exercise include reducing fat tissue, improving physical condition, better coronary blood flow, endothelial and cardiorespiratory function, and triglyceride and hypertension reduction (Vina et al., 2012). There are many indirect effects of physical activity in primary and secondary prevention of cardiovascular and metabolic diseases such as diabetes, which are also some of the causes of sexual dysfunction. Physical activity and fitness are not important only for preserving quality sexual function. Physical fitness may also be important for the quality of sexual intercourse (Kalka et al., 2013). The psychological and interpersonal effects of physical activity and exercise are found to increase self-confidence, reduce anxiety, depression, fear and tension (Hughes, 1984), reduce stress, increase self-esteem and socialization (Bungić & Barić, 2009), increase the feeling of competence (Sallis et al., 2000), and a positive effect on mood and sleep quality (Vina et al., 2012). Physically active Croatian teenagers have fewer incidencies of anxiety/depression, reticence, somatic difficulties, social problems, and problems of attention (Greblo et al., 2014). Physically active male students are more satisfied with their working abilities, energy level, rest and lower levels of discomfort, pain and fatigue (Barić, 2017). Higher levels of anxiety and depression symptoms were observed in male adolescents with a lower physical activity level (Barić et al., 2014). Observing sport, according to Barić & Greblo (2012), the positive influence of sport may be observed in the development of positive characteristics and habits (self-esteem, self-confidence, persistence, goal orientation and perseverance). It may be expected that men who practice exercise and have good physical condition will have better self-esteem and body image satisfaction, which may reduce the number of stress factors when initiating sexual intercourse, but also ensure the experience of a pleasant sexual intercourse, deprived of thinking about distractors, such as thinking about how a partner sees his body. The relationship between physical activity and various factors of sexuality has been recognized and tested in a certain number of studies, most of which point to a positive association between physical activity or exercise and the level of sexual desire, the quality of sexual function and sexual satisfaction in both genders (Leško et al. 2016). Many studies recommend physical activity as an effective non-invasive and non-pharmacological prevention method for sexual difficulties and, in combine with medical treatment and medication, reduction method of already existing sexual dysfunction (Leoni et al., 2014; Leško et al., 2016). Due to global lack of research on correlation between physical activity and sexual health in people without diagnosed sexual disturbances, and on a sample of athletes, the primary aim of this paper was to examine the correlation between the physical activity level and three factors of sexual health (sexual desire, sexual function and sexual satisfaction). Also,

the correlation between the number of training hours on weekly basis and the sexual health factors, and the correlation between body image satisfaction and sexual health factors, were examined.

Method

Out of total 705 shared questionnaires, the sample consisted of 509 male students aged 18 to 30 (M=19.70; SD=1.38), from six faculties of the University of Zagreb who completed the questionnaire in full (response 72.19%). In the total sample there were 91.55% heterosexuals and 74 athletes. The research was conducted according to the ethical principles of scientific research. The data were collected by filling the standardized questionnaires: International Physical Activity Questionnaire short form (IPAQ-SF, Craig et al., 2003), New Sexual Satisfaction Scale short form (NSSZ, Štulhofer & Buško, 2008), Figure Rating Scale (FRS, Stunkard et al., 1983), an indicator for sexual desire (Štulhofer et al., 2016) with the question: *"Thinking about a typical week in the last 2 months, mark the level of your desire for sexual activity."* (scale 0-10, higher number indicates a higher level of sexual desire), and indicator of premature ejaculation (Štulhofer & Bajić, 2006) with the question: *"How often do you ejaculate in less than two minutes from the beginning of penetration into your partner?"* Participants have selected one of four responses. The survey also contained questions about general data and specific topic-related data (age, self-assessment of competition rank for the athletes, number of sport or recreational training hours on weekly basis, sexual orientation, estimation of the intensity of increasing sexual desire during and after the sport or recreational training, frequency of sexual intercourse and masturbation in the last two months). One question was only for recreational practitioners (dominant type of training: aerobic/anaerobic; the descriptions of each category are listed, with examples of activities which describe them). The sample was divided by the physical activity level criterion. The results of the IPAQ-SF questionnaire enabled participants to be categorized into one of three categories per physical activity level on weekly basis: insufficient physical activity (0-600 MET-min), minimal physical activity (601-3000 MET-min) and sufficient physical activity (>3001 MET-min). In purposes of some analysis, men who practice recreational exercise and the athletes are specifically marked. For all variables, basic descriptive parameters and Kolmogorov-Smirnov test were calculated. Mann-Whitney U test for the independent sample and series of linear bivariate regression analysis were used. One-way ANOVA and Tukey's HSD Post-hoc test were used for calculating statistical significance of mean age difference between groups of insufficiently, minimally and sufficiently physically active men.

Results

The average physical activity level was 51.41 MET/week (MDN=41.00). There were no significant differences of mean age between the groups of insufficiently, minimal and sufficiently physically active men. In 50.29% physical activity level is sufficient, in 35.16% minimal, and in 14.53% insufficient. In the further processing of the data, the physical activity level is dichotomized to sufficient (sufficient physical activity level) and insufficient level of physical activity (insufficient and minimal physical activity level) to form two groups, insufficiently physically active and sufficiently physically active men. Such a concept showed a sufficient level of physical activity in 50.29% and insufficient in 49.70% of men. Out of all physically active men, 68.35% are recreational practitioners, 28.90% athletes, and 2.73% of those who do not practice exercise. In the athlete's sample, 56.75% are competing on the County, 33.78% on the State, 9.45% on the International level, and their distribution according to sports was the following: football (34); basketball (12); handball (5); track and field, volleyball, swimming, tennis (3); Australian football, badminton, body building, golf, karate, rugby, shooting, taekwondo, Thai boxing, water polo, rowing (1). The average number of training hours on weekly basis in the total sample of men who practice exercise was 6.42 (5.54 in the recreational practitioners, 8.58 in athletes). Out of all recreational practitioners, 56.57% practice dominantly anaerobic and 43.42% aerobic type of exercise. There were 75.83% sexually active men in the last two months. Among those with sufficient physical activity, the proportion of sexually active men is 84.37%, with insufficiently physical activity 66.79% (80.57% among recreational practitioners, 91.89% among athletes). Regarding the masturbation frequency on two months basis, the results are as follows: 32.29 among sufficiently active, 32.43 among insufficiently active (29.93 in recreational practitioners, 38.49 in athletes). Sexual intercourse frequency on two months basis for those who have been sexually active was as follows: 18.27 among sufficiently active, 17.80 among insufficiently active (16.68 in recreational practitioners, 21.88 in athletes). Data from table 1 suggest that about 65% of recreational practitioners and about 55% of athletes think that the level of sexual desire

increases during their training, while about 70% of recreational practitioners and 73% of athletes think that the level of sexual desire increases after the training.

Table 1. *The proportion of people who practice exercise, according to the subjective feeling of increasing the sexual desire level during and immediately after the sport or recreational training*

	Sexual desire during the training		Sexual desire after the training	
Intensity of increase	Recreational practitioners (% of all recreational practitioners)	Athletes (% of all athletes)	Recreational practitioners (% of all recreational practitioners)	Athletes (% of all athletes)
No increase	62 (35.42%)	33 (44.59%)	51 (29.14%)	20 (27.02%)
Slightly	55 (31.42%)	15 (20.27%)	43 (24.57%)	13 (17.56)
Moderate	37 (21.14%)	16 (21.62%)	47 (26.85%)	24 (32.43%)
Severe	17 (9.71%)	7 (9.45%)	28 (16.00%)	12 (16.21%)
Very severe	6 (3.42%)	3 (4.05%)	6 (3.42%)	5 (6.75%)

Absence of erectile dysfunction was found in 43.19% of men with insufficient level of physical activity, 54.62% in those with sufficiently level of physical activity. Table 2 shows distribution of sexually active men in the past two months, according to the prevalence of premature ejaculation.

Table 2. *Distribution of sexually active men in the past two months, according to the prevalence of premature ejaculation*

		Distribution per PA level		Distribution of sufficiently PA	
PE incidence	Total sample (% of total sample)	Insufficiently PA (% of insufficiently PA)	Sufficiently PA (% of sufficiently PA)	Recreational practitioners (% of all recreational practitioners)	Athletes (% of all athletes)
Never	88 (22.79%)	40 (23.66%)	47 (21.75%)	25 (17.73%)	15 (22.05%)
Rarely	230 (59.58%)	94 (55.62%)	136 (62.96%)	94 (66.66%)	42 (61.76%)
In about half the cases	61 (15.80%)	32 (18.93%)	29 (13.42%)	19 (13.47%)	10 (14.70%)
Often	7 (1.81%)	3 (1.77%)	4 (1.85%)	3 (2.12%)	1 (1.47%)

PE-premature ejaculation, PA-physical activity

The results indicate a significantly better erectile function and sexual satisfaction in sufficiently physically active versus insufficiently physically active men, while no significance was found in the level of sexual desire and PE (table 3).

Table 3. *Results of Mann-Whitney's U Test for assessment significant differences between the groups of insufficiently and sufficiently physically active men in sexual health variables*

Variable	Insufficient PA	Sufficient PA	Mann-Whitney U Test	
	M (SD)		p	Z
Sexual desire (N=509)	6.58 (1.90)	6.75 (1.97)	0.37	-0.89
Erectile function (N=386)	20.84 (2.97)	21.39 (2.84)	0.04*	-2.03
Premature ejaculation (N=386)	3.00 (0.70)	3.05 (0.65)	0.53	-0.61
Sexual satisfaction (N=386)	45.79 (7.00)	47.13 (6.40)	0.01*	-2.38

*M-mean, SD-standard deviation, PA-physical activity, p-significance of difference (*p<0.05), Z-Z value, N-number of participants*

The results indicate a significant positive correlation of physical activity level with sexual satisfaction and quality of erectile function (table 4).

Table 4. *Results of linear bivariate regression analysis for testing the contribution of physical activity level to sexual health variables*

Independent variable	Dependent variable	N	β	p	R^2
Physical activity level	Sexual desire	509	0.04	0.32	0.00
	Erectile function	386	0.09	0.04*	0.01
	Premature ejaculation	386	0.03	0.48	0.00
	Sexual satisfaction	386	0.09	0.04*	0.01

*N-number of participants, β– standardized regression coefficient, p-significance of correlation (*p<0.05), R^2- proportion of variance of the dependent variable explained by an independent variable*

Examining the type of exercise of recreational practitioners, the results do not suggest significant differences in the domains of sexual health between the groups of men who dominantly practice aerobic or anaerobic type of exercise (table 5).

Table 5. *Results of Mann-Whitney's U test for the difference in sexual health variables between the groups of recreational practitioners who practice dominantly aerobic and anaerobic physical exercise*

Variable	Aerobic	Anaerobic	Mann-Whitney U Test	
Sexual desire	Mean		p	Z
	6.54	6.66	0.85	-0.18
Erectile function	22.20	22.06	0.62	0.48
Sexual satisfaction	48.58	50.14	0.44	-0.75

p-significance of differences at level p<0.05, Z-Z value

An analysis of differences between recreational practitioners and athletes in sexual health variables (table 6), point to significantly higher sexual satisfaction in athletes, while significance has not been confirmed for the level of sexual desire, erectile function and PE.

Table 6. *Results of Mann-Whitney's U test for assessing the difference in in sexual health variables between recreational practitioners and athletes*

Variable	Recreational	Athletes	Mann-Whitney U Test	
	Mean		p	Z
Sexual desire	6.62	7.08	0.06	1.87
Erectile function	21.39	21.47	0.89	0.13
Premature ejaculation	3.06	3.04	0.80	0.24
Sexual satisfaction	46.37	48.91	0.01	-2.57

p-significance od differences at level p<0.05, Z-Z value

The results (table 7) point to a significant positive correlation between the number of recreational or sport training hours on weekly basis and the level of sexual desire and quality of erectile function, although for those variables a very small proportion of variance of the dependent variables was observed.

Table 7. *Results of linear bivariate regression analysis to determine the contribution of the number of sport or recreational training hours on weekly basis to sexual health variables*

	Sexual desire		
Independent variable	**β**	**p**	**R^2**
Number of training hours on weekly basis	0.29	0.00**	0.02
	Erectile function		
	β	p	R^2
	0.11	0.02*	0.01
	Sexual satisfaction		
	β	p	R^2
	0.04	0.33	0.00

*β– standardized regression coefficient, p-significance of correlation (*p<0.05, **p<0.01), R^2- proportion of variance of the dependent variable explained by an independent variable*

Examining the relationship between body image satisfaction and sexual health factors (table 8), results suggest that men who are more satisfied with their body image have a better erectile function. Small proportion of erectile function variable explained by the body image satisfaction suggest that body image satisfaction is important, but not one of the most important factors to ensure the quality of erectile function.

Table 8. *Results of linear bivariate regression analysis for testing the contribution of body image satisfaction to sexual health variables*

Variable	**Body image satisfaction [α]**		
	β	**p**	**R^2**
Sexual desire	-0.04	0.36	0.00
Erectile function	-0.16	0.00**	0.02
Sexual satisfaction	-0.00	0.96	0.00

*[α]-result 0 represents satisfaction with body image (-8 to +8 represent the level of dissatisfaction), β– standardized regression coefficient, p-significance of correlation (**p<0.01), R^2- proportion of variance of the dependent variable explained by an independent variable*

Discussion and Conclusions

The association between physical activity and various factors of sexuality has been recognized in a certain number of studies, most of which suggest a positive correlation between physical activity or exercise and the level of sexual desire, quality of sexual function and sexual satisfaction, but mostly on the older sample than was used in this study (Cheng et al., 2007; Giugliano et al., 2010; Hsiao et al., 2012; Janiszewski et al., 2009; La Vignera et al., 2011). The results of this study point to a significantly better erectile function and higher sexual satisfaction in sufficiently physically active male students compared to insufficiently active ones, while the significances were not shown for the sexual desire and PE. Some of the mechanisms of better erectile function in physically active men are often explained by psychosocial and the following reasons (and their combinations): improvement of endothelial function and nitrogen oxide flow, vascularization of penile vasculature and reduction of oxidative stress (Leoni et al., 2014; Leško et al., 2016). Observing the causes of erectile dysfunction, it was noticed that it shares risk factors with cardiovascular and metabolic diseases such as diabetes, and is often associated with lifestyle factors such as sedentary lifestyle, hormonal imbalance, but also psychologically conditioned (mental difficulties, stress, anxiety associated with sexual activity, body image dissatisfaction etc.). Apart from the mentioned positive psychological effects of physical activity, mechanisms explaining better erectile function among physically active men may be found in some of the immediate effects of physical activity, such as fat tissue reduction, improved physical condition, coronary blood flow, endothelial and cardiorespiratory function, and reduction of triglyceride and hypertension (Vina et al., 2012). There are many indirect

effects of physical activity in primary and secondary prevention of cardiovascular and metabolic diseases such as diabetes, which is one of the more frequent risk factors for erectile dysfunction. As the level of physical activity in this sample explains a very small part of the total variation of sexual health factors, it may be concluded that in this young age group with good sexual health, the level of physical activity is an important but not one of the most important factors in preserving the quality of sexual health. Taking into account the results of the majority of researches that point to a higher level of association between physical activity and sexual health in the elderly, to assume is that the level of physical activity is positively associated to the factors of sexual health in young people while the size of the correlation increases by age. Although previous studies suggest that the relationship between physical activity and sexual health increases with age, this study suggests to a better sexual health of physically active men already in the student age. Some studies point to the positive effects of aerobic physical activity on sexual health (La Vignera et al., 2011; Maio et al., 2010), but the research on the relationship between anaerobic physical activity and sexual health was not found, which does not allow comparing the results with other studies. As a result of both, aerobic or anaerobic type of exercise, the level of testosterone increases (Hackney et al., 1995). Since potential mechanisms that describe the association of physical activity and sexual health such as improving endothelial function, blood circulation in the genital region, etc. (Leoni et al., 2014; Leško et al., 2016), can be achieved independently of the type of exercise, the fact that significant differences in sexual health factors by type of physical exercise were not been found, may be considered as logical. The findings indicate that physical activity is positively related to the factors of sexual health, regardless of whether the dominant aerobic or anaerobic type of physical activity is practiced.

The potential reasons of positive correlation between the number of training hours on weekly basis and the level of sexual desire and the quality of sexual function may be explained by the fact that a higher incidence of exercise allows bigger physical changes compared to occasional, less frequent exercise. In the context of the number of training hours, Mirone et al. (2004) suggest that exercise of at least two hours per week has been associated with reducing the risk of erectile dysfunction. It was noted in this study that the critical value of the total physical activity level of 3001 or more MET-min per week differs men with better and worse sexual health. Physical activity includes the entire movement during the day (leisure activities, work activities, carrying activities, carrying out household tasks, etc.). Due to the results obtained, it may be concluded that the number of training hours as one of the constituents of total physical activity, is important in preserving the quality of men's sexual function. Due to a lack of research on correlation between the number of training hours and sexual health, it is not possible to compare the results of this research.

In this study, significantly better erectile function among men who are more satisfied with their own body image was observed. Woertman & Van den Brink (2012) suggested that the problems caused by body image dissatisfaction can cause interference from all domains of sexual function, but also difficulties related to sexual behaviour in general, avoiding sexual contact, and risky sexual behaviour. Researches that have studied the correlation between body image satisfaction and sexual health are more often conducted on a female sample. By observing the relation between body image satisfaction and quality of sexual function, their association was noted in a significant number of researches. Davison and McCabe (2005) mentioned the relationship between the body image and the quality of sexual function in middle-aged men, in whom dissatisfaction with body image was related to sexual dysfunction. The findings indicate that the men in this research achieve sexual satisfaction no matter how satisfied they are with their own body image. A potential reason may be in the more direct orientation of men to sexual performance, than on the image of their own body (Purdon & Holdaway, 2006). Men who are more satisfied with their own body image are more confident (Tiwari, 2015), which may have a beneficial effect on erectile function, which may be physiologically and psychologically conditioned. Also, in comparing to women, men rarely believe that their own body image has influenced their sexual relations (Ambwani & Strauss, 2007). Sexual satisfaction is a complex construct that, apart from sexual activity itself, also includes sexual feelings/experience, sexual intercourse, sexual focus, emotional attachment or closeness/intimacy. Potential reasons for the obtained results may be found in each of the above domains, whereby certain domains are, individually, more important than the others.

Since this is a transversal research with a correlation plan, it is not possible to make causal conclusions. Although the questionnaires are not the most reliable method for assessing physical activity level (Warren et al., 2010), this is the most frequently used method (Sallis & Saelens, 2000), and the cheapest way of collecting data for a large number of participants in a short period of time (Warren et al., 2010). This study may contribute to the dissemina-

tion of information on differences in sexual health factors between sufficiently physically active and insufficiently physically active young men. Findings may be useful to doctors, sexual therapists, sport scientists and other experts in order to expand the knowledge about physical activity as one of the primary prevention methods of sexual dysfunction. Due to a global lack of research on sexual health of the athletes, this study may serve to expand the knowledge of sexual health among that specific, physically active population. Further research on national patterns of different age groups of adult men and research on the athletes of various sports, longitudinal researches and qualitative researches, which can help to explain the relationship between physical activity and sexual health, are recommended.

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Primljen: 02. novembar 2018. / Received: November 02, 2018
Prihvaćen: 26. novembar 2018. / Accepted: November 26 , 2018

DOI: 10.7251/SSH1802127Q
Original scientific paper

UDC: 796.332:572.512.087
Originalni naučni rad

The Relationship of Some Kinematic Variables of the Fixed Foot and Body and the Accuracy of Scoring While Performing Penalty by Futsal Players

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Abstract: *There is a difference in terms of the views of coaches and specialists regarding the fixed foot and position of the body. No study has been noted on futsal in which the variables of the kinematics of the fixed foot and body were analyzed. These variables have a significant importance in terms of the angle of fixed foot and body and their direction and distance. They are important in order to be accurate in scoring and specifically in the fixed balls. The objective of the study was to identify the relationship of some kinematic variables of the fixed foot and body to the accuracy of scoring when performing penalty by futsal players. The research participants were the team of the University of Koya for the academic year 2016-2017. The researcher chose the sample by deliberate method and reached 13 players. Each player has played for at least four years, and all players use the right foot, while the the average age of sample is 23.4 years, body mass 67.37 kg, body height 171 cm, and leg length 93.76 cm. The conclusions of the researcher are that the fixed foot as other parts of the body have an effective role during the scoring of a fixed ball in the game of futsal. The direction angle of the fixed foot has an impact on the mechanical axis of the body and is reflected on the accuracy of the scoring in fixed balls in futsal.*

Keywords: *Futsal Player, Kinematic Variables, Scoring.*

Introduction

Football is the most popular sport in the world (Lees, 1998). Futsal is no less important than the football and because of the small size of the futsal field, there are many stops compared to regular football. When reviewing the futsal law, we see two penalties. The first penalty is after the fifth foul (cumulative fouls). All legal fouls reward the opposing team with a penalty kick (10m) and the second penalty is 6m (FIFA Futsal, LAW12). "Most penalty kicks can be researched and subjected to biomechanical analysis" (Barfield et al., 2002; Dorge et al., 2002; Lees and Nolan, 2002; Nunome et al., 2002; Shan and Westerhoff, 2005). As the desired goal (movement analysis) cannot be reached by observation, we must address the technical scientific observation through image analysis and clarify it more accurately. Hull notes that "biomechanical analysis is one of the most important sciences to study the movement of an organism as required by mechanical laws that are appropriate to the movement nature in order to be able to give clear scientific explanations of the performance and nature of the movement" (SGHull, 1995, p.3). The researcher sees that there are many biomechanical variables that can be exploited in order to achieve a specific goal with high precision and specifically in futsal which has a goal measuring of 6 m. "The accuracy of the direction during the kick is measured by the angle between the direction of the kick and the direction required" (Wesson, 1998). This distance is narrow and the player must have a strong muscle sense in terms of placing the fixed foot in the right place in addition to placing the corners of the body because "in the performance of these kicks, all parts of the body (trunk, arms and the fixed foot) of the player are involved in the implementation and not only the foot shooting the ball, but each part of these parts has a certain role in performing the skill smoothly (Jabr, 2012)." However, the preparation of some biomechanical variables is the bridge between them. The accuracy of the scoring and the dynamic performance of the scoring skill in futsal are considered the main factors, which can be defined as the ability to kick the ball into a specific area (Finnoff, 2002).The shooting in a penalty is considered as the last step to score a goal. A goal is a skill which

the outcome of the matches depends on. Therefore, it is more effective if coaches and players are concerned to change the result in favor of their team. It is important to focus on a goal and not only a shoot. Since there are many biomechanical researches that have studied the skill of shooting the penalty, until now there are gaps that can be addressed and studied. Therefore, the importance of this research is to focus on a scientific subject by finding the relationship between some of the biomechanical variables of the fixed foot and body to the accuracy of scoring while performing the penalty by the players of futsal, especially the performance of this penalty in order to make the best achievement. The researcher hopes to participate seriously scientific in achieving the desired benefit and to know the strengths and weaknesses and the extent of the relationship between them. A dynamic analysis of the skill of the penalty (kick) can lead us to the optimal motor performance, which can be guided to upgrade the training and educational process. The objective of this study is to identify the relationship of some kinematic variables of the fixed foot and body to the accuracy of scoring when performing the penalty kick by the futsal players and also to identify the relationship of some kinematic variables of the fixed foot and body between themselves when performing the penalty kick by the futsal players. We have proposed the following hypotheses: 1 - There is a statistically significant relationship between some of the kinematic variables of the fixed foot and body to the accuracy of scoring when performing the penalty kick by futsal players. 2 - There is a statistically significant relationship between some kinematic variables of the fixed foot and body between themselves at performing the penalty kick by futsal players.

Research Methods and Materials

Data Analysis

The research community will be from the futsal team of the University of Koya for the academic year 2016-2017. The researcher chose the sample in a deliberate manner and reached 13 players. Each player has played for at least four years, and all the players use their right foot. The average age of the sample was 23.4 years, body mass 67.37 kg, body height 171 cm and leg length 93.76 cm.

Devices, Tools and Means of Collecting Information:

Three Japanese-made video cameras (Casio-High Speed-Exilim) with 1000-420-210 image/sec speed and kinovea.V8.25 program were used for the analysis of movements and extraction of results, prepared specifically for the analysis of mathematical movements, to adjust the numbers of players and their attempts.

Test Used in the Research (Shehab and A, 2008)

The researcher used the scoring test from the fixed balls on six divisions, which measures the scoring accuracy of the fixed balls on six divisions. The player (tester) shoots 6 balls from a distance of 10 meters on the divisions drawn on the target in sequence from 1-6 and re-sequencing again.

Test conditions: The player is free to use any part of the foot.

Registration: Each player shall be awarded a grade if the ball touches the required partition or its lines.

The player is given zero if the ball does not touch the required division or any of the other divisions or outside, or the ball is rolling on the ground during the scoring process. The total score of the test is 6 degrees..

Figure 1. *shows a goal in the scoring test of fixed balls on six divisions*

Kinematic variables:

The variables selected were: horizontal distance, vertical distance, vertical and horizontal distance result (hypotenuse), angle of the fixed foot direction, hip angle, knee angle and angle of the body inclination, where the fixed foot

variables were measured between the center of the gravity of the ball and the center of the gravity of the fixed foot at the moment of placing the fixed foot.

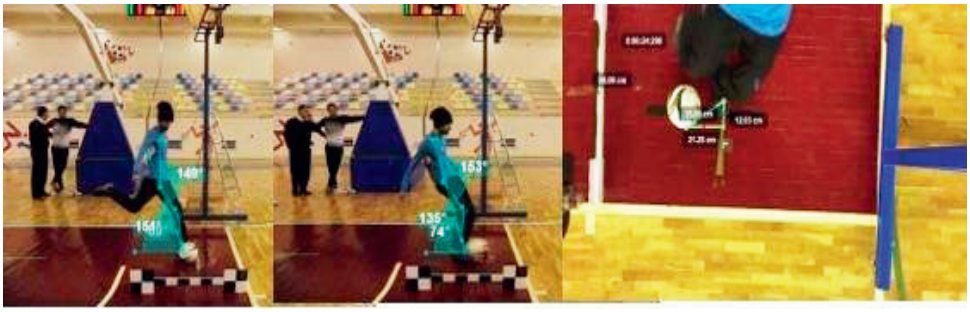

Figure 2. *shows the measurement of* **kinematic** *variables*

Precision Measurement Method:

Accuracy indicator = ideal performance total** (grade) / total of performance time (d / s)

Or accuracy indicator = total of scores / number of time of attempts.

The ideal performance is measured by the output of the performance (degree). The higher the result, the higher the accuracy of the ball, and the time of the ball (from the moment of shooting the ball to the point of arrival of the ball to the ground), through video imaging and analysis..

Figure 3. *shows the measurement of the precision indicator*

***The number of grades the tester gets while performing the penalty*

Procedures for imaging and analysis (main experiment) in order to find time and variables, the researcher used the program (kinovea.V8.25), since this program is dedicated to the analysis of sport movements to extract times, distances and angles..

The Main Test

The researcher conducted the main experiment on the selected sample of the selected players of the futsal team of the University of Koya on Tuesday, 30/2/2016 at 1:00 pm at the enclosed hall of futsal according to the measurements of FIFA and it is the hall of the School of Physical Education. The researcher gave a clear explanation of the test vocabulary before it was started and then gave a suitable period for the players for the purpose of warm-up in order to ensure the accuracy of the performance, and to detect errors and to adjust the degree of convergence of the technical performance of the player. Cameras were based according to the dimensions obtained from the exploratory experiments, therefore, the researcher used 3 (Casio-High Speed-Exilim) Japanese-made cameras with speed 1000-420-210. They also store the video recording of the movement directly into memory. The cameras were mounted on a tripod perpendicular to the midpoint of the player's movement on the right side with a distance of 3.10 meters. The height of the middle of the lens was 1.32 m, while the second camera was fixed to a holder to be above the player shooting the ball with 2.56 meters from the ground. The third camera was on the triangular holder with a distance of 11.90 meters, and the height of the middle of the lens was 1.32 m from the ground to measure the time of the ball for precision indicator. Six attempts were recorded for each player.

Statistical Means

The researcher used the statistical SPSS version 18 for data processing.

Discussion

Table 1. *Shows the computational and standard deviations of some biomechanical variables and accuracy of the fixed foot and body before kicking the ball*

Sequence	Variables	Measruing unit	Stability scoring	
			Maen	S.D
1	Horizontal distance of the foot	cm	27.37	6.82
2	Vertical distance of the foot	cm	9.94	5.02
3	The result of the foot	cm	29.13	6.40
4	Angle of the foot direction	Degree	9.76	4.29
5	Angle of inclination	Degree	70.98	4.93
6	Knee angle	Degree	145.56	12.87
7	Angle of trunk	Degree	151.59	8.28
8	Accuracy scoring	Degree	0.92	0.91

Table 2. *shows the correlation matrix between accuracy with some biomechanical variables of the base foot and the body and with some biomechanical variables between themselves before shooting the ball...*

S	Variables	Horizontal distance of the foot	Sig. (2-tailed)	Vertical distance of the foot	Sig. (2-tailed)	The result of the foot	Sig. (2-tailed)	angle of the foot direction	Sig. (2-tailed)	Angle of inclination	Sig. (2-tailed)	Knee angle	Sig. (2-tailed)	Angle of trunk	Sig. (2-tailed)	Accuracy scoring	Sig. (2-tailed)
1	Horizontal distance of the foot			0.218	0.055	0.750**	0.000	0.052	0.650	0.087	0.447	0.024	0.834	0.085	0.461	0.100	0.385
2	Vertical distance of the foot					0.199	0.081	0.022	0.848	0.219	0.055	0.079	0.494	0.047	0.683	0.017	0.883
3	The result of the foot							0.055	0.632	0.024	0.831	0.043	0.709	0.140	0.221	0.005	0.964
4	angle of the foot direction									0.218	0.055	0.356**	0.001	0.247*	0.029	0.033	0.777
5	Angle of inclination											0.399**	0.000	0.118	0.303	0.236*	0.037
6	Knee angle													0.121	0.292	0.172	0.132
7	Angle of trunk															0.087	0.447
8	Accuracy scoring																

*** Correlation is significant at the 0.01 level (2-tailed)*

** Correlation is significant at the 0.05 level (2-taile*

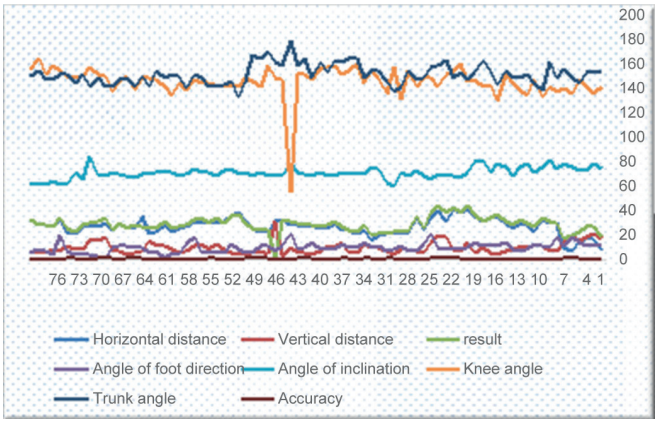

Figure 4. *Results of scoring accuracy with some biomechanical variables of the fixed foot and body before kicking the ball*

Table (2) shows that there is no statistically significant correlation between all the variables of the study with accuracy beyond the variable of the body inclination angle which formed a statistically significant correlation relationship with the value of the correlation (0.236) and the probability value (0.037) When we first come to the reason of the relationship of this variable, we see that this angle depends on the position of the foot of the base so that whenever the body inclination is as far back, the player tries to increase the bending of the knee to the foot of the strike to increase strength and vice versa. As the fixed foot position initially determines the body inclination, the knee angle of the kicking foot is increased and decreased by increasing and reducing the angle of the body inclination. This is what we see as a strong relationship between the angle of the body inclination and the angle of the knee with the value of their correlation (0.399) and a probability value (0.000) and at the end, it determines the accuracy of the strike. The other variables had no relation between themselves and with the accuracy. The researcher attributed this to the lack of interest of the research team members of the fixed foot, which has a mechanical role in the axes and rotation of the direction of the body in addition to the fact that all our players during the training units may not have been instructed to pay attention to this aspect (the base foot) by their coaches. In case of failure to confirm the status of a certain skill in all its aspects, the result is a shortage in the series of this skill. The scoring skill is the first thing where the player is to put the fixed foot to be based and then kicking, therefore practice and correcting mistakes and the establishment of this fixed foot is necessary from the kinematic and kinetic point. Because "while based on the fixed foot. a large part of the kinetic energy acquired by the player in the stage of the rapprochement diverts to potential energy and then converts this potential to kinetic energy during the process of pushing with the base foot in proportion to the nature of performance and help in the scoring process" (Arampatzis, P: 130, 1999). In addition, "scientific training is the best way for the coach to build his players and help them face the potential difficulties in the game and, through training, players can gain experience to solve the problems they face in the game" (Al-Saffar, 1987, p :).

The position of the fixed foot in terms of the horizontal or vertical distance and the angle of its direction has an impact on the accuracy of the scoring and we concluded through our research that there was no relationship between them, "The mechanical benefit of the position of the fixed foot on the left of the ball and a little late gives a mechanical advantage because the player's body will be in the best mechanical position, achieving the least torque to the direction of the line of the descending column on the foot of the base. This will also give the player balance and driving force to the striking foot, which turns to the ball" (Sumaidaie & L, 1987).

Only through the analysis we found that most of the sample put the fixed foot either advanced on the ball or beside it and this is contrary to what Loay Sumaidaie confirms - this can also be one of the reasons for the lack of relationship.

The proximity of the horizontal and vertical dimension of the fixed foot from each other is preferred when the horizontal distance is appropriate, but the vertical distance should be slightly behind the ball according to studies and according to the law of Pythagoras, as well as the result obtained by the researcher which shows that there is a relationship between horizontal distance and the result in a correlation value of (0.750).

The relationship between the angle of the direction of the fixed foot and the angle of the knee and trunk at the value of correlation (0.356, 0.247) indicates that the fixed foot has a role in directing all parts of the body and this is what we mentioned earlier..

Table 3. *Shows the computational and standard deviations of some biomechanical variables and accuracy of the fixed foot and body after kicking the ball*

Sequence	Variables	Measruing unit	Stability scoring	
			Maen	S.D
1	Horizontal distance of the foot	cm	30.57	6.44
2	Vertical distance of the foot	cm	26.18	6.23
3	The result of the foot	cm	40.24	7.39
4	Angle of the foot direction	Degree	9.24	4.61
5	Angle of inclination	Degree	78.10	5.38
6	Knee angle	Degree	138.23	11.75
7	Angle of trunk	Degree	155.04	11.06
8	Accuracy scoring	Degree	0.92	0.91

Table 4. *Shows the correlation matrix between accuracy with some biomechanical variables of the base foot and the body and with some biomechanical variables between themselves after shooting the ball*

S	Variables	Horizontal distance of the foot	Sig. (2-tailed)	Vertical distance of the foot	Sig. (2-tailed)	The result of the foot	Sig. (2-tailed)	angle of the foot direction	Sig. (2-tailed)	Angle of inclination	Sig. (2-tailed)	Knee angle	Sig. (2-tailed)	Angle of trunk	Sig. (2-tailed)	Accuracy scoring	Sig. (2-tailed)
1	Horizontal distance of the foot			0.122	0.286	0.686**	0.000	0.294**	0.000	0.110	0.337	0.097	0.396	0.059	0.605	0.144	0.208
2	Vertical distance of the foot					0.658**	0.000	0.176	1.124	0..202	0.077	0.002	0.983	0.083	0.470	0.238*	0.036
3	The result of the foot							0.121	0.293	0.133	0.244	0.148	0.195	0.125	0.277	0.259*	0.022
4	angle of the foot direction									0.041	0.722	0.171	0.134	0.044	0.702	0.213	0.061
5	Angle of inclination											0.415**	0.000	0.130	0.225	0.182	0.111
6	Knee angle													0.121	0.292	0.143	0.211
7	Angle of trunk															0.063	0.583
8	Accuracy scoring																

*** Correlation is significant at the 0.01 level (2-tailed).*

** Correlation is significant at the 0.05 level (2-tailed).*

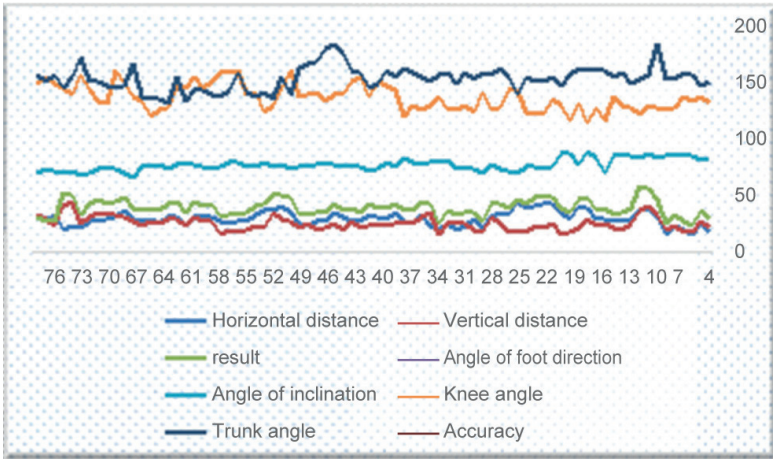

Figure 5. *Results of scoring accuracy with some biomechanical variables of the fixed foot and body after kicking the ball*

Table 4 shows that there is a statistically significant correlation between the two variables. The horizontal distance of the base foot and the vertical distance of the base foot with the mean value of the base foot is 0.86 and 0.658 respectively, and 0.000 and 0.000 respectively. The horizontal and vertical distance is the result of Pythagoras (R2 = AB2 + AC2). This indicates that the player's trunk revolves around the longitudinal axis during ball kicking, ie, a change in the horizontal and vertical distance and in the end in their outcome. The angle of direction of the fixed foot is determined according to the horizontal distance of the fixed foot. Every change in the horizontal distance changes in the angle of the base foot direction, and because of this we see that there is a relation between the horizontal distance variable and the angle of the base foot direction during shooting the ball with a correlation value of 0.294 and a probability of 0.009. In the same table, we see that only the two vertical and total distance variables were related to the accuracy variable with a correlation value 0.238 and 0.289 respectively and the remaining probability 0.036 and 0.059 while shooting the ball. The researcher attributed this to the movement of the kicking foot because of the rotation of the trunk, a change occurs in the angle of the direction of the fixed foot and this affects the angle of the body inclination and the accuracy of the strike because the path of the ball is affected by the change angle of the ball and the angle of the body inclination (a streamlined performance) because "the player's balance, the right motor ali-

gnment of the body parts, and the smooth muscular action at optimal angles have a fundamental role in the success of scoring precision mechanics" (Baumgartner, P: 48. 1995).

In general, the process of accuracy is at the expense of speed. If the player kicks the ball quickly, there will be a little accuracy and vice versa, but in terms of logic, the test should be similar to the game and prefer to cause the player strike at the highest speed because, if the player did not strike quickly during the game, the ball will be caught by the goalkeeper, especially in the narrow area of the goal of the futsal, "because the principle of privacy means containing training and learning on movements similar to the nature of performance in the futsal players' sport activities" (Fisher, p. 43, 1990) (Lamb, p: 4, 1984). Therefore, since the testers kicked the ball quickly and did not follow the position of the body, which is the first and basic basis for the fixed foot, especially for the angle of the fixed food direction which is the mechanical axis of the body. Thus it should be here with a sense of muscle and compatibility between the parts of the body during the performance of the skill because the process of kicking the ball is not limited to the muscles of the kicking foot, but shared between the majority of the muscles of the body. The studies conducted by researchers (James-Morten 1990, Kelly, Reuschlin and Hunspricker 1990, Tant 1990, Morsen and Rural 1986) have identified six characteristics to evaluate the qualitative analysis in kicking the ball by the kicking foot front and have shown these characteristics according to the sequence of appearance in the kick (focus of view, body position, fixed foot position, relay synchronization, collision force, follow-up performance) (Duane V. Kundson, 2010, p. 228-229). Players must be aware that the fixed foot is fitted in a way that suits the static work that happens to the muscles of the fixed foot and in the end it is reflected on the kicking foot..

Conclusions:

1. The fixed foot as other parts of the body have an effective role during the scoring of fixed balls in the game of futsal.
2. The direction angle of the fixed foot has an impact on the mechanical axis of the body and is reflected on the accuracy of the scoring of fixed balls in the game of futsal.
3. The farness and nearness of the fixed foot from the ball have nothing to do with the accuracy of the scoring of fixed balls in the game of futsal.
4. Before kicking the ball, the angle of the body inclination has a strong relationship with the knee angle which is reflected on the accuracy of the scoring in the game of futsal.
5. After the ball is kicked, the vertical side and the result of the fixed foot is closely related to the accuracy of scoring in the game of futsal.
6. The action line of the body inclination angle has to do with the work line of the knee angle and the angle of direction of the fixed foot before and after shooting the ball in the game of futsal.

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Primljen: 01. decembar 2018. / Received: December 01, 2018
Prihvaćen: 11. december 2018. / Accepted: December 11, 2018

DOI: 10.7251/SSH1802135J
Original scientific paper

UDC: 796.41.093:572.512
Originalni naučni rad

The Relation Between Motor Skills and Performance of Gymnastic Elements on the Floor Routine and the Vault

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Abstract: *The aim of this research was to establish a relationship between motor skills and performance of gymnastic elements on the floor routine and vault. A battery of 22 motor skills tests was assessed on the sample of 36 male subjects, students of Faculty of Physical Education and Sport, all of whom took the course "Sport Gymnastics 1". The subjects were evaluated by an expert commission in the performance of the selected elements on the floor routine (side-to-side and front-to-back cartwheel, roundoff, front and back handspring, forward and backward flip) and the vault (squat through on the vault and straddle vault with pre-flight, front handspring on vault, roundoff vault). The overall results of the canonical correlation analysis indicated to the evaluation of the applied canonical model on motor tests in relation to the performance of gymnastic elements, to the canonical correlation value of 0.998 with the Chi-Square test value of 320.11, and to statistically significant correlation of used variables on level p .00280. Through further analysis, 10 canonical roots were extracted, out of which only the first one was statistically significant (p .002). Through observation of data on the correlation between motor variables and canonical roots, it can be concluded that the standing triple jump variable and the lying medicine ball throw variable have the highest projection on the canonical factor, and thus are also most significant in conditioning the results achieved. Variables of coordination, figure eight running drill with bending under rope, lateral shuffle, agility on the floor, and agility in the air, all indicate to negative projection on the first isolated canonical factor, as do the two flexibility tests, shoulder and chest opener with rod and standing shoulder extension, pointing to the fact that the subjects with lower degree of those motor skills have also had lower performance of specific gymnastic elements. Regarding the criterion variables, the results show that the front-to-back cartwheel variable had the biggest projection, while the variables side-to-side cartwheel, back handspring, backward flip, squat through on the vault with pre-flight, and roundoff vault had almost the*

Relacije motoričkih sposobnosti i uspjeha izvođenja gimnastičkih elemenata na parteru i preskoku

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Abstract: *Cilj istraživanja je bio da se utvrde relacije motoričkih sposobnosti sa izvođenjem gimnastičkih elemenata na parteru i preskoku. Na uzorku od 36 ispitanika muškog pola, studenata Fakulteta Fizičkog vaspitanja i sporta, koji su pohađali predmet Sportska gimnastika 1, primjenjena je baterija od 24 motorička testa. Ispitanici su ocijenjeni od strane stručne komisije u izvođenju odabranih elemenata na parteru (premet strance bočno i čeono, rondat, premet naprijed i nazad, salto naprijed i nazad) i preskoku (zgrčka i raznoška sa fazom leta, premet naprijed i rondat). Generalni rezultati kanoničke analize ukazali su na vrijednost kanoničke korelacija 0.998, pri čemu je vrijednost HI kvadrat testa 320.11 te statistički značajnu povezanost korištenih varijabli na nivou p .00280. Daljom analizom dobijeno je 10 kanoničkih korijena od kojih je samo prvi pokazao statističku značajnost p .002. Posmatrajući podatke o korelacijama motoričkih varijabli sa kanoničkim korijenima može se zaključiti da varijable troskok iz mjesta i bacanje medicinke iz ležećeg položaja imaju najviše projekcije na kanonički faktor, pa prema tome i najviše uslovljavaju postignute rezultate. Varijable koordinacije: osmica sa saginjanjem, koraci u stranu, okretnost na tlu, okretnost u vazduhu, pokazuju negativnu projekciju na prvi izolovani kanonički faktor kao i testovi fleksibilnosti: iskret palicom te jarbol, ukazujući na to da su ispitanici sa nižim stepenom ovih motoričkih sposobnosti iskazali i manju uspješnost u izvođenju konkretnih gimnastičkih elemenata. Što se tiče kriterijumskih varijabli najveću projekciju pokazali su rezultati varijable premet strance čeono, dok su varijable premet strance bočno, premet nazad, salto nazad, zgrčka letom te preskok rondat imale gotovo jednaku projekciju na prvi kanonički korijen ukazujući na potrebu za većim angažmanom motoričkih sposobnosti pri izvođenju ovih elemenata.*

Ključne riječi: *gimnastika, parter, preskok, motorika, studenti.*

same projection on the first canonical root, indicating the need for greater engagement of motor skills in performing the aforementioned elements.
Keywords: *gymnastics, floor routine, vault, motor skills, students.*

Introduction

Gymnastics is known as one of those sports with a very intensive training regime that is conducted with relatively young people. In pursuit of top results and performances, the training processes have become very complex and extremely strenuous. Even though mere engagement in gymnastics at the initial level allows for different positive effects, the complicating of the acrobatic elements and performing of more demanding elements, without one's motor skills being of a high enough degree, lead to an increase in injury risk. Therefore, timely and good enough motor skill development of the individual is one of the key factors for high quality learning and demonstration of acquired knowledge (Srholj, 1989; Hume et al., 1993; Kioumourtzoglou et al., 1997; Rutkowska-Kucharska & Bobber, 1998; Gaverdovskiy, 2002; Saisoev, 2010; Hadjiev, Andonov, Dobrev, & Petrov, 2011; Petković et al., 2016; Fulurija et al., 2017; Srdić et al., 2018). With this paper, the authors wished to give a modest contribution to the field of research into connection between motor status and performance of gymnastic elements on the floor routine and the vault, so as to point to significance of high degree of motor skill preparation before the starting of training gymnastic elements in students of Faculty of Physical Education and Sport.

Methodology

The aim of this exploratory research was to calculate and determine the relations between specific motor skills and performance of technical elements on the floor routine and the vault. The research ought to contribute to defining the connection between these two fields, and defining how the degree of motor skills in male subjects contributes to the quality of performing specific sport gymnastics elements on the floor routine and the vault. The sample consisted of 36 male subjects, students of the Faculty of Physical Education and Sport in Banja Luka, aged 20 to 22. The subjects regularly attended "Sport Gymnastic 1" classes where they acquired knowledge and elements on the floor routine and the vault, after which the testing of motor skills and knowledge estimation was conducted by a committee of experts. Predictor variables are presented through a set of 22 motor tests, which are considered to cover the area of performance of the apparatus elements which were standardized by Kurelić et al. (1975) as well as by Petković, D. (1989). The following tests were applied: push-ups (MRESKL), agil-

Uvod

Gimnastika je poznata kao jedan od sportova u kojem su veoma intenzivni treninzi koji se sprovode sa relativno mladim osobama. U potrazi za vrhunskim rezultatima i izvedbama trenažni procesi su postali veoma složeni i izuzetno naporni. Iako samo bavljenje gimnastikom na početnom nivou omogućava različite pozitivne uticaje usložnjavanjem i izvođenjem zahtjevnijih akrobatskih elemenata bez posjedovanja dovoljno visokog nivoa motičkih sposobnosti povećava se i mogućnost povreda. Zato je jedan od ključnih faktora za kvalitetno učenje i demonstraciju usvojenih znanja pravovremen i dovoljno kvalitetan motorički razvoj pojedinca (Srholj 1989., Hume i sar., 1993. Kioumourtzoglou i sar., 1997., Rutowska, Kucliarska i Bober 1998., Gaverdovskiy 2002, Saisoev 2010, Hadjiev, Andonov, Dobrev & Petrov, 2011, Petković i sar. 2016, Fulurija i sar. 2017, Srdić i sar. 2018). Autori su ovim radom željeli dati skroman doprinos tom području istraživanja povezanosti motoričkog statusa sa izvođenjem gimnastičkih elemenata na parteru i preskoku, kako bi se ukazalo na značaj visokog nivoa motoričke pripremljenosti prije pristupanja obuci gimnastičkih elemenata kod studenata Fakulteta fizičkog vaspitanja i sporta.

Metod

Cilj ovog eksplorativnog istraživanja bio je da se izračunaju i utvrde relacije određenih motoričkih sposobnosti sa izvođenjem tehničkih elemenata na parteru i preskoku. Istraživanjem se želi doprinijeti definisanju povezanosti ova dva prostora te kako nivo motoričkih sposobnosti ispitanika muškog pola doprinosi kvaliteti izvođenja određenih elemenata sportske gimnastike na parteru i preskoku. Uzorak ispitanika činilo je 36 ispitanika muškog pola, studenta Fakulteta Fizičkog vaspitanja i sporta Univerziteta u Banjoj Luci, starosti između 20-22 godine. Ispitanici su redovno pohađali nastavu iz Sportske gimnastike 1 gdje su usvajali znanja i elemente na parteru i preskoku, nakon čega je izvršeno testiranje motoričkih sposobnosti i procjena znanja od strane ekspertske komisije. Prediktorske varijable su predstavljene kroz set od 24 motorička testa, za koje se smatra da pokrivaju područje uspješnog izvođenja elemenata na gimnastičkim spravama i koji su standardizovani od strane autora Kurelić i saradnici (1975) kao i Petković (1989). Primjenjeni su sljedeći testovi: sklekovi (MRESKL), okretnost na tlu (MAGONT), provlačenje i preskakanje (MBKPOP), osmica sa saginjanjem (MAGOSS), koraci u stranu (MAGKUS), stajanje na jednoj nozi uzdužno na klupici zatvorenih očiju (MBAU1Z), taping nogama

ity on the floor (MAGONT), crawling under barrier and jumping over it (MBKPOP), figure eight running drill with bending under rope (MAGOSS), lateral shuffle (MAGKUS), one leg stand facing along the beam with eyes closed (MBAU1Z), leg tapping against the wall (MBFTAZ), hand tapping (MBFTAP), leg tapping (MBFTAPN), shoulder and chest opener with rod (MFLISK), standing shoulder extension (MFLPRG), lateral arm raises (MFLONK), standing long jump (MFESDM), standing triple jump (MFETRO), lying medicine ball throw (MFEBML), supinated pull-ups (MRAZGP), laying back extensions (MRCZTL). The sample of criterion variables on the floor routine consisted of the following elements: side-to-side cartwheel (PREBO), front-to-back cartwheel (PRSTČE), roundoff (RONDAT), front handspring (PRENAP), back handspring (PRENAZ), forward flip (SALNAP), and backward flip (SALNAZ). Criterion variables of the vault consisted of the following elements: squat through on the vault with pre-flight (ZGRLET), straddle vault with pre-flight (RAZLET), front handspring vault (PRNAPR), and roundoff vault (PRERON). The level of success in performance of the elements was evaluated by a three-member committee of experts who awarded each performance grades from 1 to 5 (Table 1) using the criteria taken from Petković et al. (2016). In addition to basic descriptive parameters, all variables were also subjected to correlative analysis in order to determine the existence of relations, which was done in the statistical software SPSS 22.

Table 1. *Criteria for performance grades*

1	insufficient	The student is unable to perform an element
2	enough	The student performs the element with great technical and aesthetic errors
3	good	Student performs element with medium technical and aesthetic errors
4	very good	Student performs element with less technical and aesthetic errors
5	perfect	A student performs an element without technical and aesthetic errors

Results and Discussion

The basic statistic parameter for the predictor and criterion variables shows the normal values and indicates to normal distribution of the results. In a further process of statistical analysis, the procedure of canonical correlative analysis was conducted so as to determine the relations between motor skills of the subjects and their performance of the elements on the floor routine and the vault. The overall results of the canonical correlation (Table 2) indicate to canonical correlation value with the Chi-Square Test value 320.11, and to statistically significant connection of the used variables on level p .00280. Through further application of the analysis, 10 canonical roots were extracted, out of which only the first one was statistically significant (p .002).

o zid (MBFTAZ), taping rukama (MBFTAP), taping nogama (MBFTAPN), iskret palicom (MFLISK), jarbol (MFLPRG), odručenje (MFLONK), skok u dalj iz mjesta (MFESDM), troskok iz mjesta (MFETRO), bacanje medicinke iz ležećeg položaja (MFEBML), zgibovi pothvatom (MRAZGP), podizanje trupa ležeći na stomaku (MRCZTL). Uzorak kriterijumskih varijabli na parteru činili su sljedeći elementi: premet strance bočno (PREBO), premet strance čeono (PRSTČE), rondat (RONDAT), premet naprijed (PRENAP), premet nazad (PRENAZ), salto naprijed (SALNAP) i salto nazad (SALNAZ). Kriterijumske varijable na preskoku činili su sljedeći elementi: zgrčka sa fazom leta (ZGRLET), raznoška sa fazom leta (RAZLET), premet naprijed (PRNAPR) te rondat (PRERON). Uspješnost izvođenja elemenata je ocijenjena od strane tročlane ekspertske komisije koja je bodovala izvođenje ocjenama od 1 do 5 (tabela 1.) po kriterijumu koji je preuzet od Petković i saradnici (2016). Pored osnovnih deskriptivnih statističkih parametara za sve varijable, korištena je kanonička korelaciona analiza za utvrđivanje postojanja relacija u softverskom paketu SPSS 22.

Tabela 1. *Kriterij za ocjenjivanje uspješnosti izvođenja elemenata*

1	Nedovoljno	Student nije u mogućnosti da izvede element
2	Dovoljno	Student izvodi element uz velike tehničke i estetičke greške
3	Dobro	Student izvodi element uz srednje tehničke i estetičke greške
4	Vrlo dobro	Student izvodi element uz manje tehničke i estetičke greške
5	Odlično	Student izvodi element bez tehničkih i estetičkih grešaka

Rezultati i diskusija

Osnovni deskriptivnih statistički parametri za prediktorske i kriterijumske varijable pokazuju normalne vrijednosti i ukazuju na normalnu raspodjelu rezultata. U daljem postupku statističke analize primjenjena je procedura kanoničke korelacione analize kako bi se utvrdile relacije između motoričkih sposobnosti ispitanika i uspješnosti izvedenih elemenata na parteru i preskoku. Generalni rezultati kanoničke analize (tabela 2), ukazuju na vrijednost kanoničke korelacija 0.998, vrijednost HI kvadrat testa od 320.11 te statistički značajnu povezanost korištenih varijabli na nivou p .00280. Daljom primjenom analize dobijeno je 10 kanoničkih korijena od kojih je samo prvi pokazao statističku značajnost p .002.

Table 2. *Overall results of the canonical correlation*

		N	R	R2	HI	DF	L	P
LS	52,8	1	0.998678	0.997359	320.1077	253	0.000000	0.002802
DS	100	2	0.985930	0.972058	216.2202	220	0.000004	0.559269
RVLS	33.334	3	0.960672	0.922890	153.6120	189	0.000154	0.971835
RVDS	71.790	4	0.946480	0.895825	108.7678	160	0.001999	0.999311
CR	.998	5	0.850371	0.723130	69.1884	133	0.019185	0.999999
HI	320.11	6	0.802462	0.643946	46.7148	108	0.069293	1.000000
DF	253	7	0.700734	0.491028	28.6430	85	0.194612	1.000000
P	.00280	8	0.628389	0.394872	16.8242	64	0.382363	1.000000
		9	0.451408	0.203769	8.0337	45	0.631872	1.000000
		10	0.383409	0.147003	4.0460	28	0.793579	1.000000

Legend: *(LS = Left-set variance, DS = Right-sided variance, RVLS = Redundant left-sided variance, RVDS = Redundant right-wave variance, CR = Canonical correlation, N = Extracted eigenvalue, R = Canonical correlation, HI = hi-square test, DF = degrees of freedom, L = lambda prime, P = probability)*

Tabela 2. *Generalni rezultati kanoničke analize*

Legenda: *(LS = varijansa lijevog seta, DS = varijansa desnog seta, RVLS = redundantna varijansa lijevog seta, RVDS = redundantna varijansa desnog seta, CR = kanonička korelacija,N = ekstrahirana eigen vrijednost, R = kanonička korelacija, R2 = kanonička determinacija, HI = hi-kvadrat test, DF = stepeni slobode, L = lambda prime, P= probabilitet)*

In further analysis, as seen in Table 3, the excerpt from cross correlation matrix, the subjects showed statistically significant connection between strength tests, explosive strength tests, and coordination tests and a higher number of criterion variables, and a significantly lower number of connections between variables of coordination abilities, variables concerning speed of individual movement, and variables concerning flexibility of the shoulder zone, which discriminated the subjects and their results in performance of elements and which indicated to a complex connection between strength and flexibility of the shoulder zone and other motor skills with the goal of better performance of specific gymnastic elements. As for the variables that did not have statistically significant level of interconnection, this does not necessarily mean that they have no share in the performance of the selected gymnastic elements on the floor routine and the vault, but rather could indicate to certain ranking of required motor skill degrees in order for the demonstration of the given elements to be more successful.

U nastavku analize, inspekcijom tabele 3, koja predstavlja izvod iz matrice kroskorelacije, ispitanici su pokazali statistički značajnu povezanost testova snage, eksplozivne snage i koordinacije sa većim brojem kriterijumskih varijabli te znatno manji broj veza varijabli koje su korištene da predstave koordinaciju, varijabli iz prostora brzine pojedinačnog pokreta te varijable iz prostora fleksibilnosti ramenog pojasa, koje su diskriminisale ispitanike i njihove rezultate uspješnog izvođenja elemenata ukazujući na složenost povezanosti snage i fleksibilnosti ramenog pojasa sa ostalim motoričkim sposobnostima sa ciljem što uspješnijeg izvođenja određenih gimnastičkih elemenata. Za korištene varijable koje nisu pokazale statistički značajan nivo međusobne povezanosti ne mora da znači da nemaju udjela u izvođenju izabranih gimnastičkih elemenata na parteru i preskoku, već bi se moglo ukazati na određeno rangiranje potrebnih nivoa motoričkih sposobnosti kako bi uspješnije demonstrirali zadate elemente.

Table 3. *Excerpt from cross correlation matrix*

Tabela 3. *Izvod iz matrice kroskorelacije*

	PREBO	PRSTČE	RONDAT	PRENAP	PRENAZ	SALNAP	SALNAZ	ZGRLET	RAZLET	PREMET	PRERON
MRESKL	0.27	0.37	0.33	0.33	0.26	0.24	0.24	0.27	0.34	0.23	0.25
MFETRO	0.39	0.39	0.41	0.39	0.37	0.33	0.34	0.36	0.43	0.33	0.36
MKTOZ	-0.30	-0.35	-0.30	-0.26	-0.33	-0.33	-0.33	-0.43	-0.36	-0.30	-0.30
MBFTAZ	0.19	0.39	0.23	0.31	0.16	0.19	0.17	0.17	0.16	0.14	0.16
MRAZGP	0.21	0.34	0.26	0.32	0.25	0.23	0.23	0.29	0.29	0.22	0.23
MFLONKD	0.34	0.23	0.23	0.26	0.32	0.23	0.29	0.20	0.23	0.33	0.29

Regarding the correlation between the motor variables and canonical roots (Table 4), it can be concluded that the variables MFETRO and MFEBML have the highest projection on the canonical factor, and thus are also most significant in conditioning the results achieved, while the variables of coordination, MAGOSS, MKTOZ, MAGKUS, MAGONT, MKTOZ, have negative projection on the first isolated canonical factor, as do the flexibility tests MFLISK and MFLPRGL, indicating that the subjects with a lower degree of those motor skills have also had less success in the performance of the specific gymnastic elements. The aforementioned motor variables cover the part of the motor skills field that was researched by various authors, with the aim of reaching better knowledge acquiring of gymnastics (strength: Wolf-Cvitak, 1984; Srholj, 1989; Hume et al., 1993; coordination: Kioumourtzoglou et al., 1997; Rutkowska-Kucharska & Bobber, 1998; Šebić-Zuhrić et al., 2008; flexibility: Srholj, 1989, Hume et al., 1993). Regarding the criterion variables, the results show that PRSTČE variable had the biggest projection, while the variables PREBO, PRENAZ, SALNAZ, ZGRLET, and PRERON had almost the same projection on the first canonical root, indicating the necessity for a greater engagement of motor skills in performing those elements.

Govoreći o korelacijama motoričkih varijabli sa kanoničkim korijenima (tabela 4), može se zaključiti da varijable MFETRO i MFEBML imaju najviše projekcije na kanonički faktor, pa prema tome i najviše uslovljavaju dobijene rezultate dok varijable koordinacije MAGOSS, MKTOZ, MAGKUS, MAGONT, MKTOZ pokazuju negativnu projekciju na prvi izolovani kanonički faktor kao i testovi fleksibilnosti MFLISK i MFLPRGL, ukazujući na to da su ispitanici sa nižim stepenom ovih motoričkih sposobnosti iskazali i manju uspješnost u izvođenju konkretnih gimnastičkih elemenata. Navedene motoričke varijable pokrivaju onaj dio motoričkog prostora koji su istraživali različiti autori za kvalitetnije usvajanje gimnastičkih sadržaja (snaga : Wolf-Cvitak 1984., Srholj 1989., Hume i sar.,1993.; koordinacija: Kioumourtzoglou i sar., 1997., Rutowska - Kucliarska i Bober 1998., Šebić-Zuhrić i sar. 2008 i fleksibilnost: Srholj, 1989., Hume i sar., 1993.) Što se tiče kriterijumskih varijabli najveću projekciju pokazali su rezultati varijable PRSTČE, dok su varijable PREBO, PRENAZ, SALNAZ, ZGRLET I PRERON imale gotovo jednaku projekciju na prvi kanonički korijen ukazujući na potrebu za većim angažmanom motoričkih sposobnosti pri izvođenju ovih elemenata.

Table 4. *Canonical factors of predictor and criterion variables*

Tabela 4. *Kanonički faktori prediktorskih i kriterijumskih varijabli*

prediktorski set varijabli / *prediction set variables*	1	prediktorski set varijabli / *prediction set variables*	1	kriterijumski set varijabli / *criterion set variables*	1
MRESKL	0.32	MBFTAZ	0.31	PREBO	0.53
MFESDM	0.31	MRAZGP	0.32	PRSTČE	0.67
MFETRO	0.42	MRCZTL	-0.08	RONDAT	0.51
MBKPOP	-0.44	MFEBML	0.56	PRENAP	0.47
MAGOSS	-0.30	MBAU1ZD	0.11	PRENAZ	0.59
MAGKUS	-0.25	MBAU1ZL	0.03	SALNAP	0.49
MAGONT	-0.29	MFLPRGD	0.02	SALNAZ	0.55
MKTOZ	-0.48	MFLPRGL	-0.14	ZGRLET	0.56
MBFTAPD	0.30	MFLISK	-0.39	RAZLET	0.44
MBFTAPL	0.37	MFLONKD	0.11	PREMET	0.47
MBFTAPNL	-0.03	MFLONKL	0.09	PRERON	0.54
MBFTAPND	0.15				

Observing the results of the right set of the criterion variables (PREBO, PRSTČE, RONDAT, PRENAP, PRENAZ, SALNAP, SALNAZ, ZGRLET, RAZLET, PRNAPR and PRERON), it can be stated that all of them had connection to the first root with a higher statistical significance compared to the left set of variables. High degree of strength in both the arms and shoulder region is necessary for a better technical performance of elements on the floor routine and the vault, especially of

Posmatrajući rezultate seta kriterijumskih varijabli (PREBO, PRSTČE, RONDAT, PRENAP, PRENAZ, SALNAP, SALNAZ, ZGRLET, RAZLET, PRNAPR i PRERON), može se reći da su one sve pokazale povezanost sa prvim korijenom i to sa većom statističkom značajnošću nego što je bio slučaj sa rezultatima seta prediktorskh varijabli. Visok nivo snage ruku i ramenog pojasa potreban je za pravilnije tehničko izvođenje elemenata na parteru i preskoku, naročito kod elemenata koji imaju

elements that have push-off in the initial phase of performance (roundoff and cartwheels), and the flexibility of the shoulder region has an extremely important role in exhibiting high movement amplitudes, while a significantly high degree of strength in lower extremities has a major role in different push-offs in floor routine and vault, as well as in their timely changes (Gaverdovskiy, 2002; Šebić-Zuhrić et al., 2008; Saisoev, 2010; Hadjiev et al., 2011). Concerning the significance of coordination and agility, most attention is focused on technically correct performance of the stages of pre-flight, proper body position, and adequate rapid changes in performing selected elements. The aforementioned motor variables had a negative and a relatively high connection to performance of elements on the floor routine and the vault, indicating to a need for synthesis of all motor dimensions as crucial for better performance of specific gymnastic elements.

Conclusion

The overall results of the canonical correlation indicate to canonical correlation value with the Chi-Square Test value 320.11, and to statistically significant connection of the used variables on level p .00280. Through further application of the analysis, 10 canonical roots were extracted, out of which only the first one was statistically significant (p .002). Through observation of data on correlation between motor variables and canonical roots, it can be concluded that the standing triple jump variable and the lying medicine ball throw variable have the highest projection on the canonical factor, and thus are also most significant in conditioning the results achieved. Regarding the criterion variables, the results show that the front-to-back cartwheel variable had the biggest projection, while the variables side-to-side cartwheel, back handspring, backward flip, squat through on the vault with pre-flight, and roundoff vault had almost the same projection on the first canonical root, indicating the need for greater engagement of motor skills in performing the aforementioned elements. This research has confirmed many previous ones done on the importance of a high degree of motor skills in the acquisition and successful demonstration of gymnastic elements on the floor routine and vault, among which predominantly in importance remain strength and coordination. The obtained results can be used for better entry selection of subjects as well as for indicating to the importance of a high degree of motor skills of subjects before starting to lean gymnastic elements on the floor routine and the vault.

odriv u prvoj fazi izvođenja (rondat i premeti) sa veoma značajnom ulogom fleksibilnosti ramenog pojasa u ispoljavanju velikih amplituda pokreta, uz izuzetno značajan visok nivo snage donjih ekstremiteta koji imaju veliku ulogu pri različitim odrazima na parteru i preskoku, kao i njihove pravovremene izmjene (Gaverdovskiy 2002, Šebić-Zuhrić, L i sar. 2008, Saisoev 2010, Hadjiev, Andonov, Dobrev & Petrov, 2011). Govoreći o značajnost koordinacije i agilnosti najviše se pažnje usmjerava na tehnički pravilno izvođenje faza leta, pravilnog položaja tijela i adekvatnih brzih promjena kod elemenata koji su korišteni. Navedene motoričke varijable koordinacije i agilnosti pokazale su negativnu i relativno visoku povezanost sa izvođenjem elemenata na parteru i preskoku ukazujući na potebu sinteze svih motoričkih dimenzija kao ključne za bolji uspjeh izvođenja izabranih gimnastičkih elemenata.

Zaključak

Generalni rezultati kanoničke analize ukazali su na vrijednost kanoničke korelacija 0.998, vrijednost HI kvadrat testa od 320.11 te statistički značajnu povezanost korištenih varijabli na nivou p .00280. Daljom primjenom analize dobijeno je 10 kanoničkih korijena od kojih je samo prvi pokazao statističku značajnost p .002. Posmatrajući podatke o korelacijama motoričkih varijabli sa kanoničkim korijenima može se zaključiti da varijable *troskok iz mjesta i bacanje medicinke iz ležećeg položaja* imaju najviše projekcije na kanonički faktor, pa prema tome i najviše uslovljavaju postignute rezultate. Što se tiče kriterijumskih varijabli najveću projekciju pokazali su rezultati varijable *premet strance čeono*, dok su varijable *premet strance bočno, premet nazad, salto nazad, zgrčka letom i preskok rondat* imale gotovo jednaku projekciju na prvi kanonički korijen ukazujući na potrebu za većim angažmanom motoričkih sposobnosti pri izvođenju ovih elemenata. Ovim istraživanjem potvrđena su brojna dosadašnja istraživanja o značajnoj ulozi visokog nivoa motoričkih sposobnosti za usvajanje i uspješnu demonstraciju gimnastičkih elemenata na parteru i preskoku pri čemu među ostalima prednjače snaga i koordinacija. Dobijeni rezultati mogu se koristiti pri boljoj ulaznoj selekciji kao i ukazati na važnost visokog nivoa motoričkih sposobnosti ispitanika prije početka procesa učenja gimnastičkih elemenata na parteru i preskoku.

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Primljen: 06. novembar 2018. / Received: November 06, 2018
Prihvaćen: 29. novembar 2018. / Accepted: November 29 , 2018

DOI: 10.7251/SSH1802142M
Original scientific paper

UDC: 611.828:612.769-053.4
Originalni naučni rad

Longitudinal Skeleton Dimensionality in Children With Disturbed Body Posture

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Abstract: *Disturbed body posture in children changes the musculoskeletal system significantly. Muscular disbalance i.e. muscular asymmetry in both the sagittal and the frontal plane can affect the variation level of the longitudinal skeleton dimensionality. The conducted research included a sample of 67 children in the municipality of Subotica, out of which 22 had kyphotic disturbed body posture, 18 had lordotic disturbed body posture while 27 had flat feet. The aim of the research was to determine the differences in longitudinal dimensions in children aged 10 and 11 who have disturbed body posture. The obtained results indicate a statistically significant difference in arms' length (p=0.02).*
Key words: *posture, disturbed body posture, longitudinal dimensionality*

Introduction

The correct postural status is the basis for the proper functioning of the human body throughout life, and also contributes to a good aesthetic appearance (Kendall et al., 1968). Good postural status is reflected in a proportionate anatomical-physiological ratio between all parts of a human motor apparatus (Madić, 2014). A good postural setting of all segments of the human body contributes to the efficiency and persistence of the movement. When the condition of the muscular-skeletal balance is good, it protects from the formation and progressive development of postural disorders of those structures that hold the body in an upright position or in some other position, both in motion or at rest (Madić, 2014). A good postural status is related to the proper activation and maintenance of the locomotor apparatus, especially in critical periods of growth and development of children, and is mainly related to good living habits acquired from the earliest days. Insufficient

Longitudinalna dimenzionalnost skeleta kod dece narušene posture

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Apstrakt: *Pojava narušenog posturalnog statusa dece nosi sa sobom rizik od mogućnosti pojave niza promena na mišićno skeletnom sistemu. Bilo da se radi o narušenim držanjima u sagitalnoj ili frontalnoj ravni, mišićni disbalans tj. mišićne asimetrije mogu da "uslovljavaju " i odstupanja na nivou longitudinalne dimenzionalnsoti skeleta. Istraživanjem je bilo obuhvaćeno ukupno 67 ispitanika sa područja opštine Subotica, od čega je merenjima bilo podvrgnuto 22 ispitanika sa kifotičnim narušenim držanjem tela, 18 ispitanika sa lordotičnim lošim držanjem tela , dok je ispitanika sa ravnim stopalima bilo 27. Cilj studije je bio da se utvrde razlike u longitudinalnim dimenzijama dece uzrasta 10 i 11 godina, čija je postura narušena. Rezultati ukazuju na postojanje statistički značajne razlike u dužini gornjih ekstremiteta (p=0,02).*
Ključne reči: *postura, narušeno držanje, longitudinalna dimenzionalnost.*

Uvod

Pravilan posturalni status predstavlja osnovu za pravilno funkcionisanje čovekovog tela tokom života, a takođe doprinosi i dobrom estetskom izgledu (Kendall i sar., 1968). Dobar posturalni status se ogleda u srazmernom anatomsko fiziološkom odnosu svih delova motornog aparata čoveka (Madić, 2014). Dobra posturalna postavka svih segmenata ljudskog organizma doprinosi efikasnosti i istrajnosti pokreta. Kada je stanje mišićno skeletnog balansa dobro, ono štiti od nastajanja i progresivnog razvoja posturalnih poremećaja onih struktura koje drže telo u uspravnom stavu ili nekom drugom položaju, bilo u kretanju ili pri mirovanju (Madić, 2014). Dobar posturalni status je vezan za pravilnu aktivaciju i održavanje lokomotornog aparata, posebno u kritičnim periodima rasta i razvoja dece, i uglavnom je vezan za dobre životne navike koje se stiču od najranijih dana. Ne-

activation of the musculoskeletal system in children, conditioned by the advancement of modern technology, promotes the appearance of poor and impaired posture of the body (Choo et al., 2010). The forms and habits of human behavior have been adapted to current needs, where less and less time is spent in movement, and more and more in the sedentary regime, which may result in poor health.

The engagement in regular physical activity results in functional adaptation of the entire musculoskeletal system, and thus achieves its positive effects. Engagement in physical activity causes a number of changes in all physiological systems in the body, primarily musculoskeletal (Moreira et al., 2014; Gunter et al., 2012; Baxter et al., 2008). In addition to all the consequences that cause an impaired postural status, one of the leading consequences is reflected in changes in motor function. Insufficient muscular involvement can eventually lead to muscular imbalances, which not only have negative effects on motor skills in children, but can in the long run also cause changes in the musculoskeletal system. In order to maintain the correct postural status, it is necessary that all the links in the kinetic chain of the body function well and be in balance. The parts primarily at risk of the occurrence of postural deviations are spinal column and feet, especially in critical periods, especially affecting younger school age (Protić-Gava, 2015). According to the available data in the territory of Serbia, there is relatively large number of children of both sexes, of younger school age, with impaired postural status (Radisavljević et al., 1997). The most common deviations are seen in winged shoulder blades (21%), lordotic poor posture (44% boys and even 57% of girls) and flat feet (79%).

Reduced physical activity and sedentary lifestyle, which is increasingly present in the younger population, can consequently lead to muscular asymmetries in some segments, for example, the deviation of the shoulder blade region, or the appearance of an inferior angle of the scapula (Burkhart et al., 2003; Kibler, 2003 Kibler et al., 2002), which could later affect the formation of a impaired spinal column position. All forms of impaired posture carry certain anthropometric-morphological specificities. Muscular imbalances in the spinal column, regardless of the observed plane, when reviewing the clinical picture, may have an effect on the length of the upper extremities. Poor and insufficient musculature affects the harmonious relationship of the left and right sides of the body, and therefore can affect the dimensionality of the skeleton.

Accordingly, the aim of the study was to determine whether there are differences in the selected parameters of dimensionality (body height, sitting height, forearm

dovoljna aktivacija mišićno-skeletnog sistema kod dece, uslovljena napretkom savremene tehnologije, promoviše pojavu lošeg narušenog držanja tela (Choo i sar., 2010). Oblik i navike čovekovog ponašanja su se prilagodile aktuelnim potrebama, gde se sve manje vremena provodi u kretanju, a sve više u sedentarnom režimu, što za posledicu može da ima narušeno zdravlje.

Primena redovne fizičke aktivnosti rezultira funkcionalnim prilagođavanjem i adaptacijom celog mišićno skeletnog sistema, i na taj način ostvaruje svoje pozitivne efekte. Telo angažovano fizičkom aktivnošću uzrokuje niz promena u svim fiziološkim sistemima, u prvom redu mišićno-koštanom (Moreira i sar., 2014; Gunter i sar., 2012; Baxter i sar., 2008). Pored svih posledica koje uzrokuje narušen posturalni status, jedna od vodećih posledica se ogleda u promenama u motoričkom funkcionisanju. Nedovoljna mišićna angažovanost može vremenom dovesti do mišićnih disbalansa, koji ne samo da imaju negativne efekte na motoriku dece već u dužem vremenskom periodu mogu da uzrokuju promene na koštano-mišićnom sistemu. Da bi se održao pravilan posturalni status, neophodno je da sve karike u kinetičkom lancu organizma dobro funkcionišu i budu u balansu. Prvenstveno su podložni kičmeni stub i stopala riziku nastanka posturalnih odstupanja, pogotovu u kritičnim periodima, od kojih je jedan i mlađi školski uzrast (Protić-Gava, 2015). Prema dostupnim podacima, na području Srbije, relativno je veliki broj dece oba pola mlađeg školskog uzrasta koji imaju narušen posturalni status (Radisavljević i sar., 1997). Najčešća odstupanja se ogledaju u krilastim lopaticama (21%), lordotično lošem držanju (44% dečaci i čak 57% devojčice) i ravnom stopalu (79%).

Usled smanjene fizičke aktivnosti i sedentarnog načina života, koji je sve prisutniji u mlađoj populaciji, posledično može dovesti do mišićnih asimetrija u nekim segmentima npr., odstupanja rameno lopatične regije, odnosno pojave slabijeg skapularnog ugla (Burkhart i sar., 2003; Kibler, 2003; Kibler i sar, 2002), koje bi kasnije moglo uticati na formiranje narušene posture kičmenog stuba. Svi oblici narušene posture nose sa sobom određene antropometrijske-morfološke specifičnosti. Mišićni disbalansi u kičmenom delu, bez obzira na posmatranu ravan, kada se posmatra klinička slika, mogu imati uticaj na dužinu gornjih ekstremiteta. Slaba i insuficijentna muskulatura utiče na skladan odnos leve i desne strane tela, a samim tim može da utiče i na dimenzionalnost skeleta.

Shodno navedenom, cilj rada je bio da se utvrdi da li postoje razlike u odabranim parametrima dimenzionalnosti (telesna visina, sedeća visina, dužina podlaktice,

length, upper arm length, total arm length) in children with already established impaired posture of body segments.

Method

The sample of respondents consisted of 67 children of 10 and 11 years (± 6 months) of age, from Subotica. The sample was divided into three subsamples with an existing diagnosis given by a physician (22 respondents with a kyphotic, 18 respondents with lordotic posture, and 27 respondents with flat feet). For the estimation of the longitudinal dimensionality of the skeleton, the following parameters were measured: body height (mm), sitting height (mm), upper arm and forearm lengths and total arm length (mm). When measuring the longitudinal parameters, the standards according to the International Biological Program (IBP) have been respected in order to obtain the most relevant data. Martin anthropometer with a measurement accuracy of 0.1cm was used for all measurements of longitudinal skeleton and its segments.

Longitudinal parameters are shown through descriptive statistics (AS, S, MIN, MAX), while the univariate variance analysis (ANOVA) and the LSD Post Hock test (a series of independent t tests) were applied for determining the existence of differences between the groups of subjects for all the analyzed variables. Statistical significance was set to $p<0.05$.

Results

The study covered a total of 67 respondents from the municipality of Subotica, of which 22 respondents with kyphotic impaired body posture (32.8%), 18 respondents with lordotic poor body posture (26.9%), and 27 respondents with flat feet (40.3%). Table 1 shows the results of descriptive parameter statistics for the observed groups of respondents: with kyphotic impaired posture (K), with lordotic poor posture (L) and with flat feet (FF).

dužina nadlaktice, ukupna dužina ruke) kod dece sa već utvrđenom narušenom posturom segmenata tela.

Metod

Uzorak ispitanika je činio 67 dece uzrasta 10 i 11 godina (±6 meseci) iz Subotice. Uzorak je podeljen na tri subuzorka sa već postojećom dijagnozom datom od strane lekara (22 ispitanika sa kifotičnim, 18 ispitanika sa lordotičnim, i 27 ispitanika sa ravnim stopalima). Za procenu longitudinalne dimenzionalnosti skeleta mereni su sledeći parametri: telesna visina (mm), sedeća visina (mm), dužina nadlaktice i dužina podlaktice i ukupna dužine ruke (mm). Prilikom merenja longitudinalnih parametara ispoštovani su standardi prema Internacionalnom biološkom programu (IBP) kako bi se dobili što relevantniji podaci. Za sve mere longitudinalnosti skeleta i njegovih segmenata korišten je antropometar po Martinu, sa preciznošću merenja od 0,1cm

Longitudinalni parametri su prikazani kroz deskriptivne statistike (AS, S, MIN, MAX), dok su za utvrđivanje postojanja razlika između grupa ispitanika za sve analizirane varijable primenjeni univarijatna analiza varijanse (ANOVA) i LSD Post Hok test (serije nezavisnih t- testova). Statistička značajnost je postavljena na $p<0,05$.

Rezultati

Istraživanjem je bilo obuhvaćeno ukupno 67 ispitanika sa područja opštine Subotice, od čega je merenjima bilo podvrgnuto 22 ispitanika sa kifotičnim narušenim držanjem tela (32,8%), 18 ispitanika sa lordotičnim lošim držanjem tela (26,9%), dok je ispitanika sa ravnim stopalima bilo 27 (40,3%). U Tabeli 1. su prikazani rezultati deskriptivnih statistika parametara za posmatrane grupe ispitanika: sa kifotičnim narušenim držanjem (K), ispitanika sa lordotičnim narušenim držanjem (L) i ispitanika sa ravnim stopalima (RS).

Table 1 *Descriptive statistics of longitudinal parameters*

Tabela 1. *Deskriptivni statistici longitudinalnih parametara*

	Grupa / *Group*	AS	S	MIN	MAX
Telesna visina (mm) / *Body height (mm)*	K	1543.86	63.28	1390	1630
	L	1556.11	84.32	1375	1705
	RS	1511.67	77.78	1370	1660
Sedeća visina (mm) / *Sitting height (mm)*	K	702.23	41.71	625	790
	L	708.33	70.79	560	815
	RS	695.15	66.74	565	820
Dužina nadlaktice (mm) / *Upper arm length (mm)*	K	221.55	10.23	200	241
	L	221.67	10.91	204	250
	RS	217.41	7.92	202	232
Dužina podlaktice (mm) / *Forearm lenght (mm)*	K	206.05	12.94	184	236
	L	210.00	13.81	190	240
	RS	203.96	8.60	190	219
Dužina ruke (mm) / *Arm length (mm)*	K	595.05	21.31	535	636
	L	598.00	28.15	551	666
	RS	577.41	28.96	521	629

Legend: *AM - arithmetic mean; S – standard deviation; MIN – minimum result; MAX – maximum result*

Legenda: *AS – aritmetička sredina; S – standardna devijacija; MIN – minimalni rezultat; MAX – maksimalni rezultat*

Table 2 shows the results of quantitative differences in the longitudinal dimensionality of the skeleton at the univariate level. Based on the results of the F ratio, it can be concluded that there was a statistically significant difference only for the variable *Arm length* (p = 0.02). In other analyzed variables, statistically significant differences were not observed (p> 0.05).

U Tabeli 2. prikazani su rezultati kvantitativnih razlika longitudinalne dimenzionalnosti skeleta na univarijatnom nivou. Na osnovu rezultata F odnosa, može se zaključiti da je postojala statistički značajna razlika samo u varijabli *Dužina ruke* (p=0,02). U ostalim analiziranim varijablama statistički značajne razlike nisu uočene (p>0,05).

Table 2 *Differences between groups of respondents (ANOVA)*

Tabela 2. *Razlike između grupa ispitanika (ANOVA)*

Varijabla / *Variable*	F	p
Telesna visina (mm) / *Body height (mm)*	2,16	0,12
Sedeća visina (mm) / *Sitting height (mm)*	0,26	0,77
Dužina nadlaktice (mm) / *Upper arm length (mm)*	1,48	0,24
Dužina podlaktice (mm) / *Forearm lenght (mm)*	1,46	0,24
Dužina ruke (mm) / *Arm length (mm)*	4,21	0,02

Legend: *F – F test; p – level of statistical significance of the F test*

Legenda: *F – F test; p – nivo statističke značajnosti za F test*

In order to gain a clearer insight between which groups there were accurately statistically significant differences, a t - test for independent samples was applied. The values are presented through differences between arithmetic means using the LSD Post Hock test (Table 3). Statistically significant differences occurred between the groups with kyphotic poor posture and flat feet (p = 0.02) in favor of respondents with kyphotic poor posture, and there was also a difference between respondents with lordotic poor posture and flat-footed respondents (p = 0.02) in favor of

Da bi se dobio jasniji uvid između kojih grupa tačno su postojale statistički značajne razlike primenjen je t – test za nezavisne uzorke. Vrednosti su predstavljene kroz razlike aritmetičkih sredina uz primenu LSD Post Hock testa (Tabela 3.). Statistički značajne razlike su se pojavile između grupa sa kifotično lošim držanjem i ravnim stopalima (p=0,02) u korist ispitanika sa kifotičnim lošim držanjem, a takođe se javila razlika između ispitanika sa lordotičnim lošim držanjem i ispitanika sa ravnim stopalima (p=0,02) u korist ispitanika sa lordotičnim lo-

respondents with lordotic poor posture. In both groups of respondents, values were observed pointing to longer upper extremities compared to the group with flat feet.

Table 3. *Results of the analysis of the series of t-tests (LSD) and differences between AMs*

Varijabla / *Variable*	(I) Grupa / *Group*	(J) Grupa / *Group*	Razlika AS / *Difference between AMs* (I-J)	p
Telesna visina (mm) / *Body height (mm)*	K	L	-12,25	0,61
		RS	32,20	0,14
	L	K	12,25	0,61
		RS	44,44	0,06
	RS	K	-32,20	0,14
		L	-44,44	0,06
Sedeća visina (mm) / *Sitting height (mm)*	K	L	-5,61	0,77
		RS	7,58	0,67
	L	K	5,61	0,77
		RS	13,19	0,48
	RS	K	-7,58	0,67
		L	-13,19	0,48
Dužina nadlaktice (mm) / *Upper arm length (mm)*	K	L	-0,12	0,97
		RS	4,14	0,15
	L	K	0,12	0,97
		RS	4,26	0,16
	RS	K	-4,14	0,15
		L	-4,26	0,16

Legend: p *– level of statistical significance of the t- test*

Table 3 (continued). Results of the analysis of the series of t-tests (LSD) and differences between AMs

Dužina podlaktice (mm) / *Forearm lenght (mm)*	K	L	-3,96	0,29
		RS	2,08	0,54
	L	K	3,96	0,29
		RS	6,04	0,09
	RS	K	-2,08	0,54
		L	-6,04	0,09
Dužina ruke (mm) / *Arm length (mm)*	K	L	-2,91	0,73
		RS	17,68	0,02
	L	K	2,91	0,73
		RS	20,59	0,01
	RS	K	-17,68	0,02
		L	-20,59	0,01

Legend: *p – level of statistical significance of the t test*

Discussion

The aim of this paper is to determine whether there are differences in the selected parameters of skeletal di-

šim držanjem. U obe grupe ispitanika su uočene vrednosti koje upućuju na duže gornje ekstremitete u odnosu na grupu sa ravnim stopalima.

Tabela 3. *Rezultati analize serija t-testova (LSD) i razlike AS*

Legenda: *p – nivo statističke značajnosti t- testa*

Nastavak tabele 3. Rezultati analize serije t-testova (LSD) i razlike AS

Legenda: *p – nivo statističke značajnosti t testa*

Diskusija

Cilj rada je bio da se utvrdi da li postoje razlike u odabranim parametrima dimenzionalnosti skeleta kod

mensionality in children with already established impaired posture. The obtained data indicate that subjects with impaired posture of the spinal column at sagittal level (kyphotic and lordotic) had longer upper extremities. Due to developmental specifics, pre-puberty period is characterized by rapid growth and development, which can lead to weaker ligament connections, due to the inability of the muscles to cope with rapid bone growth. The results obtained by the research (Weinstein et al., 2008; Yilikoski, 2005; Yilikoski, 2003) have shown that children with an impaired posture of spinal column are generally higher than the standard population of the same age, which could be related to the observed difference between the groups of respondents in our study. Some studies (Ylikoski et al., 2005; Cheung et al., 2003; Escalada., 2005; Yrjonen et al., 2006) also emphasize the importance of the pre-puberty period in terms of impaired posture. The relation between the measures of longitudinality and disturbed posture is also indicated by studies (Bogdanović and Milenković, 2009), where they pointed out the correlation between body height and muscle imbalances. Considering the age of the sample examined in this study, a correlation could be created between the developmental specificities and the obtained values of the longitudinality of the upper extremities. The increased longitudinality of the skeleton is one of the prerequisites for creating an impaired posture. Studies carried out (Trajković and Nikolić, 2008; Bogdanović and Milenković, 2009) also pointed to the significant correlation between the increased longitudinality of the skeleton with muscular imbalances on the spinal column.

The intense growth of long tubular bones accompanying the pre-puberty and puberty period can affect the body's muscularity that is not able to follow such changes, which can lead to impaired body posture. Changes in observed longitudinality of extremities in respondents with kyphotic poor posture compared to the group of flat-footed respondents could be attributed to changes occurring in a typically pronounced kyphotic posture. A typical kypothic body posture the result of a change in the length of the muscles, specifically shortened deep muscles of chest cavity, such as the external and internal intercostal muscles (*mm. intercostalis externi etinterni*) and transverse chest muscle (*m. transversus thoracis*) that lead to characteristic forward-rounded shoulder. On the other hand, weak and elongated musculature of the muscles of the back, especially the muscles of upper third (superficial and deep muscles) can also lead to the forward-roundness of the shoulder, which could be associated with increased longitudinality of the upper extremities.

The weakened musculature of the abdominal region

dece sa već utvrđenom narušenom posturom. Dobijeni podaci ukazuju na to da su ispitanici sa narušenim držanjem kičmenog stuba u sagitalnoj ravni (kifotično i lordotično) imali duže gornje ekstremitete. Predpubertetski period, zbog razvojnih specifičnosti, karakteriše nagli rast i razvoj, koji može dovesti do slabijih ligamentarnih veza, usled nemogućnosti mišića da proprate ubrzan rast kostiju. Rezultati dobijeni istraživanjima (Weinstein i sar., 2008; Yilikoski, 2005; Yilikoski, 2003) su pokazala da su deca sa narušenom posturom kičmenog stuba generalno viša u odnosu na standardnu populaciju istog uzrasta, što bi se moglo dovesti u vezu sa dobijenom razlikom unutar grupa ispitanika u našem istraživanju. Pojedine studije (Ylikoski i sar., 2005; Cheung i sar., 2003; Escalada., 2005; Yrjonen i sar., 2006), takođe ističu značaj predpubertetskog perioda kada su u pitanju narušena držanja. Da postoji veza između mera longitudinalnosti i narušenih držanja ukazuju i istraživanja (Bogdanović i Milenković, 2009), gde su ukazali na povezanost telesne visine i mišićnih disbalansa. Obzirom na uzrast ispitivanog uzorka u ovom istraživanju, mogle bi da se dovedu u vezu razvojne specifičnosti sa dobijenim vrednostima longitudinalnosti gornjih ekstremiteta. Povećana longitudinalnost skeleta je jedan od preduslova za stvaranje narušenog držanja. Istraživanja koje su sprovedena (Trajković i Nikolić, 2008; Bogdanović i Milenković, 2009) su takođe ukazala na značajnu povezanost povećane longitudinalnosti skeleta sa mišićnim disbalansima na kičmenom stubu.

Intenzivan rast dugih cevastih kostiju koji prati predpubertetski i pubertetski period može da utiče na muskulaturu tela koja nije u stanju da prati takve promene, što može da dovode do narušenih držanja tela. Promene primećene u longitudinalnosti ekstremiteta kod ispitanika sa kifotično lošim držanjem u odnosu na grupu ispitanika sa ravnim stopalima bi se mogle pripisati promenama koje nastaju kod tipično izraženog kifotičnog držanja. Tipična slika kifotičnog držanja tela je rezultat promena u dužini mišića, gde kod skraćenih dubokih mišića grudnog koša, kao što su spoljni i unutrašnji međurebarni mišići (*mm. intercostales externi et interni*) i poprečni grudni mišić (*m. transversus thoracis*) koji daju karakterističnu zaobljenost u ramenom delu ka napred. Sa druge strane, slaba i izdužena muskulatura mišića leđa, pogotovo mišića gornje trećine (površinskih i dubokih) takođe može da utiče na povlačenje ramena prema napred što bi se moglo dovesti u vezu sa povećanom longitudinalošću gornjih ekstremiteta.

Oslabljena muskulatura abdominalne regije dodatno može da ima uticaja na narušena držanja u sagitalnoj i

can additionally have an effect on disturbed postures in the sagittal and frontal plane. The insufficiency of the abdominal region can lead to the abdominal wall protrusion (Ishida & Kuwajima, 2001; Penha et al., 2005) and lowering followed by pulling the shoulder belt which can result in higher longitudinal dimensions of the upper extremities.

Another aspect of interpreting the results obtained could be related to functional asymmetries caused by hemispheric brain domination. Voluntary interactions with the environment and life habits can cause functional adjustment. This can be observed from the aspect of a long sitting in front of the computer. Biomechanical adaptation to the characteristic position can cause the strengthening of motor paths which may result in the pushing of the shoulder-blade region forwards. Interaction with the environment and the influence of certain motor stimulants can result in functional lateralization, or dominance of certain muscle groups (Mostoflei and Banica., 2010).

In addition to the results obtained, the research also has some disadvantages. First of all, the fact that a sample of respondents is composed of children at the pre-puberty stage, which additionally makes it difficult to make conclusions. In order to obtain objective data when it comes to impaired posture and the values of longitudinal dimensionality it would be desirable to look at these changes in the period of completed growth and development, or in early childhood. This way, one could obtain the results that "eliminate" the phase of intense growth and development, and some other factors of influence could be correlated. In addition, a relatively small number of respondents per group limits a more certain conclusion. There is also an issue of further research by expanding and comparing results with a group of respondents without determined postural deviations and obtaining a clearer insight into mechanisms related to the growth and development of children of this age.

Conclusion

On the basis of the obtained results it can be said, as a general conclusion, that the longitudinality of the skeleton is in direct correlation with the occurrence of impaired body posture. Based on the analysis, the existence of differences in the length of the long tubular bones of the upper extremities is observed. The intense growth of long tubular bones and the fact that the body's muscularity does not accompany such a change can lead to various manifestations of body deformities characterized as poor body postures in children, which further leads to weakness of the ligament apparatus and reduced tone. More detailed control and early detection of impaired conditions is needed in order to reduce the number of children with changes that may lead to other musculoskeletal changes.

frontalnoj ravni. Insuficijencija abdominalne regije utiče na protruziju trbušnog zida (Ishida & Kuwajima., 2001; Penha i sar.,2005) i spuštanje praćeno povlačenjem ramenog pojasa što za rezultat može da ima povišene longitudinalne mere gornjih ekstremiteta.

Još jedan aspekt tumačenja dobijenih rezultata mogao bi da se odnosi na funkcionalne asimetrije uzrokovane hemisfernom dominacijom mozga. Dobrovoljne interakcije sa okolinom i životnim navikama mogu da uzrokuju funkcionalno prilagođavanje. To se može posmatrati iz ugla dugotrajnog sedenje za računarom. Biomehaničko prilagođavanje karakterističnom položaju može da uzrokuje jačanje motornih puteva koji za posledicu mogu da imaju povlačenje rameno-lopatične regije prema napred. Interakcija sa okolinom i uticajem određenih motoričkih stimulansa može da dovede do funkcionalne lateralizovanosti, odnosno dominacije određenih mišićnih grupa (Mostoflei i Banica., 2010).

Pored navedenih dobijenih rezultata, istraživanje ima i određene nedostatke. Kao prvo, činjenica je da je uzorak ispitanika sastavljen od dece u fazi predpuberteta, što dodatno otežava izvođenje zaključaka. Kako bi se došlo do objektivnih podataka kada su u pitanju narušena držanja i vrednosti longitudinalne dimenzionalnosti poželjno bi bilo sagledati upravo te promene u periodu završenog rasta i razvoja, ili pak u ranom detinjstvu. Na taj način bi se dobili rezultati koji "eliminišu" fazu intenzivnog rasta i razvoja pa bi se u vezu mogli dovesti i neki drugu faktori uticaja. Pored ovoga, relativno mali broj ispitanika po grupama limitira konkretnije zaključivanje. Otvara se i pitanje daljeg istraživanja u ovoj problematici proširivanjem i poređenjem rezultata sa grupom ispitanika bez utvrđenih posturalnih odstupanja i dobijanja jasnije slike o mehanizmima vezanim za rast i razvoj dece ovog uzrasta.

Zaključak

Na osnovu dobijenih rezultata kao generalni zaključak se može reći da je longitudinalnost skeleta u direktnoj vezi sa nastankom narušenih držanja. Na osnovu analize, konstatuje se postojanje razlika u dužini dugih cevastih kostiju gornjih ekstremiteta. Intenzivan rast dugih cevastih kostiju i činjenice da muskulatura tela ne prati takve promene, može da dovede do raznih pojava u vidu telesnih deformiteta okarakterisanih kao loša držanja tela kod dece, što dalje dovodi do slabosti ligamentarnog aparata i smanjenog tonusa. Potrebna je detaljnija kontrola i rana detekcija narušenih stanja kako bi se smanjio broj dece sa promenama koje mogu da budu okosnica za stvaranje drugih mišićno-koštanih promena.

Families, sports clubs and schools have to deal more with this problem. Prevention and early detection of impaired body posture are the key to success in their elimination. The ability to recognize the impaired body posture by a pedagogue of physical education is one of the important links in the problem-solving chain.

Porodica, sportski klubovi i škole moraju se više pozabaviti ovim problemom. Prevencija i rana detekcija kada su u pitanju narušena držanja su ključ uspeha u otklanjanju istih. Mogućnost prepoznavanja narušenih držanja tela od strane pedagoga fizičke kulture jedna je od značajnih karika u lancu rešavanja problema.

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Primljen: 23. novembar 2018. / Received: November 23, 2018
Prihvaćen: 16. decembar 2018. / Accepted: December 16 , 2018

DOI: 10.7251/SSH1802150H
Paper review

UDC: 376.7-053.4(=214.58)
Pregledni rad

Physical Activity as a Chance for Roma Children Living in Unfavorable Conditions

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Abstract: *Until now no larger child sample of exclusively Roma ethnicity has been investigated concerning their basic somatic and motor performance attributes. The aim of the present comparison of Roma and non-Roma prepubertal and pubertal boys was to analyse if there were differences in some anthropometric measures and running performance to see if Roma children fall behind their non-Roma peers in growth and development, and if so, to what extent. Kinanthropometric data collection was carried out in 184 volunteer Roma boys aged 6.51 and 14.50 years. For a control group, exactly the same number of non-Roma subjects was selected randomly from each age group of the same region - Kanjiza and Novi Knezevac.*

Keywords: *BMI, running, endurance.*

Introduction

Roma children, members of the poorest national minorities, are the children who need special social care. According to the data presented in the analysis of the primary education system in Serbia"... Roma population has a low percentage of enrollment in school, low level of attendance, low grade finish, high repetition rates and a high drop out of school rate. The largest number of children who start elementary education leave the school before finishing the fourth grade (Unicef, 2001). Teachers working with Roma children do not know enough about the problems and culture of the Roma population because they do not get any knowledge in this field during their education and professional development. Within their schools, they are

Fizička aktivnost kao šansa za romsku decu u nepovoljnim životnim uslovima

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Apstrakt: *Veoma su retka i danas istraživanja koja prikazuju morfološke i motoričke pokazatelje romske dece i koja se problematikom bave u odgovarajućem obimu što se tiče humane biologije, ali i statističkih zakonitosti. Cilj našeg istraživanja je bio da se uporede razvojni pokazatelji romske i neromske dece razne uzrasne dobi i da se izvrši analiza između pokazatelja telesnog razvoja kao i rezultata u motoričkim postignućima. Naravno ukoliko se utvrdi da su razlike signifikantne da se utvrdi u kojoj meri romska deca zaostaju u razvoju. U istraživanje smo uključili 184 učenika koji su se deklarisali da pripadaju romskoj populaciji na teritoriji opština Kanjiža i Novi Kneževac, a u uzorak smo uzeli i dečake neromske populacije u istom broju. Starosna dob dečaka iz obe skupine (romske i neromske dece) nalazio se rasponu između 6,51 i 14,50 godina u periodu istraživanja.*

Ključne reči: *BMI, brzina, izdržljivost.*

Uvod

Romska deca, pripadnici naše najsiromašnije nacionalne manjine, jesu deca kojoj je potrebna posebna društvena briga. Prema podacima prikazanim u analizi sistema osnovnog obrazovanja u Srbiji "...romska populacija ima nizak procenat upisa u školu, nizak nivo pohađanja nastave, nizak nivo završavanja razreda, visok procenat ponavljanja i visok nivo odustajanja od škole. Najveći broj dece koja su započela osnovno školovanje školu napušta pre nego što završi četvrti razred" (Unicef, 2001). Učitelji koji rade s romskom decom ne znaju dovoljno o problemima i kulturi Roma jer tokom školovanja i profesionalnog razvoja ne dobijaju obuku iz ove oblasti. Unutar svojih škola, oni su najčešće percipirani kao prosvetni

often perceived as teachers who do not achieve success. Failure of the class is mostly attributed to the (non)capability of Roma children, the environment in which they grow up and the characteristics of Roma families, so the teachers themselves often feel helpless and unmotivated. Inclusion of Roma children in education, as well as their survival in the education system, means sensitizing the school environment towards interculturality and recognizing the specificity of the educational needs of Roma children. For a better experience of their own efficiency and a more successful step towards the inclusion of Roma children, it is important to strengthen the professional roles of teachers as partners in pedagogical communication, affective interaction, regulation of social relations in the department (Ivić et al., 2001), as well as the competence for the development of tolerance and respect for diversity (Proposed strategies for improving the education of Roma in the FRY, 2003). The purpose of this research is to point out the possibility of encouraging professional competencies of teachers in working with Roma children in the field of systematic development of motor capabilities and monitoring the anthropological indicators. Living in Central Europe, the Roma people have built their specific life habits that are territorially distinct, but have globally led to more or less expressed isolation. Two important and socially complex factors are emphasized in the mentioned relations. The first factor relates to the low level of education in the Roma population, which leads to a lower standard of living that is lagging behind the living standards in Serbia, Vojvodina. In this context, we need to look at the second set of factors which is reflected in the low level of education, in a critical socio-economic status (due to direct and indirect mechanisms), in a noticeably shorter lifespan in both sexes of the Roma population compared to the non-Roma population. It is indisputable to mention the genetic, cultural and environmental factors which, although with different relative weight, can still influence the growth and development of children as well as their motor capabilities. By comparing the anthropological and motor indicators between Roma and non-Roma children, we wanted to get answers to the folowing questions: Are there humanobiological differences between our respondents in the anthropological characteristics and in motor performance? The next objective was to determine the extent of the differentiation when revealing significant differences.

Indicators of School Success among Roma Students

The specificity of acquiring education of Roma children in different European countries refers to their, as a rule, much lower educational achievements than the achievements

radnici čija odeljenja ne postižu uspeh. Neuspeh odeljenja u najvećoj meri se pripisuje (ne)sposobnostima romske dece, sredini u kojoj ona odrastaju i karakteristikama romskih porodica, pa se i sami učitelji najčešće osećaju bespomoćno i nemotivisano. Uključivanje romske dece u obrazovanje, kao i njihov opstanak u obrazovnom sistemu, podrazumeva senzitivizaciju školske sredine u pravcu interkulturalnosti i prepoznavanja specifičnosti obrazovnih potreba romske dece. Za bolji doživljaj sopstvene efikasnosti i uspešniji korak ka inkluziji romske dece, značajno je jačanje profesionalnih uloga nastavnika kao partnera u pedagoškoj komunikaciji, afektivnoj inter-akciji, regulisanju socijalnih odnosa u odeljenju (Ivić i saradnici, 2001), kao i kompetencija za razvoj tolerancije i uvažavanje različitosti (Predlog strategije unapređenja obrazovanja Roma u SRJ, 2003). Smisao ovog rada je da ukaže na mogućnosti podsticanja profesionalnih kompetencija učitelja u radu s romskom decom na planu sistematskog razvoja motoričkih sposobnosti i praćenja antropoloških pokazatelja. Živeći na prostorima Srednje Evrope Romi su izgradili svoje specifične životne navike koji se teritorijalno razlikuju ali su globalno doveli do manje ili više izražene izolacije. Dva važna i društveno kompleksna faktora se ističu u spomenutim odnosima. Prvi faktor se odnosi na nizak nivo školske spreme kod romske populacije što dovodi do izraženo nižeg životnog standarda koji zaostaje iza standarda življenja u Srbiji, Vojvodini. U ovom kontekstu moramo da se osvrnemo na drugi sklop faktora koji se ogleda u niskom stepenu školovanja, u kritičnom socio ekonomskom statusu (zbog direktnih i indirektnih mehanizama), u uočljivo kraćem životnom veku kod oba pola pripadnika romske populacije u odnosu na neromsku populaciju. Neosporno je da spomenuti genetski, kulturni i činioci životne sredine iako sa različitom relativnom težinom ipak mogu uticati na rast i razvoj dece kao i na njihove motoričke pokazatelje. I pored već postojećih i sve izraženijih razlika u uzorku romske dece u odnosu na neromsku decu u Srbiji,Vojvodini veoma mali broj istraživanja se bavi ovom problematikom. Upoređivanjem antropoloških i motoričkih pokazatelja između romske i neromske dece hteli smo dobiti odgovore na pitanja: postoje li humanobiološke razlike između naših ispitanika u antropološkim karakteristikama i u motoričkim postignućima. Sledeći cilj je bio da se prilikom otkrivanja značajnih razlika odredi i mera diferencijacije.

Analiza školskog uspeha romskih učenika

Izrazita specifičnost sticanja obrazovanja romske dece u različitim evropskim državama, odnosi se na nji-

of non-Roma children, regardless of age and gender. The results presented in the comparative study of Roma children in Europe show that in France 95% of the interviewed teachers consider that their Roma students have insufficient achievements. In Spain, teachers assess the academic achievements of their Roma students with an average grade of 4.3 (on a scale of 10), as opposed to an average grade for non-Roma students which is 6.9. The relationship between school success and students age is inversely proportional: the older the student is, the worse success he or she has (OPRE ROMA, 2002 p. 73)[1]. Available data on educational achievements of Roma students in Serbia, presented in the Monitoring Report *The equal availability of high quality education for Roma*[2], also points to their significantly lower school performance compared to the majority (Baucal, 2005, according to *Equal accessibility...,* 2007). In the National Testing of third-year school students (hereinafter: National Testing), one-time testing on a representative sample of schools (5000 students in 113 schools) data on school grades of Roma and non-Roma students in mathematics and Serbian language were collected. There is a significant difference in the achievements of Roma and non-Roma students in these two subjects. At the end of the school year, most Roma students had the lowest passing grade (2), and only 5-10% of Roma students had an excellent grade (5), as opposed to over 40% of non-Roma students who achieved this grade in the first three grades in both of these subjects. In addition, 7-11% of Roma students 'achieved' an insufficient grade (1) in the Serbian language subject, at the end of the year, 10-14% of Roma students had an insufficient grade (1) in mathematics, while among non-Roma students there were less than 1% of those who had an insufficient grade at the end of the school year. Overall, the results of Roma students on standardized national testing tests showed that after three years of education, 50% of them did not master the basic knowledge and basic concepts in mathematics and were not able to apply mathematical knowledge in simple situations (at national level, this occurs in 11% of cases); and 56% did not acquire basic knowledge and skills in the Serbian language (at national level this occurs in 14% of cases). According to some interpretations, this

hova po pravilu, mnogo niža obrazovna postignuća od postignuća neromske dece, bez obzira na uzrast i pol. Rezultati prikazani u komparativnoj studiji *Obrazovanje romske dece u Evropi* govore da u Francuskoj 95% intervjuisanih učitelja smatra da njihovi romski učenici imaju nedovoljna postignuća. U Španiji, učitelji akademska postignuća svojih romskih učenika ocenjuju prosečnom ocenom 4,3 (na skali do 10), za razliku od prosečne ocene za neromske učenike od 6,9. Odnos između školskog uspeha i uzrasta učenika je obrnuto proporcionalan: što stariji učenik, to gori uspeh (OPRE ROMA, 2002 str. 73)[1]. Dostupni podaci o obrazovnim postignućima romskih učenika u Srbiji, predstavljeni u Izveštaju o monitoringu *Jednaka dostupnost kvalitetnog obrazovanja za Rome*[2], takođe ukazuju na njihov znatno lošiji školski uspeh u odnosu na većinu (Baucal, 2005, prema *Jednaka dostupnost...,* 2007). Na *Nacionalnom testiranju učenika trećeg razreda osnovne škole* (u daljem tekstu Nacionalno testiranje), jednokratnom testiranju na reprezentativnom uzorku škola (5000 učenika u 113 škola), prikupljeni su podaci o školskim ocenama romskih i neromskih učenika iz matematike i srpskog jezika. U školskim postignućima romskih i neromskih učenika iz ova dva predmeta postoji značajna razlika. Na kraju školske godine, većina romskih učenika ima najnižu prolaznu ocenu (2), a samo 5-10 % romskih učenika ima odličnu ocenu (5), za razliku od preko 40 % neromskih učenika koji dobijaju ovu ocenu u prva tri razreda iz oba predmeta. Pored toga, od 7-11 % romskih učenika dobija nedovoljnu ocenu (1) iz sprskog jezika na kraju godine, odnosno 10-14 % romskih učenika dobija nedovoljnu ocenu iz matematike, dok među neromskim učenicima ima manje od 1% onih koji dobijaju jedinicu na kraju školske godine. Pored toga, rezultati romskih učenika na standardizovanim testovima Nacionalnog testiranja pokazuju da posle tri godine školovanja, 50 % njih nije savladalo ni najosnovnija znanja i elementarne pojmove iz matematike i nije sposobno da primeni matematičko znanje u jednostavnim situacijama (na nacionalnom nivou to se dešava u 11 % slučajeva); i 56 % njih nije

[1] *The Education of Gypsy Chidliness in Europe* project (OPRE ROMA) is a sociological and ethnographic study of the education of Roma children in Italy, France and Spain. Under the term "education", the authors of the study include the process of teaching / teaching Roma children in school, as well as their upbringing and the process of socialization in the family.

[2] *The equal availability of quality education* for Roma is an EUMAP report (the European Union Open Society Institute Monitoring and Advocacy Program) which, among other things, contains data on key educational indicators of the Roma population. The report aims to support the goals of the "Roma Inclusion Decade 2005-2015" in the field of education and to establish a framework for regular monitoring in all areas of the Decade.

[1] Projekat *The Education of Gypsy chidlhood in Europe* (OPRE ROMA) predstavlja sociološku i etnografsku studiju obrazovanja romske dece u Italiji, Francuskoj i Španiji. Pod pojmom „education" autori studije podrazumevaju proces učenja/podučavanja romske dece u školi, kao i njihovo vaspitavanje i proces socijalizacije u porodici.

[2] *Jednaka dostupnost kvalitetnog obrazovanja za Rome* je izveštaj EUMAP-a (Program monitoringa i zastupanja Evropske unije Instituta za otvoreno društvo) koji između ostalog, sadrži podatke o ključnim obrazovnim indikatorima romske populacije. Izveštaj ima za cilj da podrži ciljeve „Dekade inkluzije Roma 2005-2015" u oblasti obrazovanja i da ustanovi okvir za redovno praćenje u svim oblastima Dekade.

means that Roma students were lagging behind other students 2.2 school years in mathematics and 2.6 school years in Serbian language, while they spent an average of three years at school. In the same report, an analysis of possible causes of poorer performance of Roma students was provided - one possible explanation is in their social origin: they are from poor families and their parents have a low level of education. If the lower social and educational status of student's family is the only cause of school failure, then non-Roma students of similar background should have a lower success. In that case, this would mean that schools provide the same level of education quality to all students, and do not contribute to the existing gap between Roma and non-Roma students in school achievement. However, an analysis of the achievements of Roma and non-Roma students with similar socio-economic backgrounds shows that the difference in achievements does exist - Roma students have poorer performance on standardized tests than non-Roma students of similar socio-economic background. In other words, differences in achievements can not be explained only by socio-economic factors but one part of the explanation of why Roma children achieve lower results can also lie in the lower quality of education for Roma children in elementary schools. The lower quality of education here means the different attitudes of teachers towards Roma in relation to non-Roma students, for example by lowering expectations for Roma students. Consequently, they receive less support and incentives from their teachers, and logically, the students produce lower achievements. The illustration and argumentation of this viewpoint is found in the results of Roma and non-Roma students in tasks within the National Testing, compared to their school grades. If teachers had the same expectations for Roma and non-Roma students, and evaluated them on the basis of the same criteria, Roma and non-Roma students with the same grade should have the same average results on a standardized test. But Roma students have shown a weaker performance in tests than non-Roma students with the same grade, which means that Roma students are expected to show less knowledge to get the same grade. Data on the number of those who repeat the class also speak about the poor school performance of Roma students. At the national level, the rate of repetition in the first three grades of primary school is one percent, and for Roma students this rate is 11% p. (equal accessibility..., 2007). Frequent repetition of classes and extremely poor achievements are used as "pedagogical" arguments for the segregation of Roma children in another type of school. Poor grades are used as justifications of school authorities for moving children to special schools and adult education schools, which indicates that Roma students can not follow the curriculum of regular schools. On the other hand, repsteklo osnovna znanja i veštine iz srpskog jezika (na nacionalnom nivou to se dešava u 14 % slučajeva). Prema nekim tumačenjima, to znači da romski učenici zaostaju za drugim učenicima 2,2 školske godine u matematici, i 2,6 školske godine iz srpskog jezika, pri čemu su u školi prosečno proveli tri godine. U istom Izveštaju, data je analiza mogućih uzroka slabijeg uspeha romskih učenika – jedno moguće objašnjenje je u njihovom socijalnom poreklu: oni su iz siromašnijih porodica i imaju roditelje sa niskim nivoom obrazovanja. Ukoliko je niži socijalni i obrazovni status porodice učenika jedini uzrok školskog neuspeha, onda bi trebalo da i neromski učenici sličnog porekla imaju slabiji uspeh. U tom slučaju, to bi značilo da škole pružaju isti nivo kvaliteta obrazovanja svim učenicima, i da ne doprinose postojećem jazu između romskih i neromskih učenika u školskom postignuću. Međutim, analiza postignuća romskih i neromskih učenika sa sličnim socio-ekonomskim poreklom, pokazuje da razlika u postignućima ipak postoji – romski učenici imaju slabije rezultate na standardizovanim testovima od neromskih sličnog porekla. Drugim rečima, razlike u postignućima se ne mogu objasniti samo socio-ekonomskim faktorima, već jedan deo objašnjenja zašto romska deca postižu slabije rezultate moguće leži i u nižem kvalitetu obrazovanja za romsku decu u osnovnim školama. Niži kvalitet obrazovanja ovde znači drugačije stavove nastavnika prema romskim u odnosu na neromske učenike, na primer tako što se snižavaju očekivanja za romske učenike. Samim tim oni dobijaju manje podrške i podsticaja od svojih nastavnika, pa i niža postignuća. Ilustracija i argumentacija navedenog stanovišta nalazi se u rezultatima romskih i neromskih učenika na zadacima u okviru Nacionalnog testiranja, a u poređenju sa njihovim školskim ocenama. Ako su nastavnici imali ista očekivanja za romske i neromske učenike, i ocenjihvali ih na osnovu istih kriterijuma, romski i neromski učenici sa istom ocenom bi trebalo da imaju iste prosečne rezultate na standardizovanom testu. Ali romski učenici prolaze slabije na testovima nego neromski učenici sa istom ocenom, što znači da se od romskih učenika očekuje da pokažu manje znanja da bi dobili istu ocenu. O slabom školskom uspehu romskih učenika govore i podaci o broju onih koji ponavaljaju razred. Na nacionalnom nivou, stopa ponavljanja u prva tri razreda osnovne škole je jedan posto, a kod romskih učenika ova stopa iznosti 11 % str. (*Jednaka dostupnost*..., 2007). Često ponavljanje razreda i izrazito loša postignuća koriste se kao „pedagoški" argumenti za segregaciju romske dece u drugi tip škola. Školskim vlastima kao opravdanje za premeštanje dece u specijalne i škole za obrazovanje odraslih služe

etition of classes and inadequate success are also one of the reasons why Roma children leave the school completely.

Physical Exercise as a Chance for Development and Various Interpretations of Physical Activity in Literature

Physical activity is a widely used term, in scientific circles, in media and in ordinary speech too. In a similar or identical sense, other terms are used, such as recreational activity, recreation, physical exercise (exercise), fitness, wellness, training...

Corbin, Pangrazi and Franks (2000) group the definitions into two big categories: definitions related to products and definitions that characterize the processes. The first group includes state definitions, such as physical fitness, health and wellness. These are outcomes, often used in research as dependent variables. The definitions of a process concerns behavior or lifestyles and include physical activity, exercise, sports, dancing, etc. Processes often represent independent variables in research.

Physical activity represents the top, multidimensional term. Forms of physical activity such as work activity, exercise, sport, dance etc. are considered sub-categories of physical activity.

An universally accepted scientific definition of physical activity, determines physical activity as "every physical movement produced by skeletal muscles that results in calorie consumption" (Caspersen et al, 1985). Therefore, physical activity includes all kinds of active games, sports, dancing, exercise, active transport (walking, cycling), normal work and life activities (climbing upstairs, home jobs, carrying groceries, etc...). For example, brisk walking, lightweight exercises, table tennis, playing in the playground, sweeping leaves, belong to the physical activity of approximately the same energy price (3.5-7 kcal/min).

Physical exercise is a narrow term which represents a specific form of physical activity "which is planned, structured, repetitive and results in improvement or preservation of one or more aspects of physical fitness" (Welk, 2002). Harris (2002) gives a broader definition, according to which "Exercise is a planned, structured physical activity that fosters all aspects of physical, mental and social health and fitness, and well-being".

Fitness, according to Harris (2002), "is the ability or set of characteristics an individual possesses or achieves, which allows him to engage in physical activity and gain the benefits of doing it".

Physical activity, regardless of age, is treated as a health-related behavior that can have a beneficial effect on all aspects of health and the overall development of children.

slabe ocene, koje pokazuju da romski učenici ne mogu da prate program redovnih škola. S druge strane, ponavljanje razreda i nedovoljan uspeh predstavajaju i jedan od uzroka što romska deca potpuno napuštaju školu.

Fizičko vežbanje kao šansa za razvoj i razna tumačenja fizičke aktivnosti u literaturi

Fizička aktivnost je, naime, termin koji se široko upotrebljava, kako u naučnim krugovima, tako i u medijima i običnom govoru. U sličnom ili identičnom značenju, koriste se i drugi termini, poput: rekreativna aktivnost, rekreacija, fizička vežba (vežbanje), fitnes, velnes, kondicija, trening ...

Corbin, Pangrazi i Franks (2000) grupišu definicije u dve velike kategorije: definicije koje se odnose na produkte i definicije koje označavaju procese. U prvu grupu spadaju definicije stanja, poput fizičke kondicije (physical fitness), zdravlja i velnesa (wellness). Radi se o ishodima, koji se često u istraživanjima koriste kao zavisne varijable. Definicije procesa tiču se ponašanja ili životnih stilova, i tu spadaju fizička aktivnost, vežbanje, sportovi, ples itd. Procesi često u istraživanjima predstavljaju nezavisne varijable.

Fizička aktivnost predstavlja krovni, multidimenzionalni termin. Forme fizičke aktivnosti kao radna aktivnost, vežba, sport, ples i dr. smatraju se sub-kategorijama fizičke aktivnosti.

Opšteprihvaćena naučna definicija fizičke aktivnosti određuje fizičku aktivnost kao «svako telesno kretanje proizvedeno skeletnim mišićima koje rezultira kalorijskom potrošnjom» (Caspersen i sar, 1985). Dakle fizička aktivnost uključuje sve vrste aktivne igre, sporta, plesa, vežbanja, aktivni transport (hodanje, vožnja bicikla), uobičajene radne i životne aktivnosti (penjanje uz stepenice, kućni poslovi, nošenje namirnica itd). Primera radi, žustro hodanje, lagane vežbe oblikovanja, stoni tenis, igra na dečjem igralištu, sakupljanje lišća, spadaju u fizičku aktivnost približno iste energetske cene (3.5-7 kkal/min).

Fizička vežba je uži termin, označava specifičnu formu fizičke aktivnosti «koja je planirana, strukturirana, ponavljajuća i rezultira poboljšanjem ili očuvanjem jednog ili više aspekata fizičkog fitnesa» (Welk, 2002). Harris (2002) daje širu definiciju, po kojoj je «Vežba planirana, strukturirana fizička aktivnost koja podstiče sve aspekte fizičkog, mentalnog i socijalnog zdravlja i kondicije, te blagostanje».

Fitnes (kondicija) je, prema Harris (2002) «sposobnost ili set karakteristika koje pojedinac poseduje ili dostiže, a koje mu omogućavaju da se bavi fizičkom aktivnošću i stiče koristi od toga bavljenja».

The importance of physical activity for the development of children

The significance of physical activity for the health and development of children, and especially its impact on health in adulthood, is not easy or easy to examine. Bar-Or (1995), Fulton et al. (2001), Sirard et al. (2005). There are not enough longitudinal investigations of the intervention type, because they are expensive and technically most complex.

However, based on the existing empirical and theoretical structure related to the physical activity of children and the abundance of epidemiological findings on the adult population, it is possible to identify the potential benefits of physical activity:

- physical activity in the function of integral development of children,
- physical activity in the function of children's health,
- physical activity in the function of health in adulthood.

Ismail (1984) emphasizes that different types of development - physically, intellectually, emotionally and socially - are not simply a ‚set of' independent parts, but among them there is ‚organic unity'. In other words, action on a certain aspect of development necessarily reflects on other developmental aspects, so there can be no and there can be no isolated effects. The movement, in particular, strongly stimulates the central nervous system, activates the large zones of the bark and thus helps establish new neural connections and better utilization of brain capacities. Movement plays a key role in brain programming, both before and after birth (Cheatum and Hammond, 2000).

The importance of physical activity is reflected in the fact that children with behavioral and learning problems have similar difficulties in motor development (Cheatum and Hammond, 2000). Learning problems often arise from problems of motor development that are not timely recognized.

Gardner's multi-intelligence theory also recognizes the importance of motion, because kinesthetic intelligence is one of the eight types of intelligence (Determan, 2005). Namely, American psychologist Gardner proposed in 1983 the theory of intelligence with the intention of expanding the traditional definition of intelligence. Instead of the existence of a single general intelligence, Gardner considers that there are several types of intelligences, each of which is an independent system in the brain. In addition to linguistic, logical, mathematical, spatial, music, interpersonal, intrapersonal and naturalistic intelligences, there is also the so-called. body-kinesthetic intelligence. It represents the ability to skillfully

Fizička aktivnost se, bez obzira o kom uzrastu je reč, tretira kao ponašanje u vezi sa zdravljem, koje može povoljno uticati na sve aspekte zdravlja i kompletnog razvoja dece.

Značaj fizičke aktivnosti za razvoj dece

Značaj fizičke aktivnosti za zdravlje i razvoj dece, a pogotovo njen uticaj na zdravlje u odraslom dobu, nije jednostavno ni lako ispitivati. Bar-Or (1995), Fulton i sar. (2001), Sirard i sar. (2005). Nema dovoljno longitudinalnih istraživanja interventnog tipa, jer su skupa i tehnički najsloženija.

Ipak, na osnovu postojeće empirijske i teorijske građe vezane za fizičku aktivnost dece i obilja epidemioloških nalaza na odrasloj populaciji, moguće je identifikovati potencijalne koristi fizičke aktivnosti:

- fizička aktivnost u funkciji integralnog razvoja dece,
- fizička aktivnost u funkciji zdravlja dece,
- fizička aktivnost u funkciji zdravlja u odraslom dobu.

Ismail (1984) naglašava da različiti tipovi razvoja – fizički, intelektualni, emocionalni i društveni – nisu jednostavno ‘skup’ nezavisnih delova, već među njima postoji ‘organsko jedinstvo. Drugim rečima, delovanje na određeni aspekt razvoja nužno se odražava na druge razvojne aspekte, tako da nema i ne može biti izolovanih uticaja. Kretanje, naime, snažno stimuliše centralni nervni sistem, aktivira velike zone kore i tako pomaže uspostavljanju novih neuronskih veza i boljem iskorišćenju moždanih kapaciteta. Kretanje igra ključnu ulogu u programiranju mozga, i pre i nakon rođenja (Cheatum i Hammond, 2000).

Značaj fizičke aktivnosti ogleda se i u činjenici da deca sa problemima u ponašanju i učenju imaju slične poteškoće i u motornom razvoju (Cheatum i Hammond, 2000). Problemi u vezi sa učenjem često potiču iz problema motornog razvoja koji nisu blagovremeno prepoznati.

Gardnerova teorija multiple inteligencije takođe priznaje značaj kretanja, jer kinestetička inteligencija predstavlja jednu od osam vrsta inteligencije (Determan, 2005). Naime, američki psiholog Gardner, predložio je 1983. godine teoriju inteligencije sa namerom da proširi tradicionalnu definiciju inteligencije. Umesto postojanja jedne opšte inteligencije, Gardner smatra da postoji više vrsta inteligencija, od kojih svaka predstavlja nezavisan sistem u mozgu. Pored lingvističke, logičko-matematičke, prostorne, muzičke, interpersonalne, intrapersonalne i naturalističke inteligencije, postoji i tzv. telesno-kinestetička inteligencija. Ona predstavlja

use the body or parts of the body in various activities such as dancing, sports, acting, surgery, and the like.

Physical activity in the function of children's health. According to the World Health Organization, physical activity is a key determinant of energy consumption, and is in the function of energy balance and weight control. This is especially important in a situation where obesity becomes a global phenomenon, and one of the main obstacles in the prevention of non-communicable diseases. In many European countries, more than half of the adult population is moderately obese, and up to 30% is clinically obese (Obesity in Europe, 2002). The prevalence of obesity among children is significantly increased and in some regions it reaches up to 25%. According to the same report, childhood obesity represents an acute health crisis and the rising prevalence of diabetes (type 2) in obese children is a signal for an alert. Although they emphasize that obesity is primarily induced by inadequate nutrition, limited opportunities for physical activity and an ever-increasing sedentary lifestyle contribute to early obesity in children. In obese children, diabetes mellitus type 2, hypertension, low self-esteem, and lower quality of life related to health (AAP, 2003) are recorded to a greater extent.

Systematic exercise is a powerful stimulus for the whole organism and all major organ systems, encouraging trophic processes and strengthening the adaptive abilities of the organism. Many studies have shown that exercise (exercise) of low to moderate intensity stimulates the immune function (Freedson, 1997). The high incidence of poor body and lowered feet in pre-school children is also associated with insufficient activity of children.

Also, physical activity is in the function of the development of motor skills and skills, which is the basis for the later development of moving skills and their application in sports, recreation and everyday life. School age is an extremely important period for acquiring fundamental skills, but attainment of mature patterns of these skills can not be left only to the spontaneous maturation process, but it is also necessary to create opportunities for learning and practicing (Gallahue & Ozmun, 1998). „Insecurity, unfortunately, interferes with the child's ability to play and participate in sports activities. This reverses the child's ability to create friends and learn socially acceptable behavior. Uncoordination also intensifies the difficulties that a child can have with school tasks „(Cheatum and Hammond, 2000, p. 16).

As already mentioned, the nature of the impact, and the mechanisms of the activity of childhood physical activity in childhood, are still not sufficiently known. There are several models that explain the possible relationship

sposobnost veštog korišćenja tela ili delova tela u različitim aktivnostima poput plesa, sportova, glume, hirurgije i sl.

Fizička aktivnost u funkciji zdravlja dece. Prema Svetskoj zdravstvenoj organizaciji, fizička aktivnost predstavlja ključnu determinantu energetske potrošnje, i u funkciji je energetskog balansa i kontrole telesne težine. To je posebno važno u situaciji kada gojaznost postaje globalni fenomen, i jedna od glavnih prepreka u prevenciji nezaraznih bolesti. U mnogim evropskim zemljama, više od polovine odrasle populacije je umereno gojazno, a do 30% je klinički gojazno (Obesity in Europe, 2002). Prevalencija gojaznosti među decom je u značajnom porastu i u pojedinim regionima dostiže i do 25%. Prema istom izveštaju, dečja gojaznost predstavlja akutnu zdravstvenu krizu i rastuća zastupljenost dijabetesa (tip 2) kod gojazne dece predstavlja signal za uzbunu. Iako ističu da je gojaznost pre svega indukovana neadekvatnom ishranom, ograničene mogućnosti za fizičku aktivnost i sve zastupljeniji sedentarni način života doprinose ranoj gojaznosti kod dece. Kod gojazne dece u većoj meri se registruju dijabetes melitus tip 2, hipertenzija, nisko samocenjenje, te niži kvalitet života povezan sa zdravljem (AAP, 2003).

Sistematsko vežbanje predstavlja snažan stimulans za ceo organizam i sve velike organske sisteme, podstičući trofičke procese i jačajući adaptivne sposobnosti organizma. Mnoga istraživanja pokazala su da trening (vežbanje) niskog do umerenog intenziteta podstiče imunu funkciju (Freedson, 1997). Visoka zastupljenost loših držanja tela, te spuštenog stopala kod dece predškolskog uzrasta, takođe se dovodi u vezu sa nedovoljnom aktivnošću dece.

Takođe, fizička aktivnost je u funkciji razvoja motoričkih sposobnosti i veština, što predstavlja osnovu za kasnije usavršavanje kretnih veština i njihovu primenu u sportu, rekreaciji i svakodnevnom životu. Školsko doba je izuzetno važan period za sticanje fundamentalnih kretnih veština, ali dostizanje zrelih obrazaca tih veština ne može se prepustiti samo spontanom procesu sazrevanja, već je potrebno stvarati mogućnosti za učenje i uvežbavanje (Gallahue & Ozmun, 1998). «Nespretnost, na nesreću, interferira sa sposobnošću deteta da se igra i učestvuje u sportskoj aktivnosti. To povratno redukuje mogućnosti deteta da stvara prijatelje i uči socijalno prihvatljivo ponašanje. Nekoordinisanost takođe intenzivira teškoće koje dete može imati sa školskim zadacima» (Cheatum i Hammond, 2000; str. 16).

Kao što je već rečeno, priroda uticaja, te mehanizmi delovanja fizičke aktivnosti u detinjstvu na zdravlje

between adult health and activity in the younger age; by Blair et al. (1989), there are three possible directions of the activity of increased physical activity during childhood to the health of an adult:

1. Activity in childhood improves the health of the child, which then uses the health of an adult.
2. The active lifestyle during childhood has direct health benefits in later years.
3. Active child becomes active adult, which is therefore exposed to less risk of illness than inactive adult.

Fulton et al. (2001) state that there is evidence that some chronic diseases (eg obesity, hyperlipidemia, coronary heart disease, diabetes mellitus type 2) may begin to develop during childhood and that healthcare behavior of children can be a precursor to adult health behaviors. Thus, for example, children who have a higher cholesterol level are three times more prone than other children, to have high levels of cholesterol and as adults (NCEP, 1991). According to the American Pediatric Academy, there is a link between early obesity and obesity in adulthood. The probability that obesity will be maintained and in adulthood increases with age: in children 4 years of age it is 20%, and in adolescents as much as 80% (AAP, 2003).

Dealing with physical activity at an early age, especially with the support and encouragement of parents, teachers and others, enables the creation of positive attitudes towards physical activity and the establishment of appropriate habits and value systems (Đorđić and Bala, 2006).

Sample and Method of Research

As a part of this research, we wanted to determine the situation on the field of anthropological and motor development between members of Roma and non-Roma population of elementary school students, who are attending classes in the north of Vojvodina. The whole sample was 184 Roma students, who were elementary school students on the territory of the municipalities of Novi Kneževac and Kanjiža. We included the same number of non-Roma students in the study and they were representing the control group. Since the number of Roma children is not representative in this research, we didn't want to analyze it in detail (on a centil basis). According to the Helsinki Declaration, the participation of children in both samples was voluntary. In accordance with the applicable laws of the Republic of Serbia, only those students were included in the sample of the Roma population whose parents, when enrolling in school, declared with their signature, that their child belongs

u odraslom dobu, još uvek nisu dovoljno poznati. Postoji više modela koji objašnjavaju moguću vezu između zdravlja odrasle osobe i aktivnosti u mlađem uzrastu; po Blair i sar. (1989) postoje tri moguća pravca delovanja povećane fizičke aktivnosti tokom detinjstva na zdravlje odrasle osobe:

1. Aktivnost u detinjstvu poboljšava zdravlje deteta, što zatim, koristi zdravlju odraslog.
2. Aktivan način života tokom detinjstva ima direktne koristi po zdravlje u kasnijim godinama.
3. Aktivno dete postaje aktivna odrasla osoba, koja je stoga izložena manjem riziku od oboljevanja nego neaktivna odrasla osoba.

Fulton i sar. (2001) navode da postoje dokazi da neke hronične bolesti (npr. gojaznost, hiperlipidemia, koronarna bolest srca, dijabetes melitus tip 2) mogu početi da se razvijaju tokom detinjstva i da zdravstveno ponašanje dece može biti prekursor zdravstvenog ponašanja odraslih. Tako, na primer, deca koja imaju viši nivo holesterola tri puta su sklonija u odnosu na drugu decu, da imaju visok nivo holesterola i kao odrasle osobe (NCEP, 1991). Prema Američkoj pedijatrijskoj akademiji, postoji povezanost između rane gojaznosti i gojaznosti u odraslom dobu. Verovatnoća da će se gojaznost zadržati i u odraslom dobu raste sa uzrastom: kod dece uzrasta 4 godine iznosi 20%, a kod adolescenata čak 80% (AAP, 2003).

Bavljenje fizičkom aktivnošću u ranom uzrastu, posebno uz podršku i podsticanje roditelja, učitelja i drugih, omogućava stvaranje pozitivnih stavova prema fizičkoj aktivnosti i uspostavljanje odgovarajućih navika i sistema vrednosti (Đorđić i Bala, 2006).

Uzorak i metoda istraživanja

U sklopu ovog istraživanja želeli smo da utrvrdimo stanje na planu antropološkog i motoričkog razvoja između pripadnika romske i neromske populacije učenika osnovnih škola koji pohađaju nastavu na severu Vojvodine. Ceo uzorak je iznosio 184 učenika romske nacionalnosti koji su učenici osnovnih škola na teritorijama opština Novi Kneževac i Kanjiža. U ispitivanje smo uključili isti broj učenika neromske populacije i oni su predstavljali kontrolnu grupu. Pošto broj romske dece nije reprezantativan u ovom radu smo odustali od veoma detaljne analize (na centilnim osnovama). Prema Helsinškoj Izjavi učešće dece u oba uzorka bilo je na dobrovoljnoj osnovi. Shodno važećim zakonima Republike Srbije samo smo one učenike ubrajali u uzorak romske populacije čiji su se roditelji prilikom upisa u školu svojim potpisom izjasnili da njihovo dete pripada

to the Roma community. The age of the examined children on the day of the examination was between 6.51 and 14.50 years. The range of age and mean values were determined on the basis of the International Biological Program (Weiner & Lourie, 1969). The organized activity in the field of physical activity was represented by physical education at school three times a week, and we did not collect data about sports activities outside the school. We measured the following anthropometric indicators: body height, body mass, skin folds. We calculated the relative amount of subcutaneous fat, and we calculated the body mass index (BMI). The running speed on short sections was measured by running (sprinting) at 30 meters, and cardiorespiratory endurance was measured by running at 1200 meters.

Results

After data processing both from the anthropological and the motor space, the results obtained were presented in parallel with a clear distancing of the results for both populations involved in the sample.

We have shown the results related to body height and body mass in Table 1.

romskoj zajednici. Kalendarski uzrast ispitivane dece je na dan ispitivanja bio u rasponu između 6,51 i 14,50 godina. Raspon uzrasta i srednje vrednosti smo odredili na osnovu Međunarodnog Biološkog Programa (Weiner i Lourie, 1969). Organizovanu aktivnost na planu fizičke aktivnosti predstavljala je nastava fizičkog vaspitanja u školi tri puta nedeljno, a o sportskim aktivnostima van škole nismo skupili podatke. Izmerili smo sledeće antropometrijske pokazatelje: telesnu visinu, telesnu masu, kožne nabore. Izračunali smo relativnu količinu potkožne masti, izračunali smo i stepen uhranjenosti (BMI). Brzinu trčanja na kratkim deonicama izmerili smo na 30 metara a kardiorespiratornu izdržljivost pomoću trčanja na 1200 metara.

Rezultati istraživanja

Nakon obrade podataka kako sa antropološkog tako i sa motoričkog prostora dobijene rezultate prikazali smo uporedno sa jasnim distanciranjem rezultata za obe populacije koje su uključene u uzorak.

Table 1. *Results of body height and mass of Roma and non-Roma children* / ***Tabela 1.*** *Rezultati romske i neromske dece na planu telesne visine i telesne mase*

		Body height / Telesna visina (cm)				***Body mass*** / Telesna masa (kg)			
		Roma / romi		***Non-Roma*** / ne romi		***Roma*** / romi		***Non-Roma*** / ne romi	
Age / Uzrast	n	X	SD	X	SD	X	SD	X	SD
7	23	121.62	6.09	125.42*	5.16	22.09	6.48	24.25*	6.07
8	23	126.26	6.56	130.58*	5.39	25.37	7.04	28.59*	6.38
9	23	131.89	7.02	135.98*	6.12	31.42	7.31	32.64*	6.89
10	23	137.74	7.05	142.26*	6.38	35.55	10.33	36.64*	8.58
11	23	142.56	7.10	147.69*	7.09	38.28	11.52	40.37*	10.09
12	23	147.98	7.88	153.16*	7.90	42.18	11.26	44.62*	10.32
13	23	155.92	8.18	159.09*	8.16	47.20	12.27	49.79*	11.34
14	23	162.80	7.46	165.79*	7.89	56.58	13.09	55.69	12.39

** the difference of averages is significant at the level of 5% / * razlika proseka je signifikantna na nivou 5%*

Roma children in all ages had significantly lower body height than their peers of non-Roma ethnicity. The difference of averages in real values ranged between 2.0 and 4.3 centimeters. Partly due to the significantly lower body height, the body mass of Roma children was significantly lower in the range of 7 to 13 years. In 14-year-olds, the difference of averages was not significant.

The results showing the body mass index and relative subcutaneous fat were shown in Table 2.

Romska deca su u svim uzrastima bila signifikantno niža od svojih vršnjaka neromske nacionalnosti. Razlika proseka u okviru realnih vrednosti kretala se između 2,0 i 4,3 santimetra. Delimično zbog signifikantno niže telesne visine, telesna masa romske dece značajno je bila manja u rasponu od 7 do 13 godina. Kod dece od 14 godina razlika proseka već nije bila signifikantna.

Table 2. *Body mass index and relative subcutaneous fat* / ***Tabela 2.*** *Index telesne mase i relativne potkožne masti*

		Body mass index / Index telesne težine (BMI)				*Relative subcutaneus fat* / Količina relativne potkožne masti (%)			
		Roma / romi		*Non-Roma* / ne romi		*Roma* / romi		*Non-Roma* / ne romi	
Age / Uzrast	n	X	SD	X	SD	X	SD	X	SD
7	23	14.29	4.18	15.10*	3.69	18.59	6.49	17.01*	5.10
8	23	15.51	4.29	16.59*	3.62	19.11	6.88	17.29*	5.57
9	23	17.29	4.20	17.39	3.60	19.61	7.20	17.59*	5.87
10	23	18.39	5.30	18.09	4.09	21.14	7.49	19.35*	6.10
11	23	18.62	5.49	18.71	4.48	21.09	7.59	19.88*	6.26
12	23	19.10	5.06	19.14	4.29	20.89	7.41	19.91*	6.23
13	23	19.19	5.03	19.59	4.31	20.79	6.52	19.52*	6.31
14	23	21.08*	4.89	20.29	4.40	21.28	6.69	19.79*	6.14

** the difference of averages is significant on the level of 5% / * razlika proseka je signifikantna na nivou 5%*

The body mass index of the non-Roma sample was significantly higher in respondents aged 7 to 8 years, while the same value was significantly higher for Roma children at the age of 14. Regardless of statistically similar results in BMI, subcutaneous fat was more pronounced among members of the Roma population in all the eight examined groups.

Index telesne mase učenika u neromskom uzorku bio je signifikantno veći kod ispitanika u uzrasti od 7 do 8 godina, dok je ista vrednost bila osetno veća kod romske dece u uzrastu od 14 godina. Bez obzira na statistički skoro slične rezultate kod indexa telesne težine (BMI), potkožna mast je bila izraženija kod pripadnika romske populacije u svih osam ispitivanih grupa.

Table 3. *Time results of running at 30 and 1200 meters* / ***Tabela 3.*** *Vremenski rezultati trčanja na 30 i na 1200 metara*

		Running at 30 meters / Trčanje na 30 metara (s)				*Running at 1200 meters* / Trčanje na 1200 metara (s)			
		Roma / romi		*Non-Roma* / ne romi		*Roma* / romi		*Non-Roma* / ne romi	
Age / Uzrast	n	X	SD	X	SD	X	SD	X	SD
7	23	6,49	0,63	6,29*	0,56	461,00	52,51	422,13*	46,52
8	23	6,36	0,63	6,18*	0,52	449,87	51,52	402,02*	44,21
9	23	6,25	0,60	6,03*	0,51	437,28	50,37	388,80*	43,04
10	23	6,14	0,65	5,88*	0,63	426,38	52.62	364,91*	42,94
11	23	6,01	0,59	5,73*	0,61	421,85	53,49	356,49*	42,55
12	23	5,82	0,75	5,57*	0,65	420,85	54,79	346,15*	38,07
13	23	5,48	0,54	5,28*	0,56	403,51	57,09	332,15*	35,97
14	23	5,29	0,59	5,15*	0,21	387,76	56,21	315,94*	35,53

** the difference of averages is significant on the level of 5% / * razlika proseka je signifikantna na nivou 5%*

The results of the tests that measured the speed and the endurance of cardiorespiratory system equally in all eight groups were significantly weaker in the population of Roma children compared to children from non-Roma population.

Conclusion

Regardless of the fact that the Roma children from Vojvodina originate from North India and from the noticeable low socio-economic status of Roma children living in Vojvodina, in each of the examined groups they were 1.5-2.00 centimeters taller than their peers who live

Rezultati testova koji su merili brzinu i izdržljivost kardiorespiratornog sistema podjednako su u svih osam grupa bili signifikantno slabiji u populaciji romske dece u odnosu na decu iz neromske populacije.

Zaključci

Neovisno od toga što Romi iz Vojvodine vode poreklo iz Severne Indije i od veoma jasno primetnog niskog socioekonomskog statusa Roma koji žive u Vojvodini u svakoj od ispitivanih grupa bili su za 1,5-2,00 santimetra viši nego njihovi vršnjaci koji žive u Pataliji u severnoj Indiji (Singh et al.,1992). Moramo istaći i

in Patalia in Northern India (Singh et al., 1992). We must also point out that the body mass index of children of the same age who live in Patalia are significantly lower than the index of Roma children from Vojvodina. In the case of biological acceleration or retardation, average indicators of height and weight are very important. In line with the comparison with domestic references, we concluded that the lagging in growth and development of Roma children is estimated at 0.5-0.75 years. Such a differentiation in an individual case is not significant, but in the case of a group of more than one hundred members, it is a warning sign. Regardless of the differences arising from anthropological origin, the physical and motor development of an individual or group is significantly conditioned by the way of life, therefore in this case the role of systematically implemented physical activity is crucial. When interpreting significant differences, it should be pointed out that the adverse effects of hypokinesia can also be detected in the control group (Photiou et al.2008,. Siva et al., 2009). In the control group, an increased amount of subcutaneous fat was found compared to generations of 20-30 years ago, and motor abilities were significantly lower compared to earlier generations from the same period (Eiben et al., 1991). Regarding the Roma community, we need to look at the reasons why in all eight groups, higher values of fat tissue were found in Roma children compared to the control group. At the same time, better results were noted by the control group compared to Roma children, in running tests that measured speed (running at 30 meters) and endurance (running at 1200 meters). This data undoubtedly confirms the theory about the significant hypokinesia of Roma children, as well as the theory of irregular habits (both in quantity and in quality) in nutrition. The consequence of these facts is that, instead of social connection, there are various forms of segregation (because of the repulsive attitude of non-Roma communities, but also because of the auto segregation of the Roma themselves). We can say, that the assessment that Roma children lagging behind in physical and motor development is less and less the cosequence of genetic factors, and the causes must be sought in economical and social conditions. Starting from the known problems encountered by teachers working with Roma children, the problems of Roma children themselves, as well as the results of this analysis, we consider that improvement of educational practice can be achieved by encouraging teachers to plan and undertake activities in accordance with their own potentials in their work environment.

podatak da je index telesne mase dece istog uzrasta koji žive u Pataliji signifikantno manji od indexa romske dece iz Vojvodine. Kod biološke akceleracije ili retardacije veoma su značajni prosečni pokazatelji visine i težine. U skladu i nakon upoređivanja sa domaćim referencama dolazimo do zaključka da se zaostajanje u rastu i razvoju romske dece procenjuje na 0,5-0,75 godina. Takva diferencijacija u slučaju pojedinca nije značajna ali u slučaju grupe koja broji više od sto članova predstavlja upozoravajući podatak. Bez obzira na razlike koje nastaju od antropološkog porekla, telesni i motorički razvoj pojedinca ili grupe značajno je uslovljen načinom života, dakle u ovom slučaju presudna je uloga sistematski sprovođene fizičke aktivnosti. Prilikom tumačenja signifikantno značajnih razlika moramo istaći da se štetni uticaji hipokinezije mogu ustanoviti i u kontrolnoj grupi (Photiou et al.2008,. Siva et al,.2009). U kontrolnoj grupi utvrđena je povećana količina potkožne masti u odnosu na generacije od pre 20-30 godina, a motoričke sposobnosti su značajno slabije u odnosu na ranije generacije iz istog perioda (Eiben et al., 1991). Vodeći brigu o romskoj zajednici moramo da se osvrnemo na razloge zašto su u svih osam grupa utvrđene veće vrednosti masnog tkiva kod romske dece u odnosu na kontrolnu grupu. Istovremeno opominju i bolji rezultati na testovima trčanja koja su merila brzinu (trčanje na 30 metara) i izdržljivost (trčanje na 1200 metara) kod pripadnika kontrolne grupe u odnosu na decu romske nacionalnosti. Ovaj podatak nedvosmisleno potvrđuje teoriju o značajnoj hipokineziji romske dece kao i teoriju o nepravilnim navikama (kako u kvantitetu tako i u kvalitetu) u ishrani. Posledica navedenih činjenica je da se umesto društvenog priključivanja pojavljuju razni oblici segregacije (zbog odbojnog stava neromskih zajednica ali i zbog auto segregacije samih Roma). Nije bez osnova procena da je osetno zaostajanje romske dece u telesnom i motoričkom razvoju sve manje posledica genetskih uticaja, a da se uzroci moraju tražiti u ekonomskim i društvenim prilikama. Polazeći od poznatih problema s kojima se sreću učitelji i nastavnici koji rade s romskom decom, problema same romske dece, kao i rezultata ove analize, smatramo da se na poboljšanje obrazovne prakse može uticati kroz podsticanje nastavnika da planiraju i preduzimaju aktivnosti u skladu sa sopstvenim potencijalima u svom radnom okruženju.

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Primljen: 08. novembar 2018. / Received: November 08, 2018
Prihvaćen: 27. novembar 2018. / Accepted: November 27 , 2018

DOI: 10.7251/SSH1802162K
Paper review

UDC: 371.3:796.012-057.874
Pregledni rad

The Role of Recess in Students' Physical Activity Promotion

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Abstract: *According to contemporary approaches to health promotion, school can provide a supporting environment which promotes students' physical activity with recess being an integral part of a school day that deserves a special attention. Although the duration, number and structure of recesses in most countries are not precisely prescribed, current research confirms that there are simple, effective and sustainable intervention to promote recess physical activity. Some of interventions refer to implementation of structured physical activity program implementation, availability of equipment, playground markings and zoning, usage of movable/recycled playground materials, shift to natural playing environment etc. Since physical activity significantly varies depending on students'gender, age and other personal features, as well as on environmental characteristics, this should be considered when planning effective recess physical activity interventions.*

Keywords: *physical activity, students, school break.*

Introduction

The adoption of the Ottawa Charter in 1986, marked the turn of the World Health Organization in the promotion of health: from an individual, the focus is on an environment that supports health and healthy choices (WHO, 1986). The modern approach points out that healthy choices require environmental support, that health is not just the absence of disease and the care of doctors, but that various agents in society can contribute to health promotion. These principles are followed by Health Promoting Schools (HPS), putting all of their resources and partnerships in the function of creating a healthy environment and promoting the health of students and staff.

Улога школског одмора у промоцији физичке активности ученика

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Апстракт: *У складу са савременим приступом промоцији здравља, школе могу обезбедити подстицајно окружење које промовише физичку активност ученика, при чему школски одмор као саставни део школског дана заслужује посебну пажњу. Иако у већини земаља трајање, број и структура школских одмора нису прецизније регулисани, постојећа истраживања потврђују да постоје једноставне, економичне и одрживе интервенције усмерене на промоцију физичке активности ученика током одмора. Неке од интервенција укључују имплементацију организованог програма вежбања, доступност справа и реквизита, посебне маркације и зонирање игралишта, коришћење преносиве/рециклиране опреме, игру у природи и др. С обзиром да физичка активност значајно варира у зависности од пола, узраста и других карактеристика ученика, као и од обележја окружења, приликом планирања мера и поступака промоције физичке активности током одмора, потребно је уважити те особености.*

Кључне речи: *физичка активност, ученици, школски одмор.*

Uvod

Усвајање Отавске повеље (Otawa Charter), 1986. године, означило је заокрет Светске здравствене организације у промоцији здравља: са појединца, тежиште је усмерено на окружење које подржава здравље и здраве изборе (WHO, 1986). Савремени приступ истиче да здрави избори захтевају подршку из окружења, да здравље није само одсуство болести и брига лекара, већ да различити агенси у друштву могу допринети промоцији здравља. Ове принципе следе школе које промовишу здравље (Health Promoting Schools, скр. HPS), стављајући све своје ресурсе и партнерства у функцију стварања здраве средине и промоције здравља ученика и особља.

In Europe, this approach was introduced in 1992 and has since evolved, emphasizing, along with other key components, the importance of school's social and physical environment for promoting the health of students and school staff.

Schools play particularly important role in physical activity promotion in countries with high participation rates of young people in education. For example, in 2015, more than 19 out of 20 children in EU were enrolled in primary or secondary education (Statistical Office of the European Communities, 2015). At the same time, young people spend substantial proportion of their waking hours in school, during most of the year. Facilities and equipment for physical activity are provided to some extent and different professionals work and colaborate in school environment (PE teachers, classroom teachers, psychologists, health professionals), which can facilitate physical activity promotion.

Schools, generally speaking, can promote physical activity by creating opportunities for students to be physically active before and after school, in sports clubs, during additional and supplementary classes, weekends and school breaks, while staying in an extended stay, in recreational classes, student dormitories, as well as active breaks in the classroom, in addition to regular physical education. The school can promote active transport to/from school, that is, create conditions for students to come to school and return home on foot, by bicycle, roller skates, etc. In addition, students can also be active during the school recess, which is a common part of the school day in most schools. All these possibilities of promoting physical activity in schools have been the subject of numerous intervention studies, and the meta-analysis of the effects of these interventions on the level of physical activity of students confirmed that a modified school recess can be a significant source of additional physical activity of students (Bassett et al., 2013). Since recess is rather neglected in domestic theory and everyday practice, the paper examines the existing corpus of knowledge about the potential of a recess in the physical activity promotion.

Position of the recess in a school day

Recess is the right of every child. Article 31 of the United Nations Convention on the Rights of the Child states that every child has the right to free time. Suspension of recess, either as a disciplinary measure or for the sake of schoolwork, violates this right (Skrupskelis, 2000, p.126).

In essence, a recess should be considered child's

У Европи, овај приступ је уведен 1992. године и од тада се развија, наглашавајући, уз остале кључне компоненте, значај социјалног и физичког окружења у школи за промоцију здравља ученика и школског особља.

Школе имају посебно значајну улогу у промоцији физичке активности у земљама са високим обухватом деце. Примера ради, 2015. године, у Европској Унији је више од 19 деце на сваких 20 деце, похађало основну или средњу школу (Statistical Office of the European Communities, 2015). У исто време, деца и млади проводе значајно време у школи, током већег дела година, у школи имају приступ објектима и опреми за вежбање, а на располагању су и стручњаци различитог профила (наставници физичког васпитања, учитељи, психолози, здравствени радници), што може допринети промоцији физичке активности.

Школе, генерално гледано, могу промовисати физичку активност, кроз стварање могућности да ученици, поред редовне наставе физичког васпитања, буду физички активни пре и после школе, у школској секцији, додатној и допунској настави, викендом и за време распуста, током боравка у продуженом боравку, рекреативној настави, ученичким домовима, као и током активних пауза у склопу наставе у учионици. Школа може промовисати активан транспорт до/од школе, односно, стварати услове да ученици долазе у школу и враћају се кући пешке, бициклом, на ролерима и сл. Поред тога, ученици могу бити активни и током школског одмора, који представља уобичајени елеменат школског дана у већини школа. Све ове могућности промоције физичке активности у школи, биле су предмет бројних интервентних студија, а мета анализа ефеката ових интервенција на ниво физичке активности ученика, потврдила је да модификовани школски одмор може представљати значајан извор додатне физичке активности ученика (Bassett et al., 2013). Пошто школском одмору у домаћој теорији и пракси није посвећена довољна пажња, у раду се критички сагледава постојећи корпус сазнања о потенцијалу великог школског одмора (у даљем тексту: одмор) у промоцији физичке активности.

Позиција одмора у школском дану

Одмор је право сваког детета. Члан 31. Конвенције Уједињених нација о правима детета каже да свако дете има право на слободно време. Одузимање паузе, било као дисциплинска мера или укидање у име рада, крши то право (Skrupskelis, 2000; стр.126).

У суштини, одмор треба сматрати слободним временом детета, које не би требало ускраћивати деци у

free time, which should not be denied to children in schools. During recess, children should be encouraged to be physically active, and as such, recess should be a supplement, and not a substitute for physical education. It provides time to play, imagination, movement and socialization. Recess is a time when a child needs to make a personal choice between multiple options: sedentary, physical, creative or social activity. A recess is a break during the school day, a time spent far from cognitive tasks, a break in the school day necessary to optimize the social, emotional, physical and cognitive development of a child (Sibley & Etnier, 2003). Regardless of whether it is structured or unstructured, recess should be safe and well-supervised.

Recess is a common part of school life for most elementary and secondary school students, and experiences of students vary from country to country, often from school to school.

In Japan, children of primary school age have 10 to 15 minutes of recess every hour, which is explained by the fact that attention begins to weaken after 45 to 50 minutes of intensive classes (Ishii et al., 2014). In the United States, the duration and timetable varies depending on the age of the student, the class, the school district, or the state, and sometimes on the individual school. Most primary schools organize a recess during lunch break (Pellegrini & Smith, 1993). In some British schools, students have three outdoor recesses a day: morning and afternoon recesses are 15 minute respectively, and evening recess lasts 80 to 90 minutes (Pellegrini & Smith, 1993). In Danish schools, a total of 60 minutes is dedicated to recess. They are most often used during two to four recess periods, and the duration of the recess varies from school to school. The lunch break is the longest recess and lasts from 25 to 30 minutes (Pawlowski et al., 2014). In the Finnish school system, the lengths of recess and lunch break are not regulated by national law. In everyday practice, students in Finland are provided with several recesses during the day. The organization of lessons and duration of recess is up to particular school and its policy. In the younger grades (grades 1 to 6) and older primary school grades (7th to 9th grade), students usually have two to four recesses, lasting from 10 to 15 minutes, after every 45-90 minutes of schoolwork, as well as a longer 30-minute recess that is used as lunch break (Haapala et al., 2014). In French schools, students have three recesses. The longest recess lasts for 45 minutes and it is a lunch break, while morning and afternoon recesses last for 15 minutes each (Blaes et al., 2013). In Russian schools, a short recess usually lasts

школи. Током школског одмора децу треба подстицати да буду физички активна, и као такав одмор треба да буде допуна, а не замена за наставу физичког васпитања. Он пружа и време за игру, маштање, кретање и социјализацију. Одмор је време када дете треба да направи лични избор између више опција: седентарна, физичка, креативна или социјална активност. Одмор је пауза у току школског дана, време које се проводи далеко од когнитивних задатака, представља прекид у школском дану неопходан за оптимизацију социјалног, емоционалног, физичког и когнитивног развоја детета (Sibley & Etnier, 2003). Без обзира да ли је структуриран или неструктуриран, одмор треба да буде безбедан и добро надгледан.

Школски одмор је уобичајени део школског живота за већину ученика основних и средњих школа, а искуства ученика варирају од државе до државе, често и од школе до школе.

У Јапану деца основношколског узраста имају од 10 до 15 минута одмора на сваких сат времена, што се објашњава чињеницом да пажња почиње да слаби после 45 до 50 минута интензивне наставе (Ishii et al., 2014). У САД, трајање и распоред одмора варира у зависности од узраста ученика, разреда, школског округа, односно државе, а понекад и од појединачне школе. Већина основних школа велики одмор организује у склопу паузе за ручак (Pellegrini & Smith, 1993). У неким британским школама ученици дневно имају три одмора на отвореном: ујутру и поподне су одмори од 15 минута, а вечерњи одмори трају 80 - 90 минута (Pellegrini & Smith, 1993). У данским школама, укупно 60 минута је посвећено одморима. Најчешће се примењују од два до четири одмора, а дужина трајања одмора варира од школе до школе. Пауза за ручак је најдужа пауза и траје од 25 до 30 минута (Pawlowski et al., 2014). У финском школском систему дужина трајања одмора и пауза за ручак нису регулисане националним законом. У пракси, ученицима у Финској је обезбеђено неколико одмора у току дана. Организација часова и време одмора је ствар опредељења и политике појединачне школе. У млађим разредима (1. до 6. разред) и старијим разредима основне школе (7. до 9. разред), ученици обично имају два до четири одмора, трајања од 10 до 15 минута, након сваких 45 - 90 минута школског рада, као и један дужи одмор од 30 минута који се користи за паузу за ручак (Haapala et al., 2014). У француским школама ученици имају три одмора, најдужи одмор траје 45 минута и то је одмор за ручак, а јутарњи одмор и поподневни трају 15 минута (Blaes et al., 2013). У руским школама, мали одмори по правилу трају 10 минута, а режим рада подразумева

for 10 minutes, and the school schedule usually involves two recesses of 20 minutes (Department of Education of the City of Moscow, n.d.).

Regarding the schools in Serbia, there are currently no regulations that would regulate the duration, organization and content of school recess. This results in a very uneven practice when it comes to the total number of recesses, as well as duration, organization and supervision, which vary from school to school.

An analysis of the official websites of 410 elementary schools in Serbia (36% of the total number of primary schools), where the organization of the school day was provided, showed that the duration of a recess ranged between 10 and 30 minutes (Table 1). The highest percentage of schools (48%) has a recess of 20 minutes, after the second lesson. If the recess lasts for 10 or 15 minutes, most often there are two recesses in the school schedule, which are scheduled after the second and third lesson.

In secondary schools, recesses are arranged differently, and the results obtained on the sample of 166 secondary schools (33% of the total number of regular secondary schools) showed that the largest percentage of schools (60.2%) had a recess after the second lesson, with the duration of 15 or 20 minutes (Table 1). The longest registered recesses, lasting for 25 minutes, are also realized after the second lesson.

Of course, in all observed schools, besides the longest break in the school day, after other lessons, there are so-called short recesses of 5 minutes, which are used by students to collect their school material after the end of their lesson, switch to another classroom, if the classes are organized in different classrooms, and prepare for the next lesson.

најчешће два велика одмора од по 20 минута (Департамент образования города Москвы, n.d.).

Што се тиче школа у Србији, тренутно не постоје прописи који би регулисали трајање, организацију и садржај школских одмора. То за последицу има веома неуједначену праксу када је реч о укупном броју одмора, њиховом трајању, организацији и надзору, који се разликују од школе до школе.

Анализа званичних сајтова 410 основних школа из Србије (36% од укупног броја матичних основних школа), на којима су били доступни подаци о организацији школског дана, показала је да се трајање великог одмора креће у интервалу од 10 до 30 минута (Табела 1). Највећи проценат школа (48%) има одмор у трајању од 20 минута и то после другог часа. Уколико одмор траје 10 или 15 минута, најчешће у школском распореду постоје два мало дужа одмора, који су у распореду после другог и трећег часа.

У средњим школама су одмори другачије распоређени, а резултати које смо добили на узорку 166 средњих школа (33% од укупног броја редовних средњих школа), показали су да код средњих школа, највећи проценат школа (60.2%) има дужи одмор после другог часа, трајања 15 или 20 минута (Табела 1). Најдужи регистровани одмори, трајања 25 минута, такође се реализују после другог часа.

Наравно, у свим посматраним школама, поред великог, тј. најдужег одмора у школском дану, после осталих часова, постоје и тзв. мали одмори у трајању од 5 минута, који служе да ученици прикупе прибор по завршетку часа, пређу у други кабинет ако је настава кабинетски организована и припреме се за наредни час.

Table 1. *Recess in the schools of the Republic of Serbia*

Табела 1. *Велики одмор у школама Републике Србије*

Велики одмор* / *Recess**	**Основна школа / *Primary school* n (%)**	**Средња школа / *Secondary school* n (%)**	**Укупно / *Total* n (%)**
Позиција у распореду / *Position in the timetable*			
После 2. часа / *After the 2nd lesson*	311 (76.6)	100 (60.2)	411 (100.0)
После 3. часа / *After the 3rd lesson*	8 (2.0)	45 (27.1)	53 (100.0)
После 2. и после 3. часа / *After the 2nd and after the 3rd lesson*	87 (21.4)	12 (7.2)	99 (100.0)
Остало / *Other*	-	9 (5.5)	9 (100.0)
Укупно / *Total*	406 (100.0)	166 (100.0)	572 (100.0)
Трајање / *Duration*			
10 минута / *minutes*	8 (2.0)	5 (3.0)	13 (100.0)
15 минута / *minutes*	122 (30.0)	67 (40.3)	189 (100.0)
20 минута / *minutes*	195 (48.0)	67 (40.3)	262 (100.0)
Остало / *Other*	81 (20.0)	27 (16.4)	108 (100.0)
Укупно / *Total*	406 (100.0)	166 (100.0)	572 (100.0)

** Recess longer than 5 minutes*

** одмор дужи од 5 минута*

When planning interventions aimed at school recess, it is important to determine the current position and duration of the recess and, when needed, plan corrections in accordance with the intervention. The obtained data show that recess in most schools is in the middle of the working day and usually lasts 15-20 minutes.

Positive effects of the recess

As it has already been pointed out, all children have the right to rest. After the recess, students are more careful and willing to perform cognitive tasks. In addition, recess helps children to develop social skills that are otherwise not acquired in a more structured classroom environment (Ramstetter, Murray & Garner, 2013).

While playing in the playground, children practice the role of a leader, teach each other games, exchange roles, and learn to solve conflicts non-violently. In cases of free choice of activities, children learn negotiation skills in order to continue the game. In playgrounds where there is supervision, children learn games and conflict resolution skills, so there is less conflict (Welteroth, 2009).

School recess is a break from the demanding cognitive tasks performed indoors. Recess allows children to alleviate and manage stress caused by cognitive effort. It is the time to learn and practice other skills, such as persistence and self-control. These unstructured peer interactions facilitate the development of social skills necessary for a positive and productive interaction with others, such as negotiation skills, cooperation, problem solving, as well as encouraging persistence and self-control (Ramstetter, et al., 2010).

A play in any form relieves stress, especially in the context of the growing academic demands placed on children (Miller & Almon, 2009). Daily school recess lasting for 15 minutes improves students' behavior in the classroom (Barros, Silver, & Stein, 2009).

A survey conducted on a sample of children aged 8-12 has shown that an intervention exercise program during a recess, which contains aerobic exercise and cognitively demanding physical activity, can contribute to certain aspects of executive functioning, such as inhibition, working memory, cognitive flexibility and planning (van der Niet et al., 2016). A 30-minute activity was carried out twice a week during lunch breaks over a period of 22 weeks.

Structured and collaborative games during school recess can have a strong impact on the increase in pro-

Приликом планирања интервенције усмерене на школски одмор, важно је утврдити актуелну позицију и трајање одмора и, евентуално, планирати корекције у складу са интервенцијом. Добијени подаци показују да се дужи одмор у већини школа налази у средини радног дана и да обично траје 15-20 минута.

Позитивни ефекти одмора

Као што је већ истакнуто, сва деца имају право на одмор. Након одмора, ученици су пажљивији и спремнији за обављање когнитивних задатака. Поред тога одмор помаже деци у развијању социјалних вештина које се иначе не стичу у више структурираном амбијенту учионице (Ramstetter, Murray & Garner, 2013).

На игралишту кроз игре, деца вежбају улогу вође, једни друге уче играма, смењују се у различитим улогама и уче да ненасилно решавају конфликте. У случајевима слободног избора активности, деца уче вештине преговарања како би се игра наставила. На игралиштима на којима постоји надзор, деца уче игре и вештине решавања конфликата, тако да конфликата има мање (Welteroth, 2009).

Школски одмор представља одмор од захтевних когнитивних задатака који се обављају у затвореном простору. Одмор омогућава деци ублажавање и управљање стресом услед когнитивних напора. То је време за учење и вежбање других вештина, као што су упорност и самоконтрола. Ове неструктуриране вршњачке интеракције олакшавају развој социјалних вештина неопходних за позитивну и продуктивну интеракцију са другима, попут вештине преговарања, сарадње, решавања проблема, подстичу упорност и самоконтролу (Ramstetter, et al. 2010).

Игра у било ком виду ослобађа од стреса, поготово у окружењу све већих академских захтева који се постављају пред децу (Miller & Almon, 2009). Свакодневни школски одмор у трајању од 15 минута утиче на боље понашање ученика у учионици (Barros, Silver, & Stein, 2009).

Кроз игре на одмору деца вежбају улогу лидера, једни друге уче играма, смењују се у различитим улогама и уче се да ненасилно решавају конфликте. Школски одмор омогућава деци ублажавање и управљање стресом насталим услед когнитивног напора. Игре на одмору служе за учење и вежбање других вештина, као што су упорност и самоконтрола.

Истраживање спроведено на узорку деце узраста 8-12 година, показало је да интервентни програм вежбања на великом одмору, који је садржаво аероб-

social behavior and the reduction of behavior leading to aggression and mistreatment. Also, the role of active adult supervision in the playground has positive effects, especially when it comes to promoting positive interactions between young people coming from different cultures (Leff, Costigan, & Power, 2004).

Children who are more active during the school day are more active after school, while children who are inactive during school day tend to remain inactive after school. By observing them in the playground, teachers have the opportunity to get to know children better, which can be useful for developing a curriculum and preventing school violence (Barros, Silver & Stein, 2009).

Students' physical activity during recess

School recess allows all students to be active and practice motor skills. Even modest physical activity during recess is certainly a counterbalance to sedentary activities at school and at home and helps child reach the recommended 60 minutes of moderate to vigorous physical activity per day (American Academy of Pediatrics, AAP).

An interesting study by Vanhelst and associates (2016) found that adolescent-aged students attending schools with a longer school day (longer hours and school recess) are more physically active than peers who spend shorter time at school, suggesting the significance of the time that students spend at school and the potential of the recess in the promotion of students' physical activity. It turns out that students spend free time out of school mostly in sedentary activities. Another study showed that students are physically most active when they have physical education at school. However, additional recess in school schedule (one or two recesses) significantly contributes to the physical activity of students, especially in days when physical education is not on the timetable (Brusseau & Kulinna, 2015).

A survey conducted on a sample of German primary school students showed that a greater number of school recesses contributes to the physical activity of students (Kobel, Kettner, Erkelenz, Kesztyüs, & Steinacker, 2015). In average, children spent ¼ of recess in moderate to vigorous physical activity, with boys being significantly more active than girls.

The physical activity of students can also be influenced by the social environment in the school. Haapala and associates (et al. 2014) conducted a survey on a sample of 26 primary schools and found that the

не вежбе и когнитивно захтевне физичке активности, може допринети појединим аспектима егзекутивног функционисања, као што су инхибиција, радна меморија, когнитивна флексибилност и планирање (van der Niet et al., 2016). Вежбање у трајању од 30 минута, реализовано је два пута недељно у време одмора за ручак, током периода од 22 недеље.

Структуриране и сарадничке игре током школског одмора могу имати снажан утицај на повећање просоцијалног понашања и смањење понашања које води ка агресији и малтретирању (нпр. висок ниво грубе физичке игре). Такође, улога активног надзора одраслих на игралишту, има позитивне ефекте, посебно када је реч о промоцији позитивних интеракција између младих који долазе из различитих култура (Leff, Costigan, & Power, 2004).

Деца која су активнија током школског дана, активнија су и после школе, док деца неактивна током боравка у школи, имају тенденцију да остану неактивна и после школе. Посматрањем деце на игралишту, наставници имају прилику да боље упознају децу, што може бити корисно у развоју наставног програма и спречавању школског насиља (Barros, Silver & Stein, 2009).

Физичка активност ученика током одмора

Школски одмор пружа могућност свим ученицима да буду активни по сопственом избору и да увежбавају моторичке вештине. Чак и скромна физичка активност на одмору, свакако је противтежа седентарним активностима у школи и код куће и помаже детету да постигне препоручених 60 минута умерене до интензивне физичке активности дневно (American Academy of Pediatrics; AAP).

Занимљиво истраживање Ванхелста и сарадника (Vanhelst et al., 2016) показало је да су ученици адолесцентског узраста који похађају школе које карактерише дуже трајање школског дана (дужи часови и школски одмори), физички активнији него вршњаци који краће бораве у школи, што указује на значај времена које ученици проводе у школи и потенцијал одмора у промоцији физичке активности ученика. Испоставило се да ученици слободно време ван школе, углавном проводе у седентарним активностима. Једна друга студија, показала је да су ученици физички најактивнији оним данима када имају физичко васпитање, међутим, додатни одмори у школском распореду (један или два велика одмора), значајно доприносе физичкој активности ученика, поготово у данима када физичко васпитање није у распореду (Brusseau & Kulinna, 2015).

physical activity of students during recess is positively related to peer relationships, then with a sense of relatedness with school and school climate.

Although school recess provides time (if not other incentives) for physical activity, students do not use that opportunity sufficiently. Recommendations to spend at least 40% of the time during school recess in moderate to vigorous physical activity (Ridgers, Stratton, & Fairclough, 2006) are not met by many students.

Stratton (1999, 2000) found that children spend 15-40% of the time during recess in moderate to vigorous physical activity and that there is a gender pattern of physical activity. The research by Zask and associates (Zask, Van Beurden, Barrnett, Brooks, & Dietrich, 2001) also points to this pattern. Namely, about 50% of boys and 26.5% of primary school girls were physically active during their recess. The results of a recent study confirm that girls spend most of the recess time in sedentary activities (54.5%), which is not the case with boys (27.5%), while older students are more prone to passive school recess than younger ones (Greca & Silva, 2017).

As already pointed out, during the school recess, students are allowed to spend their free time according to their choice. In order to promote physical activity, reduce sedentary activities and develop social skills, schools can offer structured and unstructured physical activities to promote physical activity during recess. Structured recess is based on organized physical activity, teaching and encouragement by a trained adult, most often physical education teachers, who might be assisted by older students or parent volunteers. Unstructured recess involves free activity of students during recess, without guidance and encouragement.

The research that examined the effects of structured recess, that is, the application of fun and energetically demanding games over the course of nine weeks, confirmed that in this way we can significantly increase the level of moderate to vigorous physical activity during school recess and during the school day as a whole (Howe, Freedson, Alhassan, Feldman, & Osganian, 2012). At the same time, it was found that, compared with unstructured recess, there are no significant differences in the impact on the body mass index and cardiovascular risk factors. In a study by Black, Menzel and Bungum (2014), a program of organized exercise (combination of walking and running), delivered by a physical education teacher with the help of the parent volunteers, proved to be very attractive for students of both genders, significantly contributing to

И истраживање спроведено на узорку ученика немачких основних школа, показало је да већи број школских одмора, доприноси физичкој активности ученика (Kobel, Kettner, Erkelenz, Kesztyüs, & Steinacker, 2015). Деца су у просеку ¼ одмора проводила у умереној до интензивној физичкој активности, при чему су дечаци били знатно активнији од девојчица.

На физичку активност ученика може утицати и социјално окружење у школи. Хапала и сарадници (Haapala et al., 2014) спровели су истраживање на узорку 26 основних школа и констатовали да је физичка активност ученика на одмору позитивно повезана са вршњачким односима, затим, са осећањем повезаности са школом и школском климом.

Иако школски одмор обезбеђује време (ако не и друге подстицаје) за физичку активност, ученици ту могућност недовољно користе. Препоруке да најмање 40% времена током школског одмора проведу у умереној-до-интензивној физичкој активности (Ridgers, Stratton, & Fairclough, 2006), ученици много пута не испуњавају.

Стретон (Stratton; 1999, 2000) је установио да деца проведу 15-40% времена током одмора у умереној - до - интензивној физичкој активности и да постоји родни образац физичке активности. Истраживање Заска и сарадника (Zask, Van Beurden, Barrnett, Brooks, & Dietrich, 2001) такође указује на овај образац; наиме, око 50% дечака и 26.5% девојчица основношколског узраста било је физички активно током одмора. И резултати једне новије студије потврђују да код девојчица доминира седентарна активност на великом одмору (54.5%), што није случај код дечака (27.5%), при чему су старији ученици више склони пасивном провођењу школског одмора (Greca & Silva, 2017).

Као што је већ истакнуто, током школског одмора ученици су упућени да своје слободно време проводе по сопственом избору. У циљу промоције физичке активности, редукције седентарних активности и развијања социјалних вештина, школе могу понудити структуриране и неструктуриране физичке активности којима би се подстакла физичка активност током одмора. Структурирани одмори су засновани на организованој физичкој активности, подучавању и подстицању од стране обучене одрасле особе, најчешће наставника физичког васпитања, коме могу помагати старији ученици или родитељи волонтери. Неструктурирани одмори подразумевају слободну активност ученика на одмору, без усмеравања и подстицања.

their physical activity.

Unstructured recess, on the other hand, can represent a favorable context for the internally motivated play, creativity and spontaneously organized activities of children of similar abilities. A natural environment that encourages free physical activity can be of a particular importance, which was confirmed by a recent study (Wood, Gladwell, & Barton, 2014): students who played in school field were 40% more physically active than their peers who played in the playground, where physical activity in nature provided 29% of the total physical activity during the day, and the play in the playground provided 20%. It is interesting that the differences in the physical activity of girls and boys were very small when it comes to the natural environment, which according to the authors, suggests that for girls, recess spent in natural environment would be the best option.

Larson and associates (Larson, Brusseau, Chase, Heinemann, & Hannon, 2014) examined the differences between unstructured and semi-structured school recess; in the first case, the children spent their school recess at their own will, and in the second case, the physical education teacher with his assistants encouraged the students to choose the preferred physical activity - football, basketball, skipping a rope or walk in the assigned playground zones. Semi-structured recess led to a greater increase in the number of steps and moderate to vigorous physical activity compared to an unstructured recess, without the decline in the enjoyment of physical activity during recess.

The children of the younger school age were also more physically active during an organized recess, where they had the opportunity to participate in the games on the parkour course organized by physical education teacher than during a supervised recess, where they could freely play at their own preferences in the same space, and the physical education teacher only supervised students for safety (Coolkens, Ward, Seghers, & Iserbyt, 2018). More activity was particularly noted among boys.

It is interesting that children who are poorly active during their recess (active only 18% of the time), enjoy the social dimension of school recess most. It is an opportunity to socialize with a few friends, out of stress caused by school lessons, avoiding potentially conflicting physical activity. Less active students do not want to participate in physical activities along with unpleasant peers. Sometimes they do not participate because, for them, it is more important to

Истраживање које је испитивало ефекте структурираног одмора, односно, примене забавних и енергетски захтевних кретних игара током девет недеља, потврдило је да код деце на тај начин можемо значајно повећати ниво умерене до интензивне физичке активности на школском одмору и током школског дана у целини (Howe, Freedson, Alhassan, Feldman, & Osganian, 2012). У исто време, констатовано је да, у поређењу са неструктурираним одмором, не постоје значајне разлике када је реч о утицају на индекс телесне масе и кардиоваскуларне факторе ризика. У истраживању Блека, Мензел и Бангума (Black, Menzel, & Bungum, 2014), програм организованог вежбања (комбинација ходања и трчања), који је спроводио наставник физичког васпитања уз помоћ родитеља волонтера, показао се као веома атрактиван за ученике оба пола, значајно доприносећи њиховој физичкој активности.

Неструктурирани одмори, с друге стране, могу представљати повољан контекст за унутрашње мотивисану игру, креативност и спонтано организоване активности деце сличних способности. Посебан значај може имати природно окружење које подстиче слободну физичку активност, што је потврдила једна новија студија (Wood, Gladwell, & Barton, 2014): ученици који су се играли на школској пољани, били су за 40% више физички активни у поређењу са вршњацима који су се играли на игралишту, при чему је физичка активност у природи обезбеђивала 29% укупне физичке активности током дана, а игра на игралишту 20%. Занимљиво је да су разлике у физичкој активности девојчица и дечака биле веома мале кад је реч о природном окружењу, што, по ауторима, сугерише да би за девојчице игра у природи током одмора представљала најбољу опцију.

Ларсон и сарадници (Larson, Brusseau, Chase, Heinemann, & Hannon, 2014) су испитивали разлике између неструктурираног и полуструктурираног школског одмора; у првом случају, деца су проводила школски одмор по свом нахођењу, а у другом случају је наставник физичког васпитања са својим помоћницима, подстицао ученике да одаберу физичку активност по својој жељи – да играју фудбал, баскет, прескачу вијачу, играју се вије или пешаче у за то предвиђеним игралишним зонама. Полуструктурисани одмор довео је до већег пораста броја корака и умерене-до-интензивне физичке активности, у поређењу са неструктурисаним одмором, а да притом није дошло до опадања уживања у физичкој активности на одмору.

be in the company of their friends, and some of them simply want to be alone during their recess (Woods, McLoughlin, Kern, & Graber, 2018). To improve the physical activity of students, it is very important to understand the social context and the specific reasons behind the decision not to be active.

The qualitative study of Hanus and associates (2017) showed that there are numerous perceived barriers and facilitators of the recess physical activity, which can relate to the environment (physical, organizational and natural), to students' beliefs, attitudes, feelings concerning physical activity, etc. Among the identified barriers are the lack of facilities and equipment, lack of organized physical activity, insufficient time available, restrictive rules, adverse weather conditions, fear of injury, risk of equipment damage, conflicting activities, etc. At the same time, the availability of facilities and equipment for physical activity, organized support for physical activity during the recess, enough time, enjoyment of physical activity, opportunity to meet friends, are some of the factors that contribute to the physical activity of students during recess. The focus groups were also used in the Martínez-Andrés and associates study (2018), which dealt with the identification of factors that influence the attitudes of primary school students about physical activity during recess. Significant gender differences were noted: while girls prefer games, boys choose sports, competitive activities, especially football. Girls generally prefer passive games, walking and talking. Boys and girls play separately, and a peer group is very important for decisions of an individual when it comes to physical activity on recess. Inadequate space for physical activity, lack of equipment and teachers' intervention in conflict resolution are also important barriers. Dominant boys who choose football, occupy a central space in the playground, which pushes boys and girls who do not play football to peripheral zones and gives rise to conflicts about the distribution of space.

The design and characteristics of school playgrounds can positively influence the physical and sedentary activity of students (Van Kann et al., 2016).

Hannon and Brown (2008) examined how the physical activity of children is influenced by the addition of portable playground equipment in an open playground. In relation to the pre-intervention state, both genders significantly reduced sedentary behavior by 16% and significantly increased light physical activity by 3.5%, moderate by 7.8% and vigorous by 4.7%. When different materials, which are not consid-

Деца млађег школског узраста такође су била физички активнија током организованог одмора, где су имала прилику да уз наставника физичког васпитања учествују у играма на полигону за паркур, него током надзираног одмора, где су могла слободно да се играју по својој жељи у истом простору, а наставник физичког васпитања је само надзирао ученике ради безбедности (Coolkens, Ward, Seghers, & Iserbyt, 2018). Већа активност је посебно била изражена код дечака.

Занимљиво је да деца која су слабо активна током одмора (активни су само 18% времена), највише уживају у социјалној димензији школског одмора. То је прилика да се друже са неколицином пријатеља, изван стреса школских часова, избегавајући потенцијално конфликтне физичке активности. Неактивни ученици не желе да учествују у физичким активностима заједно са непријатним вршњацима, понекад не учествују јер им је важније да буду у друштву својих пријатеља, а неки међу њима једноставно желе да буду сами током одмора (Woods, McLoughlin, Kern, & Graber, 2018). За побољшање физичке активности ученика, веома важно може да буде разумевање социјалног контекста и специфичних разлога који стоје иза одлуке да не буду активни.

Квалитативна студија Хануса и сарадника (Hannus et al., 2017), показала је да постоје бројне опажене препреке и фацилитатори физичке активности ученика на одмору, који се могу односити на окружење (физичко, организационо и природно), затим на уверења, ставове, осећања ученика у вези са физичком активношћу и др. Међу идентификованим препрекама су недостатак објеката и опреме, недостатак организоване физичке активности, недовољно времена на располагању, ограничавајућа правила, неповољне временске прилике, страх од повреде, ризик од оштећења опреме, конфликтне активности и др. У исто време, доступност објеката и опреме за игру, организована подршка физичкој активности током одмора, довољно времена, уживање у физичкој активности, прилика да сретнеш другове, неки су од фактора који доприносе физичкој активности ученика на одмору. Фокус групе коришћене су и у студији Мартинез-Андрес и сарадника (Martínez-Andrés, Bartolomé-Gutiérrez, Rodríguez-Martín, Jesus Pardo-Guijarro, & Martínez-Vizcaíno, 2018), која се бавила идентификовањем фактора који утичу на ставове ученика основне школе, о физичкој активности током одмора. Констатоване су значајне родне разлике: док девојчице преферирају игре, дечаци се

ered to be playable material (eg automobile tires, boxes, plastic drums, pieces of fabric, swimming noodles, etc.) were available to children, they were significantly more active, sociable and more creative (Bundy et al., 2009). A recent study (Hyndman, Benson, Ullah, & Telford, 2014) confirms that the introduction of portable/recycled materials into the playground (various packaging, buckets, rubber, strings, bales of hay, etc.) can have a significant long- term positive effect on the physical activity of children.

Stratton & Mullen (2005), examined the effect of drawing colorful markings on an open playground on time that students spent in moderate to vigorous physical activity and vigorous physical activity. The results obtained showed that the time spent in both categories of activities increased significantly.

A review study by Bassett et al. (2013) showed that modification of the playground brings an additional 6 minutes of physical activity per day to children, and the modified school recess brings 5 additional minutes daily in comparison to a traditional recess. A traditional recess of 15 minutes can result in accumulation of about 7 minutes of MVPA among primary school students, while modifying the recess, providing playground equipment (e.g. slides, swings, climbers), placing color markings on playground surface and the availability of game equipment (e.g. balls, hoops, frisbees) further increase physical activity during recess for 5 minutes per day.

In order to ensure safe play and activity of students during the recess, schools are obliged to take appropriate measures: provision of adequate space and facilities, regular control of devices and equipment, establishment of safety rules, development and implementation of recess activities, provision of adequate supervision by qualified adults who can intervene in case physical and emotional safety of the child is at risk (Remstetter et al., 2010).

Conclusion

Unfavorable trends in terms of physical activity and nutritional status of scholl children and youth (Inchley et al., 2016), as well as high participation rates of young people in education in many countries, have drawn attention to school environments that support physical acitivity. A school recess cannot replace physical education. However, it can be an important supplement to children's total daily physical activity which, along with other developmental benefits, makes recess an important part of a school day. Previous research shows that recess-based physical activ-

опредељују за спортске, такмичарске активности, посебно за фудбал. Девојчице генерално више воле пасивне игре, шетњу и разговор. Дечаци и девојчице се одвојено играју, а група вршњака је веома важна за одлуке појединца када је реч о физичкој активности на одмору. Неадекватан простор за игру, недостатак опреме и посредовање наставника у решавању конфликта су такође важне баријере. Доминантни дечаци који бирају фудбал, заузимају централни простор на дворишту, што дечаке и девојчице који не играју фудбал потискује ка периферним зонама и рађа конфликте око расподеле простора.

Дизајн и карактеристике школских игралишта могу позитивно утицати на физичку и седентарну активност ученика (Van Kann et al., 2016).

Хенон и Браун (Hannon & Brown, 2008) су у свом истраживању испитали како на физичку активност деце утиче додавање преносиве игралишне опреме на отвореном игралишту. У односу на стање пре интервенције, код деце оба пола дошло је до значајног смањења седентарног понашања за 16% и значајног повећања физичке активности ниског интензитета за 3.5%, средњег за 7.8% и високог интензитета за 4.7%. Када су деци били доступни различити материјали, који се не сматрају игровним материјалом (нпр. аутомобилске гуме, кутије, пластична бурад, комади тканине, сунђерасте траке и сл.), деца су била значајно активнија, друштвенија и креативнија (Bundy et al., 2009). Да увођење покретног/рециклираног материјала на игралиште (различита амбалажа, канте, гуме, струњаче, бале сена и сл.), може имати значајан дугорочни позитиван ефекат на физичку активност деце потврђује и једна новија студија (Hyndman, Benson, Ullah, & Telford, 2014).

Утицај исцртавања разнобојних ознака на отвореном игралишту на време које ученици проведу у умереној-до-интензивној физичкој активности и интензивној физичкој активности испитивали су Стретон и Мален (Stratton & Mullan, 2005). Добијени резултати су показали да се време проведено у обе категорије активности значајно повећало.

Прегледна студија Бесета и сарадника (Bassett et al., 2013) показала је да модификација игралишта доноси деци додатних 6 минута физичке активности дневно, а модификовани школски одмор доноси 5 минута више физичке активности него традиционални одмор. Традиционални одмор у трајању од 15 минута може резултирати акумулацијом око 7 минута физичке активности, умереног до високог интензитета, код ученика основне школе, док се модификовањем

ity interventions are simple and feasible and can positively influence the total daily physical activity of students.

When planning intervention aimed at promoting physical activity during recess, it is important to take into account the specific needs of students of different ages, gender and level of physical activity, as well as the characteristics of social, organizational and natural environment. Intrapersonal factors might be of a particular relevance, although they are currently understudied.

одмора, обезбеђивањем игралишне опреме (нпр. тобогани, љуљашке, пењалице), постављањем ознака у боји на подлози игралишта (нпр. за "школицу", бацање врећица, решетке са бројкама и сл.) и доступношћу опреме за игру (нпр. лопте, обручи, фризби) даље повећава физичка активност током одмора за 5 минута дневно.

Да би осигурале безбедну игру и активност ученика током одмора, школе су дужне да предузму одговарајуће мере: обезбеђивање одговарајућег простора и објеката, редовну контролу справа и реквизита, успостављање правила безбедности, израду и примену плана активности током одмора, пружање адекватног надзора од стране квалификованих одраслих особа, које могу да интервенишу у случају да је физичка и емоционална безбедност детета у опасности (Remstetter et al., 2010).

Закључак

Неповољни трендови када је реч о физичкој активности и ухрањености школске деце и омладине (Inchley et al., 2016), као и чињеница да многе земље имају висок обухват деце образовним системом, у први план истичу значај школског окружења за промоцију физичке активности. Школски одмор, као стандардни сегмент школског програма, може допринети побољшању физичке активности ученика. Одмор не може заменити физичко васпитање, али може бити важан додатак укупној дневној физичкој активности детета, што уз друге развојне користи, чини велики одмор важним сегментом школског дана. Досадашња истраживања показују да су интервенције усмерене на школски одмор економичне и једноставне и да могу позитивно утицати на повећање укупне дневне физичке активности ученика.

Приликом планирања интервентних мера усмерених на промоцију физичке активности током одмора, важно је имати у виду специфичне потребе ученика различитог узраста, пола и нивоа физичке активности, као и одлике социјалног, организационог и природног окружења. Посебно важни могу бити интраперсонални фактори којима досад није била посвећена довољна пажња.

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Primljen: 04. decembar 2018. / Received: December 04, 2018
Prihvaćen: 11. decembar 2018. / Accepted: December 11 , 2018

DOI: 10.7251/SSH1802175R
Short notice

UDC: 378.141:792.028]:796.012
Kratko saopštenje

Differences in Attitudes of Drama Students Towards Physical Exercise and Sports or Recreative Activities

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Abstract: *The aim of this research is to determine the differences in attitudes toward physical exercise of students of Academy of Dramatic Arts in Banja Luka and Academy of Performing Arts in Sarajevo, and their interests in certain sports and recreational activities. The study included a total of 59 students of Academy of Dramatic Arts in Banja Luka and Academy of Performing Arts in Sarajevo. Given the requirements in terms of physical ability and physical appearance that contemporary theater and film production has for future actors, we believe that physical exercise should be their daily needs. The results of research have confirmed our opinion and pointed to a satisfactory level of physical activity of drama students. There was no significant difference in the attitudes of students toward physical exercise in relation to gender and place of study. The research results are encouraging, showing the awareness of students on the importance of practicing physical exercise in terms of improving the quality of life, as well as work and artistic creativity.*

Keywords: *drama students, attitudes, interests, physical exercise, sports.*

Introduction

Contemporary drama art imposes physical activities upon actors as an integral component of everyday's life. Regular physical activity or moderate physical activity positively influences the preservation of health and the prevention of various diseases. Resarch by Ostojic et al. (2003) shows that about 80% of the population is insufficiently physically active and that in the most developed countries there are more than 50% of the population with excessive weight. It is thought that the cause of many health problems and poor physical fitness of students is a small number of courses related to physical exercise, contemporary trends in social networks and re-

Razlike u stavovima studenata glume prema fizičkom vježbanju i sportsko-rekreativnim aktivnostima

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Apstrakt: *Cilj ovog istraživanja je utvrđivanje razlika u stavovima o fizičkom vježbanju studenata Akademije dramskih umjetnosti u Banjoj Luci i Akademije scenskih umjetnosti u Sarajevu i njihovim preferencijama prema pojedinim sportskim i rekreativnim aktivnostima. Istraživanjem je obuhvaćeno ukupno 59 studenata sa ova dva fakulteta. Obzirom na zahtjeve, u pogledu fizičkih sposobnosti i fizičkog izgleda, koje pred buduće glumce postavlja savremena pozorišna i filmska produkcija, smatramo da fizičko vježbanje treba da bude njihova svakodnevna potreba. Dobijeni rezultati istraživanja su ukazali na zadovoljavajući nivo fizičke aktivnosti studenata glume sa ova dva univerziteta. Nije pronađena značajna razlika u stavovima studenata prema fizičkom vježbanju u odnosu na pol i mjesto studiranja. Rezultati istraživanja ohrabruju, pokazujući svjesnost studenata glume o značaju bavljenja fizičkim vježbanjem u smislu podizanja kvaliteta života ali i rada i umjetničkog stvaralaštva kod istih.*

Ključne riječi: *studenti glume, stavovi, interesi, fizičko vježbanje, sportovi.*

Uvod

Savremena dramska umjetnost nameće glumcima fizičke aktivnosti kao sastavni dio svakodnevnog života. Redovno fizičko vježbanje, odnosno umjerena fizička aktivnost, pozitivno utiče na očuvanje zdravlja i prevenciju raznih oboljenja. Istraživanje Ostojića i dr. (2003) pokazuju da je oko 80% populacije nedovoljno fizički aktivno, te da u većini razvijenih zemalja preko 50% populacije ima višak kilograma. Smatra se da su uzrok mnogih zdravstvenih problema i loše fizičke kondicije studenata mali fond časova koji se odnose na fizičko vježbanje, savremeni trendovi društvenih mreža i smanjeno kretanje, odnosno hipo-

duced movement, that is, hypokinesia. Results of Hackney's research (2006) point to the importance of physical exercise in reduction of subcutaneous fat tissue, muscle mass increase, acceleration of metabolism and the hormonal system that prevents the occurrence of excess pounds.

Research by Kamtsios (2011), and Radisavljević et al. (2012) showed that the level of physical activity is decreasing between adolescence and adult age, which is crucial for the adoption and retention of habits in physical exercise. Regarding students' views on the importance of physical exercise, Vrčan, Pisačić and Slačanac (2009) conclude that students are well-aware ofthe importance of physical exercising, as many as 94% of students consider physical exercise very important, but the fact that 56% of students from the survey sample are engaged in either one form of physical excersise in extracurricular activities is quite worrying. Students as an important part of the community and the bearers of social development are less and less involved in physical activity or any aspect of physical exercise. According to Ghofrani & Golsanamlou (2012), and Ünlü, Karahan, Aydos, & Öner (2011), in this period it is very important to create quality conditions for exercise and dealing with sports, in which the teaching of physical education should take a major place.

Actors must have a good physical fitness to answer the high demands of scriptwriters and directors. The exact goal of this paper is to determine the differences in attitudes towards the physical training of the Academy of Dramatic Arts (ADU) students, acting department, at the University of Banja Luka and Academy of Performing Arts (ASU), acting department, at the University of Sarajevo. The research also includes student's tendencies for individual sports and recreational activities.

Methods

The sample of respondents were ADU students, the acting department, University of Banja Luka and ASU, acting department, University of Sarajevo. The sample of respondents covered 59 regular students of two faculties, with ADU 15 male and 12 female respondents, and ASU 18 male and 14 female respondents.This was uniformed by gender , X^2 *(1, N = 59) = 0,83, p = 0,36,* as well as according to the study site, X^2*(1, N = 59) = 0,42, p = 0,51*. The age of the subjects was 21.68 ± 2.23. The research was conducted in the winter semester of the academic year 2016/17. To collect data in this survey, a method of survey which belongs to sociological methods was applied, consisting of series of prepared questions which students are asked to answer (Haralambos & Holborn, 2002). Beside the general information about the respodent, the questionnaire included questions aimed at obtaining information about the attitude of students towards

kinezija. Rezultati istraživanja Hackneya (2006) ukazuju na značaj fizičkog vježbanja u smanjenju potkožnog masnog tkiva, povećanja mišićne mase, ubrzanje metabolizma, te na hormonski sistem koji svojim djelovanjem sprječava pojavu viška kilograma. Istraživanja Kamtsios, (2011), te Radisavljevića i saradnika (2012) su pokazala da nivo fizičke aktivnosti opada u razdoblju između adolescentskog i dobi odrasle osobe, koje je ključno za usvajanje i zadržavanje navika prema fizičkom vježbanju. Što se tiče upućenosti studenata o značaju bavljenja fizičkim vježbanjem Vračan, Pisačić i Slačanac (2009) zaključuju da su studenti dosta dobro upućeni u značaj bavljenja fizičkim vježbanjem, čak 94% studenata smatra fizičko vježbanje vrlo važnim, ali zabrinjava podatak da 56% studenata iz uzorka istraživanja nije uključeno niti u jedan oblik fizičkog vježbanja u vannastavnim aktivnostima. Studenti kao važan dio zajednice i nosioci društvenog razvoja sve manje su uključeni u fizičke aktivnosti ili bilo koji vid fizičkog vježbanja. Prema Ghofrani & Golsanamlou, (2012), te Ünlü, i saradnicima, (2011), vrlo je bitno u ovom periodu stvoriti kvalitetne uslove za vježbanje i bavljenje sportom, u čemu veliku ulogu treba da ima nastava fizičkog vaspitanja.

Kako bi odgovorili na visoke zahtjeve pisaca tekstova, scenarija i reditelja, glumci moraju imati dobru fizičku kondiciju. Upravo cilj ovog rada jeste da se utvrde razlike u stavovima prema fizičkom vježbanju studenata Akademije dramskih umjetnosti (ADU), smjer gluma, Univerziteta u Banjoj Luci i Akademije scenskih umjetnosti (ASU), smjer gluma, Univerziteta u Sarajevu. Takođe, istraživanjem su obuhvaćene i skolonosti studenata prema pojedinim sportskim i rekreativnim aktivnostima.

Metode

Uzorak ispitanika su činili studenti ADU, smjer gluma, Univerziteta u Banjoj Luci i ASU, smjer gluma, Univerziteta u Sarajevu. Uzorak ispitanika je obuhvatio 59 redovnih studenata dva fakulteta, sa ADU 15 ispitanika muškog i 12 ženskog pola, a sa ASU 18 ispitanika muškog i 14 ženskog pola. Starosna dob ispitanika bila je 21,68±2,23 godina starosti. Istraživanje je provedeno u zimskom semestru akademske 2016/17. godine.

Za prikupljanje podataka u ovom istraživanju je primijenjena metoda ankete koja pripada sociološkim metodama, a koja se sastoji se od niza pripremljenih pitanja na koja se od studenata traži odgovor (Haralambos & Holborn, 2002). Osim opštih informacija o ispitaniku, upitnikom su obuhvaćena pitanja usmjerena na dobijanje informacija o stavu studenata prema fizičkom vježbanju.

Na kraju je određen interes studenata za bavljenje pojedinom sportskom ili rekreativnom aktivnošću. Ska-

physical exercise. At the end, students' interest in dealing with each individual sport or recreational activity is determined.

The scale of behavioral intentions (Prot & Bosnar, 1993) examined students' preferences for 25 sports. On a five-step Likert-type scale, the respondents rated each sport from 1 to 5, while each grade expresses the desired intensity of engagement in certain sports activity. Score 5 signifies a sport that the respondent would definitely want to do. Score 4 means sports which the respondent would gladly do. Score 3 means the sport the respondent is not sure that he or she would like to do it or would do it occasionally or in suitable circumstances. Score 2 means the sport the respondent would do only if he had or she no other choice or option. Score 1 means the sport that the respondent would not want to do. In data processing, the standard methods of descriptive and comparative statistics were used. determining contingency analysis was used to determine the differences in attitude towards physical exercises among students (X^2 *test*). The data obtained were processed by the software system IBM SPSS Statistics 21.0.

Results

Considering the aim of the research, ie to determine the differences in the attitude of students towards physical exercise, the first two questionnaries were constructed. The first question was about the importance that respondents ascribed to physical exercise. Respondents answered the questions on the five-step Likert-type scale, and expressed a very positive attitude to physical exercise, regardless of the place of study. The fact is that only two students expressed the view that they find physical exercise irrelevant, or little relevant. The highest percentage of respondents, up to 69.5% responded that physical exercise was very important to them (Table 1).

Table 1. *The importance of physical exercise according to the place of study*

Fakultet / *Faculty*	Važnost fizičkog vježbanja / *Importance of physical exercise*					Total
	1	2	3	4	5	
ADU	0	0	9	16	2	27
	0,0%	0,0%	33,3%	59,3%	7,4%	100,0%
ASU	1	1	3	25	2	32
	3,1%	3,1%	9,4%	78,1%	6,3%	100,0%
Total	1	1	12	41	4	59
	1,7%	1,7%	20,3%	69,5%	6,8%	100,0%

Note. 1 *= none; 2 = little; 3 = medium; 4 = strong; 5 = very strong; ADU = Academy of Dramatic Arts; ASU = Academy of Performing Arts.*

There was no significant difference in this issue between ADU and ASU students, $\chi 2$ (4, N = 59) = 6.59, p =

lom bihejvioralnih namjera (Prot & Bosnar, 1993), obrađene su preferencije studenata prema 25 sportova.

Na petostepenoj skali Likertovog tipa, ispitanik je svaki sport ocijenio od 1 do 5, pri čemu svaka ocjena iskazuje željeni intenzitet bavljenja određenom sportskom aktivnošću. Ocjena 5 označava sport kojim bi se ispitanik *svakako želio baviti*. Ocjena 4 označava sport kojim bi se ispitanik *rado bavio*. Ocjena 3 označava sport kojim ispitanik *nije siguran da bi se bavio*, odnosno bavio bi se njime povremeno ili u pogodnim okolnostima. Ocjena 2 označava sport kojim bi se ispitanik *bavio samo ukoliko ne bi imao drugi izbor ili mogućnost*. Ocjenu 1 ispitanik dodjeljuje sportu kojim se *nikako ne bi želio baviti*.

Prilikom obrade podataka korištene su standardne metode deskriptivne i komparativne statistike. Prilikom utvrđivanja razlika u stavu prema fizičkom vježbanju između studenata korištena je kontingencijska analiza (χ^2-test). Dobijeni podaci su obrađeni programskim sistemom IBM SPSS Statistics 21.0.

Rezultati

Obzirom na cilj istraživanja, odnosno na utvrđivanje razlika u stavu studenata prema fizičkom vježbanju, konstruisana su i prva dva anketna pitanja. Prvo pitanje je bilo vezano za važnost koju ispitanici pridaju fizičkom vježbanju. Anketirani studenti su svojim odgovorima na petostepenoj skali Likertovog tipa izrazili izuzetno pozitivan stav prema fizičkom vježbanju, bez obzira na mjesto studiranja. U prilog tome ide činjenica da su samo dva studenta izrazili stav da im je fizičko vježbanje nebitno, odnosno malo bitno. Najveći procenat ispitanika, čak 69,5%, je odgovorio da im je fizičko vježbanje jako važno (Tabele 1 i 2).

Tabela 1. *Važnost fizičkog vježbanja u odnosu na mjesto studiranja*

Napomena. *1 = nimalo; 2 = malo; 3 = srednje; 4 = jako; 5 = izrazito; ADU = Akademija dramskih umjetnosti; ASU = Akademija scenskih umjetnosti.*

Nije uočena značajna razlika po ovom pitanju između studenata ADU i ASU, χ^2 (4, N = 59) = 6,59, p = 0,15.

0.15. On the other hand, students of the male and female sex of ADU differ significantly in understanding the importance of physical exercise,, $\chi 2$ (2, N = 27) = 9.47, p = 0.009, while students of male and female sex ASU do not differ significantly in understanding the importance of physical exercise, $\chi 2$ (4, N = 32) = 3.93, p = 0.41 (Table 2).

Table 2. *The importance of physical exercise according to sex*

		Importance of physical exercise				
		1	2	3	4	5
ADU	Male	0	0	8	5	2
	Female	0	0	1	11	0
ASU	Male	1	1	1	13	2
	Female	0	0	2	12	0

Note: *1 = none; 2 = little; 3 = medium; 4 = strong; 5 = very strong; ADU = Academy of Dramatic Arts; ASU = Academy of Performing Arts.*

The research attempted to obtain information about the time that students of ADU and ASU dedicate to physical exercise during the week. The obtained results shown in Tables 3 and 4 indicate satisfactory results on studens' weekly physical activity. More than 72% of students in the sample are actively engaged in phyisical exercises three or more times a week. It is noteworthy that female students are more often engaged in physical exercises than male students, however, there was no significant difference between the sexes in terms of the weekly time that ADU students devote to physical exercise, $\chi 2$ (5, N = 27) = 5.80, p = 0.32, as well as ASU students, $\chi 2$ (6, N = 32) = 5.74, p = 0.45. Also, ASU students practice physical exercises more often than ADU students, but, despite this, no significant difference was obtained in this criterion, X^2 (6, N = 59) = 3,06, p = 0,80.

Table 3. *Weekly time devoted to physical exercise in according to the place of study.*

Fakultet / *Faculty*	Sedmično vrijeme posvećeno fizičkom vježbanju / *Weekly time devoted to physical exercise*							Total
	0	1	2	3	4	5	6	
ADU	1	2	6	5	8	5	0	27
	3,7%	7,4%	22,2%	18,5%	29,6%	18,5%	0,0%	100,0%
ASU	2	2	3	7	12	5	1	32
	6,3%	6,3%	9,4%	21,9%	37,5%	15,6%	3,1%	100,0%
Total	3	4	9	12	20	10	1	59
	5,1%	6,8%	15,3%	20,3%	33,9%	16,9%	1,7%	100,0%

Note: *0 = I do not practice physical exercise; 1 = once a week; 2 = twice a week; 3 = three times a week; 4 = four times a week; 5 = five times a week; 6 = six times a week; ADU = Academy of Dramatic Arts; ASU = Academy of Performing Arts.*

Sa druge strane, studenti muškog i ženskog pola ADU se značajno razlikuju u poimanju važnosti fizičkog vježbanja, , χ^2 (2, N = 27) = 9,47, p = 0,009, dok se studenti muškog i ženskog pola ASU ne razlikuju značajno u poimanju važnosti fizičkog vježbanja, χ^2 (4, N = 32) = 3,93, p = 0,41.

Tabela 2. *Važnost fizičkog vježbanja u odnosu na pol ispitanika*

		Važnost fizičkog vježbanja / *Importance of physical exercise*				
		1	2	3	4	5
ADU	Muški / *Male*	0	0	8	5	2
	Ženski / *Female*	0	0	1	11	0
ASU	Muški / *Male*	1	1	1	13	2
	Ženski / *Female*	0	0	2	12	0

Napomena: *1 = nimalo; 2 = malo; 3 = srednje; 4 = jako; 5 = izrazito; ADU = Akademija dramskih umjetnosti; ASU = Akademija scenskih umjetnosti.*

Istraživanjem se pokušala dobiti informacija o vremenu koje studenti ADU i ASU posvećuju fizičkom vježbanju tokom sedmice. Dobijeni rezultati prikazani u Tabelama 3 i 4 ukazuju na zadovoljavajuću sedmičnu fizičku aktivnost studenata. Više od 72% studenata iz uzorka se fizičkim vježbanjem aktivno bavi tri ili više puta sedmično. Primjetno je da se studentice nešto češće bave fizičkim vježbanjem od studenata, ali nije dobijena značajna razlika između polova u pogledu sedmičnog vremena koje studenti ADU posvećuju fizičkom vježbanju, χ^2 (5, N = 27) = 5,80, p = 0,32, kao i studenti ASU, χ^2 (6, N = 32) = 5,74, p = 0,45. Takođe, i studenti ASU češće upražnjavaju fizičko vježbanje od studenata ADU, ali prema ovom kriterijumu nije dobijena značajna razlika, χ^2 (6, N = 59) = 3,06, p = 0,80.

Tabela 3. *Sedmično vrijeme posvećeno fizičkom vježbanju u odnosu na mjesto studiranja*

Fakultet / *Faculty*	Sedmično vrijeme posvećeno fizičkom vježbanju / *Weekly time devoted to physical exercise*							Total
	0	1	2	3	4	5	6	
ADU	1	2	6	5	8	5	0	27
	3,7%	7,4%	22,2%	18,5%	29,6%	18,5%	0,0%	100,0%
ASU	2	2	3	7	12	5	1	32
	6,3%	6,3%	9,4%	21,9%	37,5%	15,6%	3,1%	100,0%
Total	3	4	9	12	20	10	1	59
	5,1%	6,8%	15,3%	20,3%	33,9%	16,9%	1,7%	100,0%

Napomena: *0 = ne bavim se fizičkim vježbanjem; 1 = jednom sedmično; 2 = dva puta sedmično; 3 = tri puta sedmično; 4 = četiri puta sedmično; 5 = pet puta sedmično; 6 = šest puta sedmično; ADU = Akademija dramskih umjetnosti; ASU = Akademija scenskih umjetnosti.*

Table 4. *Weekly time devoted to physical exercise according to sex.*

Tabela 4. *Sedmično vrijeme posvećeno fizičkom vježbanju u odnosu na pol ispitanika*

		Sedmično vrijeme provedeno za fizičku aktivnost / *Weekly time devoted to physical exercise*						
		0	**1**	**2**	**3**	**4**	**5**	**6**
ADU	Muški / *Male*	1	2	4	3	2	3	0
	Ženski / *Female*	0	0	2	2	6	2	0
ASU	Muški / *Male*	2	1	2	5	4	3	1
	Ženski / *Female*	0	1	1	2	8	2	0

Note: *0 = I do not practice physical exercise; 1 = once a week; 2 = twice a week; 3 = three times a week; 4 = four times a week; 5 = five times a week; 6 = six times a week; ADU = Academy of Dramatic Arts; ASU = Academy of Performing Arts.*

Napomena: *0 = ne bavim se fizičkim vježbanjem; 1 = jednom sedmično; 2 = dva puta sedmično; 3 = tri puta sedmično; 4 = četiri puta sedmično; 5 = pet puta sedmično; 6 = šest puta sedmično.*

Table 5 shows the results of the students' interest in doing individual sports or recreational activities. The results are ranked on the basis of mean values, and students of ADU and ASU expressed the greatest interest for swimming, riding, dancing and shooting/paintball/archery. On the other hand, students prefer bocce, rugby, handball and chess the least.

U Tabeli 5 prikazani su rezultati prema interesu studenata za bavljenje pojedinom sportskom ili rekreativnom aktivnošću. Rezultati su rangirani na osnovu srednjih vrijednosti, a studenti ADU i ASU su najveći interes iskazali za plivanje, sportsko jahanje, ples i streljaštvo/peintbol/streličarstvo. Sa druge strane, studenti najmanje preferiraju boćanje, ragbi, rukomet i šah.

Table 5. *Preferences of drama students regarding individual sports and recreational activities.*

Tabela 5. *Preferencije studenata glume prema pojedinim sportskim i rekreativnim aktivnostima*

Sportska aktivnost / *Sports activity*	**ADU**		**ASU**		**Total**
	Muški / *Male*	**Ženski / *Female***	**Muški / *Male***	**Ženski / *Female***	
Plivanje / *Swimming*	4,27	4,25	4,11	4,57	4,29
Sportsko jahanje / *Riding*	3,47	2,83	3,50	4,00	3,90
Ples / *Dance*	3,53	4,92	2,78	4,64	3,85
Streljaštvo/paintball/streličarstvo / *Shooting/paintball/archery*	3,40	3,92	4,17	3,79	3,83
Trčanje/pješačenje/planinarenje / *Running/hiking*	3,60	3,75	3,72	4,21	3,81
Ronjenje / *Diving*	2,07	3,58	3,72	4,64	3,80
Tenis/stoni tenis / *Tennis/table tennis*	3,47	3,67	3,78	3,71	3,66
Skijanje/klizanje / *Skiing/skating*	3,27	4,00	3,44	3,86	3,61
Biciklizam / *Cycling*	3,07	3,50	3,78	3,50	3,47
Jedrenje/surfanje / *Sailing/surfing*	3,00	3,42	3,33	3,93	3,41
Gimnastika / *Gymnastics*	2,73	3,83	2,67	3,71	3,17
Odbojka / *Volleyball*	2,93	3,42	3,28	2,86	3,12
Košarka / *Basketball*	3,13	2,67	3,61	2,64	3,07
Atletika / *Athletics*	2,73	2,83	3,17	3,36	3,03
Boks/karate/džudo/rvanje / *Boxing/karate/judo/wrestling*	2,73	3,42	3,22	2,50	2,97
Fitnes/aerobik / *Fitness/aerobics*	2,27	3,42	2,67	3,71	2,97
Rolanje / *Rollerblading*	3,27	3,17	2,06	4,14	2,78
Fudbal / *Football*	2,80	1,83	3,67	2,36	2,76
Vaterpolo / *Water polo*	3,13	1,92	3,50	1,86	2,69
Veslanje/kajak / *Rowing/Kayaking*	2,53	2,42	3,11	2,29	2,63
Kuglanje / *Bowling*	2,47	2,83	2,83	2,29	2,61
Šah / *Chess*	3,20	2,08	2,56	2,21	2,54
Rukomet / *Handball*	2,67	2,58	3,22	1,43	2,53
Ragbi / *Rugby*	2,33	1,42	2,72	1,50	2,07
Boćanje / *Bocce*	1,80	1,58	1,72	1,93	1,76

Disscusion

Drama students of ADU and ASU have expressed a very positive attitude toward physical exercise and sports and recreational activities, and these results are compatible with the results obtained by Vračan et al. (2009) on a sample of students of the Faculty of Architecture and Geodesy University of Zagreb. It should also be noted that there is a connection of their attitudes to the importance of physical exercise and the time they spend doing these activities. More than two-thirds of students in the sample actively engage in physical exercise three or more times a week, and this kind of result marks the improvement comparing to earlier research among student population that pointed to poorer physical activity of young people (Lolić, Nešić, Fratrić, & Srdić, 2012; Vračan et al.,2009).

However, none of the factors found significant difference in gender and the place of study of the respondents. Somewhat greater tendency towards physical exercise was shown by ASU students, and the reason can be found in ASU`s curriculum and study program which includes the subject *Conditioning Preparation of Actors*. Furthermore, female students of ADU find the role of physical education in teaching significantly more important.

Ünlü et al. (2011) point out that creating a positive attitude towards teaching physical education is an important factor of inclusion in some physical activity, and Ghofrani and Golsanamlou (2012) indicate that the curriculum of physical education should reinforce people`s confidence in sport and contribute to a better understanding of the positive values of physical activities. Prot and Radić (2010) state that attitude towards physical exercise and sports is an important factor of preference and choice of sports, and these attitudes can be decisive mediators on which the effectiveness of teaching depends. Students of ADU and ASU show the greatest interest in sports and recreational activities that are easily accessible to them in terms of sports facilities, necessary equipment, location and economic conditions.

It is interesting that the students show weaker interest in team sports, primarily football that is certainly the most popular sport in this area. Higher students› interest in martial arts is expected in view of the dominance of action films, both in domestic and international cinema, and when it comes to genres where action is an essential component, actors who had some experience in martial arts have a better chance to be chosen. Crnjac, Brekalo and Šilić (2013), as well as Prot and Radić (2010) have proven that more positive attitude towards martial art is found in male students, which indicates the presence of gender stereotypes in martial arts. Ashutosh, Nrusingha

Diskusija

Studenti glume ADU i ASU su iskazali izrazito pozitivan stav prema fizičkom vježbanju i sportsko-rekreativnim aktivnostima, a ovakvi rezultati su kompatibilni sa rezultatima koje su dobili Vračan i dr. (2009) na uzorku studenata Arhitektonskog i Geodetskog fakulteta Sveučilišta u Zagrebu. Također, treba istaći da postoji povezanost njihovih stavova o važnosti fizičkog vježbanja i vremena koje provode u tim aktivnostima. Više od dvije trećine studenata iz uzorka se fizičkim vježbanjem aktivno bavi tri ili više puta sedmično, a ovakav rezultat dobija na vrijednosti imajući u vidu ranija istraživanja među studentskom populacijom koja su ukazivala na sve manju fizičku aktivnost mladih (Lolić, Nešić, Fratrić, & Srdić, 2012; Vračan i dr., 2009). Nešto veću sklonost ka fizičkom vježbanju pokazali su studenti ASU, a razlog možemo pronaći u samom nastavnom planu i programu rada ASU u koji je inkorporiran predmet *Kondiciona priprema glumaca*. Dok su značajno veću ulogu fizičkog vaspitanja u nastavi iskazali studenti ženskog pola ADU.

Ünlü et al. (2011) ističu da je stvaranje pozitivnog stava prema nastavi fizičkog vaspitanja važan činilac uključivanja u neku fizičku aktivnost, a Ghofrani i Golsanamlou (2012) ukazuju da nastavni plan fizičkog vaspitanja treba ojačati povjerenje ljudi u sport i doprinijeti boljem razumijevanju pozitivnih vrijednosti fizičke aktivnosti. Prot i Radić (2010) navode da je stav prema fizičkom vježbanju i sportu bitan činilac preferencije i izbora sporta i ti stavovi mogu biti odlučujući medijatori od kojih zavisi učinkovitost nastave.

Studenti ADU i ASU najveći interes pokazuju prema sportskim i rekreativnim aktivnostima koje su im lako dostupne u pogledu sportskih objekata, potrebnih rekvizita, lokacijskih i ekonomskih uslova. Zanimljivo je da slabiji interes studenti pokazuju prema timskim sportovima, prije svega fudbalu koji je na ovim prostorima, svakako, najpopularniji sport. Očekivan je veći interes studenata za borilačke sportove s obzirom na dominaciju akcionih filmova, kako u domaćoj tako i u međunarodnoj kinematografiji, a u žanrovima u kojima je akcija bitna komponenta prioritet u izboru glumaca imaju oni koji su u svom iskustvu imali sklonosti ka borilačkim sportovima. Crnjac, Brekalo i Šilić (2013), kao i Prot i Radić (2010) su dokazali da pozitivniji stav prema borilačkim sportovima imaju studenti muškog pola i to ukazuje na prisutan rodni stereotip prema borilačkim sportovima. Ashutosh, Nrusingha i Anshuman (2016) ukazuju da srednjoškolci preferiraju timske sportove, što je u suprotnosti sa rezultatima ovog istraživanja. Međutim, i u njihovom istraživanju je slabija zastupljenost borilačkih sportova.

and Anshuman (2016) indicate that high school students prefer team sports, which is contrary to the results of this research. However, even in their research, there is a weaker presence of the martial arts sports.

Further research should examine the attitude of students of acting toward physical education more thoroughly, as well as their interests in implementing curricula and physical education programs at universities.

Conlusion

The analysis of contemporary theatrical and film production, as well as the demands imposed on actors, encourage the results of this research and in one way confirm the readiness and awareness of future actors about the importance of physical exercise as part of their everyday work and creativity. It is noteworthy that female students are more often engaged in physical exercises than male students, but there is no significant difference between the sexes in terms of the weekly time that ADU students devote to physical exercise, $\chi 2$ (5, N = 27) = 5.80, p = 0.32, as well as ASU students, $\chi 2$ (6, N = 32) = 5.74, p = 0.45. Although students have shown a positive attitude towards physical exercise, the teaching of physical education at universities could further improve their attitude towards physical exercise.

In particular, this should have an impact on male students of ADU who attribute significantly less importance to physical exercise in their way of life, and therefore in artistic creativity as well. Namely, teaching of physical education has the potential of developing students' needs and habits regarding physical exercise, which would lead to more healthy and active lifestyle, and enhance the physical readiness of actors to answers the high demands of contemporary theater and film production. The obtained results suggest the ADU and ASU to adapt their program activities to the needs of film and theater production on the one hand, and, on the other hand, to the interests and preferences of their students. It is necessary to clearly define the concept of physical exercise to students as a long-term project, and the teaching of physical education in these studies should be of great quality and meet the students' interests and needs.

Teaching of physical education should lead to the activation and encouragement of students to engage in various forms of physical exercise, or to become involved in various programs of sports activities. The results of the survey show a further need for actions aimed at the improvement of positive attitude towards martial arts which should have an important role in the future curriculum of the physical education in these studies.

U daljim istraživanjima bi trebalo detaljnije ispitati stav studenata glume prema nastavi fizičkog vaspitanja, kao i njihove interese prema provođenju nastavnog plana i programa fizičkog vaspitanja na univerzitetima.

Zaključak

Analizirajući savremenu pozorišnu i filmsku produkciju, te zahtjeve koje postavljaju pred glumce, ohrabruju rezultati ovog istraživanja, te na jedan način potvrđuju spremnost i svjesnost budućih glumaca o značaju fizičkog vježbanja kao dijela njihovog svakodnevnog posla i stvaralaštva. Primjetno je da se studentice nešto češće bave fizičkim vježbanjem od studenata, ali nije dobijena značajna razlika između polova u pogledu sedmičnog vremena koje studenti ADU posvećuju fizičkom vježbanju, χ^2 (5, N = 27) = 5,80, p = 0,32, kao i studenti ASU, χ^2 (6, N = 32) = 5,74, p = 0,45. Iako su i studentkinje i studenti pokazali pozitivan stav prema fizičkom vježbanju, nastava fizičkog vaspitanja na univerzitetima bi mogla dodatno unaprijediti njihov stav prema fizičkom vježbanju. Ovo posebno treba imati uticaj na studente muškog pola ADU koji pridaju značajno manju značajnost fizičkom vježbanju u svome načinu života, a tako i u umjetničkom stvaralaštvu. Naime, nastava fizičkog vaspitanja ima potencijal da kod studenata razvija potrebu i naviku za fizičkim vježbanjem što vodi zdravom i aktivnom stilu života, te pojačava fizičku spremnost glumaca da odgovore na visoke zahtjeve savremene pozorišne i filmske produkcije.

Dobijeni rezultati ukazuju ADU i ASU da svoje programske aktivnosti približe, sa jedne strane potrebama filmske i pozorišne produkcije, a sa druge strane interesima i sklonostima svojih studenata. Potrebno je jasno profilisati koncept fizičkog vježbanja studenata, kao dugoročni projekt, a nastava fizičkog vaspitanja na ovim studijama treba da bude kvalitetna i da udovoljava interesima i potrebama studenata. Nastava fizičkog vaspitanja bi trebala dovesti do aktiviranja i poticanja studenata na različite oblike fizičkog vježbanja, odnosno uključivanja u različite programe sportskih aktivnosti.

Rezultati istraživanja pokazuju daljnju potrebu za akcijama usmjerenim na jačanje pozitivnog stava prema borilačkim sportovima koji bi trebali zauzeti bitnu ulogu u budućem nastavnom planu fizičkog vaspitanja na ovim studijama.

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Primljen: 02. decembar 2018. / Received: December 02, 2018
Prihvaćen: 10. decembar 2018. / Accepted: December 10 , 2018

DOI: 10.7251/SSH1802183M
Short notice

UDC: 796.41.06:159.947.3
Kratko saopštenje

The Relationship Between Self-Confidence and Performance of Gymnastic Elements

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Abstract: *The aim of this research was to establish a relation between self-confidence and self-concept, on the one hand, and the performance of the apparatus elements and the floor routine, on the other. The research included 29 subjects, aged 20 to 27, with the average age of the subjects being 21 years old (M= 21.16, SD= 1.54). The following measurement instruments were used: RSES (Rosenberg Self-Esteem Scale) and SC-6, as well as the evaluation of the performance of the floor exercises (side-to-side and front-to-back cartwheel, roundoff, front and back handspring, forward and backward flip) and a vault (squat through on the vault and straddle vault with pre-flight, front handspring on vault, roundoff vault) and with the apparatus: the high bar (uprise on bars with legs together, kip, front mill circle, back circle, underswing dismount) and the parallel bars (swing, forward roll, back roll, shoulder stand, front toss dismount, back toss dismount) by a three-member committee. The results showed that Rosenberg's confidence scale produced statistically significant correlations with all the remaining subscales of moderate or high intensity, and the highest one with the scale of the self-concept (r_s= .73), while the lowest one with the scale related to the performance of gymnastic elements on the apparatus (r_s = .45) (Cohen, 1988 according to Cumming, 2012). In contrast to this scale, the scale of the self-concept is in statistically significant correlation with the gymnastic elements (r_s = .61) on the floor and the vault, while the statistically significant correlation of this scale is missing with the gymnastic elements on the apparatus. It can be concluded that a high level of confidence in one's own abilities through the entire training period enabled a better access to learning, repetition and, finally, the demonstration of the selected gymnastics elements, while the level of general satisfaction was not a decisive factor in the process.*

Key words: *Rosenberg, self-confidence, gymnastics, students.*

Povezanost samopouzdanja i uspješnosti izvođenja gimnastičkih elemenata

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Apstrakt: *Cilj ovog istraživanja bio je da se ustanovi veza između samopouzdanja i self koncepta, s jedne strane i uspješnosti izvođenja gimnastičkih elemenata na spravama i parteru, s druge strane. Istraživanje je obuhvatilo 29 ispitanika muškog pola, uzrasta od 20 do 27 godina, pri čemu prosječna starost ispitanika iznosi 21 godinu (M=21.16, SD=1.54). U istraživanju su korišteni sljedeći mjerni instrumenti: RSES (Rosenberg Self-Esteem Scale) i SC-6, kao i procjena uspješnosti izvođenja gimnastičkih elemenata parteru (premet strance bočno, premet strance čeono, rondat, premet naprijed, premet nazad, salto naprijed i salto nazad) i preskoku (zgrčka i raznoška sa fazom leta, rondat i premet naprijed) te spravama: vratilu (uzmah sunožno, naupor usklopno, kovrtljaj naprijed jašući, kovrtljaj nazad, podmetni saskok) i razboju (njihanje, kolut naprijed, kolut nazad, stav o ramenima, saskok prednjihom, saskok zanjihom) od strane tročlane komisije.Rezultati su pokazali da Rosenbergova skala samopouzdanja ostvaruje statistčki značajne korelacije sa svim preostalim subskalama umjerenog ili visokog intenziteta, a najvišu sa skalom self koncepta (r_s=.73), dok najnižu sa skalom koja se odnosi na izvođenje gimnastičkih elemenata na spravama (r_s =.45) (Cohen, 1988 prema Cumming, 2012). Za razliku od ove skale, skala self koncepta je u statistički značajnoj vezi sa gimnastičkim elementima (r_s =.61) na parteru i preskoku, dok statistički značajna veza ove skale izostaje sa gimnastičkim elementima na spravama. Može se zaključiti da visok stepen vjerovanja u sopstvene sposobnosti kroz čitav period obuke, omogućio je bolji pristup učenju, ponavljanju i na kraju demonstraciji izabranih gimnastičkih elemenata, dok iskazani nivo opšteg zadovoljstva nije imao presudnu ulogu u tom procesu.*

Ključne reči: *Rosenberg, samopouzdanje, gimnastika, studenti.*

Introduction

The motor activity of each individual is a function of complex adaptive mechanisms, which are formed due to the action of stress factors in the environment and they ensure the normal functioning of the vital functions during ontogenesis. Formation of knowledge and skills in sports gymnastics is subject to the influence of similar factors. Self-confidence is a psychological construct that relates to the self-evaluation of the individual's values as a living being (Rosenberg, 1979). This psychological construct, according to Rosenberg's idea, refers to a general assessment, and in this context we can speak of general or non-situational self-confidence. Lately, special theories and models have been developed for various types of situational confidence, as well as the measuring instruments that represent their operationalization (e.g. State Self-Esteem Scale, Heatherton & Polivy, 1991). This psychological construct has been brought into conjunction with the sporting achievement of the university athletes (Gotwals & Dunn, 2003), university swimmers or general sports abilities (Shard & Golby, 2006). In most studies, self-confidence is in a positive correlation with the performance of sporting elements or general sports activities. Similarly, confidence is a psychological construct that is variable and there are indications that a certain psychological program and trainings do not only lead to an increase in self-confidence, but an increase in self-confidence is accompanied by an increase in the performance of certain sport's elements (Shard & Golby, 2006). Self-concept refers to a set of beliefs about ourselves (Čekrlija, 2014). One of the current models of this approach is the Bracken model (Bracken, 1992). This hierarchical multidimensional model of the self-concept proposes that there are six relatively independent domains: physical, competitive, emotional, family, social and academic self-concept, which consists of a superior entity-general self-concept (Bracken, 1996). This model is operationalized by the SC (Self-Concept) scale that has undergone many changes and revisions (Čekrlija & Turjakanin, 2003a; Čekrlija & Turjakanin, 2003; Čekrlija, 2011; Čekrlija & Đurić, 2014) and considering that all versions of this scale are a psychological instrument at a regional level, the research in which the self-concept is linked to other psychological constructs relates predominantly to the sample of respondents from Bosnia and Herzegovina (Čekrlija & Đurić, 2013; Čekrlija & Macher, 2013; Athenstaedt, Čekrlija, & Dušanić, 2013; Čekrlija , 2014). In the literature review, no adequate scientific research work has been found that relates self-concept to success in sports gymnastics or the papers where this concept is examined in a narrower sports context, and

Uvod

Motorička aktivnost svakog pojedinca predstavlja funkciju složenih adaptivnih mehanizama, koji se formiraju usljed djelovanja stresnih faktora sredine i obezbjeđuju normalno odvijanje vitalnih funkcija u toku ontogeneze. Formiranje znanja i vještina u sportskoj gimnastici podložno je uticajima sličnih faktora. Samopouzdanje predstavlja psihološki konstrukt koji se odnosi na samoevaluaciju vrijednosti pojedinca kao živog bića (Rosenberg, 1979). Ovaj psihološki konstrukt, prema zamisli Rosenberga, se odnosi na generalnu procjenu, te u tom kontekstu možemo govoriti o generalnom, odnosno nesituacijskom samopouzdanju. U posljednje vrijeme razvijaju se posebne teorije i modeli koje se odnose na razne vidove situacijskih samopouzdanja, kao i mjerni instrumenti koji predstavljaju operacionalizacije istih (npr. State Self-Esteem Scale, Heatherton & Polivy, 1991). Ovaj psihološki konstrukt je dovođen u vezu sa sportskim postignućem univerzitetskih atletičara (Gotwals & Dunn, 2003), univerzitetskih plivača ili generalno sportskih sposobnosti (Shard & Golby, 2006). U većini istraživanja, samopouzdanje je u pozitivnoj korelaciji sa uspješnosti izvođenja sportskih elemenata ili generalne sportske aktivnosti. Isto tako, samopouzdanje je psihološki konstrukt koji je promjenjiv te postoje indicije da određeni psihološki program i treninzi, ne samo da dovode da porasta samopouzdanja, već da porast samopouzdanja prati i porast uspješnosti izvođenja određenih sportskih elemenata (Shard & Golby, 2006). Self koncept ili samopoimanje se odnosi na skup uvjerenja o nama samima (Čekrlija, 2014). Jedan od aktuelnih modela ovog pristupa jeste i Brackenov model (Bracken, 1992). Ovaj hijerarhijski multidimenzionalni model self koncepta predlaže da postoji šest realtivno nezavisnih domena: fizičko, kompetencijsko, emocionalno, porodično, socijalno i akademsko samopoimanje koji čine viši nadređeni entitet-generalno samopoimanje (Bracken, 1996). Ovaj model je operacionalizovan skalom SC (Self Concept) koja je doživjela mnoga preinačavanja i revizije (Čekrlija & Turjačanin, 2003a; Čekrlija & Turjačanin, 2003; Čekrlija, 2011; Čekrlija & Đurić, 2014) i obzirom da su sve verzije ove skale, psihološki instrument regionalnog nivoa, istraživanja u kojima je self koncept dovođen u vezu sa drugim psihološkim konstruktima se odnose dominantno na uzorak ispitanika iz Bosne i Hercegovine (Čekrlija & Đurić, 2013; Čekrlija & Macher, 2013; Athenstaedt, Čekrlija, & Dušanić, 2013; Čekrlija, 2014). U pregledu literature, nisu pronađeni adekvatni naučno-istraživački radovi koji samopoimanje dovode u relaciju sa uspjehom u sportskoj gimnastici ili radovi gdje je ovaj koncept ispi-

this is one of the reasons why the authors decided to conduct this research.

Methods Of Work

Samples of respondents

The research includes 29 male respondents, aged 20 to 27, with the average age of the respondents being 21 years old (M= 21.16, SD= 1.54). All respondents are students of the Faculty of Physical Education and Sport, who in the regular teaching process received training in the subject of Sports Gymnastics I and II, which related to the acquisition of the elements on the floor and apparatus. The sample of respondents in this study is smaller for practical reasons, i.e. the difficulties in finding respondents who have some experience with the performance of gymnastic elements and can adequately fulfil the self-confidence assessment questionnaire. The given sample size provides the power (1-β) of .80 to obtain statistically significant results (at the level p<.05) if the actual value of the population correlation is .49 (Cumming, 2012), where the authors consider, given the exploratory nature of the study, the size of the sample acceptable.

Sample of the variables

The following measurements were used in the research: RSES (Rosens Self-Esteem Scale) for the assessment of general self-esteem and SC-6 as a questionnaire operationalisation of the self-concept according to the Bracken model, as well as an evaluation of the performance of gymnastic elements on the floor (side-to-side and front-to-back cartwheel, roundoff, front and back handspring, forward and backward flip) and a vault (squat through on the vault and straddle vault with pre-flight, front handspring on vault, roundoff vault) and with the apparatus: the high bar (uprise on bars with legs together, kip, front mill circle, back circle, underswing dismount) and the parallel bars (swing, forward roll, back roll, shoulder stand, front toss dismount, back toss dismount) by a three-member committee. (table 1). RSES (Rosenberg Self-Esteem Scale; Rosenberg, 1965; 1979) represents a questionnaire operationalisation of the general self-confidence. This measuring instrument has a concept of 10 items (examples of the item: "I am able to do things that most people can do.", "I would like to respect myself more") in the form of a five-step Likert-type scale. The higher scores on this instrument relate to more expressed self confidence among the respondents. In previous studies, on large and representative samples, this questionnaire shows very good internal consistency, criterion and structural validity and time sta-

tivan u užem sportskom kontekstu te je to jedan od razloga zašto su se autori odlučili za ovo istraživanje.

Metode rada

Uzorak ispitanika

Istraživanje obuhvata 29 ispitanika muškog pola uzrasta od 20 do 27 godina, pri čemu prosječna starost ispitanika iznosi 21 godinu (M=21.16, SD=1.54). Svi ispitanici su studenti Fakulteta fizičkog vaspitanja i sporta, koji su u redovnom nastavnom procesu prošli obuku iz predmeta Sportska gimnastika I i II, koji su se odnosili na usvajanje elemenata na parteru i spravama. Uzorak ispitanika u ovom istraživanju je manji iz praktičnih razloga, tj. teškoće u pronalasku ispitanika koji imaju određena iskustva sa izvođenjem gimnastičkih elemenata, a da pri tome mogu adekvatno ispuniti upitnike vezane za procjenu samopouzdanja. Datom veličinom uzorka obezbjeđuje se snaga (1-β) od .80 da se dobiju statistički značajni rezultati (na nivou p<.05) ukoliko je stvarna vrijednost populacione korelacije .49 (Cumming, 2012), gde autori smatraju, obzirom na eksplorativnu prirodu studije, veličinu uzorka prihvatljivom.

Uzorak varijabli

U istraživanju su korišteni sljedeći mjerni instrumenti: RSES (Rosenberg Self-Esteem Scale; Rosenberg, 1965) za procjenu generalnog samopouzdanja i SC-6 kao upitnička operacionalizacija self koncepta prema Brackenovom modelu (Bracken, 1992), kao i procjena uspješnosti izvođenja gimnastičkih elemenata na parteru (premet strance bočno, premet strance čeono, rondat, premet naprijed, premet nazad, salto naprijed i salto nazad) i preskoku (zgrčka i raznoška sa fazom leta, rondat i premet naprijed) te spravama: vratilu (uzmah sunožno, naupor usklopno, kovrtljaj naprijed jašući, kovrtljaj nazad, podmetni saskok) i razboju (njihanje, kolut naprijed, kolut nazad, stav o ramenima, saskok prednjihom, saskok zanjihom), procijenjeni od strane tročlane komisije (tabela 1). RSES (Rosenberg Self-Esteem Scale; Rosenberg, 1965; 1979) predstavlja upitničku operacionalizaciju generalnog samopouzdanja. Ovaj mjerni instrument je koncipiran od 10 ajtema (primjeri ajtema: "Sposoban sam da uradim stvari koje može uraditi većina ljudi.", "Volio bih da više poštujem sebe.") u vidu petostepene skale Likertovog tipa. Viši skorovi na ovom instrumentu se odnose na više izraženo samopouzdanje kod ispitanika. U ranijim istraživanjima, na velikim i reprezentativnim uzorcima, ovaj upitnik iskazuje vrlo dobru internu konzistentnost, kriterijumsku i strukturalnu valjanost

bility, as well as the discrimination of the items (Pullmann & Allik, 2000; Gray-Little, Williams, & Hancock, 1997). SC-6 (Čekrlija, 2014) is a questioning tool that measures six primary self-learning domains according to Bracken. This questionnaire is composed of six items (examples of the item: "I am satisfied with my own abilities, skills and successes", "I am satisfied with my own physical appearance, strength and health"), whereby each item responds to one primary domain of the self-concept according to Bracken's understanding, i.e. satisfaction with one of the primary domains of life. The author of this scale proposes the possibility of a one-component solution, i.e. possibility to summarize the individual six domains (items) into one general self-assessment scale (Čekrlija, 2014). Respondents on each item provide a response from 1 to 5 on the Likert-type scale, and the higher score on this scale represents a more positive (satisfied) self-concept of the respondents. In the research, this questionnaire shows satisfactory internal reliability as well as the test-retest reliability, stable factor structure and criterion validity (Čekrlija, Mirković, & Đurić, 2015).

Table 1. *Criterion for grading the performance of the elements*

1	Inadequate	Student is unable to perform the element
2	Adequate	Student performs the element with major technical and aesthetic errors
3	Good	Student performs the element with a medium technical and aesthetic errors
4	Very good	Student performs the element with minor technical and aesthetic errors
5	Excellent	Student performs the element without technical and aesthetic errors

Results And Discussion

Table 2. *The results of descriptive statistics and internal consistency coefficients of the used subscale*

Subskala / *Subscale*	N	M	SD	Min	Max	Sk	Ku	α	ω
Rosenberg / *Rosenberg*	10	3.63	.98	1.90	5.00	-.49	-.97	.88	.89
Self koncept / *Self-Concept*	6	3.82	.60	2.83	4.67	-.24	-1.16	.65	.66
Uspješnost 1 / *Performance 1*	11	7.83	1.32	6.00	9.83	.13	-1.30	.98	.98
Uspješnost 2 / *Performance 2*	11	8.01	1.47	6.00	10.00	.01	-1.72	.98	.98

Legend: *N-number of items; M-arithmetic mean; SD- standard deviation; Min- minimum empirical value achieved on a subscale; Max- maximum empirical value achieved on a subscale; Sk- Skewness; Ku- Kurtosis, α- Cronbach alpha coefficient of internal reliability; ω - McDonald total omega coef. of internal reliability. Performance 1- Performance of the elements on the apparatus, Performance 2- Performance of the elements on the floor and the vault.*

i vremensku stabilnost, kao i diskriminativnost ajtema (Pullmann & Allik, 2000; Gray-Little, Williams, & Hancock, 1997). SC-6 (Čekrlija, 2014) je upitničko sredstvo koje mjeri šest primarnih domena samopoimanja prema Brackenu (1992). Ovaj upitnik je sastavljen od šest ajtema (primjeri ajtema: "Zadovoljan sam vlastitim sposobnostima, vještinama i uspjesima", "Zadovoljan sam vlastitim fizičkim izgledom, snagom i zdravljem"), pri čemu svaki ajtem odgovora po jednom primarnom domenu self kocenpta prema Brackenovom shvatanju, tj. zadovoljstvu jednom od primarnih domena života. Autor ove skale predlaže mogućnost jednokomponentnog rješenja, tj. mogućnost sumiranja pojedinačnih šest domena (stavki) u jednu generalnu skalu samopoimanja (Čekrlija, 2014). Ispitanici na svaku stavku daju odgovor od 1 do 5 na skali Likertovog tipa, a viši skor na ovoj skali predstavlja pozitivnije (zadovoljnije) samopoimanje ispitanika. U istraživanjima ovaj upitnik pokazuje zadovoljavajuću internu pouzdanost kao i test-retest pouzdanost, stabilnu faktorsku strukturu i kriterijumsku valjanost (Čekrlija, Mirković, & Đurić, 2015).

Tabela 1. *Kriterij za ocjenjivanje uspješnosti izvođenja elemenata*

1	Nedovoljno	Student nije u mogućnosti da izvede element
2	Dovoljno	Student izvodi element uz velike tehničke i estetičke greške
3	Dobro	Student izvodi element uz srednje tehničke i estetičke greške
4	Vrlo dobro	Student izvodi element uz manje tehničke i estetičke greške
5	Odlično	Student izvodi element bez tehničkih i estetičkih grešaka

Rezultati i diskusija

Tabela 2. *Rezultati deskriptivne statistike i koeficijenti interne konzistencije korištenih subskala*

Legenda: *N-broj ajtema; M-aritmetička sredina; SD- standardna devijacija; Min- minimalna empirijska vrijednosti ostvarena na subskali; Max- maksimalna empirijska vrijednosti ostvarena na subskali; Sk-skjunis;Ku- kurtosis, α- Cronbach alpha koeficijent interne pouzdanosti; ω - McDonaldtotal omega koef. interne pouzdanosti.Uspješnost 1- izvođenje elemenata na spravama, Uspješnost 2- izvođenje elemenata na parteru i preskoku.*

Based on the results presented in Table 2, it is evident that the respondents on psychological instruments show a tendency towards slightly higher results, while in the performance of the gymnastic elements this tendency is in a very mild opposite direction. Correspondingly, all subscales have a satisfactory internal consistency presented through the Cronbach alpha and McDonald total omega coefficient, except for the self-concept subscale, where the values of both coefficients are slightly lower than the conventional limit value .70, probably due to a decrease in the scalar discrimination or a small number of items that make up this scale (McDonald, 1999 according to Dunn, Baguley, & Brunsden, 2014). Subscale performance 1 (performance of the apparatus elements) in this case represents the average value of all 11 gymnastic tasks, and the internal reliability coefficients, which consists of very high values, served as the basis for using instead of the average values on 11 separate tasks, one average value of all them. Furthermore, the justification for treating this subscale in this way is also found in the correlation coefficients between the same and the aforementioned 11 manifest variables, with the range of correlations ranging from r= .81 (uprise) to r= .94 (parallel bars). All correlation coefficients are statistically significant at p<.001 level, and the effect of cohesion can be categorized as a high intensity effect (Cohen, 1988 according to Cumming, 2012). The same is true for the subscale performance 2 (the performance of the elements on the floor and the vault), where the identical coefficients of the internal consistency are obtained, as in the previous case, and the correlation coefficients are in the range of r= .88 (side-to-side cartwheel) to r= .95 (straddle pommel jump), where the correlations are significant at the level of p<.001. A correlation analysis was performed, where, due to the small sample, Spearman rank correlation coefficient of as a nonparametric alternative to Pearson product-moment correlation coefficient, which on small samples produces unstable results due to the expressed sensitivity to the presence of outliers (Field, 2009).

Na osnovu rezultata predstavljenih u Tabeli 2, evidentno je da ispitanici na psihološkim instrumentima pokazuju tendenciju ka blago višim rezultatima, dok na izvođenju gimnastičkih elemenata ta tendencija je u veoma blagom opozitnom smjeru. Takođe, sve subskale imaju zadovoljavajuću internu konzistentnost predstavljenu kroz Cronbach alpha i McDonaldtotal omega koeficijent, osim subskale self koncept, gdje su vrijednosti oba koeficijenta nešto niže od konvencionalne granične vrijednosti .70, vjerovatno usljed smanjenje diskriminativnosti skale ili malog broja ajtema koje čine ovu skalu (McDonald,1999 prema Dunn, Baguley, & Brunsden, 2014). Subskala uspješnost 1 (izvođenje elemenata na spravama) u ovom slučaju predstavlja prosječnu vrijednost svih 11 gimnastičkih zadataka, a koeficijenti interne pouzdanosti, koji su jako visoke vrijednosti, su poslužili kao osnova da umjesto prosječnih vrijednosti, na 11 zasebnih zadataka, koristimo jednu prosječnu vrijednost svih njih. Takođe, opravdanost ovakvog tretmana ove subskale se nalazi i u koeficijentima korelacije između iste i već pomenutih 11 manifestnih varijabli pri čemu je raspon korelacija od r=.81 (uzmah) do r=.94 (razboj). Svi koeficijenti korelacija su statistički značajni na nivou p<.001, a veličina efekta povezanosti se može kategorisati kao efekat visokog intenziteta (Cohen, 1988 prema Cumming, 2012). Identičan je slučaj i za subskalu uspješnost 2 (izvođenje elemenata na parteru i preskoku), gdje su dobijeni identični koeficijenti interne konzistencije kao u prethodnom slučaju, a koeficijenti korelacija su u rasponu od r=.88 (predmet strance bočno) do r=.95 (razno škalet), pri čemu su korelacije značajne na nivou p<.001. U daljoj analizi izvršena je korelaciona analiza, pri čemu je, zbog malog uzorka, korišten Spearman rang koeficijent korelacije kao neparametrijska alternativa Pearson produkt moment koeficijentu korelacije, koji na malim uzorcima daje nestabilne rezultate usljed izražene senzitivnosti na prisustvo stršećih mjera (Field, 2009).

Table 3. *Results of the correlation analysis*

Tabela 3. *Rezultati korelacione analize*

	1	2	3	4
1.Rosenberg / *Rosenberg*		.73**	.45*	.47*
2.Self koncept (SC-6) / *Self-concept*			.26	.61**
3.Uspješnost 1 / *Performance 1*				.05
4.Uspješnost 2 / *Performance 2*				

Legend: ** - p <. 05; ** - p <.01, Performance 1- performing elements on the apparatus, Performance 2- Performing elements on the floor and vault*

Legenda: **- p<.05; **- p<.01, Uspješnost 1- izvođenje elemenata na spravama, Uspješnost 2- izvođenje elemenata na parteru i preskoku*

In the Table 3, the results of the correlations between the subscales used are presented. Rosenberg's self-confidence scale makes statistically significant correlations with all the remaining subscales of moderate or high intensity, and is highest with the self-concept scale (r_s= .73), while the lowest with a scale related to the performance of gymnastic elements on the apparatus (r_s = .45) (Cohen, 1988 according to Cumming, 2012). In contrast to this scale, the scale of the self-concept is in statistically significant more positive relation to the performance of the gymnastic elements on the floor and the vault (r_s = .61), while the statistically significant relation of this scale is absent with the gymnastic elements on the apparatus. Self-confidence, as Rosenberg defined it, implies a general belief in one's own abilities with the previous positive experience of the respondents, regardless of the situational circumstances encountered by the respondents, which leads to a significant correlation with general success, which is substantiated in this paper with the obtained relation and the results with the performance of the gymnastic elements and on the apparatus, floor and vault. These correlations are a positive sign, indicating that greater self-confidence leads to a more successful performance of gymnastic elements on the apparatus, floor and vault.

U Tabeli 3 su predstavljeni rezultati korelacija između korištenih subskala. Rosenbergova skala samopouzdanja ostvaruje statistički značajne korelacije sa svim preostalim subskalama umjerenog ili visokog intenziteta, a najvišu sa skalom self koncepta (r_s=.73), dok najnižu sa skalom koja se odnosi na izvođenje gimnastičkih elemenata na spravama (r_s =.45) (Cohen, 1988 prema Cumming, 2012). Za razliku od ove skale, skala self koncepta je u statistički značajnoj pozitivnoj vezi sa izvođenjem gimnastičkih elemenata na parteru i preskoku (r_s =.61), dok statistički značajna veza ove skale izostaje sa gimnastičkim elementima na spravama. Samopouzdanje, kako ga je definisao Rosenberg (1965), podrazumjeva generalno vjerovanje u sopstvene sposobnosti uz prethodno pozitivno iskustvo ispitanika, bez obzira na situacione okolnosti sa kojima se ispitanici susreću, što dovodi do značajne povezanosti sa generalnom uspješnošću, što je u ovom radu potvrđeno dobijenom povezanošću i rezultatima sa uspješnošću izvođenja gimnastičkih elemenata i na spravama, parteru i preskoku. Navedene korelacije su pozitivnog predznaka, što ukazuje na to da veće samopouzdanje dovodi do uspješnijeg izvođenja gimnastičkih elemenata na spravama, parteru i preskoku.

Table 4. *Results of frequencys at SC-6 scale*

Tabela 4. *Frekvencije rezultata kod SC-6 skale*

	1	2	3	4	5
s1			8	15	6
s2		1	4	3	21
s3			4	15	10
s4		1	5	16	7
s5			2	17	10
s6			8	19	2

The scale of the self-concept (SC-6) contains items that are more relevant to the self-assessment of the experience of satisfaction with certain general segments of life of the respondents, and less implies a specific formulation of the confidence of the respondents in their own abilities (table 4), as confirmed by the obtained results through the existence of statistically significant relation only with the performance of the gymnastic elements on the floor and vault (table 3). One of the elements that probably had an impact on the lack of a relation of the self-concept with the performance of the elements on the apparatus is a somewhat lower degree of reliability of the scale used. The authors further consider that the motor movements on the floor were much easier for the respondents, because the gymnastic elements used were much closer to the natural forms of movement than the selected gymnastic elements on the apparatus, where

Skala self koncepta sadrži ajteme koji se više odnose na samoprocjenu doživljaja zadovoljstva pojedinim generalnim segmentima života ispitanika, a manje podrazumijeva neku konkretnu formulaciju vjerovanja ispitanika u sopstvene sposobnosti, što su potvrdili i dobijeni rezultati analize frekvencija kod skale SC-6 (tabela 4) te kroz postojanje statistički značajne povezanosti samo sa uspješnosti izvođenja gimnastičkih elemenata na parteru i preskoku (tabela 3). Jedan od elemenata koji je vjerovatno imao uticaj na izostanak veze self koncepta sa uspješnošću izvođenja elemenata na spravama, je nešto niži stepen pouzdanosti korištene skale. Dalje autori smatraju da motoričke kretnje na parteru su ispitanicima bile uveliko lakše, jer su korišteni gimnastički elementi puno bliži prirodnim oblicima kretanja, nego što su to izabrani gimnastički elementi na spravama, gdje do izražaja dola-

the technical characteristics of the apparatus, which make up an important factor in the weightlessness performance of the elements (height of the bar, width of the beam, etc.), and hence these results. The authors also consider that when respondents encountered a situation that they were asked for a higher degree of challenge, while performing gymnastic elements on the apparatus, the levels of confidence and satisfaction were potentially under the influence of some other factors that were not the subject of this research, such as fear of height, loss of support, or fear of injury (and others), and that the level of satisfaction obtained may have been compromised by the influence of given elements and thus influenced the results obtained.

Conclusion

A high level of confidence in one's own abilities throughout the entire training period enabled better access to learning, repetition, and finally demonstration of selected gymnastic elements. On the other hand, the expressed level of general satisfaction did not play a decisive role in this process. In addition to this statistically significant relation of confidence in one's own capabilities (self-confidence), on this sample of respondents, the authors (Srdić, Jovanović, Mrđa, 2018) point to the significance of other factors on the the performance of gymnastic elements, where one of the factors, which are also significant for performance, is emotional stability, as a personality trait (Radonjić, 2016, according to Srdić, Jovanović, Mrđa, 2018). In addition, there is a space for thinking about possible actions and some other psychological constructs that have a potentially negative impact on the performance of the given elements that were not part of this research (e.g. anxiety). Essentially, the obtained data confirm the complexity of the learning process and the testing of psycho-motor knowledge and abilities, with a great number of psycho-motor factors affecting the performance.

ze i tehničke karakteristike sprava koje čine bitan faktor u težinskom izvođenju elemenata (visina vratila, širina grede i slično), te stoga ovakvi rezultati. Autori smatraju takođe, da kad su ispitanici došli u situaciju da se od njih traži veći stepen izazova, pri izvođenju gimnastičkih elemenata na spravama, nivoi vjerovanja i zadovoljstva su potencijalno bili pod uticajem još nekih faktora koji nisu bili predmet ovog istraživanja, kao što su npr. strah od visine, gubitka podloge ili strah od povrede (i drugi), te je dobijeni nivo zadovoljstva možda bio kompromitovan uticajem datih elemenata i tako uticao na dobijene rezultate.

Zaključak

Visok stepen vjerovanja u sopstvene sposobnosti kroz čitav period obuke, omogućio je bolji pristup učenju, ponavljanju i na kraju demonstraciji izabranih gimnastičkih elemenata, dok iskazani nivo opšteg zadovoljstva nije imao presudnu ulogu u tom procesu. Pored navedene statistički značajne veze vjerovanja u sopstvene sposobnosti (samopouzdanja), na ovom uzorku ispitanika, autori (Srdić, Jovanović, Mrđa, 2018) ukazuju na značajnost drugih faktora na samu uspješnost izvođenja gimnastičkih elemenata, gdje je jedan od faktora koji su takođe značajni za uspješnost izvođenja, emocionalna stabilnost, kao crta ličnosti (Radonjić, 2016, prema Srdić, Jovanović, Mrđa, 2018). Pored toga otvara se prostor za razmišljanje o mogućem djelovanju i nekih drugih psiholoških konstrukata koji imaju potencijalno negativan uticaj na uspješnost izvođenja datih elemenata, a koji nisu bili dio ovog istraživanja (npr. anksioznost). Suštinski, dobijeni podaci potvrđuju složenost procesa učenja i testiranja psiho-motoričkih znanja i sposobnosti, pri čemu na uspješnost izvođenja uticaj ima veliki broj psiho-motoričkih faktora.

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Primljen: 07. novembar 2018. / Received: November 07, 2018
Prihvaćen: 5. decembar 2018. / Accepted: December 5 , 2018

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ISSN 2232-8211