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CORRELATIONAL STUDY REGARDING THE ATTENTION OF THE PREPARATORY CLASS STUDENTS TO THE PHYSICAL EDUCATION AND SPORT LESSON

BĂLĂNEAN DENISA[1*], PETRACOVSCHI SIMONA[1]

ABSTRACT. Introduction: There are disorders that cannot be observed only with the naked eye and tend to be confused with lack of intelligence, in this category falling attention deficit. **Objectives:** The study aimed to analyze correlations between the level of attention and gender of children in the preparatory class, to highlight differences between girls and boys, as well as to identify the existence of increased attention of each gender, depending on the time of the lesson physical education and sport. **Methods:** Two specific tests were used: The Toulouse-Pieron Test (1982) and The Raven Progressive Matrices (1938). After applying the tests, for a period of 2 months, the direct observation method was applied. This study involved 51 children, including 22 girls and 29 boys, from the preparatory class. **Results:** The link between the level of attention and the gender of the students was demonstrated, at ρ = 0.773, with a significance threshold of .000, which shows the very significant association between the 2 variables. Obtaining a coefficient t = 7.758 and a significance threshold of .000, highlights the existence of a very statistically significant difference between the two groups. There was also a distinct degree of attention between the 2 genres, which fluctuated depending on the activity proposed. **Conclusions:** Girls have a higher degree of attention than boys, there is a link between the gender of students and the focus on certain tasks; girls are more attentive than boys to moments that involve bodily expression activities, while boys are more attentive than girls to competitive activities.

Keywords: *attention disorder, gender, association, concentration, lesson moments*

REZUMAT. ***Studiu corelațional privind atenția elevilor de clasa pregătitoare la lecția de educație fizică și sport*****. Introducere**: Există afecțiuni care nu se pot observa cu ochiul liber şi care pot fi confundate cu lipsa de inteligență, în această categorie încadrându-se deficitul de atenție. **Obiective:** Studiul şi-a propus să analizeze corelaţii între nivelul atenției şi genul copiilor din clasa pregătitoare, să

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evidenţieze diferenţe între fete şi băieţi şi să identifice existenţa unei atenţii mai sporite a fiecărui gen, în funcţie de momentul lecţiei de educaţie fizică şi sport. **Metode:** S-au utilizat două probe specifice: Testul Toulouse-Pieron (1982) şi The Raven Progressive Matrices (1938). Ulterior aplicării testelor, pe o perioadă de 2 luni s-a aplicat şi metoda observaţiei directe. La acest studiu au luat parte 51 de copii, dintre care 22 de fete şi 29 de băieţi, elevi de clasa pregătitoare**. Rezultate:** S-a demonstrat legătura dintre nivelul atenţiei şi genul elevilor, la un ρ= 0,773, cu un prag de semnificaţie de .000, care arată asocierea foarte semnificativă dintre cele 2 variabile. Obţinerea unui coeficient t= 7,758 şi a unui prag de semnificaţie de .000, evidenţiază existenţa unei diferenţe foarte semnificative statistic între cele două grupuri. S-a observat, de asemenea, un grad distinct de atenţie între cele 2, oscilând în funcţie de activitatea propusă. **Concluzii:** Fetele prezintă un grad mai ridicat de atenţie decât băieţii, existând o legătură între genul elevilor şi focusarea pe anumite sarcini; fetele sunt mai atente decât băieţii la momentele care cuprind activităţi de expresie corporală, în timp ce băieţii sunt mai atenţi decât fetele la activităţile competitive.

Cuvinte cheie: *deficit de atenţie, gen, asociere, concentrare, momentele lecţiei*

INTRODUCTION

Attention deficit disorder is one of the most common psychopathological problems encountered in children, this term going through several concepts and proposals issued in various fields, but in general, the starting point of the definition is clear and shows inattention, impulsivity and hyperactivity, all these being multiple dimensions that are related to each other (Guevara & Galarza, 2015; Piek & Dyck, 2004; Urzua, Alfonso, Marcos et al., 2009). In addition to difficulty concentrating, the inability to shape their attention in response to the demands of the external environment, as well as the immediate reaction given by impulsivity (Salamanca, 2015), these children also have a number of motor deficits, including and motor coordination (Flapper, Schoemaker, 2006; Pitcher, Piek & Hay, 2003; Sergeant, Piek & Oosterlaan, 2006).

For decades, the way in which motor coordination disorders in childhood did not manifest itself only as an isolated problem has been highlighted (Missiuna, 1994). The child's educational stages are considered to be sensitive phases in which attention is manifested through movement, and this is similar to existing evidence of how cognitive structures (especially attention) are affected, leading to a negative consequence in motor skills (Ruiz, Gómez & Navia, 2018). These deficits found in children with attention disorders are well recognized in the literature worldwide (Doyle, Wallen & Whitmont, 1995; Parry, 1996; Piek, Pitcher &

Hay, 1999; Whitmont & Clark, 1996). Some longitudinal studies have shown that those with these deficits have a higher risk of learning difficulties due to high comorbidity (Jongmans, Smits-Engelsman & Schoemaker, 2003). Therefore, it has been pointed out in studies that motor coordination disorders have been closely linked to the existence of other problems that affect certain cognitive abilities, including the ability to maintain attention (Dewey, Kaplan & Crawford, 2002). However, the association between motor coordination and attention deficit disorder is poorly recognized in the DSM-IV (American Psychiatric Association, 1994).

Despite the fact that many studies attest to the link between attention deficit and coordination, research on the difference between the female and male gender is quite rare in the literature. After conducting a meta-analysis of the literature on these deficits, Gaub and Carlson (1997) argued that there were no gender differences in aspects such as impulsivity, academic performance, social functioning, and motor skills, indicating that few studies included a number of sufficient female participants to justify gender-based conclusions. Some differences appear to be strongly mediated by the effects of prejudice, especially that in studies conducted in school contexts, it is argued that teachers tend to rate girls slightly differently than boys, leading to derivation processes (Coles et al., 2012; Hart , Grand & Riley, 2006), and the male gender to be assessed more severely than the female gender (Gillberg & Kadesjo, 2003), which is why the results may not be considered valid. On the other hand, in a similar study (Meyer & Sagvolden, 2006) girls scored much lower than boys on a coordination test.

OBJECTIVES

The study aimed to analyze correlations between the level of attention and gender of children in the preparatory class, to highlight differences between girls and boys, as well as to identify the existence of increased attention of each gender, depending on the time of the lesson physical education and sport.

HYPOTHESES

1. There is a statistically significant association between the level of attention and the gender of children in the preparatory class.

2. There is a statistically significant difference between boys and girls in terms of level of attention.

3. Girls are more attentive than boys at times of lesson involving activities of body expression, while boys are more attentive than girls at times involving competitive activities.

MATERIAL AND METHODS

This study involved a number of 51 students from a school in Timisoara (43.14% girls and 58.86% boys), aged between 6 years (54.90%) and 7 years (45.10%.), Participants in the lesson of physical education and sport.

Under the guidance of a licensed psychologist, two tests were applied to these students: the Perception and Attention Test (Toulouse-Pieron, 1982) and the Raven Progressive Matrix Test (1938, J. C Raven, et al. L. S. O. Enrose). The perception and attention test measures the ability to focus on motor tasks, along with perceptual speed and continuous attention. The Raven Progressive Matrix Test was built to primarily assess general intelligence, using two categories of skills: educational and reproductive.

Following the collection of data (results from psychological tests and gender of students), they were centralized and introduced in the statistical program SPSS, which was used to obtain the results of the proposed hypotheses.

After applying the tests, for a period of 2 months, the method of direct observation was applied in order to record the main gender differences in terms of attention to the lesson of physical education and sports. Regarding this method, a certain homogeneity of the whole sample was tried, being created a single group for each class, in work formations that allowed the placement of a girl next to a boy.

RESEARCH RESULTS

Hypothesis 1: There is a statistically significant association between the level of attention and the gender of children in the preparatory class.

The testing of this hypothesis started at the ascertaining level, by verifying the normality of the distribution related to the attention variable, indicated by means of the obliquity index and the vaulting index.

Their values together with the indicators of the central tendency of the variable in question are presented below:

Table 1. Descriptive attention indicators for the whole sample (N=51)

Variable	N	Mean	St. Dev	Minimum Value	Maximum Value	Skewness	Kurtosis
Attention	51	67.54	31.23	15	140	-0.21	-0.01

Given the values of the obliquity index of -0.21 and the vaulting index of -0.01, it was found that the distribution in the case of the attention variable in the case of the entire investigated sample meets the criterion of normality. However, the fact that the gender of the participants is represented by a dichotomous variable, it is necessary to test the working hypothesis using as a statistical technique a non-parametric correlation, namely the Spearman correlation.

Table 2. Correlation indices attention - gender

		Gender
Attention	*Spearman correlation*	.773
	Sig.	.000
	N	51

ρ (49) = 0.773, p= .000 (p < .01), bilateral test, r^2= .59

The value of the coefficient ρ = 0.773 shows that the association between the variables is high, while the significance threshold of .000 shows that the identified association is very statistically significant (p <.01). The magnitude of the observed effect is strong (r^2 = .59). Thus, the working hypothesis is supported by the data obtained.

Hypothesis 2: There is a statistically significant difference between boys and girls in terms of level of attention.

First, the ascertaining level for the distributions of the attention variable related to each group was achieved. The descriptive indicators are presented below:

Table 3. Descriptive indicators attention for girls (N=22) and boys (N=29)

Group	N	Mean	St. Dev	Minimum value	Maximum value	Skewness	Kurtosis
1 Girls	22	93.9	22.96	64	87	0.95	-1.92
2 Boys	29	47.55	18.4	15	140	-0.06	0.71

As shown in Table no. 3, the values of the skewness and the vaulting indices in both the girls and the boys group fall within the range corresponding to the distributions that meet the normality criterion.

Thus, for testing the hypothesis, the t test for independent samples was used as a statistical technique, given that the two groups are not pairs, the measurements are not repeated, and the distributions of the attention variable are symmetrical. The values obtained from the application of the t test are presented in the following tables:

Table 4. Group statistics

Variable	Group	N	Mean	Standard deviation	St. error
Attention	1 girls	22	93.9	18.4	3.92
	2 boys	29	47.55	22.96	4.26

Table 5. T test for independent sample

Variable		Levene's test for equality of dispersion		T test for equality of means		
		F	Sig	T	Df	Sig.
Attention	Homogeneous dispersion	7.484	.009	7.758	49	.000
	Heterogeneous dispersion			7.998	48.82	.000

t(49)= 7.758, p=.000 (<.01), bilateral test, r^2=.55

Therefore, a coefficient t = 7.758 and a significance threshold of .000 (p <.01) was obtained, which means that the difference between the two groups is very statistically significant; the average of the group of girls (M = 93.9) being significantly higher than that of boys (M = 47.55). The magnitude of the effect is strong (r^2 = .55). The working hypothesis is supported by the data obtained.

Hypothesis 3: Girls are more attentive than boys at lesson moments that involve body expression activities, while boys are more attentive than girls at moments that involve competitive activities.

Following the application of the observation method, the following were found in the Physical Education and Sport lesson:

Table 6. Observation of gender differences

LESSON MOMENTS	OBSERVATION
1. Organizing the group of students	No differences were observed between boys and girls, both genders showing the same degree of attention in each class.
2. Preparing the body for effort	No differences were observed between boys and girls, both genders showing the same degree of attention in each class.
3. Selective influence of the musculoskeletal system	There was a difference between boys and girls, the female being much more focused on harmonious physical development exercises, but also on those in gymnastics, where they tried to use auxiliary objects (gymnastic sticks). There was a visible difference, especially since after each set of exercises performed, a verbal command was used to which a quick response was expected, and the girls were more focused on what they had to do.
4. Development of motor quality with aerobic energy (Coordinative Capacity/ Speed)	There was a difference between boys and girls, this time the male gender showing a higher concentration, especially in exercises and games designed to develop speed. Mainly, I found a burning desire to win, and this competitiveness led them to pay more attention.
5. Acquisition, consolidation, improvement of general or specific motor skills and abilities of some sports	A difference was observed between boys and girls, but which fluctuated depending on the proposed theme. Thus, in the dynamic competition exercises, as well as in the preparatory ones for a sports game, the boys remained focused for a longer period of time, compared to the girls. On the other hand, the female gender manifested this concentration in the exercises in artistic gymnastics, balance and even in practicing motor acts that involved body expression activities.
6. Development of motor quality with aerobic energy (Strength / Endurance)	There was a difference between boys and girls, with a predominance of attention, especially in males, particularly in exercises and games designed to develop strength.
7. Cooldown	No differences were observed between boys and girls, both genders showing the same degree of attention in each class.
8. Appreciations and recommendations	No differences were observed between boys and girls, both genders showing the same degree of attention in each class.

Therefore, it was observed that girls are more attentive at times of the lesson that involve activities of body expression, while boys are more attentive than girls at times that involve competitive activities.

DISCUSSIONS

Academic performance can be influenced by a multitude of variables, such as socioeconomic status, family structure, sociocultural level, personal motivation, individual abilities, time and effort devoted to study (Cano, 2001).

The first hypothesis, which supports the idea that there is a statistically significant association between the level of attention and the gender of children in the preparatory class, has been confirmed. In a similar study (Fernández-Castillo, Gutiérrez Rojas, 2009), gender differences in selective attention were found, where the girls showed a remarkable increase in selective visual attention effort when an invalid, comparative signal appeared, while it was not the same with the boys, who benefited from this type of signal anyway. This demonstrates the possible statistical difference, in which boys and girls respond to an attention task differently (Fernández Castillo et al, 2009). There are also differences in the use of attention techniques and strategies, with the frequency of use being higher in girls than in boys (Tejedor, González & García-Senoran, 2008).

Also in the aforementioned study from 2009, it is confirmed that one of the factors that contributes to the difference between boys and girls with attention deficit disorder is depression. It was found that depressive symptoms are associated with selective attention only in boys, not girls. Also, for the male gender, this symptomatology manifests itself more often in the school environment. Another rather important factor mentioned in the study is the association of anxiety with a low level of selective attention only in the case of males, not females.

In contrast, Biederman et al. (2010) found differences in the comorbidity of each gender, noting that girls, compared to boys, are more likely to develop anxiety disorders. This information may be useful in a possible future study, which could find out how much attention is influenced by depression and what the real difference would be, analyzing the child's condition and diagnosing other possible symptoms.

Regarding hypothesis 3, the researchers examined the effects of coordinated-bilateral exercises on attention and concentration in young children (6-8 years). Budde et al. (2008) found that bilateral coordination exercises in Physical Education and Sport lessons led to significant improvements in children's attention. Similarly, Smits-Engelsman et al. (2012) examined the attention of 90

children, tested before, during, and immediately after the experiment. They found that coordination exercises increased significantly the children's ability to concentrate and pay attention.

Moreover, in a systematic review of physical activity interventions, Van der Fels and colleagues (2015) suggest that a short physical activity intervention can improve attention, processing speed, and focus. According to authors such as Khan and Hillman (2014), the practice of physical activity in the early stages of life can optimize children's cognitive functions, as it promotes the maturation of the brain and allows better development of neural networks. Other recent studies have also shown the existence of an association between physical activity practice and executive functioning (Chaddock, Hillman, Buck & Cohen, 2011; Scudder et. al, 2014).

How exercise helps children focus is not yet clear and there is a clear need for future research to determine the mechanisms of the brain involved.

CONCLUSIONS

Following the study, we found that there is a link between children's attention and their gender and, in terms of the difference between boys and girls, we found differences in attention, a balance that leans in favor of girls. It has also been observed that girls show a higher degree of attention when subjected to artistic or bodily expression tasks, while boys are more focused on competitive activities.

Regarding the different degree of attention depending on the time of the lesson, it is observed that both girls and boys prefer certain types of exercises and games, each with different objectives that inevitably affect the level of attention. In order for this study to not lead to gender bias, we propose for the following research directions to include larger samples, with different ages and targets.

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RELATIONSHIP BETWEEN MENTAL TOUGHNESS, STRESS, ANXIETY AND DEPRESSION

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ABSTRACT. Introduction. Mental toughness (MT) is defined by some authors as being fundamental to success in life. In terms of sport at the highest level, is based on the athlete's ability to perform at optimal levels under conditions considered very demanding. MT is considered one of the most important psychological construct underlying sport performance, and is seen as an umbrella concept that encompasses a large number of psychological factors / features connected to each other. **Objective**. The objective of the present study was to investigate the relationship between mental toughness, stress, anxiety and depression among a sample of athletes. **Methods**. The sample in this study consisted of 47 participants. There were 57.4% males and 42.6% females. Their age ranged from 19 to 30 years with M= 21.89 (SD = 2.72). 68.1% of them being performance athletes (from different sports) and 31.9% are students of the faculty of physical education. **Results**. Distribution indicators were evaluated against standard skewness and kurtosis criteria. There was no significant deviation from the standards. Correlation between Mental Toughness Inventory and Dass21 overall score was r= -.53; and between MT and stress, anxiety and depression ranged between r= -.49 and r= -52. Correlation between Dass21 dimension ranged between r=.85 and r=.98. **Conclusions.** The results of the current study highlighted the relationship between mental toughness stress, anxiety and depression. Higher levels of MT have a significant impact in reducing stress, anxiety and depression which can help athletes perform better.

***Key words**: Mental toughness, Dass21, Mental toughness inventory, sport performance, stress, anxiety, depression.*

REZUMAT. *Relația dintre Mental toughness, stres, anxietate și depresie.* **Introducere.** Mental toughness (MT) este definit de autori ca fiind fundamentală pentru a avea succes în viață. În ceea ce privește sportul la nivel înalt, se bazează

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pe capacitatea sportivului de a performa la niveluri optime în condiții considerate foarte solicitante. MT este considerat un important construct psihologic care stă la baza performanţei sportive şi este văzut ca un concept umbrelă care cuprinde un număr mare de caracteristici psihologice conectate între ele. **Obiective.** Obiectivele studiului prezent a fost de a investiga relația dintre MT, stres, anxietate şi depresia în rândul unui eşantion de sportivi. **Metode.** Eşantionul acestui studiu a fost format din 47 de participanți. Dintre aceştia, 57,4% bărbați şi 42,6% femei. Vârsta lor a variat între 19 şi 30 de ani, M=21,89 (SD = 2,72). 68,1% dintre aceştia fiind sportivi de performanţă, iar 31,9% fiind studenți ai facultății de educație fizică. **Rezultate.** Indicatorii de distribuție au fost evaluați în raport cu criteriile standard de asimetrie şi curtoză. Corelația dintre Inventarul mental toughness şi scorul general Dass21 a fost r = -.53; în ceea ce priveşte corelațiile dintre MT şi stres, anxietate şi depresie acestea au variat între r = -.49 şi r = -52. Corelația dintre dimensiunile Dass21 a variat între r = .85 şi r = .98 **Concluzii.** Rezultatele studiului au evidențiat relația dintre MT, stres, anxietatea şi depresie. Nivelurile mai ridicate de MT au un impact semnificativ în reducerea stresului, anxietății şi a depresiei, care pot ajuta sportivii să performeze mai bine.

***Cuvinte cheie**: mental toughness, Dass21, inventarul mental toughness, performanţă sportivă, stres, anxietate, depresie.*

INTRODUCTION

Mental toughness (MT) is defined by some authors as being fundamental to success in life (Wakefield, 2008; Weinberg, 2010). The concept represents "*a personal capacity to produce consistently high levels of subjective (e.g. personal goals or strivings) or objective performance (e.g. sales, race time, GPA) despite everyday challenges and stressors as well as significant adversities*" (Gucciardi et al., 2014, p.3).

In terms of sport at the highest level, is based on the athlete's ability to perform at optimal levels under conditions considered very demanding (Jones, Hanton, & Connaughton, 2007). MT is considered one of the most important psychological construct underlying sport performance, and is seen as an umbrella concept that encompasses a large number of psychological factors / features connected to each other (Gucciardi et al., 2014). At present factors such as self-confidence and the ability to cope and interpret anxiety symptoms are accepted as supporters of sports performance (Jones, Hanton, & Connaughton, 2007; Mellalieu, Hanton, & Fletcher, 2006).

The construct of MT has been approached by different authors using different conceptual frameworks (Gucciardi et al., 2014). In his vision (Loehr, 1986) claimed that mental toughness is acquired rather than inherited. Based on his extensive work applied with elite athletes and coaches suggested that MT includes 7 dimensions (self-confidence; attention control; negative energy; motivation level; attitude control; positive energy; and visual and imagery control).

Clough, Earle, & Sewell (2002) added the construct of confidence to 3C hardiness model (Kobasa, 1979) to reach the final version 4C model of mental toughness (control, commitment, challenge and confidence). After 4C model of MT, (Gucciardi et al., 2014) return to the form of Loehr (1986) in which MT model that includes 7 dimensions MT consists of 7 dimensions and conceptualizes their own 7-dimensional model (self-belief, attention regulation, emotion regulation, success mind-set, context knowledge, buoyancy and optimism). Although MT has been conceptualized over time in various forms, based on different dimension, eg. 7 dimension (Loehr, 1986; Gucciardi et al., 2014), 4 dimension (Clough, Earle, & Sewell, 2002) or 3 dimension (Sheard et al., 2009) several correlation studies have been carried out between this concept and others that have an impact on sport performance.

Relationship between MT and stress, stress appraisal, coping and coping effectiveness during competition, higher levels of MT were associated with more problem focused coping, less emotion-focused and avoidance coping (Kalinin et al., 2019). According to Haghighi & Gerber (2019) stress are associated with depressive symptoms while MT are associated with higher levels of mental health, so symptoms of stress and depression were much more present in students with lower levels of MT than in those with high MT levels. At the same time, depressive symptoms were negatively correlated with MT and life satisfaction.

Aim

Stress and anxiety can prevent athletes from performing at their true potential, while overcoming sports career failures can lead to depression. MT provides significant support for sports performance so it is necessary to establish the relationship between MT, stress, anxiety and depression to determine the extent to which MT can help athletes overcome certain moments and perform at the highest possible levels. Therefore, the aim of this study is to establish the relationship between MT, stress, anxiety and depression.

METHOD

Participants

The sample in this study consisted of 47 participants. There were 57.4% males and 42.6% females. Their age ranged from 19 to 30 years with mean age 21.89 (SD = 2.72). 68.1% of them being performance athletes (from different sports) and 31.9% are students of the faculty of physical education.

Instruments

Mental Toughness Inventory (Gucciardi, Hanton, et al., 2015) self-reported measure was used to operationalize mental toughness. Participants are asked to indicate how true each of the statements (e.g., "I strive for continued success" and "I am able to regulate my focus when performing tasks") is as an indication of how they typically think, feel, and behave as an athlete using a 7-point response scale (ranging from 1 = false, 100% of the time, to 7 = true, 100% of the time). MTI was validated on different languages (English, Chinese and Malay) and different cultures such as: Australian (Hannan et al. 2015), Malaysian (Gucciardi et al., 2016), Chinese (Li et al.,2017), African (Cowden, 2018).

Depression, anxiety, stress scale (DASS-21) (Martin A. M. et at., 1998) is a self-report measure in which participants rate the frequency and severity of experiencing negative emotions over the previous week. Frequency/severity ratings are made on a series of 4-point scales (0 - did not apply to me at all, 3 - applied to me very much, or most of the time).

Procedure

Following informed consent obtained from each participant data collection was carried out in group settings. These were arranged in two series of 20-25 people, and data collection was done in a laboratory with 25 computers. In order to reduce the percentage of missing data, participants were forced to give an answer to each item, unable to proceed if they had missing answers. The general instructions were given before the data was collected. The data are part of a larger study, in the collection of data being more questionnaires. Time for completing the questionnaire package is 30 minutes.

Data analysis

In the first phase, a descriptive analysis was performed (mean, standard deviation, skewness and kurtosis) to test multivariate analysis assumption. In the second phase, the correlations between MT stress, anxiety and depression were calculated to see which of them can influence MT, and to see what kind of influence (negative/positive) they have on MT. This analysis was conducted using IBM SPSS Statistics 22.

RESULTS

The descriptive statistics are presented in Table 1. The mean score for MT was m= 46.43, while mean for Dass21overall score was M=36.64 and mean for Dass21 subscale ranged between 12.09 and 12.30.

Table 1. Descriptive statistics

Variable		M (SD)	Skewness	Kurtosis
Mental toughness		46.43 (6.43)	-.66	.40
Dass21	Stress	12.09 (9.11)	.39	-.95
	Anxiety	12.30 (7.76)	.28	-.73
	Depression	12.26 (8.89)	.28	-.90
Dass21		36.64 (24.76)	.25	-1.11

Distribution indicators were ranged between -1.1 and .4 and were evaluated against standard skewness and kurtosis criteria (Jones, 1969). There was no significant deviation from the above-mentioned standards (Chou & Bentler, 1995).

Table 2. Correlation between MT and Dass21

Pearson' Correlation	MT	Dass21			Dass21
		Stress	Anxiety	Depression	
MT	1				
Stress	-.51**	1			
Anxiety	-.52**	93**	1		
Depression	-.49**	.88**	.85**	1	
Dass21	-.53**	.98**	.96**	.95**	1

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

Correlation between Mental Toughness Inventory and Dass21 are presented in Table 2. We found a strong negative relationship between MT and Dass21 overall score was r= -.53, and also between MT and Dass21 subscale (stress, anxiety and depression) correlation value ranged between r= -.49 and r= -52; Regarding correlation between Dass21 dimension ranged between r=.85 and r=.98. A Negative correlation means that if one of variable increases the other decreases. In this case, this indicates that increasing the level of MT can significantly reduce the level of stress, anxiety and depression among athletes.

DISCUSSION

Decreased stress and depressive symptoms are associated with increased MT levels, these correlations can be attributed to the fact that both stress and depression are based on dysfunctional thoughts and patterns of maladaptive behavior, including symptoms of helplessness, hopelessness, withdrawal, avoidance and rigidity (Beck & Alford, 2009; Gerber et al., 2013).

Some authors have explained the relationship between MT and anxiety with the help of other psychological constructs as motivation or coping. Schaefer et al. (2016) investigate the relationship between MT, motivation and anxiety and in his study on golfers shown that the golfers motivation profile higher in intrinsic motivation reported higher levels of MT, furthermore MT mediate a negative association between motivation and competition anxiety. Several studies have highlighted the negative relation between MT and anxiety (Hossein et al. 2016; Algani et al., 2018; Miftakhul, 2018; Kalinin et al. 2019). Intervention studies showed that increased level on MT reduce level of competitive anxiety (Kalinin et al.2019).

Mentally tough athletes tend to be less stressed, anxious or depressed. This result is consistent with another definition of the concept of MT, which characterizes people with a high level of MT as "*having a high level of control, commitment and constancy, even in unfavorable circumstances and tend to interpret problems in terms of challenges*" (Gucciardi et al., 2014).

CONCLUSION

Stress and anxiety are present in the lives of athletes due to the pressures of competitions, failures and training periods. The results of the current study highlighted the relationship between mental toughness stress, anxiety and depression.

Higher levels of MT have a significant impact in reducing stress, anxiety and depression which can help athletes perform better and overcome difficult moments in their careers.

Consequently, any intervention aimed at increasing the level of MT in athletes will also indirectly contribute to reducing the level of stress, anxiety or depression.

Our results provide empirical support for the MT construct in terms of supporting sports performance, but more research is needed to reveal how mental resistance acts on these variables (stress, anxiety, depression).

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DEVELOPING SPEED ENDURANCE THROUGH THE USE OF SMALL-SIDED FOOTBALL GAMES TO 16-18-YEAR-OLD JUNIORS

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ABSTRACT. Introduction. Training with small-sided games has proven to be effective in the training of football players. **Objectives**. The aim of this study was to analyze the effect of the participation of 16-18-year-olds in a small-sided football games program on speed-resistance (SE). **Methods**. The subjects of this study were 34 16-18-year-old sportsmen divided into two equal groups: Experiment group (EG) and control group (CG). Both groups participated in 18 workouts for 6 weeks – EG in a small-sided game content training program; CG in a training program structured on classic methods. The following equipment has been used: Hossand GT.a – to measure HRmax – and the WittyGate Microgate2. Subjects performed the YYIRTL1 and the 7x34.2 field test. The data collected was processed with the SPSS program, variant 23. **Results**. In the field test 7x34.2 there were no significant differences in the initial testing (IT) of the two groups, but in the final testing (FT) the differences were significant. The difference between the best time (BT) scores averages in the two groups was significant at FT (Mann-Whitney U = 39.5, N1 = 17, N2 = 17, two-tailed p = 0.000) and for the fatigue index averages (FI, U = 66.5, N1 = 17, N2 = 17, two-tailed p=0.007). **Conclusions**. The study revealed that through the application of a 6-week time program, in which small-sided football games were used, speed endurance developed.

Keywords: *small sided games, speed endurance, football, 16-18 years juniors*

REZUMAT*. Dezvoltarea rezistenței în regim de viteză prin utilizarea jocurilor de fotbal pe teren redus la juniorii de 16-18 ani.* Introducere. Antrenamentele cu jocuri pe teren redus s-au dovedit a fi eficiente în pregătirea fotbaliştilor. **Obiectiv.** Scopul acestui studiu a fost de a analiza efectul participării unor copii de 16-18 ani la un program de jocuri de fotbal pe teren redus asupra rezistenței în regim de viteză (RRV). **Metode.** Subiecții acestui studiu au fost 34 de sportivi de 16-18 ani împărțiți în două grupe egale: grupa experiment (GE) şi

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grupa control (GC). Ambele grupe au participat la 18 antrenamente, timp de 6 săptămâni – GE la un program de antrenamente cu conținut de joc pe teren redus; GC la un program de pregătire structurat pe metode clasice. S-au folosit următoarele echipamente: Hossand Gt.a – pentru a măsura FCmax – și sistemul WittyGate Microgate2. Subiecții au efectuat testele YYIRTL1 și testul de teren 7x34,2. Datele colectate au fost prelucrate cu programul SPSS, varianta 23. **Rezultate.** La testul de teren 7x34,2 nu au fost diferențe semnificative la testarea inițială (TI) la cele două grupe, dar la testarea finală (TF) diferențele au fost semnificative. Diferența dintre mediile scorurilor celui mai bun timp (BT) la cele două grupe a fost semnificativă la TF (Mann-Whitney U = 39,5, N_1 = 17, N_2 = 17, two tailed p = 0,000) și pentru mediile indicelui de oboseală (FI, U = 66,5, N_1 = 17, N_2 = 17, two tailed p=0,007). **Concluzii.** Studiul efectuat a scos în evidență că prin aplicarea unui program periodizat de 6 săptămâni, în care s-au utilizat jocuri de fotbal pe teren redus, s-a dezvoltat rezistența în regim de viteză.

Cuvinte cheie: *jocuri pe teren redus, rezistența în regim de viteză, fotbal, juniori 16-18 ani*

INTRODUCTION

Modern football requires attack and defense actions to be carried out quickly, with training constantly having to adapt to the requirements of the game. In recent years, there has been a lot of debate about the methodology for conducting sports training in football (Clemente, Martins & Mendes, 2014).

According to Weineck (1988, p.75), the development of endurance, in its various forms of manifestation, by using the integrated type training method has a higher yield. The integrated approach to various factors, the simultaneous improvement of effort capacity, with tactical and dynamic game-specific skills, can be achieved through the training method using small-sided games (Hil-Haas, Rowell, Dawson & Coutts, 2009). To create a close form of sports training to the football game the coaches used the small-sided game method (Aguiar, Bothelho, Lago, Maças & Sampaio, 2012; Hoff, 2002). In the past, this type of exercise was mainly used to develop technical tactical skills, nowadays it is standardized for aerobic training (Balsom, 1999; Drust, Reilly & Cable, 2000; Reilly & Gilbourne, 2003). This is not the only way to develop football-specific endurance, and training can be complemented by intermittent, ball and ball-free exercises (Balsom, 1999, p.29). According to Clemente et al. (2014) the standard dimensions for small-sided games that have an effect on anaerobic capacity development are 5x10 or 10x15 for 1vs.1 and 10x15 and 15x20 for

2vs. 2 games. The unpredictability of the dynamics of play or training actions, caused by repeated speed runs, made it difficult to monitor and investigate speed endurance (Spencer, Bishop, Dawson & Goodman, 2005).

Balsom, Seger, Sjadin & Ekblom (1992), shows that the dosage of training effort by increasing sprint distances and the sizing of breaks should be calibrated in order for the body to return to maximum possibilities. As small-sided games stimulate the physical and physiological aspects of the football game, this method is considered to be an effective way of training (Dellal, Chamari, Owen, Wong, Lago-Penas & Hil-Haas, 2011; Hil-Haas et al., 2009). Measuring heart rate (HR) in effort development training is an effective method of conducting activity (Bangsbo, 2008, p. 140). Training goals can be routed and controlled by HR value measurements, which provide objective information about the intensity of effort each sportsman is involved in (Bangsbo, 2008, p.141). Using modern technology for HR measurement is a valid method, common in many recent studies and research (Clemente et.al, 2014).

OBJECTIVES

The aim of this study was to analyze the effect of the participation of 16 – 18 year-old young footballers in a small-sided game program on speed endurance (SE).

MATERIALS AND METHODS

The sample included in the study consisted of 34 16-18-year-old sports pupils divided into two groups of 17 subjects each – experiment group (EG) and control group (CG) – participants in the U19 Junior County Championship. Both groups participated in some 18 trainings for 6 weeks from 15.07.2019 to 25.08.2019. EG to a small-sided games training program, CG to a classic-method-based training program.

All subjects performed the YYIRTL1 test at the beginning of the study (Bangsbo, 2007; 2008) to measure HRmax and to delineate individual sport effort zones. According to Wilmore & Costill (2002, p.224), HRmax values show minor changes from year to year. For both groups the initial test, 7x34.2, was conducted on 15.07.2019 and the final test after 6 weeks of training. For EG, within the weekly microcycles there were small-sided games in 3 days: Monday, to optimize aerobic capacity (>50% of HRmax); Wednesday, to develop lactacide anaerobic capacity (>80%HRmax); Friday, small sided games whose content

accessed the alactacide anaerobic zone (90% HRmax), (Table 1). During this period, the CG attended a training program structured on traditional methods, analytical exercises for the practice of technical elements and processes and tactical actions, as well as athletics exercises to develop effort capacity. To guide training intensity and duration, heart rate was monitored using the Hossand GT a system.

Table 1. The structure of the weekly microcycle used by EG

Week	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
0	YYITRL1	Antre Th-Ta 60% FCmax	Initial Test 7x34.2	TL	1vs1 90%FCmax	Game	Free day
1	4 vs 4 / 6vs 6 50%-60% FCmax	Antre Th-Ta 60% FCmax	2vs 2 / 3vs 3 >80%FCmax	TL	1 vs1 90%FCmax	Game	Free day
2	4 vs 4 / 6vs 6 50%-60% FCmax	Antre Th-Ta 60% FCmax	2vs 2/3vs 3 >80%FCmax	TL	1 vs 1 90%FCmax	Game	Free day
3	4 vs 4 / 6vs 6 50% - 60% FCmax	Antre Th-Ta 60% FCmax	2vs 2 / 3vs 3 >80%FCmax	TL	1 vs 1 90%FCmax	Game	Free day
4	4 vs 4/6vs 6 50%-60% FCmax	Antre Th-Ta 60% FCmax	2vs 2/3vs 3 >80%FCmax	TL	1 vs 1 90%FCmax	Game	Free day
5	4 vs 4/6vs 6 50%-60% FCmax	Antre Th-Ta 60% FCmax	2vs 2 / 3vs 3 >80%FCmax	TL	1 vs 1 90%FCmax	Game	Free day
6	4 vs 4/6vs 6 50%-60% FCmax	Antre Th-Ta 60% FCmax	2vs 2/3vs 3 >80%FCmax	TL	Final Test	Game	Free day

Note: TL = Theoretical lessons;

The same structuring rules have been established in the standardization of small-sided games: Topic covered by game moments, field dimensions, number of players, number of touches, goalpost size and position, half time duration, break duration and type, number of repetitions, presence or absence of goalkeepers, HR max, HR during effort, HR during break, effort zone - % HR max (Table 2).

Table 2. Small-sided games characteristics

SSG Type	Rep. sec/ Min	Break min	No. rep.	Dimensions	HR effort	HR/ break	Effort zone
1vs Gk	6``	2`	10	10x15	190	110/120	>90%HR max
1vs1	12``	2`	4	10x15	190	110/120	>90%HR max
2vs2	2`	1`	6	15x15	180/ 185	150	>80%HR max
3vs3	3`	1`30``	6	15x20	180/ 190	140/150	>80%HR max
4vs4	4`	3`	4	20x20	150/ 160	120/130	>60%HR max
5vs5	5`	3`	4	40x20	150	120	>50%HR max

The statistical analysis of the data was carried out using the SPSS program, variant 23.0. Descriptive analysis, data distribution check, comparison of media (t-test, Mann-Whitney U, Wilcoxon).

RESULTS

From the analysis of data distribution and interpretation of the Shapiro-Wilk test for the parameters of the 7x34.2 sample (Table 3), it was found that during the initial test (IT) the data were normally distributed to the best time (BT, p = .184), the seven sprints averages (AVT, p = .214) and fatigue index parameters (FI, p = .773) and at control group at BT (p = .328) and FI (p = .678). Not normally distributed to the control group for the AVT parameter (p = .020).

As regards the final testing, the distribution was normal for the test group (EG) at BT (p = .206) and AVT (p = .398); It was not normal for the test group at FI (p = .004) and for the control group at BT (p = .046), AVT (p = .043) and FI (p = .005).

Table 3. Testing the normality of the data distribution for the 7x34.2 (N=34) variables

Tests of Normality

Time	Variable	Group	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
			Statistic	df	Sig.	Statistic	df	Sig.
IT	7x34.2 BT	EG	.126	17	.200*	.926	17	.184
		CG	.135	17	.200*	.941	17	.328
	7x34.2 AVT	EG	.128	17	.200*	.930	17	.214
		CG	.192	17	.098	.867	17	.020
	7x34.2 FI	EG	.157	17	.200*	.967	17	.773
		CG	.114	17	.200*	.962	17	.678
FT	7x34.2 BT	EG	.150	17	.200*	.929	17	.206
		CG	.222	17	.026	.890	17	.046
	7x34.2 AVT	EG	.125	17	.200*	.946	17	.398
		CG	.183	17	.134	.888	17	.043
	7x34.2 FI	EG	.257	17	.004	.818	17	.004
		CG	.321	17	.000	.825	17	.005

* This is a lower bound of the true significance.

a. Lilliefors Significance Correction

Note: IT = initial testing, FT = final testing, BT = the best time, AVT = the seven sprints averages, FI = fatigue index, EG = experimental group, CG = control group.

Considering the distribution of data, parametric tests (independent t-test and paired sample test) were used for comparison of the averages when the data were normally distributed and not parametric (Mann-Whitney U or Wilcoxon) when the data were not normally distributed.

The t test for independent samples shows that in the initial test the difference between the two groups averages at parameters BT and FI is not statistically significant (Table 4), the groups being homogeneous.

Table 4. Means, standard deviations and comparison of means for 7x34.4m Test – BT and FI – before intervention program (N=34)

Variable	Group	Mean	Std. Deviation	t-test for Equality of Means		
				t	df	Sig
BT	EG (N=17)	7.1324	.45564	-.082	32	.936
	CG (N=17)	7.1424	.21905			
FI	EG (N=17)	1.5318	.47908	.087	32	.931
	CG (N=17)	1.5200	.28476			

To compare the averages recorded in the two groups under the AVT parameter, the Mann-Whitney U test was used, which shows that no significant differences were found between the two groups averages (U=133.50, N_1=17, N_2=17, two-tailed p = .705), with the groups also being homogeneous 7x34.2.

After the completion of the intervention program, the measurements for the sample under investigation were repeated and the results are also analyzed statistically (Table 5). The difference between the scores averages of the two groups was significant for the variables BT (U = 39.5, N_1 = 17, N_2 = 17, two-tailed p =.000) and FI (U = 66.5, $N_{1,2}$ = 34, two tailed p =.007) and not significant for the variable AVT (U = 93.0, $N_{1,2}$ = 34, p = .076).

Table 5. Comparison of the averages at the end of the intervention program (N=34)

Test Statistics[a]			
	FT 7x34.2 BT	FT 7x34.2 AVT	FT 7x34.2 FI
Mann-Whitney U	39.500	93.000	66.500
Z	-3.619	-1.774	-2.688
Asymp. Sig. (2-tailed)	.000	.076	.007
Exact Sig. [2*(1-tailed Sig.)]	.000[b]	.079[b]	.006[b]

a. Grouping Variable: Group
b. Not corrected for ties.

For the analysis of the effect of intervention programs on the subjects in the two groups, the averages recorded by the subjects at the two study points were compared using tests according to the data distribution. Thus, the test-t for pair samples (Table 6) shows that in the test group the differences are significant for the variables BT (t = 7.590, df = 16, p = .000, d = 1.30) and AVT (T = 6.347, DF = 16, p =.000, d = 1.09). We also notice a significant difference for the FI variable (Z = -3.267, df = 17, p = .001, d =.6).

Table 6. Media, standard deviations, comparison of media and effect size in the 7x34.2 sample, BT and AVT variables in the experiment group before and after the intervention program (N=17)

		Paired Samples Statistics[a]		Paired Samples Test[b]			
		Mean	Std. Deviation	t	df	p	d
Pair 1	IT 7x34.2 BT	7.1324	.45564	7.590	16	.000	1.3
	FT 7x34.2 BT	6.1929	.39285				
Pair 2	IT 7x34.2 AVT	7.5612	.56998	6.374	16	.000	1.1
	FT 7x34.2 AVT	6.9376	.35298				

Note: a. EG; b. t-test.

The Wilcoxon test was used when comparing the control group averages (Table 7) and the FI variable from the experimental group, and the differences were significant with the BT variable (Z = -2.391, p =.017, d =.41), but not significant for the AVT variables (Z = -.923, p =.356). And FI (Z = -1.823, p = .068).

Table 7. Average, standard deviations and meaning of the difference in average for 7x34.2 sample, control group (N = 34)

		Paired Samples Statistics[a]		**Test Statistics[b,c]**		
Pair	Variable	Mean	Std. Deviation	Z	Sig. 2-tailed	d
1	IT 7x34.2 BT	7.1424	.21905	-2.391[c]	.017	.41
	FT 7x34.2 BT	6.8459	.39887			
2	IT 7x34.2 AVT	7.5553	.31562	-.923[c]	.356	-
	FT 7x34.2 AVT	7.3741	.72722			
3	IT 7x34.2 FI	1.5200	.28476	-1.823[c]	.068	-
	FT 7x34.2 FI	1.2488	.40151			

Note: a. CG; b.Wilcoxon Signed Ranks Test; c. Based on positive ranks

DISCUSSIONS

The results obtained by the two groups at IT for sample 7x34.2 do not show any significant differences between the two groups for any of the measured parameters. Unlike IT, the results obtained at FT for the same sample show significant differences across all parameters in favor of EG. EG's differences between FT and IT 7x34.2 at BT and AVT parameters are significant, which indicates that the small-sided games method produces effects both in optimizing travel speed over a distance specific to football actions, as well as in improving the ability to repeatedly perform high-intensity exercises.

We note significant differences between the FI average scores between the two EG tests, which indicates that this period and the content of the training program were effective in improving the body recovery rate and in summarizing the substances needed to produce energy to continue the effort to the higher parameters. Bangsbo (2007; 2008), states that the use of small-sided games in the training program of juniors should have the primary objective of developing technical qualities and as a secondary objective developing physical condition. The investigation carried out by the Impellizzeri et al. (2006) shows that small-sided games can be an effective mean of physical training, but little research has evidence to confirm this at junior level.

One example is the Katis & Kelis study (2009), with 34 sportsmen aged 13. The study analyzes the effects produced by two small sided games, 3vs.3 and 6vs.6, with the results obtained indicating that the small sided game of 3vs.3 produces positive effects in the development of the 30 meter running speed (Katis & Kelis, 2009). Just like our study, their results confirm that using small-sided games in football training can optimize the fast-speed physical quality of sportsmen. The efficiency of the integrated practice method is also confirmed by Weineck (1988, p. 77), which states that rationalization and standardization of small-sided games has positive effects on the development of endurance under conditions that are specific to football.

CONCLUSIONS

The analysis of the results and the experience gained from this experiment lead us to the following conclusions:

- The study revealed that through the application of a 6-week time program, in which small-sided football games were used, speed endurance developed.
- The correct standardization of the exercises can have an impact on the proposed area of effort to be influenced.

Conflicts of interest

The authors hereby state that there is no conflict of interest involving this study.

Acknowledgments

All authors contributed equally to this research.

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A SYSTEMATIC REVIEW OF GOAL SETTING INTERVENTIONS TO IMPROVE SPORTS PERFORMANCE

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ABSTRACT. Introduction. Goal setting theory (Locke & Latham, 1990) was initially developed for the field of organizational psychology, and since then it was used as a motivational technique in a variety of areas, including sports performance. Considering the multiple factors influencing sports performance and the fact that goal setting has become an increasingly popular subject, we consider it appropriate to summarize the recent results regarding this topic. **Objective.** The purpose of this paper was to conduct a systematic review of the literature on goal setting interventions to enhance sports performance. **Methods.** A comprehensive literature search of Scopus, ScienceDirect, Directory of Open Access Journals, ERIC, Social Sciences Citation Index, Science Citation Index, and APA PsycArticles databases was conducted in October 2020 and included journal articles published since 2000. **Results.** A total of 1520 results were identified, of which 27 studies met eligibility criteria and were fully reviewed. **Conclusions.** This systematic review highlights that goal setting is an effective behavior modification procedure that can improve athletes' performance. Discussions focus on practical implications and future research directions.

Keywords: *goal setting, sports, applied behavior analysis, sports performance*

REZUMAT. ***O recenzie sistematică asupra intervenţiilor care folosesc stabilirea obiectivelor pentru îmbunătăţirea performanţei sportive.*** **Introducere.** Teoria stabilirii obiectivelor (Locke & Latham, 1990) a fost dezvoltată iniţial pentru domeniul psihologiei organizaţionale, iar de atunci a fost folosită ca tehnică motivaţională în mai multe domenii, printre care şi cel al performanţei sportive. Având în vedere factorii multiplii care influenţează performanţa sportivă, precum şi faptul că stabilirea obiectivelor a devenit un subiect din ce în ce mai popular, considerăm oportună sumarizarea celor mai recente rezultate ştiinţifice din acest domeniu. **Obiectiv.** Obiectivul acestei lucrări este de a realiza o recenzie sistematică a literaturii de specialitate asupra intervenţiilor care folosesc stabilirea obiectivelor pentru creşterea performanţei sportive. **Metode.** O căutare comprehensivă a literaturii de specialitate a fost realizată în bazele de date: Scopus, ScienceDirect,

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Directory of Open Access Journals, ERIC, Social Sciences Citation Index, Science Citation Index şi APA PsycArticles în Octombrie 2020 şi a inclus articole ştiinţifice publicate începând cu anul 2000. **Rezultate.** Un total de 1520 de rezultate au fost identificate, dintre care 27 de articole au întrunit criteriile de eligibilitate şi au fost incluse în această recenzie. **Concluzii.** Această recenzie sistematică evidenţiază faptul că stabilirea obiectivelor reprezintă o strategie eficientă de modificare comportamentală care poate îmbunătăţi performanţa sportivilor. Discuţiile se concentrează asupra implicaţiilor practice şi a direcţiilor viitoare de cercetare.

Cuvinte cheie: *stabilirea obiectivelor, sport, analiza aplicată a comportamentului, performanţa sportivă*

INTRODUCTION

Goal setting theory (Locke & Latham, 1990) is a motivational theory initially developed for organizational psychology, based on more than 400 studies that suggest that specific and challenging goals conduct to a higher level of task performance than easy or vague goals.

Applied behavior analysis also relies on goal setting as a behavior modification tool that implies establishing a goal for the desired change in the target behavior (Miltenberger, 2015). It is effective as a single procedure, but practitioners also use it in conjunction with other strategies such as monitoring, public posting, feedback, or reinforcement (Cooper et al., 2014). From a behavioral perspective, Luiselli & Reed (2011) consider goal setting as a rule that modifies behavior because it describes a contingency that arises from following that rule (Luiselli & Reed, 2011).

Nevertheless, in the sports performance field, findings were inconsistent at first, which was attributed by Locke (1991) mainly to methodological flaws, arguing that different problems occurred in manipulating "do your best" conditions, measuring personal goals, and making specific goals difficult. In a reaction to Locke, Weinberg & Weigand (1993) consider that it would be overly simplistic to attribute inconsistent findings only to methodological issues and propose as alternative explanation differences in motivation and type of task between sport and organizational settings. However, as the number of academic papers regarding goal setting in sports increased, a meta-analysis showed that results are similar to goal setting in organizational psychology, highlighting an effective strategy (Kyllo & Landers, 1995).

From the standpoint of Mellalieu & Hanton (2008), researchers and practitioners should consider contextual variations, intra-individual, and inter-individual differences when they use goal setting in sport. Therefore, goals can be viewed either as a direct motivational strategy that regulates behavior in terms of attention and effort or as the cognitive drivers for involvement in activities (Mellalieu & Hanton, 2008). According to achievement-goal theory (Nicholls, 1989), individuals are motivated by demonstrating competence, and they set goals that are consonant with their cognitive beliefs about what is needed to maximize achievement in that context (Harwood et al., 2000). Athletes usually adopt two types of achievement goals: mastery (or task involved) and ego (or result involved) (Tenenbaum & Eklund, 2007). Mastery involvement refers to situations in which athletes feel competent about improving their own performance, while ego involvement refers to situations in which athletes feel successful about outperforming others (Ames, 1992; Nicholls, 1989).

In sports and exercise settings, people set either subjective goals that are not measurable, either objective goals requiring meeting a specific standard on a given task within a time frame (Weinberg & Gould, 2011). Another classification describes three types of goals: outcome goals, performance goals, and process goals (Cox, 2011). Outcome goals refer to sports' competitive aspects and emphasize social comparison and winning (Eklund & Tenenbaum, 2013). On the other hand, performance goals imply self-comparison, focusing on own achieving standards, which are independent of other competitor's performance, and for that reason, these types of objectives are more flexible and within an athlete's control (Weinberg & Gould, 2011). Finally, process goals target specific behavior, focusing on the process of performing rather than on performance (Eklund & Tenenbaum, 2013). In sports performance, all three types of goals are essential in directing behavioral change (Weinberg & Gould, 2011).

When setting goals, coaches need to focus on four aspects: goal difficulty, goal specificity, goal proximity, and goal collectivity (Eklund & Tenenbaum, 2013). Based on these variables, recommendations include using moderate or difficult goals, both short- and long-term goals, using them in conjunction with performance feedback, and using specificity, public acknowledgment, and a combination of different goals (Luiselli & Reed, 2011; Weinberg & Gould, 2011).

Although other papers have emphasized the utility of using goal setting in sports performance, there is no recent systematic review on this topic. Considering the multiple factors influencing sports performance and the fact that goal setting has become increasingly popular, we believe it is appropriate to summarize the recent results regarding this topic. According to Munn et al. (2018), a literature review can provide clarity, identify gaps and trends regarding the topic studied, and provide pieces of information that future research may address. Therefore, this paper's purpose was to conduct a systematic review of the literature on goal setting interventions to enhance sports performance.

METHODS

Inclusion and exclusion criteria

Our inclusion criteria include the following: first, a goal setting intervention had to be implemented, either single or in conjunction with other strategies. Second, the target behavior had to be related to sports performance: technical, tactical, physical, or psychological. We excluded studies that targeted the participant's physical activity level or studies that have not implemented an intervention. Also, we excluded from this review studies that were not written in English.

Search strategy

We conducted a comprehensive literature search using specific keywords sport* and "goal setting" together. Double quotes were used to restrict the search to the exact phrase of goal setting, and an asterisk was used to find also derivates such as sports, sporting, sportive, sportsmen, sportswoman, and others.

The literature search was performed in October 2020 and included journal articles published since 2000 in the following databases: Scopus, ScienceDirect, Directory of Open Access Journals, ERIC, Social Sciences Citation Index, Science Citation Index, and APA PsycArticles.

RESULTS

We found a total of 1520 journal articles as a result of the systematic search, and after removing duplicates, there were 1354 papers included for abstract review. Two independent reviewers assessed abstracts using Rayyan software (Ouzzani et al., 2016), and in situations in which they did not get enough information from the abstract, they evaluated the full article. Disagreements on whether to include an article were resolved by consensus of authors. After reviewing abstracts, a number of 22 studies were included, and we identified seven more papers by cross-checking the reference list of published articles. A total of 29 journal articles were thoroughly reviewed with full-text, out of which two were removed because they did not assess an intervention's effect. Therefore, 27 journal articles were included in this review. Figure 1 illustrates the process of selecting studies for this review.

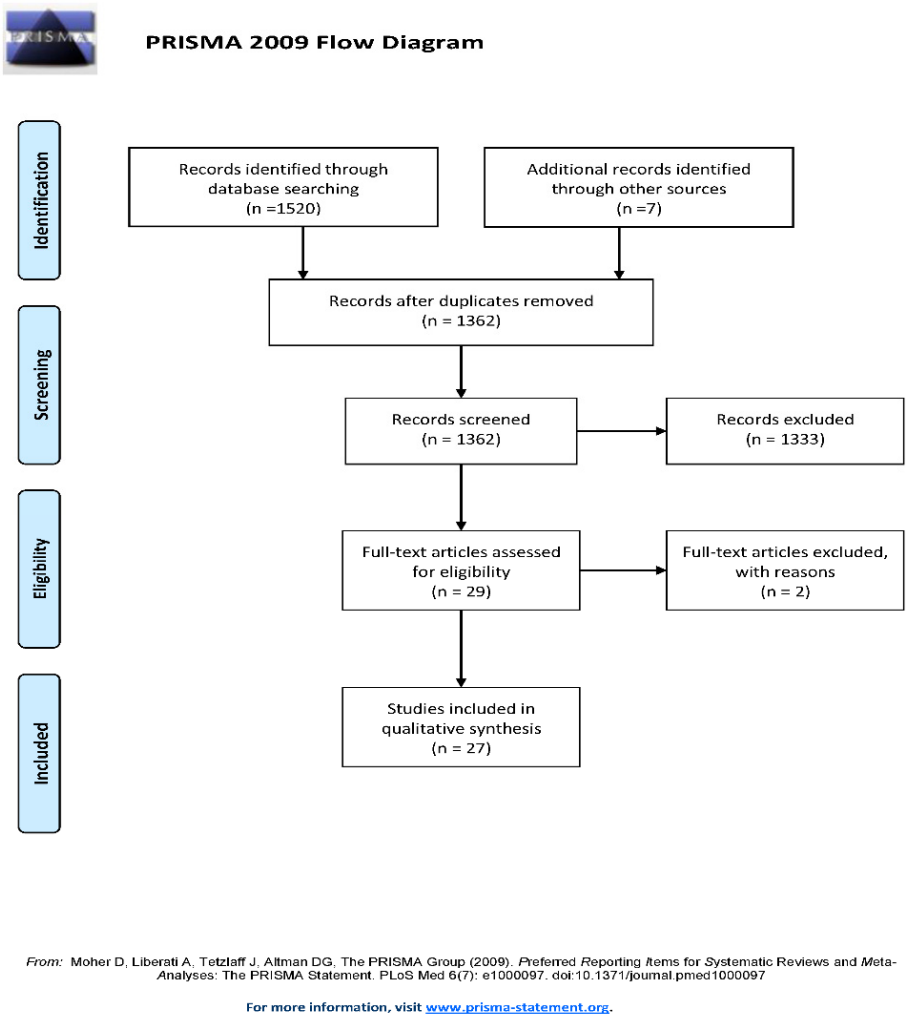

Figure 1. Goal Setting Interventions - Study Selection for Review.

Participant characteristics

In the reviewed articles, 770 individuals participated in interventions based on goal setting, out of which 400 were females and 370 males. Participants were both adults and children, whose ages ranged from 7 to 36. They practiced sports as amateurs or professional athletes at different levels: recreational, high school, collegiate, or sports clubs. Also, participants played both individual and team sports.

Sports included

The most studied team sport in selected articles was volleyball (6) (e.g., Palao, 2016), followed by basketball (4) (e.g., Ortega et al., 2013), soccer (3) (e.g., Brobst & Ward, 2002), and football (2) (e.g., Ward & Carnes, 2002). Other team sports examined were rugby (1) (Mellalieu et al., 2006) and cricket (1) (Thelwell & Maynard, 2003).

As far as individual sports are concerned, tennis (2) (e.g., Boyce et al., 2001), triathlon (2) (e.g., Thelwell & Greenlees, 2001), track and field (2) (e.g., Thelwell & Greenlees, 2003), table tennis (1) (Liu et al., 2012), boxing (1) (O'Brien et al., 2009), and swimming (1) (Simoes et al., 2012) were the sports analyzed in this review. Additionally, one study assessed the intervention in two different individual sports: swimming & track and field (Wikman et al., 2014).

Study design characteristics

In this review, articles included used both individual-level design popularly known as single-subject design and group level experimental design. Of the studies that used a single-subject design, the most common approach was multiple baseline across participants (5) (e.g., Thelwell & Greenlees, 2003), followed by multiple baseline across behaviors (2) (e.g., Ward & Carnes, 2002). Other studies utilized multiple baseline design with a reversal (1) (Holt et al., 2012a), alternating treatments design (1) (Holt et al., 2012b), ABACABC multi-treatment withdrawal (1) (Smith & Ward, 2006), and AB design (1) (Mellalieu et al., 2006). Regarding group design, authors also used different approaches, and both quasi-experimental (e.g., Palao, 2016) or experimental designs (e.g., Corrêa et al., 2006).

Type of goal setting intervention

The authors studied goal setting as a single procedure in 15 studies from a total of 27 identified. Out of those, some evaluated the effect of a goal setting program (e.g., Ortega et al., 2013; Zetou et al., 2008), and others also looked at variables associated with efficacy of goal setting programs such as goal difficulty (e.g., Dutra et al., 2017; Liu et al., 2012) or goal specificity (e.g., Corrêa et al., 2006). In these interventions, authors used assigned-set goals (e.g., Corrêa et al., 2006), self-set goals (e.g., Vidic & Burton, 2010; Zetou et al., 2008), or they investigated both self-set and assigned-set goals (e.g., Boyce et al., 2001). Concerning self-set goals, Mellalieu et al. (2006) and O'Brien et al. (2009) used a procedure based on a model proposed by Burton et al. (2001), which consisted of goal determination, goal setting, and goal reviewing.

Moreover, selected articles tested separately short- and long-term goals (e.g., Corrêa et al., 2006) or a combination of both (e.g., Boyce et al., 2001; Durdubas et al., 2019), and also looked at individual goals (e.g., Ortega et al., 2013), group goals (e.g., Senécal et al., 2008), or a combination of individual and group goals (e.g., Vidic & Burton, 2010).

Finally, in order to make the intervention more effective, McCarthy et al. (2010) accompanied the goal setting intervention with an educational booklet that explained and offered examples of different outcome goals, performance goals, and process goals and taught athletes to set SMART goals.

In contrast to single procedure interventions, several studies looked at the effect of goal setting in conjunction with other strategies such as peer-assessed feedback and group contingency (Holt et al., 2012a), individual contingency and group contingency (Holt et al., 2012b), public posting (Ward & Carnes, 2002), public posting and verbal feedback (Brobst & Ward, 2002; Smith & Ward, 2006), planning (Bieleke et al., 2019), positive self-talk and imagery (Heydari et al., 2018), relaxation, mental imagery, and self-talk (Thelwell & Greenlees, 2001, 2003), activation regulation strategies, self-talk, mental imagery, and concentration (Thelwell & Maynard, 2003) and patterns of social comparison (Bueno et al., 2008).

Target behavior

We grouped selected articles according to target behaviors into four different sports performance factors: technical, tactical, physical, and psychological.

Technical performance

A large number of studies looked at technical improvements in sports performance. For instance, in volleyball, authors investigated motor learning performance in a task of dig/forearm pass (Corrêa et al., 2006), errors, velocity, and precision (Bieleke et al., 2019), serving, serve-receiving, and attacking (Zetou et al., 2008) or serve reception (Dutra et al., 2017). In the case of soccer, we identified studies that examined changes in players' technique, such as: passing and first touch (Holt et al., 2012a), the highest number of consecutive touches of the ball or "juggles" in the correct sequence (Holt et al., 2012b), movement with the ball, movement during restarts and movement after the player passed the ball (Brobst & Ward, 2002). Regarding football, the authors were interested in technical target behaviors including tackles (Ward & Carnes, 2002), percentage of correct blocks & percentage of correct releases from the line of scrimmage (Smith & Ward, 2006).

Additionally, for other sports were utilized the following target behaviors: the number of ball carries, the number of tackles, successful kicks, and the number of turnovers in rugby (Mellalieu et al., 2006), punches landed

in boxing (O'Brien et al., 2009), tennis serve speed and placement (Boyce et al., 2001), serving success in table tennis (Liu et al., 2012), accuracy score for a basketball free-throw task (Neumann & Hohnke, 2018) and subjective and objective performance in cricket (Thelwell & Maynard, 2003).

Tactical performance

Four studies implemented a goal setting intervention targeting the tactical behavior of athletes. The variables targeted were advanced offensive tactical play in tennis (Vidic & Burton, 2010), perception and use of the game statistics in volleyball (Palao, 2016), and percentage of correct routes run (Smith & Ward, 2006), and reads and drops in football (Ward & Carnes, 2002).

Physical performance

Concerning physical performance, the following dependent variables were aimed: swimming chronometric performance (Simoes et al., 2012), the overall time achieved in triathlon (Thelwell & Greenlees, 2001, 2003), total meters covered in track and field endurance athletes (Bueno et al., 2008), fitness performance in tennis (Vidic & Burton, 2010) and total touches during each 4-min practice as a measure of the intensity of effort in soccer (Holt et al., 2012b).

Psychological outcomes

Several papers used psychological outcomes in track and field, including threat perceptions, strategies to cope with threats while running, self-efficacy, personal goals (Bueno et al., 2008), fear of failure (Wikman et al., 2014), and positive and negative affect experienced (McCarthy et al., 2010). Moreover, for basketball, cohesion (Senécal et al., 2008), perceptions of cohesion and perceptions of a task-involving and ego-involving motivational climate (Durdubas et al., 2019), perceived efficacy and level of achievement of the individual goals (Ortega et al., 2013) were studied as psychological outcomes of goal setting interventions.

Finally, in relation to other sports, psychological outcomes targeted were swimmers fear of failure (Wikman et al., 2014), motivation and confidence of tennis players (Vidic & Burton, 2010), use of mental skills in triathlon (Thelwell & Greenlees, 2001, 2003), self-regulation of table-tennis players (Liu et al., 2012), cognitive anxiety, somatic anxiety and self-confidence of boxers (O'Brien et al., 2009), awareness in soccer (Holt et al., 2012a), and self-confidence (Heydari et al., 2018) and commitment to the goal in volleyball (Dutra et al., 2017).

Table 1 shows a summary of reviewed articles embracing relevant aspects discussed, such as the type of sport, procedures implemented, and target behavior.

Table 1. Summary of Studies Reviewed Sorted by Type of Sport

Type of sport	Sport	Procedures	Target behavior	In-text citation
Individual sport	Boxing	Goal setting	Punches landed, cognitive anxiety, somatic anxiety, self-confidence	(O'Brien et al., 2009)
Individual sport	Swimming	Goal setting	Swimmers' chronometric performance	(Simoes et al., 2012)
Individual sport	Swimming & track and field	Goal setting	Fear of failure	(Wikman et al., 2014)
Individual sport	Table tennis	Goal setting	Self-regulation & serving success	(Liu et al., 2012)
Individual sport	Tennis	Goal setting	Motivation, confidence, and performance	(Vidic & Burton, 2010)
Individual sport	Tennis	Goal setting	Performance (at tennis serve speed and placement) and retention	(Boyce et al., 2001)
Individual sport	rack and field Endurance)	Goal setting	Performance (total meters covered), threat perceptions self-efficacy, personal goals	(Bueno et al., 2008)
Individual sport	Track and field (Multievent)	Goal setting	Positive & negative affect experienced	(McCarthy et al., 2010)
Individual sport	Triathlon	Goal setting, relaxation, imagery, and self-talk	Overall triathlon time, use of mental skills	(Richard C. Thelwell & Greenlees, 2003)
Individual sport	Triathlon	Relaxation, mental imagery, self-talk & goal setting	Total time to complete a Gymnasium Triathlon, usage of mental skills	(Thelwell & Greenlees, 2001)
Team sport	Basketball	Goal setting	Cohesion	(Senécal et al., 2008)
Team sport	Basketball	Goal setting	Perceptions of cohesion, perceptions of a task- and ego-involving motivational climate	(Durdubas et al., 2019)
Team sport	Basketball	Goal setting	Accuracy score for a basketball free-throw task	(Neumann & Hohnke, 2018)
Team sport	Basketball	Goal setting	Perceived efficacy and level of achievement of the individual goals	(Ortega et al., 2013)
Team sport	Cricket	Goal setting, activation, regulation, self-talk, mental imagery, concentration	Subjective and objective cricketing performance scores	(Thelwell & Maynard, 2003)

Type of sport	Sport	Procedures	Target behavior	In-text citation
Team sport	Football	Goal setting, public posting, verbal feedback	Percentage of correct blocks the percentage of correct routes run, percentage of correct releases from the line of scrimmage	(Smith & Ward, 2006)
Team sport	Football	Public posting, goal setting	Reads, drops, and tackles	(Ward & Carnes, 2002)
Team sport	Rugby	Goal setting	Number of ball carries, number of tackles (either made or missed), successful kick, number of turnovers won	(Mellalieu et al., 2006)
Team sport	Soccer	Goal setting alone, an individual contingency, and a group contingency	The highest number of consecutive touches of the ball in the correct sequence and total touches	(Holt et al., 2012b)
Team sport	Soccer	Public posting, goal setting & oral feedback	Movement with the ball, movement during restarts, movement after the player passed the ball	(Brobst & Ward, 2002)
Team sport	Soccer	Peer-assessed feedback, goal setting and a group contingency	Awareness, passing, and first touch	(Holt et al., 2012a)
Team sport	Volleyball	Goal setting, positive self-talk, and imagery	Self-confidence	(Heydari et al., 2018)
Team sport	Volleyball	Goal setting	Motor learning performance in a task of dig/forearm pass	(Corrêa et al., 2006)
Team sport	Volleyball	Goal setting & planning	Errors, velocity, precision, and the coach's ratings of performance improvements	(Bieleke et al., 2019)
Team sport	Volleyball	Goal setting	Serving, serve-receiving, and attacking	(Zetou et al., 2008)
Team sport	Volleyball	Goal setting	The score on each serve reception and the commitment to the goal	(Dutra et al., 2017)
Team sport	Volleyball	Educational program about game statistics and goal setting	Perception and use of the game statistics	(Palao, 2016)

DISCUSSION

This paper aimed to review recent journal articles published and also to summarize the applicability of goal setting interventions in sports performance.

Compared to participants in control or baseline conditions, participants in goal setting group improved performance, showing consistent behavior change. However, the results were slightly contradictory with respect to group cohesion. In a study, female high school basketball players improved cohesion after participating in a season-long intervention (Senécal et al., 2008). In contrast, Durdubas et al. (2019) found that the season-long goal setting intervention failed to increase the perception of cohesion in a group of male high school basketball players except for group integration-task dimension. According to the authors, these inconsistent findings could be explained by different methodologies and the usage of motivational climate as a variable in the second study (Durdubas et al., 2019).

Another concern might be represented by the generalization of intervention effects to game or competition settings. In a study investigating the effect of public posting, goal setting, and oral feedback on female soccer players' skills, positive results emerged during practice, but it produced limited generalization during games (Brobst & Ward, 2002).

A significant number of studies focused on technical and psychological outcomes. While the attention on technical performance seems logical due to the high educability nature of motor behavior, concentration on psychological outcomes could be considered surprising. Moreover, in the case of package interventions, variables used in conjunction with goal setting were also psychological. However, considering the need for interdisciplinarity in the sports performance field and the fact that goal setting is a term derived from psychology literature, it might explain the focus on psychological interventions and outcomes.

On the other hand, a small number of articles showed interest in athletes' physical and tactical improvements. Physical performance was examined in six papers with an emphasis on the volume or intensity of effort. In our opinion, practitioners could improve both variables of effort with the use of goal setting interventions. Therefore, there is a need for more data from articles to draw useful conclusions and design guidelines. In the last years, the appearance of GPS devices means that coaches could get more information about athletes' physical effort and set goals to improve it (Malone et al., 2017).

In the case of tactical behavior, four studies were included in this review. This small number might be explained because tactical behavior is more present in sports training with experienced athletes than with amateurs and children. However, in a recent review of behavioral interventions to improve

sports performance, Schenk & Miltenberger (2019) claimed that they found no studies aiming to enhance professional athletes' performance. Furthermore, authors argue that most sports clubs hire specialists for these kinds of interventions, and they are also cautious about revealing valuable pieces of information about performance enhancement to rival teams (Schenk & Miltenberger, 2019). Considering the small number of studies that assessed tactical behavior and the relative lack of studies that used high-level athletes in goal setting interventions, future research should address this issue.

According to Eklund & Tenenbaum (2013), coaches need to focus on four aspects when setting goals: goal difficulty, goal specificity, goal proximity, and goal collectivity. Studies included in this review focused on demonstrating the utility of variables aftermentioned. Most articles used moderate or difficult goals in their intervention. Additionally, some studies examined goal difficulty as the primary variable of interest. For example, Dutra et al. (2017) looked into the effects of difficulty on the volleyball serve reception, and results showed that the difficulty of group goals improved motor performance. Similarly, Liu et al. (2012) studied goal setting difficulty in serving success in table tennis. Once again, results highlighted that challenging goals improve sports performance and also that self-regulation is a mediator between goal difficulty and serving success (Liu et al., 2012).

Another key variable in goal setting is specificity. The literature covered in this review used specific goals set by instructors or taught participants to set their own specific goals. Furthermore, authors in one study were interested in the effect of goal specificity on sports performance. In this study, even if participants improved performance, the authors did not find differences among the four different experimental groups: generic goals, specific long-term goals, specific short-term goals, and control (Corrêa et al., 2006). In short, Corrêa et al. (2006) explained these results to methodological aspects like task difficulty, the quantity of practice (only four practice sessions), and self-set goals. In our opinion, taken all together, results suggest that goal setting might be less efficient with high-level athletes because they naturally use self-set goals and because they already have trained skills. In the case of goal proximity and goal collectivity, most articles reviewed used short-term goals or a combination of short- and long-term goals and both individual and group goals, in line with guidelines (Eklund & Tenenbaum, 2013).

Finally, only three articles of those included described a mediation model. As stated earlier, self-regulation seems to mediate the relationship between goal difficulty and serving success in table tennis (Liu et al., 2012). In another study, Bueno et al. (2008) found that motivational and emotional variables mediated goal setting efficacy in endurance sports. In future research,

authors should consider mediation and moderation analyses in order to explore complex relationships between goal setting and sports performance. The concern of complex research designs, in particular, is an issue in the field of sports performance.

CONCLUSION

This systematic review highlights that goal setting is an effective behavior modification procedure that can improve athletes' performance. We ought to provide a contribution to the literature by adding new insights into the methods used to maximize goal setting interventions with athletes.

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MAIN FACTORS THAT CONTRIBUTE TO THE REDUCTION OF PARTICIPATION IN SPORTS ACTIVITIES AMONG UNIVERSITY STUDENTS

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ABSTRACT. Introduction*:* In this article, our aim is to examine the main reasons that lead university students to practice less and less physical sports activities. **Objective:** Identifying the differences that may exist between students who were enrolled at the Technical University of Cluj-Napoca, in the academic year 2011-2012, and those who were enrolled in the academic year 2019-2020, regarding the reasons that determine them to reduce the time allocated to physical sports activities. **Methods*:*** To find out why the level of participation of university students in various physical sport activities is very low, and tends to decrease from year to year, we conducted two studies, the first one in the 2011-2012 academic year (n=880 participants), and the second one, in the academic year 2019-2020 (n=594 participants), and we compared the results obtained. **Results:** The results of the study show the reasons for today's short time allocated by students to physical activities and the reasons why they are too busy to play sports. The findings indicate that the main reason why students of the Technical University of Cluj-Napoca practice less and less physical sports activities is because they are busier. The overloaded program from university is the main cause why some students have reduced the time allocated to sports activities. Other important factors are the lack of energy and the lack of sport facilities. **Conclusions*:*** Increasing educational requirements and reduced leisure time, justify a decrease in students' interest in participating in extracurricular sports activities. To increase the motivation and future sport adherence of students, it would be necessary for universities and local public authorities to provide a motivational climate for practicing physical activities and sport.

Key words: *physical activity, sport, student population, free time, motivation.*

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REZUMAT. ***Factorii principali care contribuie la reducerea participării la activităţi sportive în rândul studenţilor***. **Introducere:** Scopul acestui articol este de a examina principalele motive care îi determină pe studenţi să practice din ce în ce mai puţine activităţi fizice sportive**. Obiective:** Identificarea diferenţelor care pot exista între studenţii care au fost înscrişi la Universitatea Tehnică din Cluj-Napoca, în anul universitar 2011-2012, şi cei înscrişi în anul universitar 2019-2020, cu privire la motivele care îi determină să reduce timpul alocat activităţilor fizice sportive. **Metode:** Pentru a afla de ce nivelul participării studenţilor la diferite activităţi fizice sportive este foarte scăzut, şi tinde să scadă de la an la an, am efectuat două studii, primul în anul universitar 2011-2012 (n = 880 participanţi), şi al doilea, în anul universitar 2019-2020 (n = 594 participanţi), şi am comparat rezultatele obţinute. **Rezultate:** Rezultatele studiului arată motivele pentru care studenţii alocă puţin timp activităţilor fizice şi de ce sunt prea ocupaţi pentru a face sport. Principalul motiv pentru care studenţii Universităţii Tehnice din Cluj-Napoca practică din ce în ce mai puţine activităţi sportive este faptul că sunt mai ocupaţi şi au mai puţin timp liber. Programul încărcat de la universitate este principala cauză pentru care unii dintre studenţi au redus timpul alocat activităţilor sportive. Alţi factori importanţi sunt lipsa de energie şi lipsa facilităţilor pentru practicarea sportului. **Concluzii:** Creşterea cerinţelor educaţionale şi reducerea timpului liber, justifică scăderea interesului studenţilor de a participa la activităţi sportive extraşcolare. Pentru a spori motivaţia şi aderarea sportivă viitoare a studenţilor, ar fi necesar ca universităţile şi autorităţile publice locale să ofere un climat motivaţional pentru practicarea activităţilor fizice şi a sportului.

Cuvinte cheie: *activitate fizică, sport, populaţie studenţească, timp liber, motivaţie*

INTRODUCTION

The present research starts from statistical data made public more and more frequently regarding sedentary life (Unick et al., 2017; WHO, 2018) and weight gain among young people (Donnelly et al., 2009; Booth et al., 2017; Pinto et al., 2017).

Despite the health benefits (Reiner et al., 2013; McKinney et al., 2016), personal development (Fraser-Thomas & Strachan, 2015) and social effects (Eime et al., 2013; Di Bartolomeo & Papa, 2019) of practicing physical activities and sports, many young people choose not to be physically active, citing lack of time, lack of physical energy, lack of interest and lack of motivation as the main reasons for physical inactivity (Weinberg & Gould, 2011; Fox et al., 2012).

The level of involvement in various physical activities and sports is influenced by several factors, such as: age, sex and health, autonomy, family support, access to sport facilities, intention to participate and previous involvement in sports or exercise programs (Bauman et al., 2012).

According to Papaioannou et al. 2020, a particularly important role in the behavior of participating in sports activities is played by personal factors (such as time, self-efficacy and perceived competence), social factors (such as parents, teachers and support from friends) and environmental factors (such as sports venues and school environment).

This study is part of a wider research regarding the student's motivation from the Technical University of Cluj-Napoca to practice physical activities and sports.

The results of the study show the reasons for today's short time allocated by students to these activities and the reasons why they are too busy to play sports.

MATERIAL AND METHODS

The purpose of the research:

Analysis of the reasons that determine the students enrolled at the Technical University of Cluj-Napoca to practice less often physical sports activities.

Hypotheses:

- the existence of reasons that can influence students, in terms of the frequency with which they practice physical sports activities, causes them to reduce the time allocated to these activities;
- the existence of factors that can make students consider that they are busier, influences their decision to practice such activities less often;
- there are significant differences between the students who attended the courses of the Technical University of Cluj-Napoca in the period 2011-2012, and those who attended the university courses in the period 2019-2020, in terms of the reasons why they reduced the frequency with which they practice sports activities.

Objectives:

- identifying the main reasons why university students reduce the time allocated for practicing sports activities;

- identifying the main reasons why students do not play sports with the same frequency as in the past;

- identifying the differences that may exist between students who were enrolled at the Technical University of Cluj-Napoca, in the academic year 2011-2012, and those who were enrolled in the academic year 2019-2020, regarding the reasons that determine them to reduce the time allocated to physical sports activities.

Methods, techniques and research tools

In the present research we used the method of quantitative research and the technique of administering the questionnaires by sociological survey.

Research tools: The questionnaire used as a research tool has been taken and adapted from that used in the study "Sports, exercise and physical activity: public participation, barriers and attitudes" Lorraine Murray, Ipsos Mori, Scottish Executive Social Research, October 2006.

The sample investigated:

The research conducted in 2012 was attended by 880 students (601 male students and 279 female students), enrolled in the academic year 2011-2012, at one of the following faculties of the Technical University of Cluj-Napoca: Architecture and Urban Planning; Automation and Computer Science; Civil Engineering; Electronics, Telecommunications and Information Technology; Materials and Environmental Engineering.

The research conducted in 2020 was attended by 594 students (330 male students and 264 female students), enrolled in the academic year 2019-2020, at one of the following faculties of the Technical University of Cluj-Napoca: Architecture and Urban Planning; Automation and Computer Science; Civil Engineering; Electronics, Telecommunications and Information Technology; Materials and Environmental Engineering; Electrical Engineering; Automotive, Mechatronics and Mechanical Engineering; Materials and Environmental Engineering; Machine Building, respectively, Faculty of Building Services Engineering.

Sampling was done at these faculties to have in this study both students whose curriculum is very busy and students whose curriculum is less busy. The sampling in 2012 was performed using the nominal lists of the catalogs and the selection was made randomly, by the 10-step method, choosing each tenth student from the nominal list and ensuring that the proportion of subjects in the sample by gender, corresponds to the proportion by sex of students enrolled at each faculty, specialization, division, year of study. In 2020, for increasing the participation rate in the study, we asked the students to send the link to the questionnaire to their colleagues, together with the application form.

Research population

It is represented by all students who attended full-time courses, at one of the faculties of the Technical University of Cluj-Napoca, in the academic year 2011-2012, respectively 2019-2020, regardless of the year of study, age, department and specialization.

Both studies were conducted only among students attending faculties in Cluj-Napoca University Center. Students from the Baia Mare University Center and those from the extensions in the cities of Alba-Iulia, Bistriţa, Satu-Mare and Zalău were not included in this study.

RESULTS

After collecting the answers of our students, we proceeded to the interpretation of the data, which was done using the SPSS program. We considered that the following associations may be relevant for the present study:

Table 1. The significance of the statistical determinants of logistic regression on the probability that students participated more frequently in sports physical activities in the past

	2012	**2020**
Nagelkerke R Square	0.943	0.511

Table 2. Logistic regression results on the determinants of the statistical probability that students participated more frequently in sports activities in the past

Dependent variable	**2012**		**2020**	
	Sig.	Exp(B)	Sig.	Exp(B)
Feel busier	0.000	2700.575	0.000	15.012
Less sports facilities after high school graduation	0.000	655.200	0.000	0.330
Less sports facilities after relocation	0.000	653.719	0.078	1.863
Health reasons	0.000	744.152	0.751	0.872
Friends no longer practice sports activities	0.000	93.977	0.206	1.911
No longer like to practice a sport	0.000	93.106	0.005	0.061
Too much cost	0.994	1240210352.276	0.018	4.586
Halls/clubs have too many participants	0.997	1309775276.086	0.144	3.388
Too much pressure to achieve performance	0.997	11520239324.55	0.427	0.578
Lack of energy	0.994	2194842608.213	0.000	10.379
Constant	0.000	0.022	0.000	0.365

The results of the logistic regression (statistical modeling of the probability that students have reduced the time allocated to physical sports) indicate that, after controlling: the possibility for students to feel busier now, reducing facilities for playing sports after left high school, reducing facilities for playing sports after relocation, the occurrence of health reasons, the possibility that their friends no longer practice physical sports, the possibility that students no longer like playing a sport, the probability that playing a sport will involve too high costs, the possibility that the halls/clubs have too many participants, the possibility that there is too much pressure to achieve performance, lack of energy, the most important factor and the one that has an associated significance accepted in each of the years studied is the possibility that students feel more busy currently, because exp (b) = 2700.575 among students surveyed in 2012 and because exp (b) = 15.012 among those surveyed in 2020. Also, in the academic year 2012, most of the measured variables prove to be predictors that can influence students' decisions in this regard:

- reduction of sports facilities after graduation from high school (because exp (b) = 655.200);
- reduction of sports facilities after the change of address (because exp (b) = 653.719);
- the possibility that their friends no longer practice physical sports activities (because exp (b) = 93.977);
- the possibility that students no longer like to practice a sport (because exp (b) = 93.106);
- the occurrence of health reasons (because exp (b) = 744.152);

In 2020, in addition to the predictor indicating the extent to which students feel busy, another important predictor proves to be lack of energy (because exp (b) = 10.379).

Table 3. Significance of logistic regression regarding the statistical determinants of the probability that students will have reasons to reduce the frequency with which they currently engage in physical sports activities

	2012	**2020**
Nagelkerke R Square	0.455	0.225

Table 4. The results of the logistic regression regarding the statistical determinants of the probability that the students have reasons to reduce the frequency with which they currently engage in physical sports activities

Dependent variable	**2012**		**2020**	
	Sig.	Exp(B)	Sig.	Exp(B)
School	0.000	5.152	0.000	16.930
Workplace	0.896	0.949	0.997	172491990.990
Voluntary work	0.426	0.702	0.998	76074988.657
Family life	0.330	1.672	0.761	0.426
Social life (parties, meetings, going out)	0.007	2.381	0.997	76515987.614
Other interests, hobbies	0.086	1.648	0.997	30465345.268
Constant	0.000	0.702	0.209	0.861

The results of the logistic regression (statistical modeling of the probability that students are currently too busy to practice physical sports activities) indicate that, after controlling for possible causes, such as: school, workplace, volunteer work, family life, social life (parties, meetings, outings in the city) and other interests (hobbies), the probability that those who currently have reduced the frequency with which they practice physical sports activities have done so due to school is 5 times higher among students surveyed in 2012 (because exp (b) = 5.152) and almost 17 times higher among students surveyed in 2020 (because exp (b) = 16.930).

CONCLUSIONS

The students of the Technical University of Cluj-Napoca declare that they rarely practice physical sports activities at present, because they are busier. Among the reasons why they feel this way, the school occupies the most important place. The overloaded program is the main cause why most of the students have reduced the time allocated to sports activities.

This aspect is especially relevant because, at the same time, among the students surveyed in 2020, an important factor proves to be the lack of energy.

The lowering interest for sport activities is indeed justified by the reduction of leisure time and the increasing educational requirements.

Also, in 2020, the lack of facilities due to the change of residence and after high school graduation, seem to be no longer important factors for the frequency with which students currently engage in physical sports activities. This is due to the increasing number of spaces for sports and leisure activities, investments made by local authorities in the creation of sports facilities, parks, sport grounds and bicycle lanes.

The offer of sports activities where students can participate voluntarily, for pleasure, for fun and for socialization is quite limited at the Technical University of Cluj-Napoca. A more flexible schedule, the organization of sports competitions, free access to sports facilities, will increase the attractiveness and participation. The physical education curriculum should also be adapted to students' favorite sports and physical activities. According to the students, the offer of extracurricular sports activities is not very attractive. Insufficient number of physical education classes, overloaded curriculum and limited access to sports centers reduce the number of students who practice sports.

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COMPARATIVE STUDY REGARDING MOTIVATION IN SPORTS ORGANIZATIONS

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ABSTRACT. In sports, the motivation of athletes can be the key to success. Motivation, as a concept, was offered a wide range of interpretations, many of which were developed from a managerial perspective that highlights a better understanding of the mechanisms of motivation of human character. **Objectives**. Identifying the reasons for playing basketball by athletes aged 14-15, but also highlighting the motivational performance factors by comparing two teams with different competitive results**. Methods and means**. To carry out this study, the survey method was used by filling in a questionnaire by the basketball players of the two sports clubs. The questionnaire includes 24 questions and refers to the causes that athletes find motivating to practice the game of basketball. **Results**. The results presented show for each category the average level of motivation that underlies the engagement in the basketball game of each team studied. In the "amotivation" category, both teams have a result of 1, thus eliminating the risk of abandoning the sports activity. Regarding the "external regulation", U-BT athletes have a higher score, thus resulting in a higher extrinsic motivation based on praise or external factors. Both teams scored high on "intrinsic motivation", demonstrating that athletes practice basketball voluntarily. **Conclusions**. In conclusion, these variations can be justified due to the transition age in which the athletes are, the players coming to detach themselves from the concrete and situate the real in a set of possible transformations. This study illustrates a motivational portrait of junior teams engaged in the domestic national championship.

Keywords: *management, sports organizations, motivation, basketball*

REZUMAT*. Studiu comparativ privind motivaţia în cadrul organizaţiilor sportive.* În sport, motivația sportivilor poate fi cheia succesului. Motivației, ca și concept, i s-a oferit o gamă largă de interpretări, multe dintre acestea fiind dezvoltate din perspectivă managerială ce scoate în evidenţă o mai bună

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cunoaștere a mecanismelor de motivare a caracterului uman. **Obiective.** Identificarea motivelor practicării jocului de baschet de către sportivii cu vârsta cuprinsă între 14-15 ani, dar şi scoaterea în evidenţă a factorilor de performanţă motivaţionali printr-o comparaţie a două echipe cu rezultate competiţionale diferite. **Metode şi mijloace.** Pentru realizarea acestui studiu s-a utilizat metoda anchetei prin completarea unui chestionar de către jucătorii de baschet a celor două cluburi sportive. Chestionarul cuprinde 24 de întrebări şi face referire la cauzele pe care sportivii le găsesc motivatoare pentru a practica jocul de baschet. **Rezultate.** Rezultatele prezentate arată pentru fiecare categorie în parte nivelul mediu al motivaţiei care stă la baza angrenării în jocul de baschet al fiecărei echipe studiate. La categoria ”amotivare” ambele echipe au un rezultat de 1, astfel se elimină riscul abandonului activităţii sportive. Privind ”reglarea externă” sportivii de la U-BT au un punctaj mai mare, rezultând astfel o motivaţie extrinsecă mai mare bazată pe laude sau factori externi. Asupra ”motivaţiei intrinseci” s-a realizat un punctaj mare de către ambele echipe, demonstrând faptul că sportivii practică baschetul în mod voluntar. **Concluzii.** În concluzie, aceste variaţii, pot fi justificate datorită vârstei de tranziţie în care sportivii se află, jucătorii ajungând să se desprindă de concret şi să situeze realul într-un ansamblu de transformări posibile. Acest studiu ilustrează un portret motivaţional al unor echipe de juniori angrenate în campionatul naţional intern.

Cuvinte cheie: *management, organizaţii sportive, motivaţie, baschet*

INTRODUCTION

In sports, the motivation of athletes can be the key to success. Different external factors can have an effect on the sports career, the relationship between coach and athlete being the most important factor for obtaining sports performance (Macra-Oşorhean, Torok & Suciu, 2019).

From ancient times, psychologists talk about motivation and its role in people's lives, over time trying to establish the specificity and its role in explaining personal behavior. They also consider motivation as the main source of energy that pushes people to action, the engine of the whole activity, both professionally and personally (Fowler, 2014).

Motivation, as a concept, was offered a wide range of interpretations, many of which were developed from a managerial perspective that highlights a better understanding of the mechanisms of human character motivation (Vlăsceanu, 2003). The definition of the concept of motivation has been quite unclear, as there are numerous theories and studies on human behavior (Macra-Oşorhean & Purdea, 2006).

Motivation includes the active phase of behavior, allowing or not, along with other factors of a mental or material nature, objective, achievement, high performance or outline some concepts and theories on motivation and its manifestations (Deci & Ryan, 1985; Mielu, 2009; Vansteenskite, 2007).

External regulation is subordinated to actions taken to receive praise from the coach or by pushing athletes to practice that sport by parents (Luc, Michelle, Robert & Kanninka, 1995).

The introjection results that the actual presence of the stimulus is no longer necessary to initiate a behavior (Luc, Michelle, Robert & Kanninka, 1995).

Identification is a last type of extrinsic motivation and occurs when the individual comes to value and judge the behavior as important, therefore, he practices it without his will.

OBJECTIVES

The objective of the research is to identify the reasons for practicing the game of basketball by athletes aged 14-15, but also to highlight the motivational performance factors through a comparison of two teams with different competitive results.

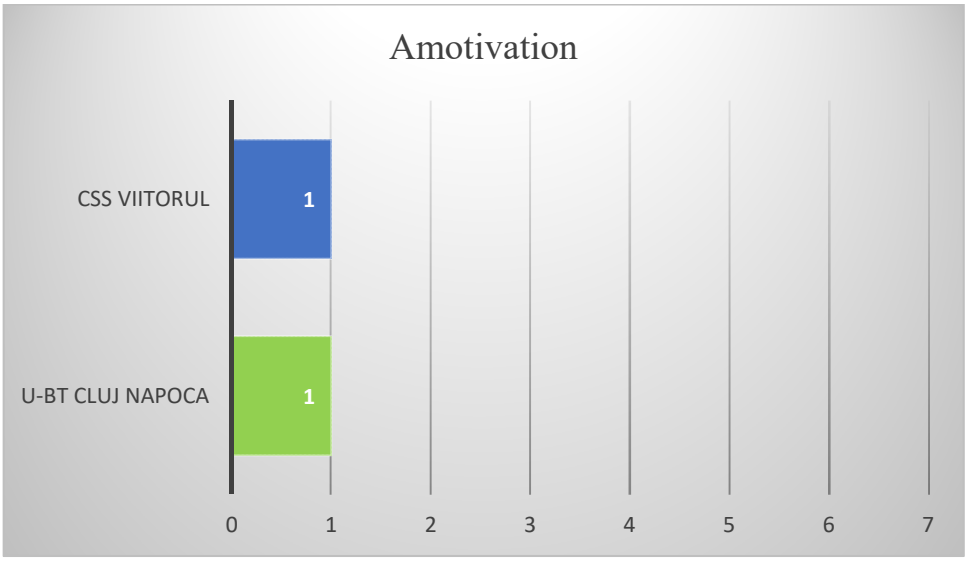
METHODS AND MEANS

This study was made between 10.02.2020-21.02.2020 on the players from the junior basketball teams U16 U-BT Cluj-Napoca and CSS Viitorul Cluj-Napoca.

To carry out this study, the survey method was used by filling in a questionnaire by the basketball players of the two sports clubs. The questionnaire includes 24 questions and refers to the causes that athletes find motivating to practice the game of basketball. Participants answer questions using a Likert scale with 7 items in which 1 - does not correspond at all, and 7 - corresponds exactly.

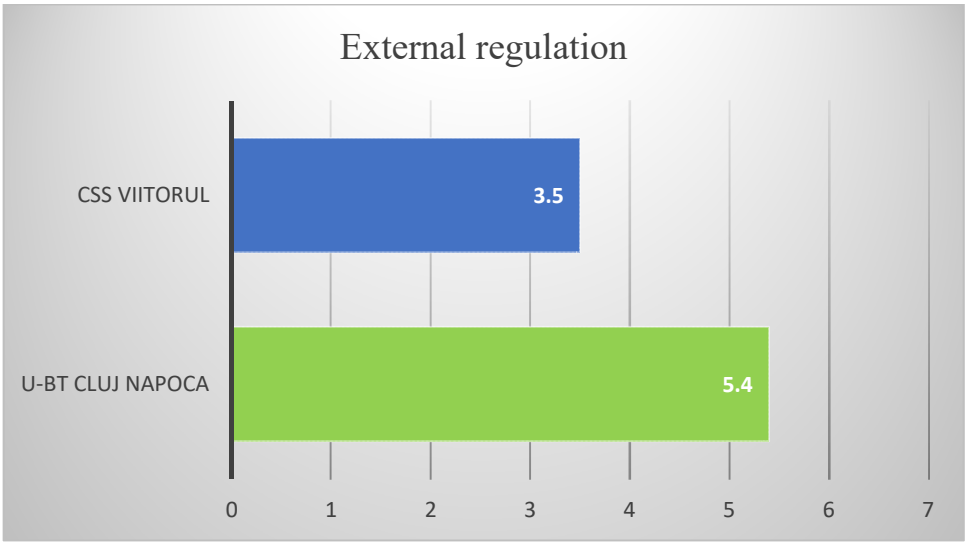
RESULTS

The results presented show for each category the average level of motivation that underlies the engagement in the basketball game of each team studied.

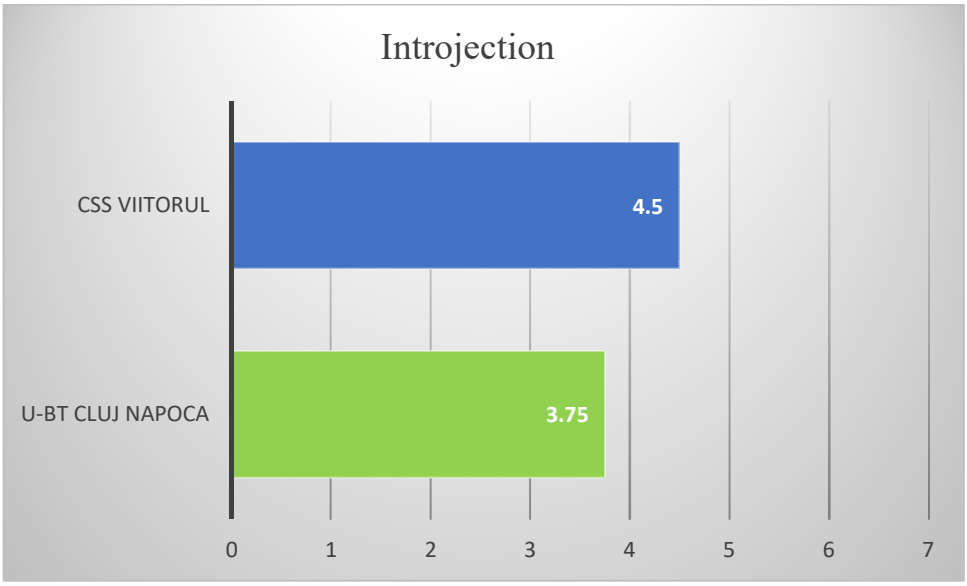


Graph. 1. Amotivation

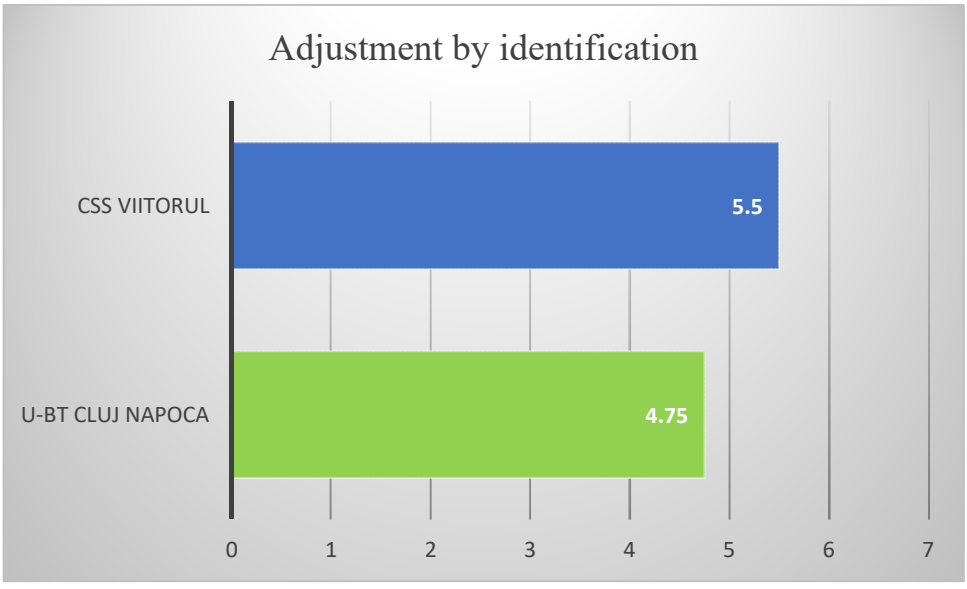
Graph number 1 shows us that both teams had a result of 1 in the category "motivation", representing the fact that this category does not correspond at all to the type of motivation that underlies the practice of basketball. This score excludes the risk among players of giving up sports.



Graph. 2. External regulation



Graph. 3. Introjection

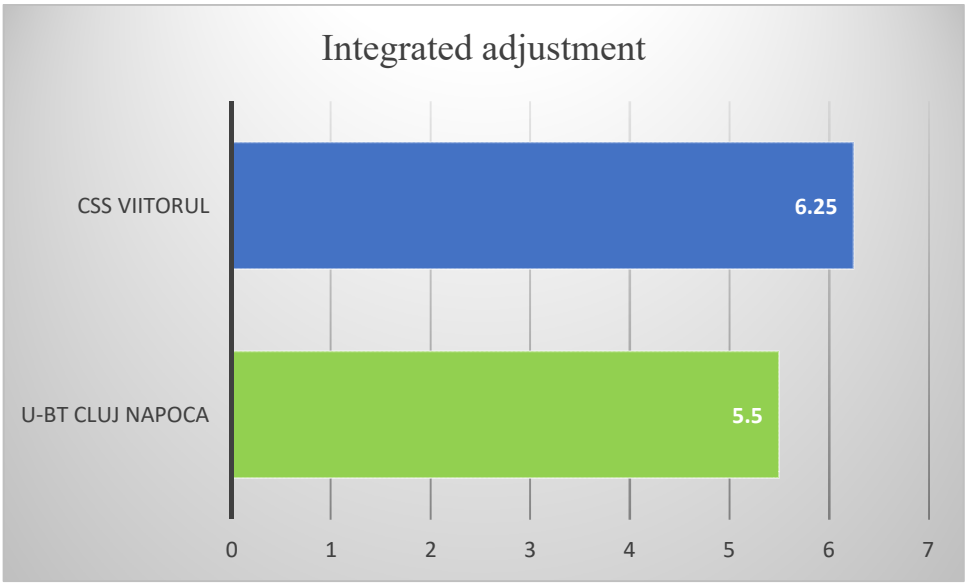


Graph. 4. Adjustment by identification

In this category, the sports club U-BT Cluj-Napoca had a result that places it in the category "corresponds a lot", and CSS Viitorul Cluj-Napoca had a result that places it in the category "corresponds little" with the trend of "corresponds moderate". This regulation is a form of extrinsic motivation, athletes practicing sports to receive praise or because they are pushed to activity by parents.

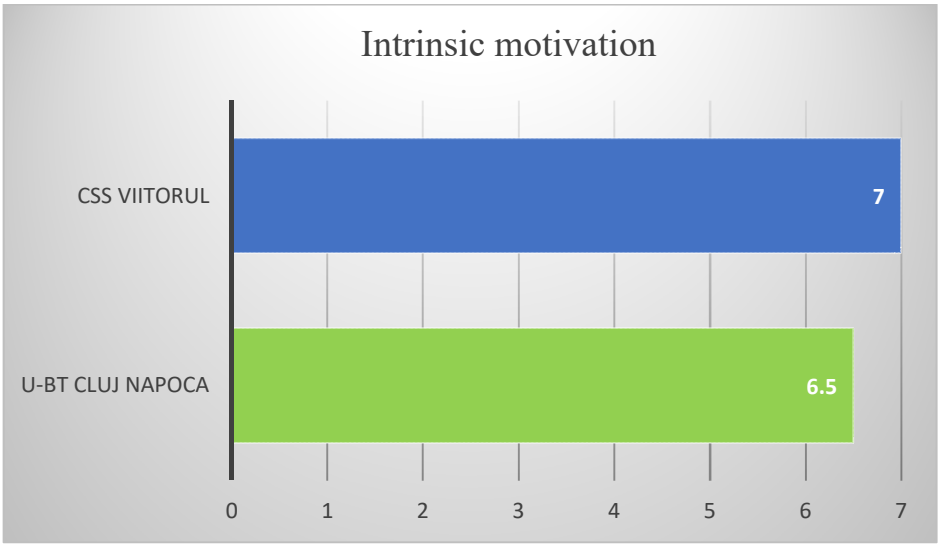
Graph number 3 shows us a high percentage for CSS Viitorul Cluj in the category "corresponds moderately" with the tendency towards "corresponds a lot", while U-BT had a percentage that places it in the category of "corresponds moderately". This means an inclination towards intrinsic motivation, the actual presence of the stimulus is no longer necessary to initiate an action.

CSS Viitorul scored a score that places it in the category of "corresponds a lot" with the tendency towards "corresponds exactly", while U-BT has a percentage of falls in it "corresponds moderately" with the tendency towards "corresponds a lot".



Graph. 5. Integrated adjustment

Graph number 5 has a result that includes the CSS Viitorul team in the "exactly corresponds" category, and U-BT in the "corresponds a lot" category with the tendency towards "exactly corresponds". This is an important form of extrinsic motivation present among athletes.



Graph. 6. Intrinsic motivation

In the last category, both teams fall into the category "corresponds exactly", CSS Viitorul scoring a higher percentage, thus reaching the last step. The activity is carried out voluntarily, in the absence of material rewards or external constraints.

CONCLUSIONS

In the motivational process, the management team would be useful to be involved in motivational actions throughout the competition, because the mood that supports motivation fluctuates depending on internal or external factors with which members of the organization or athletes come into contact. Therefore, one of the attributions of motivational management is to keep the average motivation within the organization / club active and oriented towards achieving the objectives.

The manager needs to know and understand what matters to the members of the sports organization and how to motivate them, understand the internal motivators and know how to identify them. This knowledge can help lead the organization to the highest threshold of development. The motivational process needs to be continuous, adapted to the needs of the individual, but also at the team level.

The average results of the studied teams show us the options chosen by them for motivation, so the first option chosen was intrinsic motivation, followed by integrated regulation, external regulation, regulation by identification, introjection, and the last option being amotivation.

In conclusion, these variations can be justified due to the transition age in which the athletes are, the children coming to detach themselves from the concrete and to situate the real in a set of possible transformations.

This study illustrates a motivational portrait of junior teams engaged in the domestic national championship

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ANNEXES

Scale of sports motivation – 6 (SMS)

• Why do you practice the sport you do?

Does not correspond at all	Corresponds a bit	Corresponds moderate	Corresponds a lot	Corresponds exactly
1	2 3	4	5	6 7

1. For the joy I feel when I am really involved in the activity.	1	2	3	4	5	6	7
2. Because it is part of the way i chose to live my life.	1	2	3	4	5	6	7
3. Because it is a useful way to learn many things that can be useful to me in other aspects of life.	1	2	3	4	5	6	7
4. Because it allows me to be seen well by the people I know.	1	2	3	4	5	6	7
5. I don't know anymore. I have the impression that I am unable to succeed in this sport.	1	2	3	4	5	6	7
6. For the personal satisfaction I feel while mastering certain difficult training techniques.	1	2	3	4	5	6	7
7. Because it is absolutely necessary to practice a sport in order to be fit.	1	2	3	4	5	6	7
8. Because it is one of the best ways I have chosen to develop other aspects of my life.	1	2	3	4	5	6	7
9. Because it's an extension of mine.	1	2	3	4	5	6	7
10. Because I have to play a sport to feel good about myself.	1	2	3	4	5	6	7
11. For the fame of being an athlete.	1	2	3	4	5	6	7
12. I don't know if I still want to invest so much time and effort in sports.	1	2	3	4	5	6	7
13. Because practicing my sport is according to my principles.	1	2	3	4	5	6	7
14. For the satisfaction I feel when I improve my skills.	1	2	3	4	5	6	7
15. Because it's one of the best ways to maintain a good relationship with my friends.	1	2	3	4	5	6	7
16. Because I would feel bad if I didn't make time to do sports.	1	2	3	4	5	6	7
17. It is no longer clear to me, I don't think my place is in sports.	1	2	3	4	5	6	7
18. For the pleasure of discovering new improvement strategies.	1	2	3	4	5	6	7

19. For the material and/or social benefits that come from the fact that they are sports.	1	2	3	4	5	6	7
20. Because intensive training will improve my performance.	1	2	3	4	5	6	7
21. Because participating in the sport I do is an integral part of me.	1	2	3	4	5	6	7
22. It doesn't seem like the sport I play is as fun as it used to be.	1	2	3	4	5	6	7
23. Because I have to do sports regularly.	1	2	3	4	5	6	7
24. To show others how good I am at sports.	1	2	3	4	5	6	7

Age: Club:

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WOMEN TEACHERS FROM PRE-UNIVERSITY HAVING A SECOND JOB?

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ABSTRACT. Introduction: Although there are some areas favored by male teachers, teaching is considered in the literature and traditionally a female profession. According to the latest studies in Romania, the percentage of women pre-university teachers has increased by 4% in recent years. **Objectives:** The main variable of interest in this study was to have a second job among female pre-university teachers in Romania and how this indicator affects their lives, especially health and leisure. **Methodology:** Data collection was performed online using the quality-of-life questionnaire based on the European Quality of Life Surveys structure. Of the 206 women respondents, 78 said they had a second job. **Results:** Following the analysis of demographic data, the average age of teachers included in the current study was 40.5 years. 63% are married, 20% are unmarried and 13% say they are divorced. The health condition is perceived as good by 50% of our respondents, most of them being in the age category 20-44 years. Most subjects (74%) stated that they have a hobby, although, unfortunately, 35% of the respondents did not confirm the preferred type of hobby. **Conclusions:** Although they have a second job, the continuous desire for education is high, certified by the fact that 63% of respondents take courses. Only 14% practice physical activity, which leads us to believe that people who have a second job when they have little free time, prefer activities that do not involve physical effort. Even though they have a second job, in terms of financial situation, 73% said that their monthly income is insufficient, and they are dissatisfied with their remuneration.

Keywords: *female teachers, second job, quality of life, health*

REZUMAT. ***Ca profesoară în învățământul preuniversitar din România, poți avea un job secundar?*** **Introducere:** Deşi există unele domenii favorizate de profesorii de gen masculin, predarea este considerată în literatura de specialitate şi prin tradiție o meserie feminină. Conform ultimelor studii din România, procentul de femei cadre didactice din preuniversitar a crescut cu 4% în ultimii ani. **Obiective:** Principala variabilă de interes în acest studiu a fost

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aceea de a avea un al doilea loc de muncă în rândul profesorilor preuniversitari de gen feminin din România și modul în care acest indicator le afectează viața, în special sănătatea și timpul liber. **Metodologie:** Colectarea datelor a fost efectuată online utilizând chestionarul de calitatea vieții bazat pe structura European Quality of Life Surveys. Din cele 206 de femei respondente, 78 au declarat că au un al doilea loc de muncă. **Rezultate:** În urma analizei datelor demografice, vârsta medie a cadrelor didactice incluse în studiul actual a fost de 40,5 ani. 63%, sunt căsătoriți, 20% necăsătoriți și 13% au declarat că sunt divorțați. Starea de sănătate este percepută ca fiind bună de 50% dintre respondenții noștri, majoritatea acestora fiind în categoria de vârstă 20-44 de ani. Majoritatea subiecților (74%) au declarat că au un hobby, deși, din păcate, 35% dintre respondenți nu au confirmat tipul preferat de hobby. **Concluzii:** Deși au un al doilea loc de muncă, dorința continuă de educație este mare, certificată de faptul că 63 % dintre respondenți urmează cursuri. Doar 14% practică activitate fizică, ceea ce ne face să credem că persoanele care au un al doilea loc de muncă atunci când au puțin timp liber, preferă activități care nu implică efort fizic. Chiar dacă au un al doilea loc de muncă, în ceea ce privește situația financiară, 73% au declarat că veniturile lunare sunt insuficiente fiind nemulțumiți de remunerație.

Cuvinte cheie: *profesoare, al doilea loc de muncă, calitatea vieții, sănătate*

INTRODUCTION

Education has always been a topic of interest from all points of view. In recent years, more and more studies are being conducted to observe the direction in which education is heading.

Human resource is of an uttermost importance in almost all fields of life, in the light of this statement the teacher is for the educational system a key element.

In the last decades we are witnessing a tendency towards female emancipation, fuelled by a desire to surpass themselves on all levels. However, when we talk about professions, it is known that some of them are feminine. (Gaskell and Mullen, 2006)

Although there are some fields favoured by male teachers, teaching is considered in the research literature and by tradition a feminine job. (Drudy 2008)

According to the latest studies in Romania, the percentage of women pre-university teachers has increased by 4 percent in the latest years. If in 2013 the percentage of women among pre-university teachers was 69%, by 2018 this percentage registered a statistically significant increase. Thus, this percentage became 73% in Romania. (TALIS, 2018)

Following a survey conducted by the Census Bureau from United States, almost 50% of the teachers interviewed declared that they have a second job, also the report states that women are more likely to have second jobs.

Due to financial pressures or the desire to practice a hobby many Romanians look for a second job as a way of living variant. (Precupeţu I. et al., 2018)

In Romania, 1.36 million people have two or more ongoing employment contracts simultaneously, successively or with intersection periods in the reference interval. Of this, a number of approximately 420.000 people have two employment contracts simultaneously, which can translate into two jobs simultaneously, according to data provided by the Ministry of Labor.

From our current study almost 38% stated that they have a second job. Starting from this indicator and analyzing women teacher's quality of life we could outline a profile that could give us an inside view of the problems, aspiration's, health, expectations of this extremely important socio-professional category.

OBJECTIVE & RESEARCH IN THE FIELD

The data upon this study is based on comes from a more comprehensive research aimed at establishing the perceived level of own quality of life among pre-university teacher's nationwide.

The main variable of interest in this current study was having a second job among pre-university female teachers in Romania and how this indicator impacts their lives, especially health and leisure time.

When we talk about health the World Health Organization (WHO) defines it as a "state of complete physical, mental and social well-being and not merely the absence of disease or infirmity."

People's perception of their own health is influenced by a complex set of factors, including environmental, cultural, and socio-economic conditions.

According to a study conducted by INSSE 2016 in EU the self-health among women is likelihood perceived as good and very good, not surprisingly, this fact decreases by age. At European level 85.3% women between 16-44 years consider their health good and very good, 62.3% between 45-64 years and 36.3% the age category 65 and beyond, this tendency in perceiving self-health can be seen also in Romania where 94.0% of women aged between 16 and 44 who consider their health to be good or very good, 61.8% 45-64 years and 17.5% 65 years.

METHODOLOGY

Data collection was performed using a questionnaire covering all 12 areas of quality of life: health, employment, income, education, family, social participation, housing, environment, infrastructure, personal safety, leisure, and life satisfaction. Using European Quality of Life Surveys as a guide and starting point.

The questionnaire was administered online and has been disseminated through the following platforms: Google Forms and Facebook.

Out of 229 valid responses registered, we have extracted the 206 female respondents and further one we isolated the 78 ones that have declared that they have a second job.

The following demographics data were collected: age, gender, marital status, number of children, religion, ethnicity, county and type of locality in which they were born, county and type of locality in which they carry out their professional activity, the subject taught and the educational level in which they work.

RESULTS

Demographic data

Following the analysis of demographic data, the average age of the female teachers included in the current study was 40.5 years. The age intervals have an almost uniform distribution the highest percentage being registered in the age range 36-40 years with 20%, followed by the age interval 46-50 with 18%. Also, if we take into consideration the distribution based on county of teaching, 17% of the respondent are from Bucharest, followed by Cluj and Brasov with 9%, the other counties being distributed almost equally between 3-5%.

More than half of our respondents, 63%, are married, 20% unmarried, and 13% declared that are divorced. An interesting thing that has been noticed and could be related to having a second job is the number of respondents who said they are divorced 18 from 206 women respondents, 10 being in the group of those with a second job.

Educational domain

Although they have a second job, the continuing desire for education is high, as evidenced by an encouraging percentage of 63% of respondents who said they are taking courses to complete their education. Thus 19% of them follow different specialization courses, 15% a bachelor's degree, 49% master studies and 17% doctoral studies.

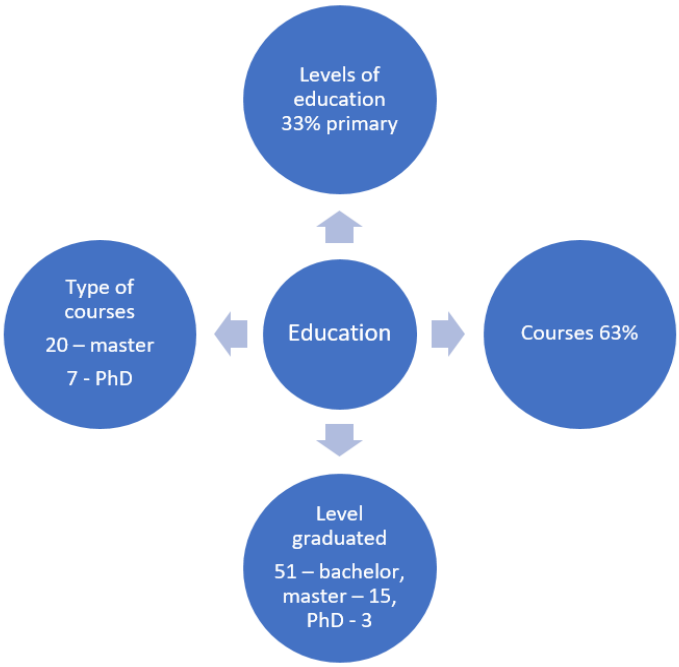

Figure 1. Highlights of respondents' education

The last educational cycles completed by our respondents are the following: 12 persons finished high school, 51 have one bachelor's degree, 1 has a second bachelor's degree, 15 have master's degrees and 3 PhD studies.

Health and life satisfaction

Self –health status is perceived by 50% of our respondents as good, most of them being in the age category 20-44 years. There is also a percentage of 31% declaring that their health is acceptable/fair which interfere with the level of happiness.

When we analyzed the health and life satisfaction domains, we identified a mismatch between the level of happiness declared by the respondents and the state of mind in the past 2 weeks. The level of happiness is quite high between 8 and 10 on a scale from 1 to 10, 1 being very unhappy and 10 very happy.

The question regarding their state of mind in the last two weeks was a Yes or No question in which 77% did not feel happy and optimistic nor calm and relaxed in the past two weeks, 73% of the respondent did not feel active and full of energy.

Which leads us to think that respondents fail to assess themselves correctly, there is no correlation between the general state of happiness on long-term and the satisfaction offered by life and happiness, optimism on short-term.

Leisure time and incomes

Most subjects (74%) stated that they have a hobby, although, unfortunately, 35% of the respondents did not confirm the preferred type of hobby. Of those who responded, 30% read as a hobby, 8% handmade and only 14% practice physical activity, which leads us to believe that people who have a second job when they have little free time, prefer activities that do not involve physical effort.

Of course, future studies are needed, but if we continue to assume, we can correlate the lack of physical activity as a hobby with the response of subjects in terms of perception of health, 31% declaring it acceptable. Concluding that the higher the level of physical activity, the better the perception of health.

The average of those who have spent their vacation in the last 5 years being 1 per year confirming the need to relax after a year of work.

When it comes to income and meeting everyday necessities even though they have a second job, 73% declared that the monthly incomes are insufficient, 40 %with some difficulties and 31% stated that the incomes meet their necessities with difficulties.

Following the responses received regarding jobs, work schedule and family commitments, 50% of respondents stated that they manage to cope well between work schedule and family commitments. Also, a relatively high percentage of 37% said they do not cope so well with family commitments. In this case, we can assume that having a second job involves more time spent at work and therefore a greater load of tasks that affect their family life.

CONCLUSION

Upon analyzing the data, we can certify that having a second job brings into the respondent's life positive aspects as well as negative ones. Although the willingness to assume heavier workloads can ensure an easier lifestyle, from an economical point of view it does not necessarily translate into experiencing a better quality of life.

In the following lines we briefly present the most relevant characteristics of the studied group.

Relative characteristics of our targeted group: mostly married (63%) with an average age of 40.5 years that teach at primary, secondary inferior and secondary superior levels in urban areas, the majority being from Bucharest 17%, followed by Cluj and Brasov with 9%.

Taking into consideration all 12 domains of quality of life we can draw a profile of female pre-university teachers stating that:

Although they have a second job, the continuous desire for education is high, certified by the fact that 63% of respondents take courses, 19% of them follow different specialization courses, 15% a bachelor's degree, 49% master studies and 17% doctoral studies.

When we analyzed the health and life satisfaction domains, we identified a mismatch between the level of happiness declared by the respondents and the state of mind in the past 2 weeks. Which leads us to think that respondents fail to assess themselves correctly, there is no correlation between the general state of happiness on long-term and the satisfaction offered by life and happiness, optimism on short-term.

A significant percentage of 74% stated that they have a hobby most of which consisting in reading, physical activities, traveling or handmade. Only 14% practice physical activity, which leads us to believe that people who have a second job when they have little free time, prefer activities that do not involve physical effort.

The balance between having a second job and family is largely uneven, 37% of the respondents affirmed that do not cope well with work schedule and family commitments. The problems related to long working hours on the one hand and family responsibilities that interfere with working life lead to difficulties in trying to have a harmonious life.

The relatively high percentage of more than half of respondents who own a property and a car without a loan comes as a confirmation of previous studies where this may be due to the privatization of social apartments in the 90's.

A few below 60% of the respondents have given a bribe in the last 12 months declaring in the same time that they do not trust in state institutions, this fact is quite sad because we consider that thought education we can change the world. This vicious circle can be broken starting with education by changing the mentality that still comes from the communist regime.

Even though they have a second job, in terms of the financial situation, 73% declared that the monthly incomes are insufficient being dissatisfied with remuneration.

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PRELIMINARY DATA ON THE PROPHYLAXIS OF SEVERE FORMS OF COVID-19 THROUGH EXERCISE

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ABSTRACT. Independent studies suggest the possibility of prophylaxis of severe forms of COVID-19 through moderate-intensity exercise. There is the fear that intense exercise could increase the risk of the virus entering the cell, a determining factor being hypoxia. As a result, in this paper we aimed to assess the heart rate and oxygen saturation of the blood in the case of Kangoo Jumps and aerobic training at home. Kangoo Jumps workouts practiced in such a way as to avoid in principle the high intensity of the effort, do not produce transient hypoxia, not even in subjects whose heart rate indicated an intense effort. Preliminary data show that aerobics at home does not produce hypoxia in mature adults and the elderly, and heart rates do not exceed the limit of moderate intensity; however, additional studies are required for both categories of exercises under study.

Keywords: *COVID-19, Kangoo Jumps, aerobics*

REZUMAT. ***Date preliminare privind profilaxia formelor grave de covid-19 prin exerciții fizice.*** Studii independente sugerează posibilitatea profilaxiei formelor severe de COVID-19 prin exerciţii de intensitate moderată. Există teama că exercițiile intense ar putea crește riscul pătrunderii virusului în celulă, un factor determinant fiind hipoxia. În consecință, în această lucrare ne-am propus să evaluăm frecvența cardiacă și saturația de oxigen a sângelui în cazul Kangoo Jumps și antrenamentului aerob la domiciliu. Antrenamentele Kangoo Jumps practicate în așa fel încât să evite în principiu intensitatea ridicată a efortului, nu produc hipoxie tranzitorie, nici măcar la subiecții a căror frecvență cardiacă a indicat un efort intens. Datele preliminare arată că aerobicul la domiciliu nu produce hipoxie la adulții maturi și vârstnici, iar ritmul cardiac nu depășește limita intensității moderate; cu toate acestea, sunt necesare studii suplimentare pentru ambele categorii de exerciții discutate în acest studiu.

Cuvinte cheie: *COVID-19, Kangoo Jumps, aerobic*

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INTRODUCTION

Medical hypothesis that moderate-intensity exercise can prevent severe forms of COVID-19 by stimulating mitochondrial biogenesis (Hagiu, 2020a) is partially confirmed by a study showing that people infected with SARS-CoV-2 but who are sufficiently physically active have a 34.3% lower risk of hospitalization (De Souza FR et al, 2020). However, that study did not differentiate between intense and moderate exertion. We consider that the percentage would be much higher if only individuals who had performed at least 150 minutes per week of moderate intensity effort were considered, because the intense effort, through the created hypoxia, could increase the expression of ACE2 receptors for the SARS-CoV-2 (Hagiu, 2020b).

OBJECTIVES

In view of the above, we aim to assess the heart rate (HR) (exercise intensity indicator) and the level of oxygen saturation in the blood (SpO_2) in the case of Kangoo Jumps practitioners (leisure sports activity especially appreciated by women, given the effect of lowering body weight – Beqa, Elezi & Elezi, 2019), as well as in the case of home aerobics practiced by the elderly, an activity considered to have low risks in this category (McPhee et al., 2016).

MATERIALS AND METHODS

The research was performed on a group of 7 women aged between 22 and 41 years, practicing Kagoo Jumps (Sports Club "Let's Move", Iasi, Romania), and, for the preliminary purpose of investigating the prophylaxis by exercise of severe forms of COVID-19, on a group of 6 subjects (4 women and 2 men) aged between 50 and 75 years, who attended a single aerobics session (moderate intensity) lasting 15 minutes. For Kangoo Jumps practitioners, the heart rate and the level of oxygen saturation in the blood were determined using the Breuer pulse oximeter before the start of the session, in the middle of it (after 30 minutes) and at the end (after 60 minutes). The determinations were repeated after 4 weeks, because during which time it was found that high-intensity training results in a chronic decrease in ACE2 plasma concentrations (acute increases occur only during and immediately after exercise sessions) (Klöting, Ristow & Blüher, 2020). In fact, in order to protect the study participants (who were already enrolled in that course at the time of volunteer recruitment), Kangoo Jumps programs were developed that would require less to moderate effort.

Thus, a lighter, dance-based program was applied, the upper and lower limbs were not required at the same time, the jumps were performed with medium amplitude, the jump/run ratio was 30%/70%, the tempo of the music was 135 bpm (beats/minute) compared to 138 bpm classical rhythm. It should be mentioned that all participants in the study had the status of beginners, the intensity of training gradually increasing based on learning to move. For the elderly subjects, the same determinations were performed with the pulse oximeter, before and after the 15-minute moderate-intensity aerobics session. In order to correlate the level of effort felt with that indicated by the increase in heart rate, the Borg test was also performed in elderly subjects. For all subjects, the maximum heart rate (HRmax) was calculated according to the formula 226 - age (years) for women, and 220 - age (years) for men. Then, for the HR determinations performed during and/or at the end, the respective percentage of HRmax was calculated as an indicator for the intensity of the effort.

RESULTS

The results are shown in Tables 1 and 2.

Table 1. Age, anthropological data (weight and height), HRmax, SpO_2 and HR measured before, 30 minutes after the start of the exercise session and at the end of the exercise session for Kangoo Jumps practitioners

No. crt.	Age (years)/ HRmax (beats/ min)	Weight (kg)/ height (cm)		SpO_2 – 1	HR1 (beats / min)	SpO_2 - 2	HR2 (beats / min) / P2	SpO_2 – 3	HR3 (beats / min) / P3
1	36/ 191	75/ 170	IM	99	77	98	129/ 67%	98	108/ 56%
			FM	99	72	98	117/ 61%	93	127/ 66%
2	34/ 193	55/ 165	IM	99	74	99	153/ 79%	98	137/ 70%
			FM	99	74	96	153/ 79%	97	161/ 83%
3	41/ 185	67/ 163	IM	99	85	97	123/ 66%	97	121/ 65%
			FM	98	59	97	128/ 69%	97	147/ 79%
4	22/ 204	57/ 171	IM	92	91	98	117/ 57%	98	143/ 70%
			FM	98	93	97	138/ 67%	97	130/ 63%

No. crt.	**Age (years)/ HRmax (beats/ min)**	**Weight (kg)/ height (cm)**		**SpO_2 – 1**	**HR1 (beats / min)**	**SpO_2 - 2**	**HR2 (beats / min) / P2**	**SpO_2 – 3**	**HR3 (beats / min) / P3**
5	25/ 201	70/ 170	IM	99	103	98	125/ 62%	98	145/ 72%
			FM	99	85	98	146/ 72%	98	165/ 82%
6	**26/ 200**	**76/161**	**IM**	**98**	**95**	**97**	**173/ 86%**	**97**	**147/ 73%**
			FM	**99**	**120**	**97**	**160/ 80%**	**96**	**176/ 88%**
7	**28/ 198**	**66/ 173**	**IM**	**99**	**92**	**98**	**165/ 83%**	**99**	**174/ 87%**
			FM	**85**	**71**	**97**	**123/ 62%**	**99**	**133/ 67%**

Note: IM - initial measurements; FM - final measurements (after 4 weeks); SpO_2 - 1 - blood oxygen saturation level at determination 1 (before training); SpO_2 - 2 - blood oxygen saturation level at determination 2 (after 30 minutes); SpO_2 - 3 - blood oxygen saturation level at determination 3 (after 60 minutes); HR1 - heart rate at determination 1 (before training); HR2 - heart rate at determination 2 (after 30 minutes); HR3 - heart rate at determination 3 (after 60 minutes); P2 - percentage of maximum heart rate at determination 2 (after 30 minutes); P3 - percentage of maximum heart rate at determination 3 (after 60 minutes)

Table 2. Age, anthropological data (weight and height), HRmax, Borg index, SpO_2 and heart rates measured before and after the moderate-intensity aerobic session

No crt	age (years) / gender / HR max (beats / min)	weight (kg) / height (cm)	Borg scale	SpO_2 - 1	HR1 (beats / min)	SpO_2 - 2	HR2 (beats / min) / P
1	69/F/157	74/166	9	96	77	95	84/53%
2	50/F/176	85/168	9	96	63	98	80/45%
3	55/F/171	60/165	10	97	70	95	90/52%
4	**74/F/152**	**77.164**	**14-15**	**97**	**70**	**95**	**75/49%**
5	**75/M/145**	**76/177**	**12-13**	**98**	**65**	**95**	**70/48%**
6	72/M/148	75/165	7	93	65	92	65/43%

Note: M - male gender; F- feminine; HRmax - maximum heart rate; SpO_2 - 1 - blood oxygen saturation level at determination 1; SpO_2 - 2 - blood oxygen saturation level at determination 2 (after 15 minutes); HR1 - heart rate at determination 1; HR2 - heart rate at determination 2 (after 15 minutes); P2 - percentage of maximum heart rate at determination 2 (after 15 minutes)

DISCUSSIONS

The analysis of the results shows that for Kangoo Jumps practitioners SpO_2 never dropped below 92 during the exercise sessions, which means that the lactic threshold was not exceeded (Ozcelik & Kelestimur, 2004). Moreover, the absence of deoxygenation leads us to believe that there was no overexpression of ACE2, and thus an increased risk of SARS-CoV-2 infection. Maintaining normal blood oxygenation in conditions of increased heart rate above the limit that characterizes moderate exercise (70% of HRmax) can be explained by the cardiovascular effects of plyometric training (post-exercise hypotension, probably caused by vasodilation) (Arazi et al, 2014). Except for subjects 6 and 7, the heart rate limit that characterizes vigorous exercise intensity (85% of HRmax) was not exceeded. Due to the small number of subjects we did not calculate and compare the average values of heart rates, but it seems that 4 weeks of training were not enough to improve aerobic capacity. Preliminary data indicate an encouraging fact, namely that moderate Kangoo Jumps training does not lead to hypoxia and implicitly the stimulation of ACE2 expression, and can be included in the category of physical activities with a prophylactic role of severe forms of COVID-19. However, further studies are needed, as it appears that intense exercise is contraindicated in this prophylaxis not only due to deoxygenation and the immune disorders they cause, but also through multiple metabolic changes (Hagiu, 202, Da Silveira et al, 2021). In the case of subjects who performed moderate intensity aerobics, the values of heart rates recorded at the end of the session did not exceed the limit for moderate exercise intensity (70% of HRmax). Deoxygenation did not occur in any of the subjects. The Borg scale shows a more intense appreciation of effort in older subjects (4 and 5). It follows that individualized aerobic programs must be implemented in those individuals, and the monitoring of the effort must be done continuously.

CONCLUSIONS

1. Kangoo Jumps trainings performed in such a way as to avoid high intensity exercise in principle, although falling within vigorous exercise intensity, do not produce transient hypoxia suspected of inducing overexpression of ACE2 receptors (to which SARS-CoV-2 binds). This proved to be true even in subjects whose heart rate indicated intense exertion, probably due to metaboreflexes triggered by plyometrics.

2. Preliminary data indicate that home aerobics is well tolerated by mature and elderly adults. However, at older ages, adapted, individualized programs as well as continuous supervision are needed.

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RESPIRATORY MUSCLE TRAINING METHODS FOR IMPROVING THE LUNG CAPACITY OF PROFESSIONAL VOCALISTS AND WIND INSTRUMENTISTS

NICOARĂ RAREŞ[1,*], MONEA DAN[1]

ABSTRACT. Introduction. Various muscle groups are involved in pulmonary ventilation, which play an essential role in maintaining proper breathing, their development being aimed at improving the physical, psychological and qualitative performance of the performance of professional singers and blowers in instruments. **Objectives**: The objectives of the training of the respiratory muscles are aimed at improving dyspnea, toning the respiratory muscles, increasing the efficiency of the respiratory muscles, increasing the volumes of air mobilized, decreasing the fan labor, controlling and coordinating the respiratory rhythm. **Methods**: The study subjects were 9 young musicians, students at the Conservatory in the singing and wind instruments sections, who performed workouts with a threshold device (POWERBreathe Inspirational Muscle Training IMT), five days a week, twice a day, for 6 weeks. Subjects performed spirometry tests VC, FVC, FEV1, FEV1/FVC, VF, FEV6 at each beginning and end of the meeting, the data collected were processed by interpreting the results of lung function and flow measurements. **Results**: The results obtained from the spirometry tests show us statistically significant differences between the initial (IT) and the final (IT) test. Thus, at the first sit, with the device adjusted to max.15% PI/PE (inspiratory – expiratory pressure), the average of the VC values, FVC, FEV1, VF, FEV6 (5.72 – 5.84l, l/s) increased by 2%, and at the end of the second session, with the device set to min.40-60% PI/PE, the average lung function values (5.72 – 6.14l, l/s) increased by 9.8%. **Conclusions**: This experiment can demonstrate that the acute effect of training with a breathing device (threshold) results in a significant increase in the use of flow during singing and blowing, leading to a sound with a higher acute sound and more activity.

Keywords: *respiratory muscle, training, exercise capacity.*

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REZUMAT. ***Metode de antrenament a musculaturii respiratorii pentru îmbunătăţirea capacităţii pulmonare a profesioniştilor vocali şi suflătorilor instrumentişti.*** **Introducere**. În ventilaţia pulmonară sunt implicate diverse grupe musculare care au rol esenţial în menţinerea unei respiraţii corespunzătoare, dezvoltarea lor fiind menită să îmbunătăţească performanţele fizice, psihologice şi calitative ale prestaţiei cântăreţilor profesionişti şi suflătorilor în instrumente. **Obiective**: Obiectivele antrenamentului muşchilor respiratori au ca scop ameliorarea dispneei, tonifierea musculaturii respiratorii, creşterea eficienţei muşchilor respiratori, creşterea volumelor de aer mobilizate, scăderea travaliului ventilator, controlarea şi coordonarea ritmului respirator. **Metode**: Subiecţii studiului au fost 9 tineri muzicieni, studenţi la Conservator la secţiile de canto şi instrumente de suflat, care au efectuat antrenamente cu un dispozitiv threshold (POWERBreathe Inspiratory Muscle Training IMT), cinci zile pe săptămână, de două ori pe zi, timp de 6 săptămâni. Subiecţii au efectuat teste spirometrice VC, FVC, FEV1, FEV1/FVC, PEF, FEV6 la fiecare început şi sfârşit de şedinţă, datele colectate au fost prelucrate prin interpretarea rezultatelor funcţiei pulmonare şi a măsurătorilor de debit. **Rezultate**: Rezultatele obţinute la testele spirometrice ne arată diferenţe semnificative statistic între testarea iniţială (TI) şi cea finală (TI). Astfel, la prima şedinţă, cu dispozitivul reglat la max. 15% PI/PE (presiune inspiratorie – expiratorie), media valorilor VC, FVC, FEV1, PEF, FEV6 (5.72 – 5.84l, l/s) a crescut cu 2%, iar la sfârşitul celei de-a doua şedinţe, cu dispozitivul setat la min. 40-60% PI/PE, media valorilor funcţiei pulmonare (5.72 – 6.14l, l/s) a crescut cu 9.8%. **Concluzii**: Acest experiment poate demonstra că efectul acut al antrenamentului cu un dispozitiv de prag respirator (threshold) are drept consecinţă o creştere semnificativă a utilizării debitului în timpul cântului, ceea ce duce la un sunet cu o sonoritate acută mai mare şi cu mai multă activitate.

Cuvinte cheie: *muşchi respiratori, antrenament, capacitate de efort.*

INTRODUCTION

Respiratory muscle training is the most innovative and up-to-date component of the pulmonary development program. The technique provides significant benefits when applied individually or when integrated into a respiratory empowerment program, improving muscle strength and resistance of the respiratory muscles and increasing the subject's exercise capacity (Postolache, Cojocaru 2013).

Respiratory muscle training is divided into two categories: that of the inspiring muscle and that of the exhaling muscles.

Before starting the training program, the maximum inspirational pressure in the oral cavity, which is the exercise capacity of the respiratory muscles, will be evaluated.

OBJECTIVES

The objectives of the training of the respiratory muscles are aimed at improving dyspnea, toning the respiratory muscles, increasing the efficiency of the respiratory muscles, increasing the volumes of air mobilized, decreasing the fan labor, preventing premature closure of the airways in exhalation, controlling and coordinating the respiratory rhythm.

METHODS AND MATERIALS

The methods and equipment used for the two types of training differ significantly.

Endurance training, performed by maintaining forced hyperventilation for several minutes, trains both the inspiring and exhaling muscles. In this type of training, the respiratory muscles are forced to work at high, short speeds within an extended time frame (Jimborean, Ianosi, Croitoru 2017).

Devices that require increased resistance to the oral cavity are used for training based on increased muscle strength. Respiratory muscle training uses various devices, including stimulation spirometer, Pflex resistance breathing, Flutter valve and Threshold breathing (Szasz, Postolache 2017).

The stimulation spirometer (fig. 1) is a device that contains several balls that rise according to the power of the respiratory flow. During this workout, the subject must generate a target inspirational-exhaling flow that propels the balls to the top of the device. As respiratory capacity increases, the balls rise more. The advantage of this device is that it provides encouraging visual feedback for the subject in progress (Wesst, Taylor, Campbell, 2009).

Breathing against Pflex resistance (fig. 2) is a workout consisting of a series of repeated exhalations and inspirations against an increased resistance given by a fixed diameter hole on the inspiring circuit, having six levels of resistance. This technique depends on respiratory flow and 10–15 minutes per day is recommended throughout the respiratory rehabilitation program.

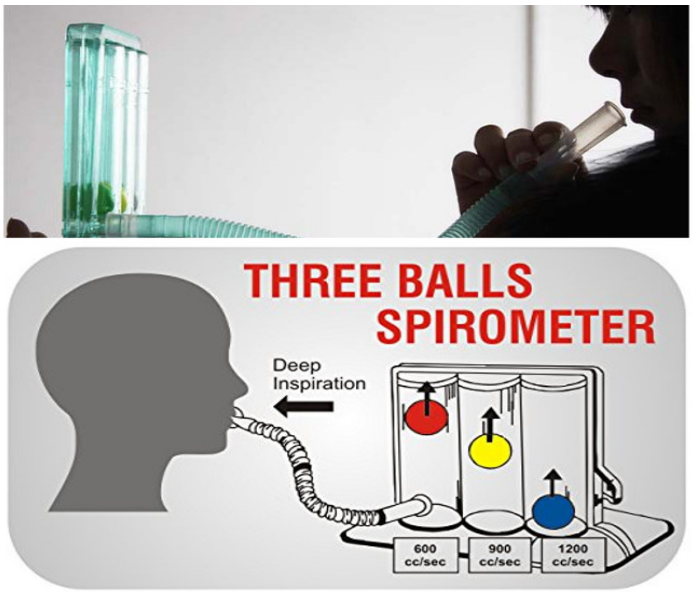

Fig. 1. Stimulation spirometer
(source: www.hitechtherapyonline.co.za)

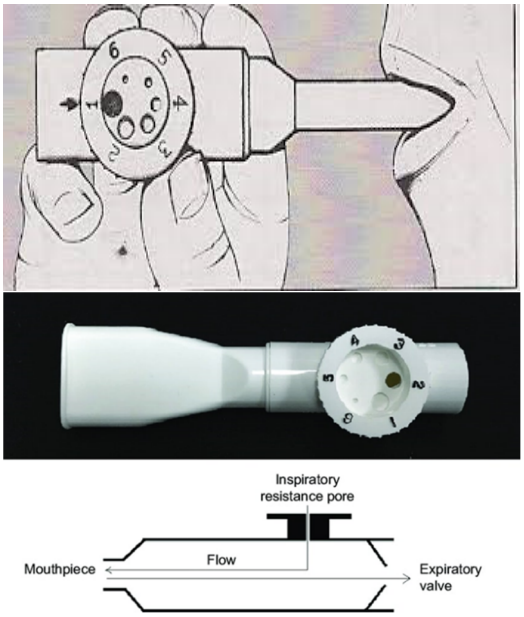

Fig. 2. Pflex Resistance
(source: www.researchgate.net)

Threshold training allows a charge at a variable, quantifiable intensity, the pressure adjusting easily, by simply rotating the distal end of the device. The device has a resistance level of 7 to 41 cm H_2O (fig. 3). Subjects will train with this device for 30 minutes daily at a resistance of 30%–60% of the initial value of maximum inspirational pressure in the oral cavity (McConnell, 2013).

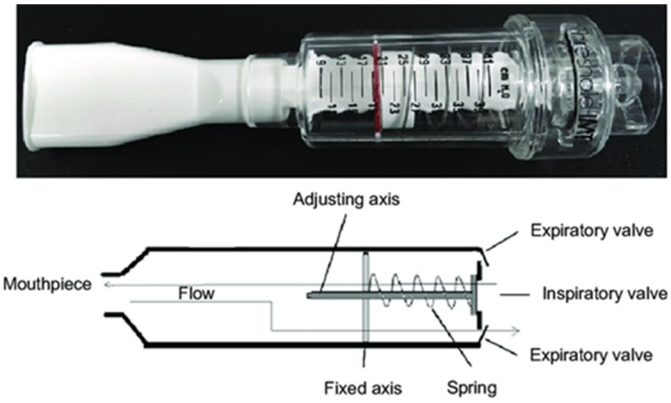

Fig. 3. Threshold Device
(source: www.researchgate.net)

The Threshold PEP (Positive Expiratory Pressure Device) has the same one-way flow valve system that opens with the subject's exhalation. This creates positive pressure that keeps the airways open.

Isocapnic ventilation training – also called endurance training – is a technique consisting of forced ventilation at increased flow sustained for several minutes. To train the inspiring muscles, the subjects will perform an inspiration through a device, usually POWERBreathe (fig. 4), which contains an electronically activated valve that resists inhalation and can automatically adapt to the increase in the strength of the inspiring muscles at the beginning of each training session. One of the advantages is that the results of the workout are displayed on a screen, allowing monitoring and optimization of the training technique. Cycles of 30 breaths are performed twice a day. Exercises will be performed for 30 minutes daily, six five-minute sessions, with two minutes break between sessions, increasing the resistance of the device by 5% per week (McConnell, 2013).

Fig. 4. POWERBreathe® Kinetic K3 is the ideal respiratory training device for professionals. It features a technology of self-regulation of opposing resistance during the training of the respiratory muscles, adapting specifically to each user and its respiratory functions. This perfected electronic training system is also recommended for all those who want to improve their respiratory capacity, requiring only two sessions per day of 30 breaths

(Source: www.respiracorect.ro)

Isocapnic hyperpnea is a physically demanding method that requires a high degree of involvement and motivation on the part of the subject.

The POWERBreathe device contains a valve that resists inhalation. The intensity and frequency of the exercises depend on the subject's tolerance and respiratory failure.

The most used device for training the exhaling muscles is Shaker Plus (fig. 5). Mobilizes secretions from the airways through vibrations and helps to eliminate them thus making breathing easier.

Fig. 5. Shaker Plus Device
(source: www.habdirect.co.uk)

SHAM method

We found a Dutch study (Dries Koen et al., 2017) that indicates a muscle training program determined on an increase in exhaling muscle pressure that can be applied to student musicians from the singing and wind instrument sections. However, these results were not directly related to the sound performance produced and the quality of the performance. In the literature we have not found previous studies that directly correlate the effects of a respiratory muscle formation program with musical parameters. We propose the hypothesis that a respiratory muscle training program using a *threshold* device could be a universal solution for breath development training in singers and instrumentalists. An increase in respiratory muscle strength and a strong focus on breathing technique through this non-musical exercise should allow a performer to broaden and improve his action repertoire, resulting in a more efficient singing technique, different sound possibilities and increased performance/comfort in interpretation.

The purpose of this study is to investigate whether artistic performance can be improved in professional and semi-professional singers if a muscle respiratory training protocol is required. This protocol aims at strengthening the respiratory muscles and should result in singers improving the respiratory flow so necessary for the length of the sung phrases.

For this pilot study we used a batch of 9 young musicians, aged 19 to 23, tenors, baritones, sopranos, mezzos and instrumentalists on which we will apply the SHAM training program, along with the initial, intermediate and final measurements. Due to the current situation, the pandemic, the quarantine areas, the online work and school, we did not have access to a larger number of subjects in order to be able to do comparative studies.

Table 1. Anthropometric measurements

Subjects	
1 tenor (male): 19 years, 64kg, 1.77m	S1
1 tenor (male): 21 years, 74kg, 1.85m	S2
1 baritone (male): 20 years, 96kg, 1.74m	S3
1 baritone (male): 23 years, 115kg, 1.80m	S4
1 soprano (female): 21 years, 55kg, 1.64m	S5
1 soprano (female): 22 years, 61kg, 1.72m	S6
1 mezzo (female): 23 years, 84kg, 1.68m	S7
1 clarinet (male): 21 years, 75kg, 1.81m	S8
1 oboe (male): 21 years, 88kg, 1.78m	S9

Body mass (G) and body height (h) we measured using standardized anthropometric techniques (Table 1).

We used a 5-week validated training program with a Breathe Air® Powerlung®) designed for a combination of muscle and inspirational training (fig.6).

Fig. 6. POWERBreathe Device
(source: www. henrotech.be)

This small hand held device exerts pressure against breathing flow during breathing and exhalation. SHAM training (5 weeks) consists of a routine workout, breathing in the device, with resistance levels set at 15% - 40% - 60% of the maximum inspiring and exhaling pressure MIP/MEP (MIP - maximum inspiration pressure/ MEP - maximum expiratory pressure) measured at the initial level. I applied the following training scheme: one week, for five days a set of 40 breaths (4 times 10 breaths, inspiration-breathing), twice a day, with resistance set at max.15% MIP/MEP, followed by two days of non-activity. The adherence, time spent and effort will be monitored with a written journal. This followed immediately (without a break period) a real training program (4 weeks) consisting of the same routine training, with the resistance progressively established by min. 40 – 60% of MIP / MEP.

Table 2. Training sessions

Session 1 (baseline)	Session 2 (4 weeks)
SHAM training (max 15% of MIP/MEP), 1 week, 5 days/week, 2x/day with a difference of 6 hours between sessions	SHAM training (min 15% - max 100% of MIP/MEP), 4 weeks, 5 days/week, 2x/day with a difference of 6 hours between meetings
1. lung function testing	1. lung function testing
2. SHAM training session (40 breaths at max.15% of MIP+MEP)	2. SHAM training session (40 breaths at min. 40-60% of MIP+MEP)
3. tests to measure respiratory flow	3. tests to measure respiratory flow

We performed two sessions: baseline (heating training), and SHAM training. At each session we carried out a series of tests to assess the influences of training on lung function and respiratory flow. During the first workout, the resistance setting of the hand device was at the level of SHAM (max.15% MIP / MEP). During the second training, the strength of the hand device was established at the training level (min. 40% - 60% MIP / MEP).

We performed spirometric measurements with Vitalograph ALPHA Touch Spirometer (Ltd, Intl., Monkeys Moreton, U.K.), before and after each training session. Subjects were tested in a sitting position, carrying a clip on their noses. After maximum inspiration, they expired as loud and as quickly as possible. They were encouraged to continue expiring for at least six seconds so that the forced exhaling volume for one second (FEV1), the forced exhaling volume for 6 seconds (FEV6) and the forced vital capacity (FVC) could be measured. The tests will be repeated three to five times until the two higher values recorded - forced life force (FVC) and FEV1, FEV6 will vary by less than 3%. Direct measurements include VC (vital capacity – liters), FVC (liters), FEV1 (liters), FEV6 (liters) and peak-PEF exhaling flow (liters/second). The forced expiring ratio (FEV1/ FVC × 100) will also be calculated (%). All of the above measurements will be made under standard environmental conditions by continuously measuring temperature, humidity and atmospheric pressure allowing comfort temperature (between 18 °C and 22 °C), atmospheric pressure of 760 mmHg and a relative atmospheric humidity of 30 to 60% (Miller M., et al. 2005).

Table 3. Training sessions

Sessions	Subjects
Session 1	Initial measurements VC, FVC, FEV1, FEV1/FVC, VF, FEV6
	SHAM 1 week-hand workout with breathing at max. 15% MIP+MEP
	Control measurements VC, FVC, FEV1, FEV1/FVC, VF, FEV6
Session 2	SHAM 2 week-to-week workout with breaths at min. 15% - 40% MIP+MEP
	SHAM 2 week-to-week workout with breaths at min. 40% - 60% MIP+MEP
	Final measurements VC, FVC, FEV1, FEV1/FVC, VF, FEV6

Note: VC – vital capacity (l); FVC – forced vital capacity (l); FEV1 – forced exhaling volume for one second (l); PEF – peak expiring flow (l/s); FEV6 – forced exhaled volume for 6 seconds (l)

Before the start of the training, we performed a series of initial measurements for the assessment of lung function (Table 4).

Table 4. Initial measurements

Subjects	Vc	FVC	FEV1	FEV1/FVC	Pef	FEV6
S1	4.49	5.54	4.81	86.80%	9.87	5.59
S2	4.67	6.24	5.28	84.60%	10.96	6.31
S3	4.41	5.74	4.73	82.40%	10.26	5.73
S4	4.58	5.96	4.98	83.60%	10.62	5.97
S5	3.29	4.16	3.58	86.10%	7.19	4.13
S6	3.37	4.53	3.84	84.80%	7.81	4.52
S7	3.31	4.21	3.68	87.40%	7.69	4.21
S8	3.57	5.97	4.98	83.40%	10.56	5.93
S9	3.56	5.89	4.91	83.40%	10.36	5.84
Average	3.91	5.36	4.53	84.72%	9.48	5.35
Total average				5.72		

Note: VC – vital capacity (l); FVC – forced vital capacity (l); FEV1 – forced exhaling volume for one second (l); PEF – peak expiring flow (l/s); FEV6 – forced exhaled volume for 6 seconds (l)

After a week of breathing with the device set to max.15% MIP/MEP, we performed another series of measurements to assess pulmonary flow and function (Table 5).

Table 5. Intermediate measurements

Subjects	Vc	FVC	FEV1	FEV1/FVC	Pef	FEV6
S1	4.56	5.61	4.94	88.06%	10.09	5.71
S2	4.74	6.38	5.37	84.17%	11.16	6.41
S3	4.51	5.84	4.84	82.88%	10.46	5.89
S4	4.63	6.11	5.06	82.82%	10.85	6.03
S5	3.39	4.21	3.66	86.94%	7.36	4.24
S6	3.41	4.66	3.91	83.91%	7.99	4.65
S7	3.37	4.27	3.77	88.29%	7.81	4.27
S8	3.61	6.08	5.09	83.72%	10.78	6.03
S9	3.66	6.03	5.03	83.42%	10.54	5.95
Average	3.98	5.46	4.63	84.90%	9.67	5.46
Total average				5.84		

Note: VC – vital capacity (l); FVC – forced vital capacity (l); FEV1 – forced exhaling volume for one second (l); PEF – peak expiring flow (l/s); FEV6 – forced exhaled volume for 6 seconds (l)

Following the measurements we observed an increase of 2% (5.72 – 5.84) in lung function parameters, due to the difference in the mean between the two tests. After two days of inactivity, the 4-week program began with resistance set to min. 40 – 60% MIP/MEP, gradually increasing. At the end we made the final measurements (Table 6):

Table 6. Final measurements

Subjects	Vc	FVC	FEV1	FEV1/FVC	Pef	FEV6
S1	4.95	6.05	5.26	86.94%	10.07	6.14
S2	5.11	6.87	5.82	84.72%	11.18	6.93
S3	4.85	6.31	5.20	82.41%	10.47	6.29
S4	5.01	6.58	5.44	82.67%	10.83	6.56
S5	3.66	4.53	3.96	87.42%	7.33	4.53
S6	3.73	4.98	4.20	84.34%	7.97	4.96
S7	3.60	4.60	4.06	88.26%	7.84	4.62
S8	3.91	6.59	5.44	82.55%	10.77	6.51
S9	3.93	6.45	5.39	83.57%	10.57	6.41
Average	4.30	5.88	4.97	84.76%	9.67	5.88
Total average				6.14		

Note: VC – vital capacity (l); FVC – forced vital capacity (l); FEV1 – forced exhaling volume for one second (l); PEF – peak expiring flow (l/s); FEV6 – forced exhaled volume for 6 seconds (l)

Measurements showed an increase in respiratory parameters of 9.8% (5.72 – 6.14) compared to baseline testing, and 5.13% (5.84 – 6.14) compared to intermediate testing. Although there was a slight increase in peak expiring flow (PEF) in the 1st preparatory meeting, no significant change in the EF was found after the 4-week program.

Table 7. Centralized parameters VC / FVC / FEV from reference values to intermediate values and final values

Subjects	VC (0)	VC (test I)	Vc (Test II)	FVC (0)	FVC (test I)	FVC (test II)	FEV 1 (0)	FEV 1 (test I)	FEV1 (test II)
S1	4.49	4.56	4.95	5.54	5.61	6.05	4.81	4.94	5.26
S2	4.67	4.74	5.11	6.24	6.38	6.87	5.28	5.37	5.82
S3	4.41	4.51	4.85	5.74	5.84	6.31	4.73	4.84	5.2
S4	4.58	4.63	5.01	5.96	6.11	6.58	4.98	5.06	5.44
S5	3.29	3.39	3.66	4.16	4.21	4.53	3.58	3.66	3.96
S6	3.37	3.41	3.73	4.53	4.66	4.98	3.84	3.91	4.2
S7	3.31	3.37	3.6	4.21	4.27	4.6	3.68	3.77	4.06
S8	3.57	3.61	3.91	5.97	6.08	6.59	4.98	5.09	5.44
S9	3.56	3.66	3.93	5.89	6.03	6.45	4.91	5.03	5.39
Average data	3.91	3.98	4.3	5.36	5.46	5.88	4.53	4.63	4.97

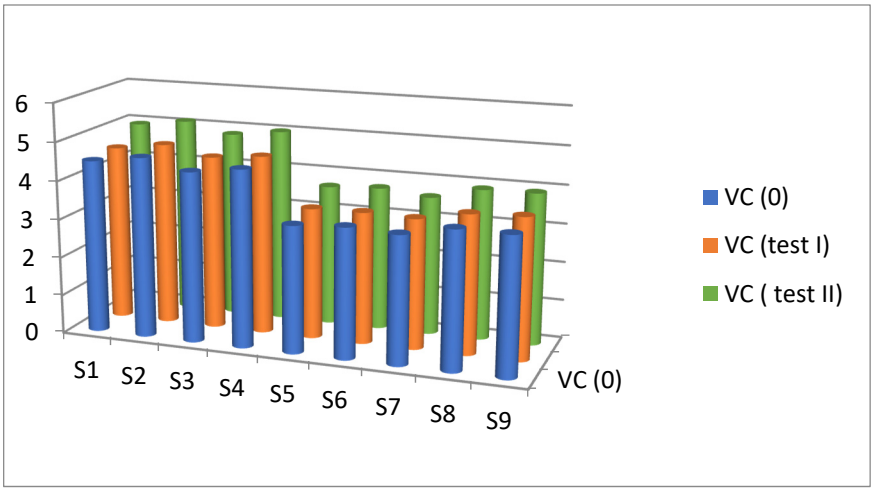

Fig. 7. Evolution of VC from initial to final testing

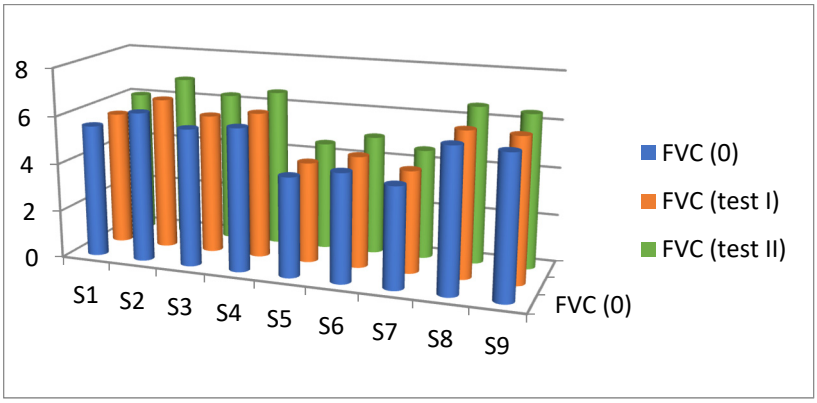

Fig. 8. Evolution of FVC from initial to final testing.

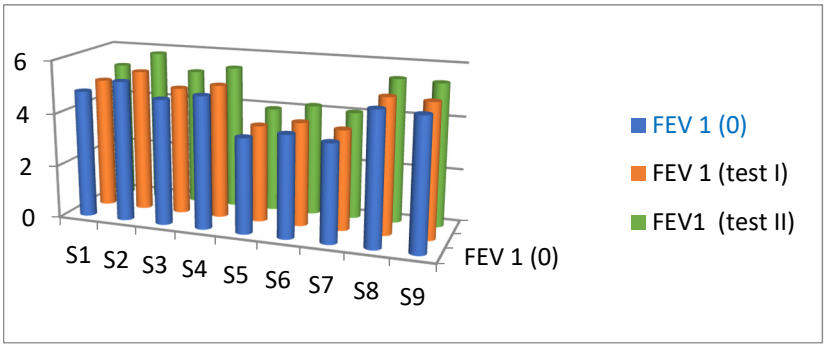

Fig. 9. Evolution of FEV1 from initial to final testing.

Table 8. Centralized parameters PEF / FEV6 from reference values to intermediate values and final values

Subjects	PEF (0)	PEF (test I)	PEF (test II)	FEV6 (0)	FEV6 (test 1)	FEV6 (test II)
S1	9.87	10.09	10.07	5.59	5.71	6.14
S2	10.96	11.16	11.18	6.31	6.41	6.93
S3	10.26	10.46	10.47	5.73	5.89	6.29
S4	10.62	10.85	10.83	5.97	6.03	6.56
S5	7.19	7.36	7.33	4.13	4.24	4.53
S6	7.81	7.99	7.97	4.52	4.65	4.96
S7	7.69	7.81	7.84	4.21	4.27	4.62
S8	10.56	10.78	10.77	5.93	6.03	6.51
S9	10.36	10.54	10.57	5.84	5.95	6.41
Average data	9.48	9.67	9.67	5.35	5.46	5.88

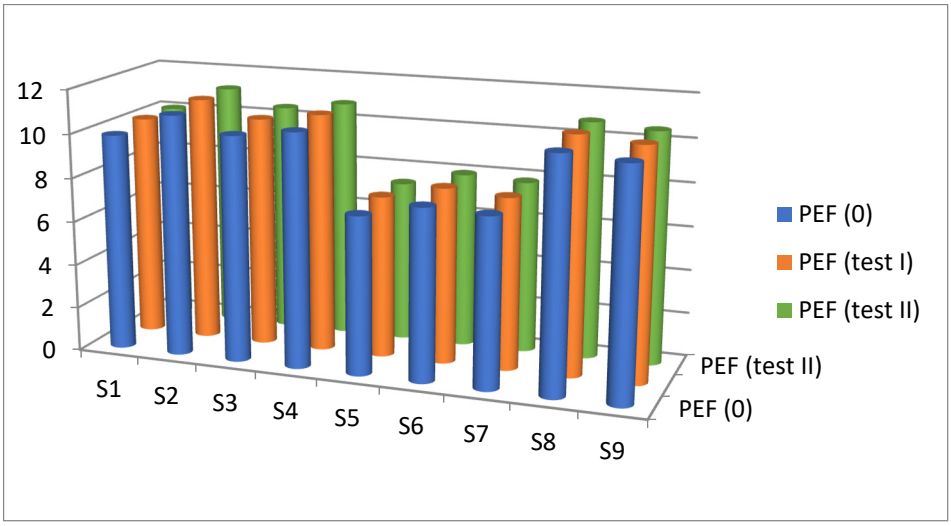

Fig. 10. Evolution of the EF from initial to final testing.

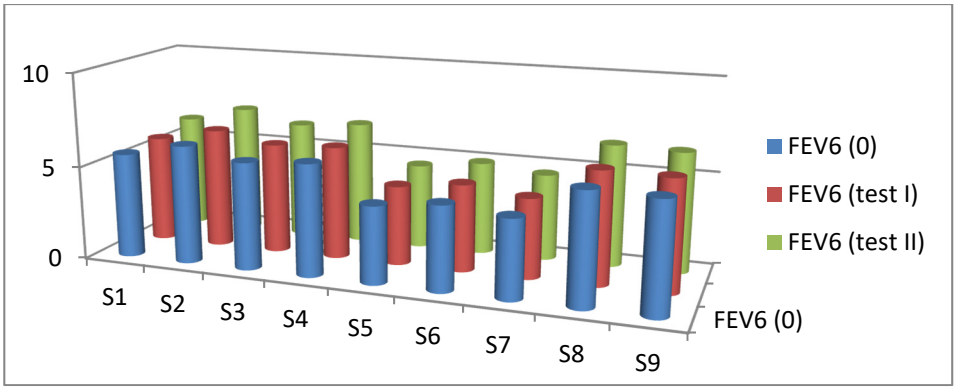

Fig. 11. Evolution of FEV6 from initial to final testing.

Table 9. Final Average Centralizer

	Evolution of the parameters analyzed
Basic measurements (initial point)	5.72
Intermediate measurements	5.84
Final measurement (final point)	6.14

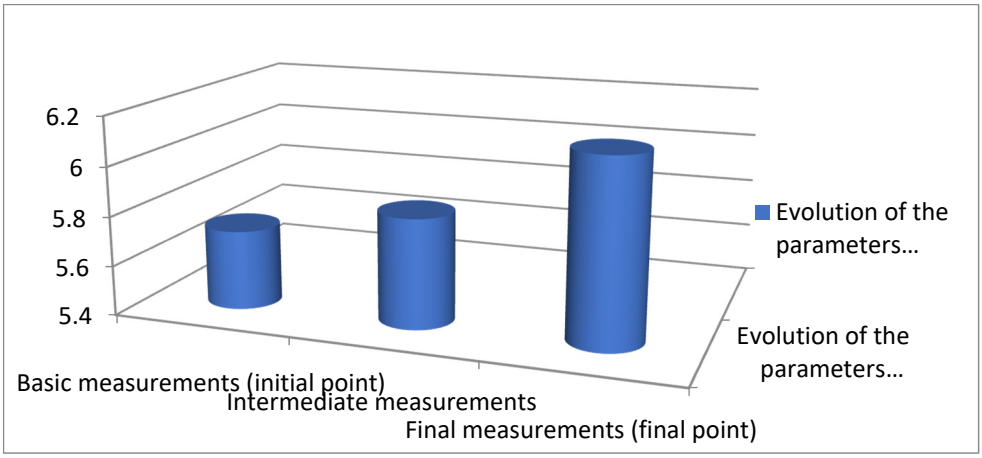

Fig. 12. Evolution of the parameters analyzed.

During the two training periods, participants were asked to track their progress in a journal and the documented length of each training session, the number of breaths completed and a feeling of effort (1-5) on a visual analog scale (Drummond et al., 2015). Participants reported that at resistive breathing training 40-60% MIP/MEP, respiratory muscle training demonstrated stronger resistance for both inspiration and exhalation compared to low resistive breathing training of 15% MIP/MEP.

The literature (Beckerman M, et al., 2005), shows that a longer-term respiratory muscle workout, up to 12 months, when the training stimulus is suitable for increasing the inspiring muscle strength, would increase exercise capacity, improve quality of life and decrease dyspnea.

CONCLUSIONS

This experiment can demonstrate that the acute effect of training with a breathing threshold device, results in a significant increase in the use of flow during singing. Increased use of respiratory flow after completion of the SHAM training program may also be observed. Although the inspirational and exhaling pressures for participants increased, the effect was not considered significant for the peak inspirational and exhaling flows at SHAM training. There may be several reasons for these observations. Low strength settings for MIP/MEP training may lead to a smaller increase in lung function parameters. A training program with a higher registry setting would lead to a greater increase in respiratory muscle strength and peak flows, as demonstrated in the literature (DePalo, et al. 2004).

This method can clearly indicate that a respiratory muscle formation program using a device (threshold) with a medium-strength threshold increases respiratory flows and hence lung function. In addition, it can be shown that immediately after a training session, the flow increases and pressure control is easier, which leads to a sound with a sound conforming to specialized standards and an increased acoustic efficiency.

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THE INFLUENCE OF BIOFEEDBACK IN POSTURAL REHABILITATION OF ATHLETES

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ABSTRACT. Background. A balanced posture allows sports movements PERFORMANCE with optimal consumption of energy and minimal stress on the musculoskeletal system with the help of the technology offered by the posturograph, we can identify the center of gravity deviations, the points of support, the load, the weight distribution in the soles, the anterior posteriorized or compressed posture, the asymmetries of the body. By an interpretation in biomechanical context, any compensations or decompensations can be identified. **Aim.** The aim of the study is to improve posture through biofeedback treatment using the GPS 600 device**. Materials.** The Posturograph or Global Postural System (GPS) is an advanced postural analysis system that uses techniques and methods of noninvasive diagnosis and evaluation in the field of medical recovery. Posturography includes 2 diagnostic units and software. **Methods.** We used the following methods: bibliographic study methods, method of observation, measurement method, experimental method, statistical method. **Applied treatments.** The treatments for re-educating the posture with the GPS 600 device took place for 2 weeks. During the treatment, the subjects had to maintain their body position / posture as indicated by the device. **Results.** From the 12 athletes, the anteriority of the head improved, the center of gravity, loading on the right and left lower limbs. At the end of the 2 weeks, the athletes reached a perfect balance of the center of gravity and the weight distribution on the lower limbs**. Conclusion.** Biofeedback treatments with the GPS 600 device help to improve POSTURE and maintain the results over time.

Keywords: *biofeedback, posture, athletes, GPS 600*

INTRODUCERE. ***Influența biofeedback-ului în reeducarea posturală a sportivilor.*** O postură echilibrată vă permite să efectuați mișcări sportive cu un consum optim de energie și un stres minim pe sistemul musculo-scheletic. Cu ajutorul tehnologiei oferite de posturograf, putem identifica abaterile cu ajutorul centrului de greutate, punctele de susținere, gradul de încărcare, distribuția greutății în tălpi, postura anterioară posteriorizată sau comprimată,

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asimetriile corpului și printr-o interpretare în context biomecanic, pot fi identificate orice compensații sau decompensări. **Scop.** Scopul studiului este de a îmbunătăți postura prin tratament de biofeedback folosind dispozitivul GPS 600. **Materiale.** Posturograful sau sistemul postural global (GPS) este un sistem avansat de analiză posturală care folosește tehnici și metode de diagnostic și evaluare neinvazivă în domeniul recuperării medicale. Posturografia include 2 unități de diagnostic și software. **Metode.** Metodele utilizate pentru evaluare au fost metoda de studiu bibliografic, metoda de observare, metode de măsurare, metoda experimentala, metoda statistica. **Tratament.** Tratamentele pentru reeducarea posturii cu dispozitivul GPS 600 au avut loc timp de 2 săptămâni. În timpul tratamentului, subiecții au trebuit să-și mențină poziția / postura corpului, așa cum este indicat de dispozitiv. **Rezultate.** Dintre cei 12 sportivi, anterioritatea capului s-a îmbunătățit, centrul de greutate, încărcarea pe membrele inferioare dreapta și stânga. La sfârșitul celor 2 săptămâni, sportivii au atins un echilibru perfect al centrului de greutate și al distribuției greutății pe membrele inferioare. **Concluzii.** Tratamentele biofeedback cu ajutorul dispozitivului GPS 600 ajută atât la îmbunătățirea, cât și la menținerea rezultatelor obținute în timp.

Cuvinte cheie: *biofeedback, postura, sportivi, GPS 600*

INTRODUCTION

A balanced posture allows to perform sports movements with optimal consumption of energy and minimal stress on the musculoskeletal system.

The existence of a dysfunction in the musculoskeletal system leads to compensations that requires a high consumption of energy and that untreated, over time can cause injuries, fractures or certain health problems.

At an overview, the movements performed by the athlete do not reflect the existence of a compensations of the musculoskeletar system so it is necessary to use more detailed advanced medical investigations to find it.

With the help of the technology offered by the posturograph, we can identify the deviations of the center of gravity, the points of support, the degree of load, the weight distribution in the soles, the anterior posteriorized or compressed posture, the asymmetries of the body and by an interpretation in biomechanical context, any compensations or decompensations can be identified.

The originality of our research lies in the fact that we will use both the posturograph for identification of deficits as well as for their correction in real time, using the information provided by the device, technique known as biofeedback.

Modern biofeedback is the technique of using electronic equipment to instantly discover certain physiological imbalances and to teach patients to correct these otherwise involuntary misalignments through manipulation displayed signals (usually visual and / or acoustic)

In rehabilitation, modern biofeedback has gained a strong place in the treatment of motor neuron lesions superior, especially in the retraining muscles and in inducing the relaxation of the spastic muscles a patients with stroke (Basmajian et al, 1981).

The number and the time of the meetings are determined by the general state of health and the patient's ability to learn to control their physical responses.

Therapy specialists through the biofeedback technique can be doctors specialized in psychiatry, psychologists, nurses, dentists or physiotherapists.

To learn these techniques of biofeedback and to install a visible result, most people need about 8-12 sessions.

The ultimate goal for the patients is to be able to exercise through exercise control posture, muscle tone or blood circulation without the help of a monitor.

Biofeedback is generally delivered through visual displays or acoustic signals, however, more recently virtual technology (VR) or exergaming technology has been used as biofeedback signals.

VR technology and exergming technology have been investigated mainly in post-stroke rehabilitation, however, more recent work has shown that this type of biofeedback is effective in improving exercise technique in the musculoskeletal system in any patient (Oonagh M Giggins et al. , 2013).

Authors such as Maciaszek J. et al. (2014), Macizszek J. (2018) and Sayenko D. et al. (2012) had investigated the effects of biofeedback training with the help of the posturograph.

Some authors study the effect of visual feedback of the center of pressure versuscenter of gravity on postural control during a new permanent movement. In the during treatment participants had to hold for 20-30 seconds on a swab foam.

Syenko D. et al. (2012) has used patient destabilization by modifying the platform support, during which time the patient had to keep his center of gravity in the same position.

Others studied the effects of visual feedback, which it was improved over time in the balance training.

Hasegawa N. et al. (2017) studied the increase of sensory biofeedback (BF) for postural control which is widely used to improve postural stability.

However, effective sensory information in BF motor learning systems for postural control are still unknown.

Chien-Hung Lai (2013) shows the effects of interactive video-based exercise on balance.

Interactive exercise based on six-week video games improves the balance. The training effects remain partially after 6 weeks of interventions without exercises.

The existence of a dysfunction in the musculoskeletal system leads to compensations that require a high energy consumption and that over time can cause injuries and wear.

With the help of posturograph technology, we can identify deviations of the center of gravity, support points, the load, weight distribution in the soles, anterior, posterior or compressed posture, body asymmetries and through an interpretation in a biomechanical context can identify possible compensations

Our research will use posturograph both to identify deficits and to correct them in real time, using the information provided by the device, a technique known as biofeedback.

The study included a screening phase involving 12 MMA athletes between the ages of 15 and 28, who sought to identify signs of physical deconditioning.

The initial and final evaluation included GPS 600 posturograph testing

HYPOTHESIS

The use of the posturograph in the analysis of posture helps the deconditioning syndrome in adults who are professionally involved in activities that require the repetition of the same movement for a long time.

AIM

The aim of the study is to improve posture through biofeedback treatment using the GPS 600 device.

MATERIALS

The Posturograph or Global Postural System (GPS) is an advanced postural analysis system that uses techniques and methods of noninvasive diagnosis and evaluation in the field of medical recovery.

Posturography includes 2 diagnostic units and software:

• Podoscope - is used in the analysis of static disorders of the foot and the position of the center of gravity; with its help the captured images are processed, determining the exact length of each leg, the existence of static plantar disorders (flat foot, hollow, etc.), as well as possible deviations at the ankle.

• Postural analysis unit - is used to determine deficiencies in the spine, through a system of video cameras that allow the acquisition of high-resolution images, images that are then processed by software, to analyze all segmental or global deviations of the body.

Postural analysis is performed from the front, back and profile and can diagnose deficiencies of the spine in the sagittal or frontal plane (scoliosis, kyphosis, hyperlordosis).

The software allows the storage of the patient's medical data, both those resulting from posturographic tests and those related to the medical history or medical treatments that follow. It is useful for monitoring the evolution of patients and the effectiveness of recommended therapies.

Based on data obtained from a complete posturography, personalized physiotherapy and medical recovery programs are developed.

METHODS

We used the following methods:

• bibliographic study method - the study of specialized literature to update the theoretical basis;

• method of observation - intentional tracking, correct and systematic recording of events and situational context for each subject;

• measurement method - the evaluation of subjects using posturograph provides somatometric and functional data;

• experimental method - application of the program proposed by the working methodology;

• statistical method - data processing and interpretation using SPSS program, descriptive statistical analysis, ANOVA test.

APPLIED TREATMENTS

The treatments for re-educating the posture with the GPS 600 device took place for 2 weeks as follows: the subjects came to treatment for 5 days.

During the treatment, the subjects had to maintain their body position / posture as indicated by the device. The device indicates the position that should be balanced, a correct posture. During each treatment, maintaining the correct posture was for 10 times for 20 seconds.

RESULTS

The 12 athletes improved, the anteriority of the head as follows:
- In 8 athletes it improved between 0-1.0 cm;
- In 4 athletes it improved between 1.1-2 cm.

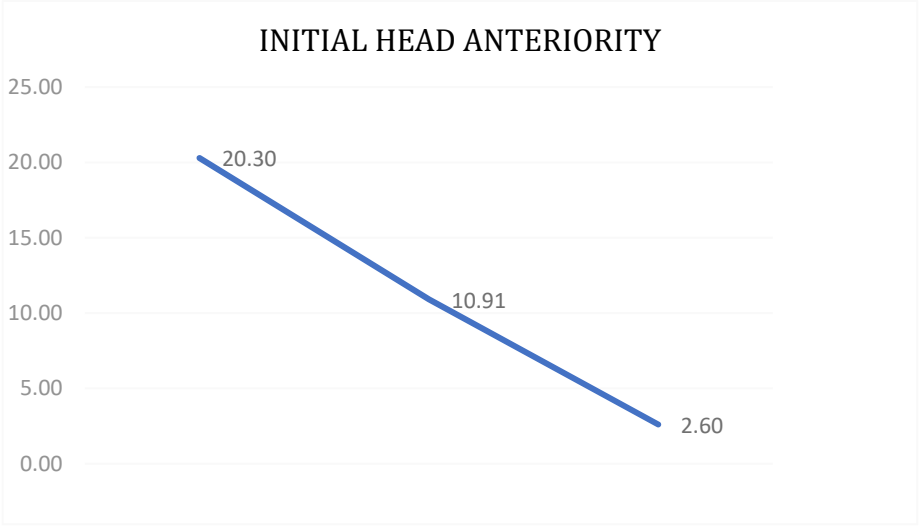

Figure 1. Initial results of the anteriorised head (cm)

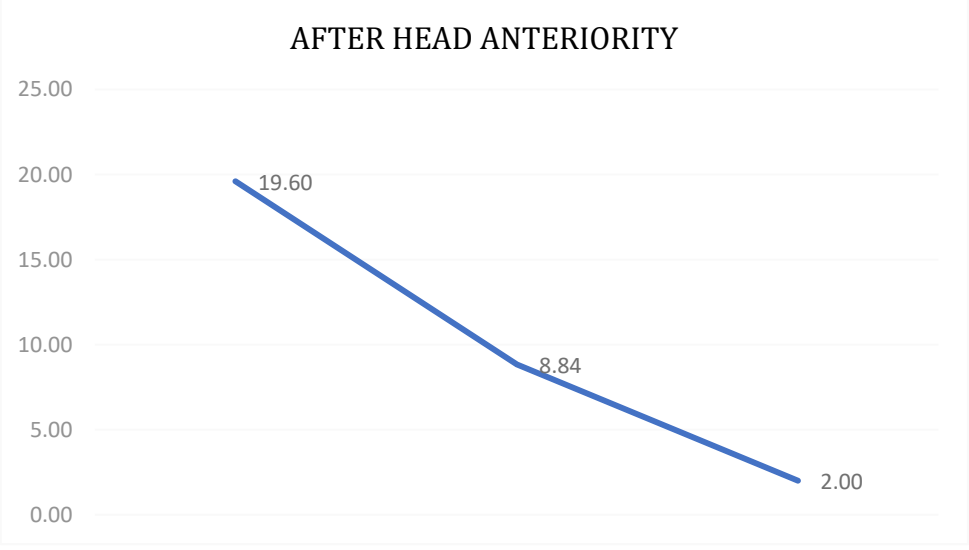

Figure 2. Final results of anteriorised head (cm)

The center of gravity has been improved by the following values:
- In 10 athletes it improved between: 0-2.0 cm;
- In 2 athletes it changed by 2.8 cm.

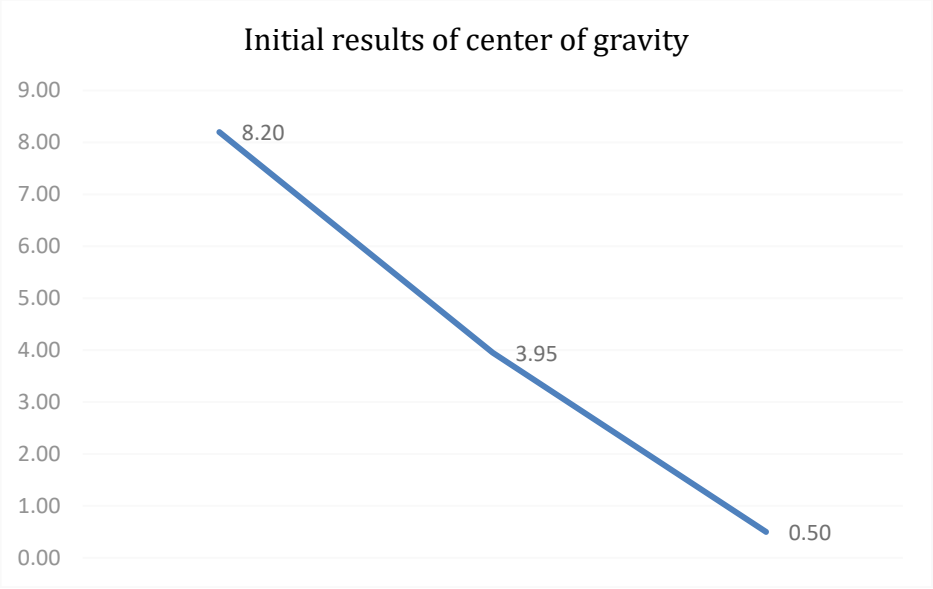

Figure 3. Initial results of center of gravity (cm)

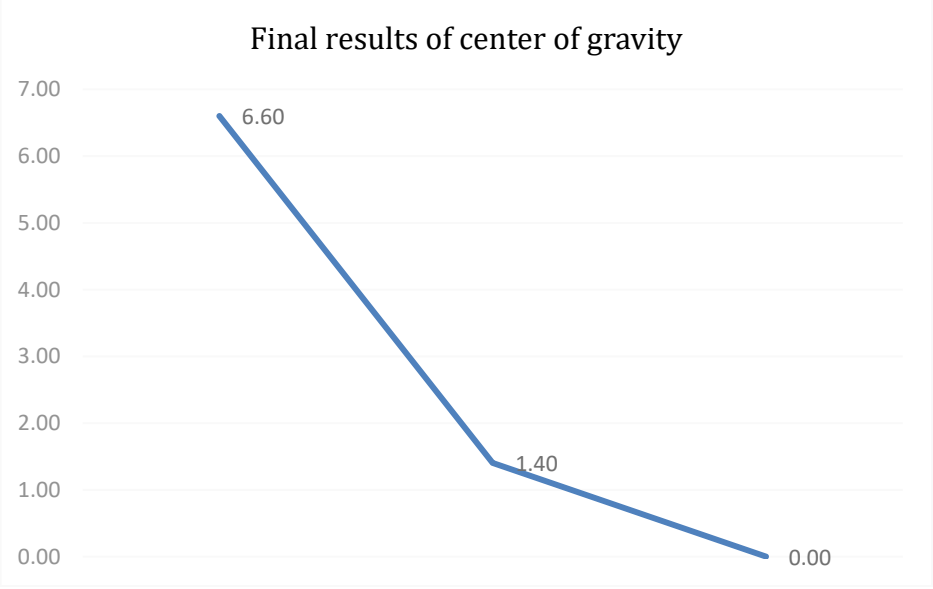

Figure 4. Final results of center of gravity (cm)

Loading on the right and left lower limbs has improved otherwise:
- In 1 athlete improved by 7%;
- In 1 athlete improved by 5%;
- In 1 athlete improved by 3%;
- In 4 athletes it improved by 2%;
- In 2 athletes it improved by 1%;
- In 3 athletes it improved by 0%.

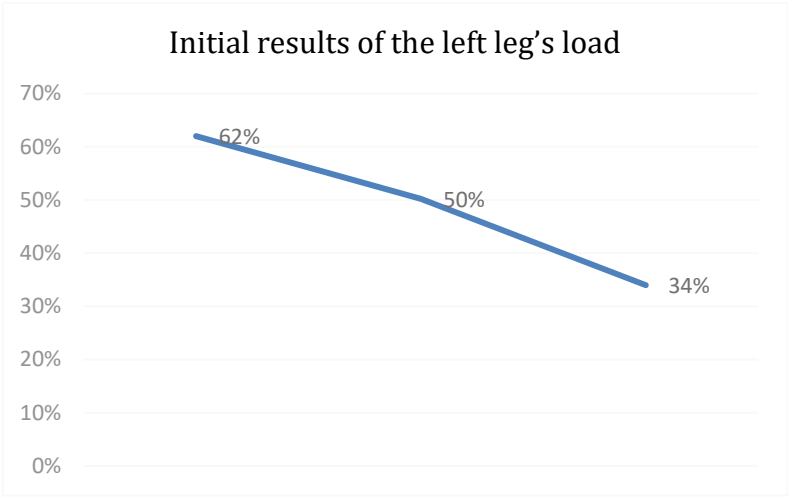

Figure 5. Initial results of the left leg's load (cm)

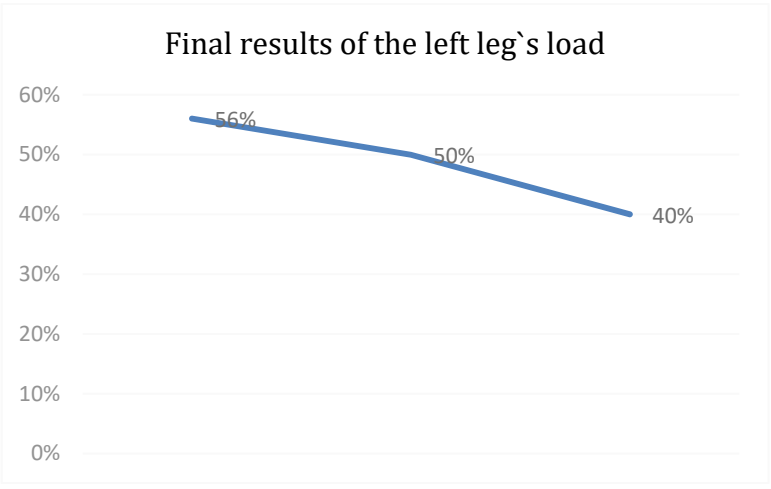

Figure 6. Final results of the left leg`s load (cm)

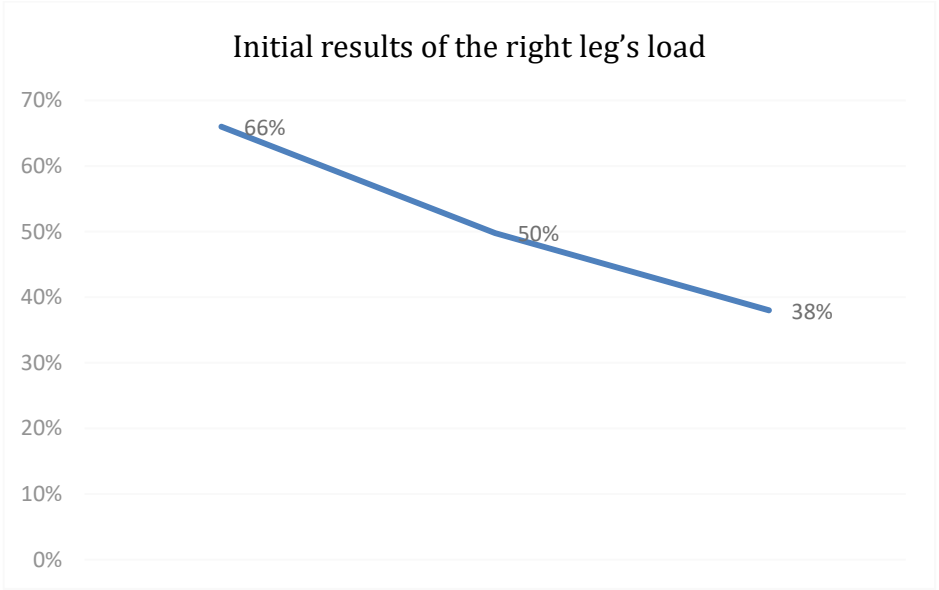

Figure 7. Initial results of the right leg's load (cm)

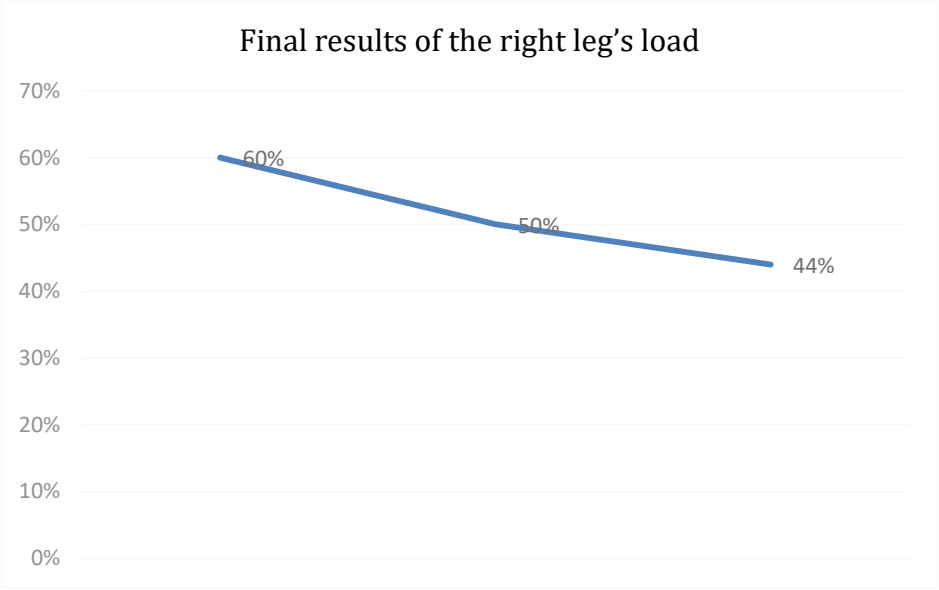

Figure 8. Final results of the right leg's load (cm)

CONCLUSIONS

At the end of the 2 weeks, the athletes reached a perfect balance of the center of gravity and the weight distribution on the lower limbs. The center of gravity reached a balance of 50-50% in 10 out of 12 athletes.

The weight distribution on the right and left lower limbs was 100% balanced in 10 of 12 athletes.

The anteriority of the head has significantly improved by 2 cm, which means that the balance is considerably improved.

During this difficult period of COVID 19 all treatments were stopped. After we resumed our activity, we re-evaluated the 12 athletes. The athletes results were the same as at the end of the 2 weeks of treatment, before the COVID period 19.

Unlike the other people, the athletes from the 6th session managed to maintain their posture in the position indicated by the device, in the correct posture position.

Biofeedback postural rehabilitation program with the help of the GPS 600 device help both to improve and maintain the results obtained over time.

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THE ROLE OF SOCIAL MEDIA ON SPONSORSHIP ACTIVATION

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ABSTRACT. Globally, sponsorship has grown impressive over the last 30 years, receiving an increased importance in the communication mix of companies. Sport organizations have understood the importance and the role sponsorship it plays for the financial support they need. Sponsorship is the material support of an event, activity or organization by an unaffiliated partner. It is a good way to increase brand awareness, which helps to generate consumer preferences and promote brand loyalty and also improves the brand image. Brands play an important role in the development of companies because they bring a number of benefits to them. The paper "Innovation's impact on sponsorship activation" aims to present a series of theoretical elements of activating sponsorship, as well as the element of innovation in this process, an element represented by the social media presence in our lives and in the last part of the paper is presented a study based on a survey on our topic.

Keywords: *Brand, Sponsorship activation, Social Media, Athlete.*

REZUMAT. ***Rolul social-media în activarea sponsorizării.*** La nivel global, sponsorizarea a crescut impresionant în ultimii 30 de ani, primind o importanţă crescută în mixul de comunicare al companiilor. Organizaţiile sportive au înţeles importanţa şi rolul de sponsorizare pe care îl joacă pentru sprijinul financiar de care au nevoie. Sponsorizarea este sprijinul material al unui eveniment, activitate sau organizaţie de către un partener neafiliat. Este o modalitate bună de a creşte gradul de conştientizare a mărcii, care ajută la generarea preferinţelor consumatorilor şi la promovarea loialităţii mărcii şi, de asemenea, îmbunătăţeşte imaginea mărcii. Mărcile joacă un rol important în dezvoltarea companiilor, deoarece le aduc o serie de beneficii. Lucrarea „Impactul inovaţiei asupra activării

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sponsorizării" îşi propune să prezinte o serie de elemente teoretice ale activării sponsorizării, precum şi elementul de inovaţie în acest proces, element reprezentat de prezenţa social media în vieţile noastre şi în ultima parte a lucrării este prezentat un studiu bazat pe un sondaj pe tema noastră.

Cuvinte cheie: *Marcă, Activare Sponsorizare, Reţele Sociale, Sportiv*

INTRODUCTION

Sports sponsorship is considered as an investment in a sports entity that captures the capital of the commercial potential of this sports property. The International Chamber of Commerce sets out a general definition and states that sponsorship is: "Every communication action in which a sponsor contractually undertakes to financially support (or otherwise) to positively associate the image, identity, brands, products or services of the event, activity, organization or person it supports".

From the late 1930s, sports fans began to listen, and soon after, they began to see how athletes and their teams preferred to compete live. It was only a matter of time before the big television and marketing companies realized the impact that sport has on social influence and consumer choice.

Sports activities have been very attractive to sponsors, in part due to the special attention they attract. Sport is the main type of sponsorship, mainly for the following reasons: the inclination to attract the general public not only to each event, but also through the media associated with these activities (Aaker, 2002). In addition, it offers a simplistic segmentation measure and increased visibility opportunities for the sponsor, due to the duration of each event.

Successful sponsorship requires a "total marketing package", not just used as a single marketing tool. To maximize the benefits of sponsorship, it is recommended that all four elements of the traditional promotional mix (advertising, public relations, sales and personal sales promotions), as well as other promotional tools be implemented in conjunction with sponsorship (Aaker, 2013). This is sponsorship activation — taking a sponsorship and "activating" it by making the most of it through the right kinds of corresponding marketing activities to truly connect with your desired audience. Sponsorship activation is successful when a brand finds mutual value for the audience, the organization seeking sponsorships and the sponsors themselves.

LITERATURE REVIEW

Theoretical considerations regarding the sponsorship activation

Sponsorship activation is the intention of independently promote and advertise, from a sponsors' point of view, towards a specific marketing opportunity. Such process is formed by the tactical activities that the sponsors devise to exploit to the fullest and by the marketing rights derived from the sponsorship. Think of it like a way to "switch on" your sponsorship.

Sponsorship activation is perceived as a good thing or if not, better, a special way of promotion. When you sponsor an event, a community or a cause, the chances are that the target audience will like you rather than not trust you. And the biggest advantage is that there is no need for texts, captivating headlines and melodic slogans. Through sponsorship, a less rectilinear message is transmitted indirectly, with an average propagation speed, but with maximum impact. For this reason, this type of partnership is an innovative method of marketing (Armstrong, Delia and Giardina, 2016).

Sponsorship as a marketing method means more than achieving typical goals, in that it also refers to the ability to strengthen the brand and create value for consumers in a way that can lead to behaviour change. This can be achieved by creating unique opportunities for new experiences, self-expression, entertainment, connection or contribution to the social good. And all this, if done correctly, conveys value to consumers and can cause them to click, visit, test or even purchase.

In order to meet the criteria of efficiency, sponsorship must be seen differently than a simple charitable act. The amounts allocated are in fact an investment from which measurable results are expected, in addition to increasing the degree of knowledge / recognition of a company, or brands, products or services. To be able to say that it is part of a profitable marketing, participating in an event (sports, music, awards gala, etc.) from the position of sponsor, will go beyond the increase of notoriety, directly generating additional sales. As an option, sponsorship will be chosen when it is the most profitable option available as part of a profitable marketing (Barbu, 2010).

Sponsorship activation propels a brand one step further than other competitors and helps create a connection with the target audience. One of the most important criteria is who to focus on for this beneficial partnership. It can be a non-profit organization, a community event or even individuals. Whatever the choice, this is a way of self-expression and should have something in common with the brand's mission and market position.

The activation process is where both audience and sponsor goals come together to achieve common goals.

To understand better, such process can be brought down to three easy steps.

Step 1: Negotiate beneficial contracts for brand sponsors.

-Ask your audience what they like and don't like about your event, space program etc…

-Ask them what their expectations are towards the campaign and what they wish to have more or less of

Step 2: Build creative brand activation programs to excite and engage consumers

Be sure to use activity communicate with your prospective sponsors about what you have heard from your audience

Step 3: Leverage all benefits and elements of a partnership to optimise program spend

Ask your sponsors what outcomes they are hoping to achieve.

Creating positive feelings towards the issuing brand is one of the keys to successful sponsorship. Perhaps some of the greatest partnerships of all time, which fit perfectly in terms of connections, are those between clothing brands and large-scale sporting events.

Premier League 2019-2020 was sponsored by eight different brands, which have chosen one or more teams. In terms of sponsoring t-shirts, brands like ManBetX, SportPesa, W88 or M88 do their best to attract attention. Another successful sports partnership was announced in December 2018 between the UFC and PokerStars. There are also situations where a permanent merger takes place between the two parties involved, such as the Red Bull Rampage event. It was first organized in 2001, and is now one of the largest mountain biking events in the world.

Sponsorship can become an important element in marketing activities for any brand. This can provide an opportunity if expectations are clear in terms of results and motivation. In addition to helping the brand by increasing its credibility in the market, it also improves its public image and builds prestige.

Effective sponsorship activation creates a positive impact on brand's image, strengthening customer relationships and trust in the brand (Crăciun and Barbu, 2014). Sponsorship can help resurrected brands of sport organizations to gain financial resources and the brands to be associated to renewed and updated sports organisations (Florea et al., 2018). Even small companies can beneficiate from sponsorship to gain awareness and to build a respectable image (Barbu et al., 2010). Sponsorship can be successfully combined with CSR activities to sustain a strong corporate reputation (Sitnikov and Bocean, 2015; Bocean et al., 2018).

Promotion and activation of sponsorships - and maximising all assets available - are crucial factors in magnifying a sponsorship's impact (Carrillat, d'Astous and Couture, 2015). Sponsorship activation, done in a meaningful way, has the potential to build a brand's identity which in turn increases brand strength and delivers increased revenues.

SPONSORSHIP ACTIVATION AND SOCIAL MEDIA

After defining what the activation of sponsorship is, we present what is the element of innovation, the element that differentiates it from the simple process of sponsorship. And this element is represented by the presence of social media which has a great power over brand awareness and brand image.

Social media are essential in all communication campaigns. They can also be used to activate sponsorship campaigns, to create a relationship and engage an audience during an event.

Social media has changed the way we live our lives. From the way we receive and read the news to the way we interact with our loved ones. Social media is everywhere and about everything (Eagleman, 2013). It is an inevitable environment, it is a strong environment and it is constantly growing and developing. All major companies, aware of the trend and direction in which most users turn their attention, choose to communicate, promote and run marketing campaigns using social networks.

In today's world, social media is a real "gold mine", virtual networks offer the perfect, if not vital, way in which people can assert themselves and be successful. Marketing is largely supported by advertising, but a simple newspaper ad, a poster or a flyer are no longer enough to convince people to buy the product, the online world has a much wider range and is much more effective. Why? We can say that the virtual environment is based on a certain manipulation: it takes into account our preferences, our searches, what we follow, why we appreciate, these being ultimately used to suggest a product „what do they think that it would suit us". Therefore, with the help of a "click", generated by people's curiosity, corporations, companies, brands come to benefit. As an example we can take Instagram, which is one of the largest and most profitable social networks at the moment, which uses the things mentioned above to "give us the best experience". In the online environment, through increasingly diverse social networks, new companies and brands can become known quickly and gain immediate notoriety. Reputation is built and prepared today by communicating in this way; any business must adapt and use the benefits offered by these promotion channels (Kotler, Wong, Saunders and Armstrong, 2005).

Social networks provide intelligent support to quickly transmit information about news, products, campaigns and brand values and get the best conversion rates.

In this sense, the development of personalized and complex marketing strategies, created especially for social media, focused on original images, messages or videos, designed for the long term, with an adequate budget, contributes a lot to increasing the reputation and notoriety of online businesses (Kaplan and Haenlein, 2010).

The evolution of social media has changed the way we interact and communicate with each other. Nowadays social media are considered the most consumed medium of attention of fans among all other traditional medium outlets such as TV and Radio.

On average, 142 minutes are spent daily on social networks. Whether you're flipping through dozens of endless Facebook feeds, or posting your favourite image on Instagram, there's no doubt that you're accessing your social media accounts every day. But how much time is spent on these platforms?

In an analysis made by the Global World Index, it was found that individuals spend an average of 2 hours and 22 minutes on social media. For business owners, this means you can use your social media accounts to market your brand, gain more followers, and ultimately enjoy the profits that come with it.

If you give customers a positive experience on social networks, they are likely to recommend it to others. According to HubSpot research, at least 71% of customers who receive a good experience with a brand through social networks are likely to recommend it.

That's why athletes, teams and sport organizations are trying to benefit as much as possible from using them.

Building a social media presence is an important part of any athlete's brand building plan because it allows them to:

- Build a fan base and connect with fans from all over the globe.
- Increase their sphere of influence and sponsorship potential, by reaching fans that may never get the chance of seeing them compete live in a pitch or court.
- Share content directly to traditional media, as journalists now rely mostly on social media for story ideas and sources.
- Tell their story the way they want to, directly to fans, without a middleman.

One of the biggest reasons why athletes invest time and energy in building a favourable image in this environment is closely linked to popularity. Having the opportunity to be in contact with a large audience and from any

corner of the world is definitely an advantage. Fans of an athlete can not only be constantly informed about their activity, but can even interact with them with the help of social networks such as Facebook, Twitter or Instagram (Pegoraro, 2010).

When it comes to social networks, their great advantage is that all users have the opportunity to communicate with anyone, regardless of location in the world. In the case of some athletes, their messages can be read by tens of millions of fans, with information and news spreading with incredible speed (Barbu et al., 2019).

Moreover, these aspects represent a benefit not only for celebrities, but also for fans and sponsors. Users who follow personalities from the world of sports in the virtual environment have the opportunity to be informed at any time about the various competitions and the companies with which the athletes are affiliated advertise themselves through the image of athletes.

But advertising can take another form, as celebrities choose to promote products and services they trust. Like sponsored ads, a star's personal opinions can reach a large audience that can later share the information (Barbu and Popescu, 2018).

Another aspect related to the visibility gained through social networks concerns humanitarian causes.

Celebrities campaigning for noble causes have managed to make a positive impact in fundraising campaigns due to the influence of the online environment (Witkemper, Lim and Waldburger, 2012).

The number of "followers" on online networks also depends on the popularity of the sport, so the top athletes with the most fans is dominated by footballers.

But among them are professional NBA players like LeBron James or Stephen Curry. Also in this top is one of the most famous boxers in the world, the undefeated Floyd Mayweather.

The presence of athletes in the online environment was noticed not only on social networks, but also on live streaming sites such as Twitch.tv. A good example of this is professional poker player Jason Somerville. Over the years, he has managed to gather a significant number of fans to interact with and explain his ideas about the game throughout the broadcasts.

In addition to those who personally choose to appear live on the Twitch site, more and more companies are struggling to obtain rights to broadcast major sporting events. Thus, to the delight of microbes from all over the world, the matches of this year's World Cup were broadcast live on various specialized sites.

Although the experience cannot be compared to that in the stands, the fact that there is the possibility not to miss the favourite events is considered a step forward in the evolution of our society.

Regardless of the reason why the athletes took the social networks by storm, their presence certainly does not go unnoticed. Thanks to millions of fans around the world, the information, pictures and videos of sports celebrities can be appreciated by as many users as possible.

FINDINGS AND DISCUSSIONS

Regarding the practical part of this work, we used a survey in order to gather information and to draw conclusions regarding the advantages and disadvantages that they believe that sponsorship brings on the sports market, the importance of social media in sponsorship and the most used social networks by athletes. Due to insufficient in-depth examinations in this area, our paper must be a starting point and a prelude to future investigations that can be based on the existing study.

In order to identify the people's opinion about the topic presented, we conducted a research on a sample of 250 people, by completing an online questionnaire, on 01 December 2020-05 January 2021.

The questionnaire included 11 questions, the first four questions aimed at presenting some general data about the respondents, and the next seven questions, all with evaluation scales from 1 to 5 (total disagreement, disagreement, indifferent, agreement, total agreement), in order to find out the respondents' opinions.

The questionnaire was conducted in pursuit of the objectives of this research. The data obtained were subjected to univariate, bivariate and multivariate analyses, supported by the Microsoft Office Excel program.

The participation was performed on a voluntary basis and the verbal agreement of the participants was requested. The participants were assured about the confidentiality of the results but also about the possibility to request the results personally from the researcher. All people participated in the research under the conditions of informed consent.

Analysing the data regarding the respondents who were part of our study we notice that a percentage of 54% are females, and 46% are males.

The next question was about age, so between 20-30 years were 80 people equivalent to 32%, 50 respondents were aged 30 - 40 years, respectively 20%, 45 respondents were aged between 40 - 50 years, and 25 respondents the equivalent of 10% are over 50 years old.

The distribution of respondents after the last absolute studies highlighted the fact that 64 respondents have secondary education, 38 respondents have higher education, and the rest have postgraduate studies.

The analysis of jobs showed that a large part of people are still students without any activity in the field of work, and the rest fall into one of the following categories: officials, computer scientists, accountants, teachers, trade workers or have another occupation.

The first question aimed to highlight the main benefits of brand sponsorship. As we can see in the figure 1 for the 4 answer variants, we have the number of respondents, but also the number given within the evaluation scale from 1 to 5.

Thus, brand loyalty is considered the ultimate benefit, which means total agreement from the respondents, followed by the brand awareness about which people are indifferent, generate revenue-driving leads and brand loyalty they are on the last places, but they have received total agreement and agreement, which means that they are also an important part of the benefits.

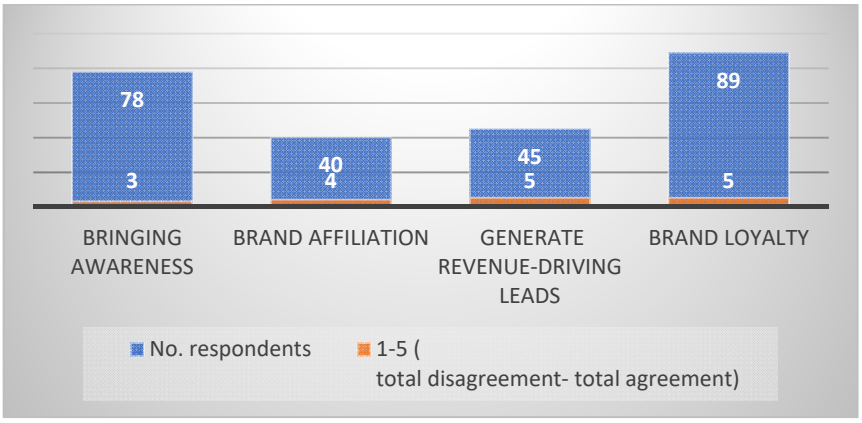

Figure 1. Distribution by main benefits of sponsorship for the brands

Next, we wanted to see what the respondents think to the activation of sponsorship. Thus, the vast majority agreed that now the brands must connect with the audience, but 67 people agreed that all the proposed options are true, so sponsorship activation also adds that brands now have to tack on additional marketing touch points, now have to actually connect with audiences and brand have to find mutual value for the audience, the organization seeking sponsorships and the sponsors themselves (figure 2).

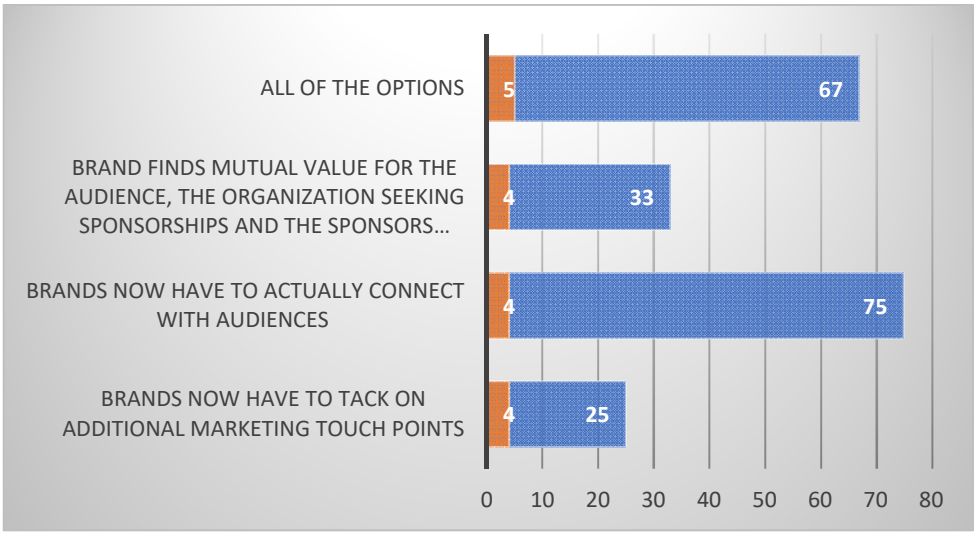

Figure 2. Distribution according to what brings the activation of sponsorship in addition

The question How sponsorship helps athletes or sports teams, and why these associations are becoming more popular, both in real life and in social media? highlighted what we already knew, namely that social media and sports are compatible because the evolution of social media has changed the way we interact and communicate with each other. Nowadays social media are considered the most important medium of attention of fans. Then another way how the sponsorship helps the athletes it's because live sport means a lot of brand exposure and also sponsorship monitoring makes it easy to track. Having sponsorship funding allows athletes to focus more on the training and production of their sports and reduces stress when it comes to finding money to train and put on events. Sport sponsorship is also beneficial for the brand's employees as it is connected very strongly with health and well-being, which means the brand becomes the beneficiary of positive sentiments by association (figure 3).

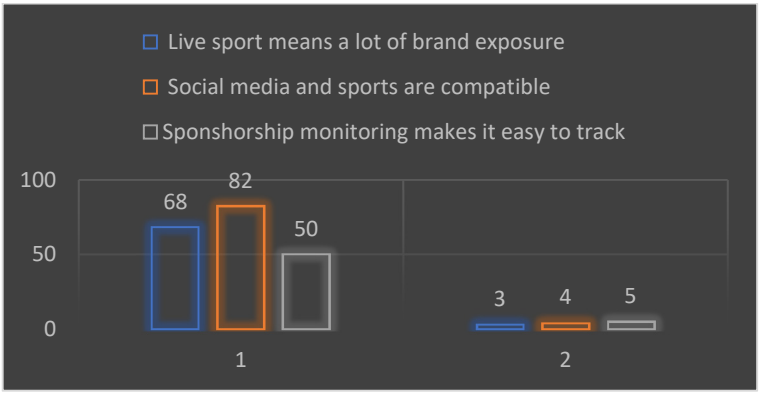

Figure 3. Distribution according to the means how sponsorship helps athletes or sports teams

Regarding the disadvantages of activating sponsorship on the sports market, our respondents considered that the implementation of activities in this process involves the addition of new funds, and also it is a more complex process to manage. Sponsorship activation is perceived as a good thing or even better, a special way of promotion. When a company sponsors an event, a community or a cause, the chances are that the target audience will like the company rather than not trust the company. And the biggest advantage is that there is no need for texts, captivating headlines and melodic slogans. Through sponsorship, a less rectilinear message is transmitted indirectly, with an average propagation speed, but with maximum impact. For this reason, this type of partnership is an innovative method of marketing (figure 4).

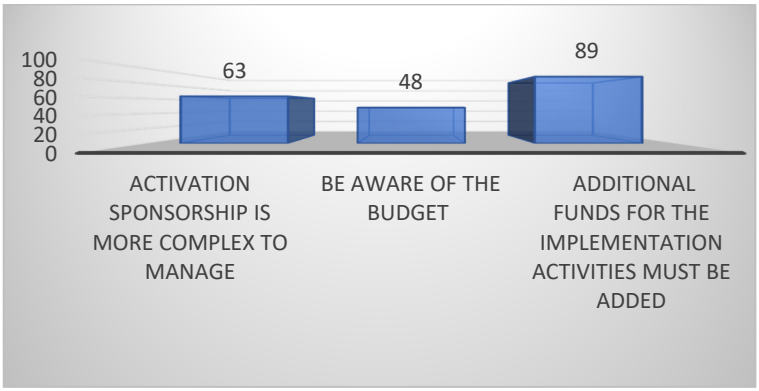

Figure 4. Distribution according to the disadvantages of activation sponsorship in sports market

In this graphic are presented for the first time the grades from the evaluation scale given by the respondents for each answer variant, and the following columns present the number of people who chose the respective variant. Thus, 95 people totally agreed that social media is today one of the main channels used to activate sponsorship, in second place with a smaller number of respondents, but all giving the same grade 5, believe that through social media is successful reaching the maximum audience, at the right place and time. Also, just over 10% of respondents agreed that social media involves quite low costs, another reason why it is an important element in sponsorship (figure 5).

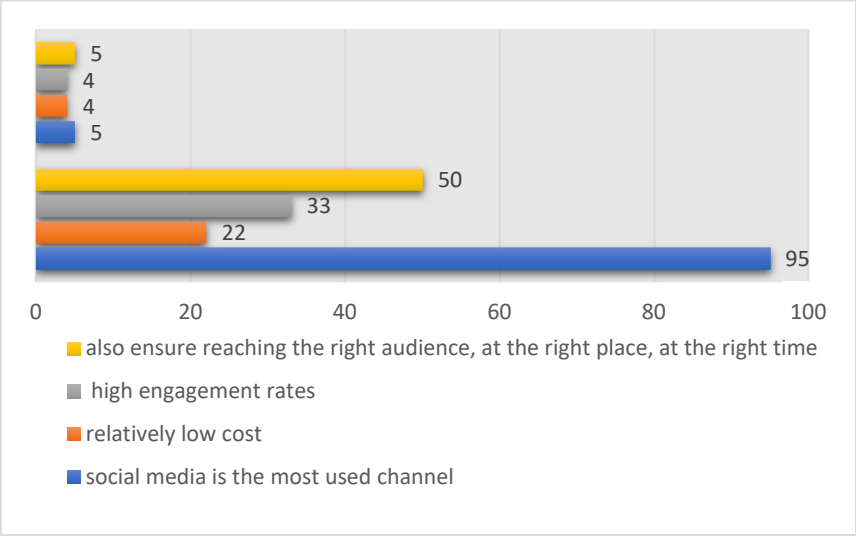

Figure 5. Distribution according to the role of social media

In the next question, respondents were asked to say the first association that comes to mind between a brand and an athlete. Although different answers have been provided, in the chart below you can see which paths have been repeated most often. The first association is that between Cristiano Ronaldo, who needs no introduction, even people who are not interested in football, know who this athlete is and the Tag Heuer company, the two collaborating to make a watch with the athlete's name. As TAG Heuer is by far the best at what they have been doing for 150 years, and there is no other luxury brand with so many close ties to the highest level of sport, they have decided to choose Ronaldo as their brand ambassador.

The next partnership was between Adidas and Michael Jordan. Throughout the history of sneakers, no other collaboration between a sneaker brand and an athlete could have been more successful than in the case of Nike and Michael Jordan. The combination of these two concepts gave birth in 1984 to the legend of Air Jordan (figure 6).

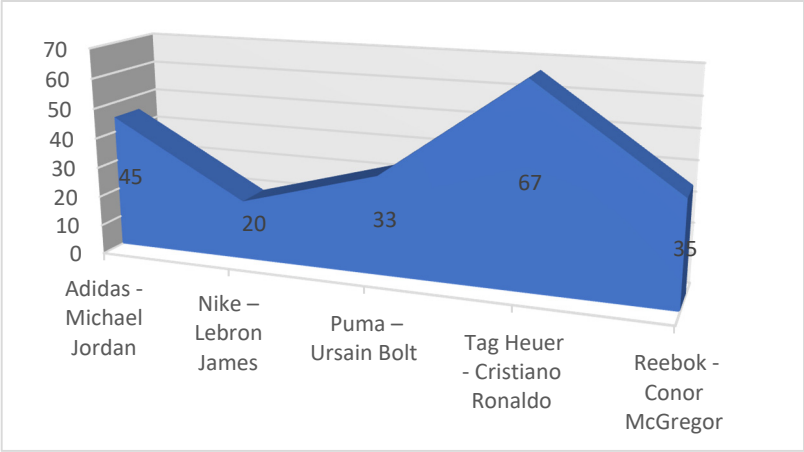

Figure 6. Distribution according to a brand's most famous associations with an athlete

We wanted to see which of the social media platforms is the most used by athletes. Thus, in the graph we can see two circles, the first shows the proportion of each answer chosen by the respondent, and the next circle shows the grade from the evaluation scale given. Thus, the respondents considered that Facebook, Twitter and Instagram are among the most used networks and can occupy the same place in the ranking, followed by YouTube and Snapchat.

Athletes have understood how vital their presence and interaction in the virtual environment is, that's why they record fabulous numbers on their Facebook and Twitter accounts. The most watched international athlete is Cristiano Ronaldo, who enjoys over 162 million fans worldwide. The Brazilian football player, Neymar Jr, follows him in the ranking with over 102 million fans, and the star of the team from the city of Barcelona, Lionel Messi gathered over 100 million fans, and this in the conditions in which he has only one account of Facebook and none on Twitter.

Simona Halep has benefited from an exponential increase in the number of fans, she has over 830,000 fans on the social network Facebook. One of the Romanian athletes who works in Canada is Lucian Bute; the number of fans of

his Facebook page amounts to over 600,000. Equally well "seen" on social media is Gheorghe Hagi, the former great Romanian player, who has over 500,000 fans on his Facebook page (figure 7).

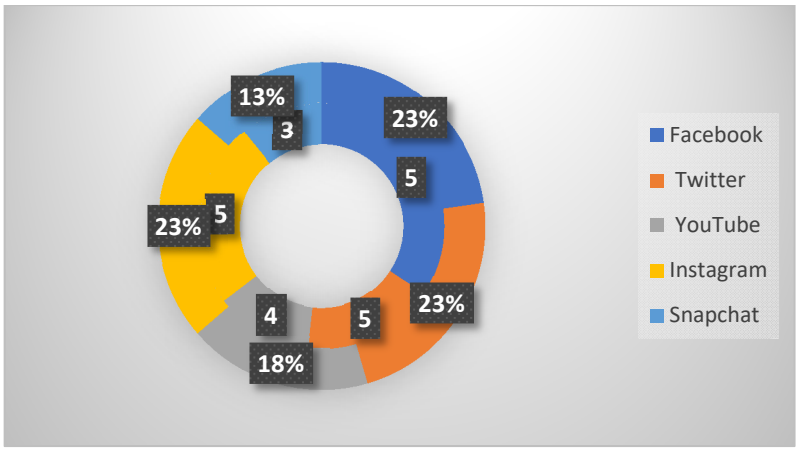

Figure 7. Distribution according to the most popular social media platforms used by athletes

CONCLUSIONS

Sponsorship activation is what a company can do with what it owns. This can take many forms, but activation is all about bringing brand to life from things as simple as booth spaces at an event to more sophisticated programs like employee engagement initiatives, virtual engagements, sales contests, once-in-a-lifetime experiences, and customer celebrations.

Sports sponsorship has been explained as the attempt to form a strategic link between a company and a sport athlete, team or event, as a means of communicating branded messages to the general public of a particular team, player or event. With the widespread expansion of the sport to a different audience, the platform has also been known to significantly differentiate a company from its competitors.

The sports activities were very attractive for the sponsors, partly due to the special attention they attract. Sport is the preferred type of sponsorship, mainly for the following reasons: the tendency to attract the general public not only to each event, but also through the media associated with these activities. In addition, it offers a simplified segmentation measure and increased visibility opportunities for the sponsor, due to the duration of each event.

Successful sponsorship requires a "total marketing package," not just used as a single marketing tool. To maximize the benefits of sponsorship, it is recommended that all four elements of the traditional promotional mix (advertising, public relations, sales and personal sales promotions), as well as other promotional tools be implemented in conjunction with sponsorship. This is sponsorship activation, taking a sponsorship and "activating" it by making the most of it through the right kinds of corresponding marketing activities to truly connect with the target audience.

Acknowledgments

All authors of this paper contributed equally to the research.

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