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EFFECTS OF CROSSFIT LESSONS IN PHYSICAL EDUCATION ON THE AEROBIC CAPACITY OF YOUNG STUDENTS

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Abstract

Strength training in adolescents is one of the pending subjects of Physical Education. Habitually, improvements in physical condition are solely and exclusively related to training in aerobic resistance. The objective of this study was to assess the effects of the incorporation of Crossfit along with aerobic games on aerobic capacity over a period of 8 weeks in a group of teens during their physical education sessions at the school. The study examined 82 subjects between 16-18 years of age, who were high school students. 40 women and 42 men were distributed into two groups, experimental and control. The results indicate that the effect on aerobic capacity measured through the course navette test is significantly positive through the inclusion of crossfit methodology along with aerobic games in physical education sessions.

Key words: *Aerobic capacity, adolescents, crossfit.*

Introduction

The attainment of a good physical condition is the backbone of the subject of Physical Education and this objective must be carried out in a way that is entertaining and new, without losing sight of its purpose. We have to keep in mind that students spend many hours sitting and working on theoretical concepts individually. That is why we must take advantage of our material to work effectively and efficiently and at the same time achieve practical training in their academic performance and enable them to disconnect from the stress generated by their studies. Unfortunately, many centers use traditional training methodologies that discourage students as they are boring, repetitive, unrealistic, and above all provide few incentives that encourage students to practice sports. This is important not just in the classroom, but also because adherence to physical activity is key to the development of the student. We have in our hands as teachers, the opportunity to gain students' adherence to physical activity and to enable them to escape from a sedentary lifestyle.

Force work in adolescents is one of the pending subjects of Physical Education. Habitually improvements in physical condition are solely and exclusively related to training in aerobic resistance. We believe that a novel model such as the combination of seasons of high intensity exercises with short periods of time combining strength exercises, aerobic exercises, and coordination exercises is the solution to motivate students to practice outside the classroom and to better understand training through different methods. On the one hand, we will work with music as it improves the performance of students in an activity and is a fun instrument that also provides a necessary rhythm for the timing of high-intensity workstations. We will apply multiarticular exercises that students will be able to do outside of the classroom and will explain what muscles are worked on in each exercise. The stations will be equipped with material such as TRX, coordinating stairs, and kettlebells, which are new to many students and at the same time create a more motivating element.

Keep in mind that health problems are no longer the sole responsibility of the healthcare field. This new way of understanding health is an innovative approach that has come to schoosl and is affecting the reconstruction of the curriculum of the area of Physical Education. Several agencies, such as the United States Department of Health, Centers for Disease Control and Prevention in the United States and the Australian Ministry of Health and the Third Age of Australia, Anzar & Webster (2), point out that children and adolescents need to Perform at least 60 minutes (and up to several hours) of physical activity of moderate to vigorous intensity, all or most days of the week. As it is proven that these values are not achieved, we have to put into practice new models of fitness work that can provide different results that should be applied and analyzed to continue progression in a science such as Physical Education.

If the main objective of Physical Education is to promote health and train students for regular physical activity in their free time, to continue physical activity into adulthood and lead to the adoption of exercise habits which have a positive impact on health and quality of life, Physical Education professionals can not turn their backs on this problem. (16)

Patterns of physical activity in young people have important health implications, since with low levels of practice there may be an early onset of cardiopathy, osteoporosis or obesity in adulthood, (19). In the last three decades, the abundant epidemiological analysis of physical activity has reached very uniform conclusions about the benefits of its regular practice. However, the prevalence of sedentary lifestyles continues to increase, so physical intervention promotion interventions are necessary to achieve the goal of "accumulating at least 30 minutes of moderate intensity physical activity in almost all , or better all, the days of the week".

The amount and quality of physical activity has been considerably reduced in today's society. The imbalance that is produced in terms of food consumption that exceeds energy expenditure leads to an increase in body weight and, consequently, of obesity. There are several determinants of obesity, as well as its consequences. To treat an obese person, one must know, first of all, the agent triggering the illness. Teachers of Physical Education, together with the contributions of professionals from other areas of sports sciences, can be of vital importance to help children and adolescents with problems caused by being overweight (3).

In a recent study (13), the level of physical condition of adolescents, especially the aerobic capacity, with the levels of body fat is inversely related. Having a high level of obesity involves serious health problems as it increases the risk of coronary artery disease, high blood pressure, type 2 diabetes, etc. Unfortunately, obesity and being overweight are increasing alarmingly in Europe. The World Health Organization now recognizes physical inactivity as the fourth risk factor for global mortality in noncommunicable diseases. In a few years, some countries have doubled their obesity rates and the epidemic, far from referring, threatens to continue increasing. According to a study (15), the prevalence of weight increase and obesity in children and adolescents in Spain is still very high (about 40%). The obesity rate in the Spanish adult population (25-60 years) is 14.5% while being overweight is 38.5% (16).

Crossfit and aerobics

Crossfit is a novel, comprehensive, general and inclusive method based on multi-articular or functional movements that combines weight-bearing exercises or basic gymnastics, weight-lifting and metabolic conditioning activities, performed at high intensity, (18).

According to the principles of this sport modality, Crossfit is based on the improvement of the 10 domains of fitness, which would be precision, agility, balance, coordination, cardiovascular and pulmonary resistance, flexibility, power, speed, general resistance or endurance and strength, (18).

CrossFit has been one of the best fitness training methods in the fitness industry since its inception in 2000. This popularity could be derived from two main factors: physiological changes in training and psychological benefits. There are two factors that have influenced the success of this modality. One is the little time necessary to practice it because it is a high intensity training or HIIT and the other is that it improves physical and physiological abilities, (18). Although in

Physical Education, the levels of practice are lower than in extracurricular activity (6). P.E. Classes are very important in achieving the motivation that will make these students intend to be physically active later. Likewise, strength training at an early age should be incorporated progressively and be part of a wider global physical conditioning program. For this reason, force training at the adolescent stage should be presented in similar formats with these ages, in order to avoid boredom and to foster compliance (14).

Benefits of Crossfit school interventions

Fortunately crossfit, along with aerobic gaming activities, would be considered an ideal way to reduce the weight increase and obesity of children and adolescents as shown by a recent study (1). According to these authors, the most effective physical activity program is the one that combines aerobic and anaerobic exercises. There is consensus on the need to accumulate more than 180 minutes a week dedicated to these ends, with 3 sessions of 60 minutes; each one of physical exercise of a moderate intensity. This could be enough to execute a physical exercise program for those children, teens or adults who present this problem of being overweight or obese.

The following study was conducted to investigate the physiological and psychological benefits of CrossFit training in a population of healthy adults subjected to their first contact with the training method. The CrossFit program was conducted for 8 weeks by Certified CrossFit trainers at a local gym. After the 8-week training, the participants were evaluated again using the same measures. In conclusion, this study suggests that CrossFit training may be beneficial for improving body composition and at the same time changing certain motivational factors to continue participating in physical activity (17).

Another study, in this case with obese children (5), evaluated the hypothesis that strength training is beneficial for obese children with a controlled diet compared to the acquisition of lean mass and bone mineral The children in the training group showed a significantly greater increase in lean body mass and overall bone mineral content compared to control group subjects. Therefore, in pre-existing children with obesity / excessive weight who perform a controlled diet, participating in an exercise program with emphasis on strength training resulted in improvements in lean mass and in the aggregation of bone minerals.

In another study, in which the intensity of the exercise is the same as that proposed in the didactic unit, the effect of a program of 8-week high intensity aerobic training, developed during Physical Education classes, on the aerobic capacity of adolescents aged 15 to 18. The training program consisted in the practice of aerobic physical activity with an intensity equivalent to 75-80% of the VO2max. In conclusion, a high intensity aerobic training program of 8 weeks, 2 days per week, improves the aerobic capacity of the students.

According to Sánchez et al, (15) the practice of Crossfit encourages the motivation of the students due to being a new activity and also increases the perception of fun, learning and level of intensity of Physical Education classes. That is why all time spent on Crossfit at the school will encourage students to continue practicing out of school. Hence the value of seeding at the center an effective and fun work methodology that will allow the student to enjoy and at the same time learn theory and practice of training. It will be, therefore, the school that sets the necessary precedent so that the student can continue practicing outside and throughout life.

The objective of this study is to assess the effects on aerobic capacity, the incorporation of Crossfit along with aerobic games for 8 weeks in a group of teens in their physical education sessions at the school.

Materials and Methods

Part of the study comprised 82 subjects between 16-18 years of age, high school students. 40 women and 42 men were distributed in two groups, experimental and control.

Table 1. Descriptive characteristics from the sample

	Full Sample		Intervention group		Control Group	
	N	*Mean*	*N*	*Mean*	*N*	*Mean*
Age (Years)	82	17,2	45	17,1	37	17,3
Gender %						
Male	82	51,2%	45	50,2	37	52,4
BMI Kg/cm2	82	19,8	45	18,5	37	20,3

To measure the aerobic capacity, and establish indirectly the VO2Màx at the initial and the final stage of the Didactic Unit, both control and intervention groups where tested.

It has been decided to use the *Course Navette* Test. This test evaluates the maximum aerobic capacity from an indirect-incremental field test-20m. maximum return, using the equations proposed by Léger et al, (10) to estimate the maximum oxygen consumption (VO2màx). The reliability and validity of this test to predict VO2max in children and adolescents have been sufficiently demonstrated.

The school intervention will consist of the completion of eight weeks in which a first part of work will be carried out for high intensity and short physical activity High intensity interval training (HIIT) stations, which will be formed by eight stations in which there will be Crossfit exercises and other simpler exercises, as there will be adaptations for adolescents, although the dynamics of multi-art exercises will be the same.

The circuit will last between 16 and 24 minutes, during which the students will do two laps of the circuit and the latter will be equipped with music, which will motivate more students. There will also be a time dictating when the students have to change their stage and when they have to start the exercise.

The other part will be formed by cooperative and collaborative-opposition games, in which there will be an inclusion and exclusion criterion that will give sense to the work of aerobic resistance. The basic premise of the game is to make the greatest number of students move, and thus increase motor commitment and make the activity more effective and efficient. The intention is to change the habit of the student who does not practice physical activity outside the classroom and get him or her to adhere to a program of physical activity either in a gym, in the street or with the practice of a sport circuit training. This will be useful as the students will know what muscles work in each exercise, to what intensity and what benefits this activity entails.

Results

The T test was done to compare related samples concerning the effects of the intervention on the increase of the VO2màx thanks to the work of the Didactic Unit (DU).

We can see in table 2 how the results of the experimental group change significantly after the crossfit intervention in the physical education sessions.

In the control group there are no differences in the two moments in which the sample has been analyzed.

Table 2. Values of aerobic capacity (Vo2max/Ml/Kg/min) in both control and intervention groups, before and after the physical Education intervention.

	Pre-intervention Vo2max	Post-intervention Vo2max	t'	Sig
Experimental	34,04	36,96	-3,02	**0,004***
Control	35,88	35,85	0,66	,948

The results indicate that the effect on aerobic capacity measured through the *course navette* test has been significantly positive through the inclusion in the physical education sessions of the crossfit methodology along with aerobic games.

Discussion

The main objective of this study was to assess whether a didactic pedagogical crossfit unit and aerobic game with music could be a more suitable way of improving condition compared to traditional physical condition work.

The results showed that students who practice pedagogical crossfit and aerobics, have a greater degree of fun compared to traditional physical condition and significant improvements in aerobic capacity (VO2màx), which indicates that they are the most intensive activities convenient for the work on physical condition in school.

All the knowledge can be transferred to a gym or the street, and therefore health is promoted and the training of students for a regular physical activity in their free time, which remains into adult age and that is tied to the adoption of physical exercise habits that positively affect health and quality of life since physical education professionals can not turn their backs on this problem (16). There would be a congruence between our conclusions and the present study.

The pedagogical Crossfit aims to motivate and enhance the practice of physical exercise since, according to the results, the values of satisfaction are higher than those of the traditional physical condition. This motivation would be an incentive for students to practice physical activity outside school as well, because according to a recent study (11), adolescents do not reach the minimum recommendations established by international organizations and the levels of practice are greater during extracurricular or leisure hours, than during PE classes.

In addition, the high levels we have obtained of fun amongst the students are of vital importance, although in Physical Education, the levels of practice are lower than in the extracurricular activity, according to a Cuevas et al, (6) classes are very important to achieving the motivation that will make these students later intend to be physically active. Therefore, it would be interesting to apply this type of physical condition workout because the results with regard to the effects are signifcatively positive.

The results show a significant improvement in the VO2max and these effects would also be positive at the psychological level. In another study (4), 226 girls participated from the bachelor of the Murcia institutes. Here, physical activity was related to anxiety and depression. The results indicated that girls who practiced some physical activity had lower levels of both depression and anxiety. It was also possible to determine that those who practiced physical activity more frequently had even lower levels of anxiety and depression. On the other hand, girls who practiced low intensity physical activity had higher levels of anxiety and depression. Therefore, it was a cause-effect study since increasing the physical activity variable decreased depression.

On the other hand, crossfit pedagogical and aerobic games are activities that are practiced in groups. This has a number of benefits thanks to the social component of physical activity; one of its main effects would be to prevent mental illnesses such as depression. This is shown by a case-effect study (20). These researchers carried out an analysis of several factors associated with those of anxiety, social phobia and depression. The work allowed researchers to determine thatsocial anxiety and the depression increase if sport activities are not realized, they do not have intimate friendly relations nor is there friendly interaction. It was found that people who do not perform any of these activities present social anxiety and depression greater than those that do them.

Improving physical condition would make it possible for students to prevent illness, as demonstrated by a study from Ortega et al, (13) that inversely relates the level of physical condition of adolescents, especially the aerobic capacity, with levels of body fat. Having a high level of obesity involves serious health problems as it increases the risk of coronary artery disease, high blood pressure, and type 2 diabetes.

The pedagogical crossfit is formed by multiarticular exercises. Regular participation in physical conditioning and sports programs that include multi-articulation exercises with moderate to high intensity overload (CrossFit) can help

optimize the accumulation of bone mineral density during childhood and adolescence.

Also, several studies have shown that children performing strength training using multi-art exercises and even similar to those of Olympic upsurge or jumps as a training complement to regular sporting activities (set games, combat sports, athletics, etc.) tend to significantly reduce the incidence of injuries (7).

We have been able to observe that the physical state of teens is low; our results are congruent with the Ortega, BF. et al. (12), in which the results indicate the need to improve the level of physical condition of Spanish adolescents.

This study presents some limitations. One of them is that it has only been possible for two months. This fact means that it is difficult to extrapolate, since perhaps in a work of 10-12 weeks the results would be more evident. Another was not to have taken into account the socioeconomic level of the centers, which would have allowed other comparisons.

The practice of the didactic unit: the effects of pedagogical crossfit combined with aerobic games could be the best indications of working on physical condition for results regardingincluding satisfaction, fun, and improvement of the VO2màx.

We have also verified that the practice of the didactic unit is motivating and this could lead to changes in the sedentary habits that unfortunately many students have in the center. These results imply that it would be convenient and very effective to work on the physical condition through this didactic unit since the component of diversion and satisfaction would be greater. Also, that the activities worked on can be easily taken out of the classroom and finally that the improvement of the cardiovascular capacity would be significant. We should not forget that Physical Education is a science and there must be constant reassessment by teaching staff and adaptation of the new training trends in the classroom.

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AN INVESTIGATION INTO ATHLETES' EATING ATTITUDES

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Abstract

This aim of this study is to investigate eating attitudes among athletes who do active exercise.

The study was conducted with 161 individuals 19±1.86 years of age who are students at Atatürk University Sport Sciences Faculty in Erzurum. Two different scales were applied to individuals participating in the study.

The first applied scale is the ID form which is tdesigned o obtain personal information. The second scale applied is the Eating Attitude Test (EAT) which is to determine eating disorders and eating attitudes. The analysis of acquired datas is done using SPSS (version 22) and Significance for statistical datas was selected being p<0.05.

As a result of study, individuals participating in the study's EAT levels were found to be fairly high. According to these results, it can be said that Athletes have eating disorders. Nevertheless, there were no significant differences in EAT levels according to state of family income, abode,smoking, or alcohol use.

Key words: *Attitude, Eating, Athlete, Sport*

Introduction

Good and bad eating habits which are embedded in societies have been confronted over a variety of ages and gender as a problem. An increase in eating disorders and environmental warnings have been experienced, and the crucial role of a healthy life has recently gained much more importance result in new behavior disorders.

In eating disorders, body, body weight, energy values of food, excessive efforts to become slim, and obsessive-compulsive disorder (OCD) resemble each other. Eating disorders contain serious anxiety such as an unreliable decrease or increase in the buying of food, or excessive anxiety about body weight and appearance which occurs in eating behaviors (1). Eating disorders might improve when normal behaviors and attitudes to the control of body weight, physical appearance, and consumption of food become excessive. Basic known eating disorders consist of not eating (Anorexia Nervosa), eating excessively and vomiting (bulimia nervosa), and binge-eating (2). It is reported that eating disorders are mostly observed together with other psychiatric disorders such as depression, substance abuse, and anxiety disorders (2). One of the first steps causing these disorders is a rise in awareness. Also, the outbreak of the disorder is often associated with an event which leads to stress (3). Eating disorders are described as a chronic health problem which stimulates adolescents in western societies and ranks third. In addition to the fact that these disorders are observed in western societies more frequently, it is stated that today, they affect most of the societies all over the world. Especially in recent years, eating disorders have become the center of attention among researchers and clinicians in Europe and America (21).

Eating disorders are destructive diseases resulting from a combination of many factors. Some of these are emotional dysregulation, personality disorders, parental pressure, genetic - biological susceptibility, physical - sexual abuses, social culture inclined to the excessive consumption of food, and also obsession with slimness (4-5). Generally, these are diseases which become chronic and lead to serious complications. The desire to have ideal body sizes in society clarifies why eating disorders have so widespread (4).

The change in the concepts of beauty and attractiveness and the fact that slimness is considered as the most essential aspect of physical beauty have led to a change in eating habits. These disorders include medical illnesses that can be treated and real ones which are not based on the lack of behaviors or desires (2). Thus, medical nutrition therapy is growing in importance with regard to eating disorders day by day (6,7).

The increase in eating disorders has led to various health problems. Regarding this, these fundamental health problems include excessive slimness, obesity, and bone problems. Eating habits and disorders occupy an important position considering the issue of sport. As is known, in many studies previously conducted, nutrition is as important as training in order to achieve success and physical accomplishments at the highest level. From this perspective, it is crucial to prevent eating disorders for athletic skills and success. Considering the purposes of current research, this study was designed to explore the eating habits of individuals who do physical exercise actively.

Methodology

A total of 161 people who are majoring at the Sport Sciences Faculty at Erzurum Atatürk University and who do exercise actively at about 19±1.86 ages participated in the study. 109 of these participants were male and 52 of them were female students. Two different surveys were administered to the students within the scope of this study.

Personal Information Form; This consists of questions about age, gender, income status and some habits.

Eating Attitudes Test (40/YTT-40/EAT-40)

The eating attitude test which was originally designed in English (YTT-40) was developed by Garner and Garfinkel (50) in 1979 as a self-assessment scale which objectively measures the symptoms of anorexia nervosa and bulimia nervosa. As it provides more detailed information in clinical evaluation, it also depicts the changes that come out at the end of treatment. On the other hand, it is used as a scanning tool in order to examine the cases of anorexia nervosa which have not been diagnosed before in high-risk group societies for the disease (8).

YTT-40 is a paper and pencil test which is a graded scale with 40 items and 6 choices, is administered to adolescents and adults without time limitation. Items take the form of a graded scale" in multiple choice format with 6 scales ranging from "always", "very often", sometimes", "rarely", to "never (8). In measurement of the test, 3 points are given for every extraordinary response and 2-1 point(s) are given for other options. The total score is obtained after the scale is graded. 30 points and above are considered significant. The top point is 120 (9).

Validity and reliability analyses of the test was carried out by Işık Savaşır and Neşe Erol (10) in Turkish in 1989.

YTT is a valid and reliable scale which is widely used in an attempt to scan eating disorders and translated into Turkish, and psychometric studies of which have been done (11). YTT measures possible eating disorders in normal individuals as much as behaviors and attitudes of individuals who have these eating disorders (10).

Results

The table above displays the relationship between eating attitudes and other variables including gender, smoking, alcohol use, physical pleasure and income status of participants. There was not a statistically significant difference between participants' eating attitudes and the variables such as gender, smoking, alcohol use, physical pleasure, and income status.

Table 3.1. The relation between eating attitude and gender, smoking, alcohol use, physical pleasure, income status.

Eating Attitude	**Gender**	**N**	**Mean**	**Std. Dev.**	**t**	**p**
	Male	109	87,8532	12,63360	-1,663	,098
	Female	52	91,3077	11,64262	-1,712	,090
	Smoking					
	Yes	49	90,2653	12,69640	,877	,382
	No	112	88,4018	12,27130	,866	,389
	Alcohol Use					
	Yes	61	86,1538	16,40169	-1,267	,207
	No	100	89,5111	11,46042	-,998	,326
	Physical Pleasure					
	Yes	141	89,2270	12,13400	,700	,485
	No	20	87,1500	14,24492	,619	,542
	Income	**N**	**Mean**	**Std.Dev.**	**F**	**p**
	≤1400TL	46	87,4565	13,79325		
	1401-2500TL	64	89,5469	10,98040		
	2501-3500TL	32	91,3125	9,60993	,859	,464
	3500TL≥	19	86,7368	16,92087		
	Total	161	88,9689	12,39225		

*p<0.05

Table 3.2. Eating Attitude Scores

	N	**Minimum**	**Maximum**	**Mean**	**Std. Deviation**
Eating Attitude	161	49,00	117,00	88,9689	12,39225

The average score of participants in the eating attitude test was found to be 88,96±12,39. Considering this finding, it is obvious that participants of the current research have eating disorders to a considerable extent.

Discussion-Conclusion

This study was carried out in order to determine eating disorders of individuals who do exercise actively.

52 of the participants were female (32.3%), and 109 of them were male students (67.7%). The age range of the individuals on average was between 19±1.86. While 49 of the participants (30.4%) smoke, 112 of them (69.6%) do not smoke. Apart from that, while 61 of the participants (37.9 %) use alcohol, 100 of them (62.1%) do not use alcohol. In addition, considering income status, the income status of 46 participants (28.6%) was found to be 1400 Turkish liras and below, and the income status of 64 participants (39.8%) was found to be between 1400-2500 Turkish liras, while that of 32 participants (19.9%) was found to be between 2501 and 3500 Turkish liras. Lastly, the income status of 19 participants (11.8%) was stated to be 3500 Turkish liras and above.

Eating disorder scores of participants were found to be 49,00 at minimum, 117 at maximum, and 88.96±12.39 on average. According to these findings, it can be stated that the participants have problems related to eating disorders.

It is known that desires, demands, and expectations of all human beings are different, and therefore this case also changes people's consumption habits. Global developments in recent years have considerably increased the expectations, desires and needs of people as they change their consumption habits. People may be motivated to desire something which is far away thanks to information and communication technology.

One of the significant concepts resulting from changing consumption patterns is nutrition.

The attitudes of people to the concept of 'nutrition' changes day by day and this case also changes and their eating habits too. One of the groups whose consumption patterns change particularly, mostly due to dynamic environmental factors, is adolescents. The consumption patterns of college students who comprise a crucial percentage of adolescent groups change too. Eating habits that especially constitute a significant part of physiological stimuli consistently undergo change. In this sense, in the relevant literature, there have been substantial numbers of studies conducted in this field of research and many are still being conducted regarding the eating habits of adolescents (12, 13, 14, 15).

Çehreli and Özarslan who examined students' eating habits and the relationship between their physical conditions and nutrition in their research, focused on the participants who had an age range of between 16-23. 140 of these participants were males whereas 60 of them were females. The participants were students majoring at sports academy, studying at different sports branches and who were active athletes. The findings of the study showed that most of the participants consumed dairy products, meat, eggs, legumes, and sugar-grain in the recommended quantity or above whereas they consumed fruits and vegetables less than the recommended quantity (16).

In another piece of research, Öztürk examined general eating habits of individuals who often went to the gym, and consequently found out that their eating habits were bad (17).

Kayatürk focused on the knowledge regarding eating and eating habits of individuals who did aikido at an advanced level or lower levels in his research. As a result, Öztürk established that participants had sufficient knowledge about eating whereas their eating habits were not good (18).

In another study, Dülger found out that among the participants, 20 % of college students did not regularly have breakfast, 35.5 % of them did not regularly have lunch, and 5.2 % of them did not regularly have dinner. According to data obtained from another study which was carried out in the same field of research, it is stated that 35 % of students did not regularly have breakfast, 46.2 % of them did not regularly have lunch, and 29.6 % of them did not regularly have dinner. These results support the findings of our study.

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EFFECTS OF HIGH INTENSITY INTERVAL TRAINING (HIIT) INTERVENTION AMONGST SCHOOL ADOLESCENTS

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Abstract

Physical Education classes fail to reach the minimum levels of moderate-vigorous activity recommended by international policies (50% of the class duration). Although several methodological strategies have been suggested in scientific literature to combat this limitation, few proposals exist in educational practice in this context. In this sense, the objective of this work was to integrate the emerging high intensity interval training method into a traditional learning unit of Physical Education with the intention of increasing intensity. The results showed that the students analysed improve their body composition and some components of the physical condition, in a non-significant manner. In conclusion, it seems to be a priority to include methodological strategies during physical education classes in order to achieve adequate intensity. The method presented in this practical proposal shows a positive trend in improving health in schoolchildren, although future research is necessary to confirm or refute the results found.

Key words: *Physical Education, intensity, high intensity interval training, active learning units, methodological strategies.*

Introduction

Eighty percent (95% CI 80.1-80.5) of adolescents do not meet the minimum recommendations of physical activity [19]. In addition, the prevalence of weight increase and obesity in children and adolescents has increased worldwide from 16.9% (IU 16.1-17.7) to 23.8% (22.9-24.7) in children from 1980 to 2013, and from 16.2% (15.5-17.1) to 22.6% (21.7-23.6) in girls [30]. In fact, longitudinal studies have shown that physical activity decreases by 10% each year during adolescence; however healthy habits acquired during this period continue into adult life [15]. These worldwide problems position the adolescents as a priority for public health.

Schools represent an ideal place for the promotion of health-related physical fitness [21]. In fact, the subject of Physical Education (PE) seems to be the most suitable subject for this promotion. However, the scientific literature suggests that adolescents remain below the range of moderate to vigorous physical activity (MVPA) recommended during PE classes (at least 50%) [17, 22]. These data have been highlighted in a recent national study by Esteban-Cornejo et al. [16], in which it was found that 1780 Spanish adolescents achieved only 10.8% of the PE class time in the MVPA range. Being aware that the teaching load in this area cannot be modified by the teachers, they should introduce changes in the design of their classes in order to introduce greater physiological stimulus by means of increasing the intensity of work.

There has recently been increased interest in the effects of vigorous exercise intensity because of the potential benefits that could be achieved in health. In fact, there is evidence from cross-sectional and longitudinal studies that associate intense (non-moderate) physical activity with healthier waist circumference, systolic pressure and body mass index [12, 20]. At the national level and in this line we find the EDUFIT study, whose objective was to analyse

the effects of an intervention program based on increasing volume and intensity in PE classes. The results of this study indicated that increase (duplicate) in the load of PE in school facilities achieve an improvement of physical fitness in general, if it is accompanied by an intensity increase [2].

In this context and in the last 10 years a trend has emerged in scientific literature that supports the possible effectiveness of high intensity interval training (HIIT) in improving certain parameters related to the health of adolescents [13]. Although there is no consensus on the definition of this method, it usually involves short periods (from 30 s to 4 min) but intense (more than 75% of maximum heart rate) of physical exercise interspersed with short breaks. Costigan et al. [13] in their systematic review have shown that HIIT can improve aerobic capacity in adolescents (non-standardized mean difference (MD) = 2.6 ml/kg/min, 95% CI 1.8 to 3.3). In this context, the randomized trial with the largest sample size (n=503) to date and one of the first on the field, showed significant changes in aerobic capacity and muscle strength after 10 weeks, where adolescents were prescribed with 10-second sprints at an intensity of between 100-120% of their maximum aerobic velocity [4]. In another systematic review, Logan et al. [25] found improvements in VO2max, insulin resistance, HDL cholesterol, and reductions in body fat, systolic blood pressure, waist circumference, glucose, cholesterol and triglyceride levels in adolescents following a HIIT intervention.

The major limitation of the previous studies is that many of them have been carried out under clinical conditions and with trained participants; therefore, there is little evidence about its effects on the general population. In this sense, the incorporation of HIIT during the school day has begun to be explored [3, 4, 8, 11, 14, 24, 32]. However, most studies have prescribed sprints as a method of increasing the intensity of physical activity. Only Lambrick et al. [24] and Weston et al. [32] used fun activities or circuits as a different strategy for increasing intensity. Thus, the objective of this study is to examine the effects of a 2-month high-intensity interval training program implemented during PE classes at the level of compulsory secondary education on physical fitness in adolescents between 15-16 years.

Materials and Methods

Participants

To conduct this research, an intervention study was carried out; the sample was conveniently selected. A total of 80 participants were part of the intervention, of whom 55 received the intensity program and the other 25 constituted the control group. The mean age of participants was 15.84 ± 0.59 years.

Instruments

Measures were taken before and after the intervention. The order in which the measurements were done was as follows: weight, height, (BMI), waist circumference, body fat, muscular strength, speed-agility and aerobic capacity.

The protocol used for each of the measurements was based on the fitness assessment batteries developed for national and European research projects ALPHA-FIT and PREFIT:

Weight

The child, barefoot, was placed in the center of the platform of the scale distributing their weight across both feet, facing the front, with their arms along the body, and without making any movement. The measurement was made in light clothing, excluding a jacket. A Tanita model BC-601 scale was used. The percentage of body fat was obtained through the formulas integrated in the scale and through the bioimpedance method.

Height

The child, barefoot, stood erect, placed his heels together and his arms along his body. The heels, buttocks and upper back should be in contact with the rod. The head was oriented in such a way that the upper protuberance of the tragus of the ear and the lower edge of the orbit of the eye (Frankfort plane) remained in the same horizontal plane. The child breathed deeply and kept his breath, the measurement was made at that moment and taking as reference the highest point of the head, leaving the hair compressed. Hair adornments and braids were not allowed. To perform this measurement, the Seca 213 portable stadiometer was used.

Waist circumference

The examiner wrapped the tape around the child's waist, who then lowered his arms to a relaxed, abducted position. The measurement was performed at the navel level and so that the tape formed a horizontal plane parallel to the floor. For this measurement the ergonomic metric tape Seca 201 was used.

Muscular strength

The child squeezed the dynamometer gradually and continuously for at least 2 seconds, performing the test twice (alternately with both hands) with the optimum grip adjustment at 4.0 cm and allowing a short rest between measurements. An analog dynamometer was used, namely the Takei model, TKK 5002. For lower muscular strength the student stood behind the jump line, with a foot separation equal to the width of his shoulders. From that position, he bent his knees with his arms in front of his body and parallel to the ground, swinging his arms, pushed hard and jumped as far as possible. He touched the ground with both feet simultaneously and upright. At that time the measurement was taken.

Speed-agility

The 4x10 test run and turn at maximum speed (4x10 m) was used to assess speed-agility. Two parallel lines were drawn on the ground (with ribbons) 10 meters away. When the start was indicated, the child ran as fast as possible to the other line, returned to the starting line, crossing both lines with both feet and hitting the examiner's hand. Then, again, he ran as fast as he could to the opposite line, and ran back to the initial exit line where he hit the examiner's hand. The time needed to cover that distance was chosen.

Aerobic capacity

The child moved from one line to another located 20 meters away and making the change of direction at the rate indicated by a sound signal that was progressively accelerated (20 meter shuttle run test). The initial speed of the signal was 8.5 km/h, and increased by 0.5 km/h/min (1 minute is equal to 1 stage). The test ended when the child was not able to arrive for the second consecutive time to one of the lines with the audio signal. Otherwise, the test ended when the child was stopped by fatigue.

Intervention

The intervention consisted of a high intensity physical exercise program, internationally called HIIT, of a duration of 5 months. The exercise program was implemented at the rate of 2 sessions per week during Physical Education classes. The intervention consisted of a circuit of ten stations, where a high intensity activity was performed at each one. 3 students were at each station and remained together during the 10 stations, performing the activity of each station simultaneously (all three at the same time). The groups of 3 students started the circuit at one station and had to rotate clockwise for the remaining 9. The working time at each station was 45 " and the rest time was 15 " (3:1). The break included the time needed to move from one station to another and to be ready for starting the next station. To correctly control the times, the beginning and the end of each station was marked by the teacher who supervised the physical exercise protocol. Therefore, during one session each student performed 7 minutes and a half of high intensity (HIIT) and 2 and a half minutes of rest. The optimal intensity of working time was greater than 85% of maximal heart rate. Finally, the physical education classes were modified and their timing was as follows: 5 minutes of warm-up + 10 minutes of HIIT + 40 minutes of other curricular content + 5 minutes (intended for, before and after the PE classes). The 10 minutes of HIIT were prescribed by a professional of the group GICAFE-UIB and the remainder of the class was conducted by the professor of PE. Taking into account the school calendar, physical exercise intervention lasted 16 weeks (excluding holidays and evaluation periods), being 32 classes of PE of 60 minutes, which resulted in a total of 226 minutes of vigorous activity.

RESULTS

The main results of this work are presented below. Table 1 shows the main characteristics of the sample. It can be observed that at the beginning of the intervention there were no significant differences between the HIIT group and the control group.

Table 1. Characteristics of participants.

	HIIT (n=55)		CG (n=25)		Sig.	t	95%	
	M	SD	M	SD			Inferior	Superior
Weight (kg)	-4,44	20,47	0,71	1,55	0,053	-1,00	-15,46	5,16
Height (cm)	-2,88	23,58	-0,69	1,20	0,299	-0,37	-14,05	9,68
BMI (kg/m$^{2)}$	0,15	0,61	0,45	0,48	0,304	-1,73	-0,64	0,05
Waist circumference (cm)	-1,44	15,35	0,03	3,77	0,264	-0,38	-9,27	6,32
Body fat (%)	-1,50	10,88	0,18	1,81	0,118	-0,61	-7,18	3,82
Standing broad jump (cm)	12,90	54,22	11,47	26,41	0,495	0,10	-26,92	29,78
Speed-agility 4x10 (s)	0,38	3,08	0,78	3,14	0,800	-0,45	-2,21	1,39
Handgrip strength test (kg)[a]	1,00	3,37	1,97	4,27	0,171	-0,92	-3,08	1,14
Handgrip strength test (kg)[b]	0,63	4,17	2,53	4,00	0,936	-1,58	-4,30	0,50
Aerobic capacity (stages)	-3,36	4,76	-1,47	2,42	0,008	-1,74	-4,05	0,28

[a]Handgrip strength right hand; [b]Handgrip strength left hand; HIIT: high intensity interval training; CG: control group

Table 2. Effects of the HIIT intervention among groups and compared to control group.

	Total (n=80)		HIIT (n=55)		CG (n=25)		
	Mean	SD.	Mean	SD.	Mean	SD	p
Edad (años)	15,84	0,59	15,85	0,64	15,83	0,44	0,123
Weight (kg)	60,72	11,35	61,51	11,67	58,32	10,28	0,438
Height (cm)	167,76	8,73	167,41	8,76	168,83	8,77	0,530
BMI (kg/m$^{2)}$	21,55	3,57	21,91	3,59	20,47	3,39	0,531
Waist circumference (cm)	72,21	9,03	72,85	9,54	70,28	7,19	0,337
Body fat (%)	21,88	8,07	22,42	8,09	20,27	8,02	0,691
Standing broad jump (cm)	159,25	54,60	158,52	58,90	161,44	40,34	0,156
Speed-agility 4x10 (s)	10,30	2,96	10,19	3,04	10,65	2,76	0,595
Handgrip strength test (kg)[a]	30,62	8,08	31,19	8,47	28,89	6,70	0,124
Handgrip strength test (kg)[b]	28,83	7,87	29,51	8,05	26,78	7,12	0,712
Aerobic capacity (stages)	7,36	2,56	7,49	2,60	7,08	2,48	0,716

[a]Handgrip strength right hand; [b]Handgrip strength left hand; HIIT: high intensity interval training; CG: control group

The results of the intervention are presented in Table 2. Negative means represent that they declined after the intervention program and the means in positive denote that the variables increased after the intervention. It should be noted that the intervention did not have significant improvements in any of the variables analysed in comparison to the control group; despite this, the majority of variables analysed resulted in a positive change in the overall health of adolescents.

Discussion

The results of this work show that the intervention carried out in this study has not been enough to produce positive changes at the

physiological level. From these results, several conclusions are drawn; the HIIT method can be feasibly carried out in Physical Education classes although there is still a need for greater knowledge about its prescription in the school population to provoke significant and positive changes in the physical health of adolescents.

It is important to note that most of the variables analysed in this study have shown a tendency toward a positive change for health, although as we have pointed out, it is not enough to be significant. This data indicates that the HIIT is able to stimulate the analysed variables at the physiological level, although not determinant to be statistically relevant. All this leads to the belief that future research is warranted to increase the frequency and volume of this type of methodological strategy in school settings. Due to the limited time dedicated to Physical Education at the curricular level, teachers in this area should seek and implement alternative methodological strategies that increase the intensity levels in physical activity.

In this sense, it is important to highlight the role of the school in achieving positive aspects of health. Schools are ideal environments for the promotion of healthy habits, since childhood is a time of vital development in which the main habits of life are acquired [6]. In this specific case, PE is a compulsory part of school programs in most countries including Spain; and although the PE begins to be considered indispensable within the official curriculum, optimal levels of intense physical activity to promote health benefits in school population are needed [27].

Data from the AVENA study (Feeding and Assessment of the Nutritional Status of Adolescents) show that the Spanish adolescent population has an excessively low level of physical fitness compared to adolescents across other countries. The current situation of sedentary lifestyles, which is increasingly present in the school community, makes PE a more relevant subject, contributing to and facilitating the conservation and improvement of health [18]. It is fundamental to reconsider its role not only from the formative and pedagogical point of view, but also in terms of health, in order to promote healthy lifestyles.

In this line of work, it is important to emphasize the concept of health-related physical fitness, including cardiorespiratory or aerobic capacity, strength, muscular endurance, flexibility and body composition, since a direct relationship between physical fitness and cardiovascular risk in adulthood has been observed [30, 31].

In the case of the EDUFIT study, whose objective was to analyse the programs of an intervention program based on increasing volume and intensity in PE classes on the physical fitness of adolescents, the results indicated that increasing (doubling) the EF load in schools increases aerobic capacity and flexibility [1]. According to the same authors, and despite the difficulty of incorporating these types of programs into the curriculum for mainly bureaucratic and administrative issues, these results can potentially be extrapolated to other educational centres.

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EXAMINATION OF THE COMMUNICATION SKILLS AND TEAM WORKABILITY OF SPORTS STUDENTS ACCORDING TO A RANGE OF VARIABLES

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Abstract

The aim of this study is to examine the communication skills and team workability of students educated in sports education in universities according to a range of variables.

In the study, a personal information form was used to identify the university, department, class and sports branches of participants. The communication skills scale developed by Ersanlı and Balcı in 1998 was used to determine communication skills. For the determination of team workability, the Team Workability Scale developed by Tuncer in 2008 was used. 165 Students from Atatürk and Kafkas University participated in the study. Frequency analysis and parametric statistical analyses were used in the study. As a result of the study, it was determined that the participants had moderate levels (X=3,56±,861) of communication skills and the majority of the participants have responsibility (n=105 %64).

According to the variables of the communication skills and team workability of the students who studied sports education in universities, the communication skills levels did not change statistically according to the universities and departments variables of the participants. The highest average of communication skills amongst the participants are mental skills. (X=3,86±,414). The lowest average of the communication skills of the participants are behavioral. (X=2,44±,616). On the other hand, it has been determined that the team sports athletes among the participants have high averages on Collaboration and Teamwork in team workability. (n=98 %59,39).

Key words: *communication skills, team workability, sports students*

Introduction

Communication skills

Individuals are constantly redefined within their relationships. It is unthinkable to consider a person that does not have any relationship with other people. The nature of a person's relationships determines the quality of that person's life. Self-awareness and a relationship with other people and nature brings about a meaningful life (Cüceloğlu, D 2004). Furthermore, maintaining this meaningful relationship is only possible with communication. The term communication is derived from the Latin word "communis", which means "common". Due to its etymology, the word "communication" refers to partnership, socialization and coexistence. Individuals communicate the rules, values and beliefs in society through communication (Tevrüz, S 1997).

Communication skills are "effective response and effective listening skills, which enable encoding and transmission of messages sent and interpreting the messages received correctly" (Deniz, 2003:8). Communication skills can be summarized as sensitivity to verbal and non-verbal messages, effective listening and

effective response (Korkut, 2004). Cüceloğlu defines communication in the following way: "It is the exchange of emotion and thought between people in general" (cf. Çetinkaya Ö, Alpaslan M A 2011).

Communication skills in communication activity are very important in acquiring sensitivity, especially in understanding others and perceiving their feelings and thoughts by identifying with them. The most important factor in achieving behavioral change is communication skills. Granvold (1994) addresses communication skills within the social skills and states that these skills support successful interpersonal relationships. He considers four cognitive and behavioral skills required for interpersonal relationships and social support.

The skills that enable a healthier communication can be summarized as effective listening and effective response. These skills can be listed in detail as asking appropriate questions, summarizing, repeating with other words, reacting with keywords, identifying and appropriately reflecting other people's behavior, words and emotions, testing their understanding, and giving effective feedback (Coursen, D and Thomas, J 1989).

Although some believe that communication skills are innate and intuitive, many studies show that most of the communication techniques have a characteristic learnable and teachable (Buckman, 2001, Egan, 1994 cf. Korkut Owen and Bugay 2014). Opinions about the kinds of skills involved in communication skills can vary. According to one opinion, communication skills deal with verbal, vocal-based, physical, tactile, gesture-based messages and various mixtures of these messages.

Team workability

Team workability can be seen as a topic that was first discussed indirectly in the late 19th century. People's relationship with their colleagues, managers and other people in their working environments has been the subject of many studies. The industrial establishments, which gained momentum after the industrial revolution, paved the way for more people to do various work in groups. This has further increased the units in a workplace and the importance of coordination between those working in those units. Since the most valuable and powerful source of business is human resources, it is vital for people to be in harmony with each other in terms of productivity.

Schein's group concept is a structure consisting of more than two individuals associated with each other, which call themselves a group and embraces each other psychologically. From this point of view, the difference between the concept of group and "people who came together by chance" is the communication, awareness and the acceptance of the group as an entity.

Unlike groups, Adair defines teams as "communities with absolute goals and common interests". Another definition states that a team is a community formed by two or more individuals who are interdependent and act together to reach predetermined goals. A team emerging as a result of this common goal must serve the interests of the individuals that form the team in question. On the other hand, the individuals who form the team must also serve the interests of the team as well as their own personal interests. This uncovers a kind of synergy called team spirit. Thanks to this cooperation, teammates can work as a team and achieve the desired goals even if they are not physically close. For businesses, individuals who have a team spirit as well as a commitment to their team and organization are more valuable than independent, isolated individuals who act alone. Organizations idealize the individuals who are open, able to express themselves, able to find solutions to problems, and can work as a team, and these qualities are considered to be future employment skills.

An organizational culture based on teamwork, trust in employees, providing authority as well as providing feedback on various matters brings about a positive effect on their motivations. In this context, it is necessary to ensure that employees develop an "organizational identification" and "organizational adoption" by giving priority to teamwork. Their fears must be eliminated by improving mutual trust, understanding and production among employees.

What makes teams valuable is their ability to do a task that requires more than can be achieved on an individual basis, in a more successful manner with fewer people.

Method

The aim of this study is to examine the communication skills and team workability of students who are educated in sports education in universities according to a range of variables. In the study, a personal information form was used to identify the university, department, class and sports branches of participants. The communication skills scale developed by Ersanlı and Balcı in 1998 was used to determine communication skills. For the determination of team workability, the Team Workability Scale developed by Tuncer in 2008 was used. 165 Students from Atatürk (n=77) and Kafkas University (n=88) participated in the study. Frequency analysis and parametric statistical analyzes (an independent samples T test and one way ANOVA) were used in the study.

Findings

Table 1. Information Related to Participants' Demographic Characteristics.

Gender	**N**	**%**
Male	104	63,1
Female	61	36,9
University	**N**	**%**
Atatürk University	77	46,7
Kafkas University	88	53,3
Department	**N**	**%**
Department of Physical Education and Sport Teaching	42	25,5
Department of Training Education	43	26,1
Department of Sports Management	80	48,5
Class	**N**	**%**
1	36	21,8
2	40	24,2
3	45	27,3
4	44	26,7
Sports Branch	**N**	**%**
Individual Sports	67	40,6
Team Sports	98	59,4
Total	**165**	**100**

It is revealed that when considering the distributions related to gender of participants, 36.9% of them are women with 61 people, 63.1% of them are men with 165 people; when considering the distributions related to university 49.7% of them are from Atatürk University with 77 people, 53.3% of them are from Kafkas University with 88 people; when considering the distributions related to departments, 25.5% of them come from the department of physical education and sports teaching with 42 people, 26.1% of them are from the department of education training with 43 people, 48.5% of them are students of the department of sports management with 80 people; when considering the distributions related to class 21.8% of them are first year students with 36 people, 24.2% of them are second year students with 40 people, 27.3% of them are third year students with 45 people and 26.2% of them are fourth year students with 44 people; when considering the distributions related to their branch of sports 40.6% of them re individual sports athletes with 67 people, 59.4% of them are team sports players with 98 people.

Table 2. Communication Skills and Team Workability Comparison of Participants according to Gender. (T-Test)

	Gender	N	X	s.d	t	p
Com. Skills	**Male**	104	3,68	,398	-3,098	,925
	Female	61	3,48	,430		
Team Work	**Male**	104	3,39	,380	1,648	,158
	Female	61	3,25	,421		

(p<0,05)

When the obtained data is analyzed, as a result of communications skills and team workability, a significant difference hasn't been found in terms of comparison of participants according to gender,. (p<0,05) According to this, male students (X=3,68±,398) have higher communication skill levels than the female students (X =3.48±,430). In terms of team workability comparison of participants according to gender, a significant difference hasn't been found. (p<0,05) According to this, male students (X=3,39±,380) have higher team workability levels than the female students (X =3.25±,421).

Table 3. Communication Skills and Team Workability Comparison of Participants according to Universities. (T-Test)

	Universities	N	X	s.d	t	p
Com. Skills	**Atatürk University**	88	3,5	,401	-2,958	,119
	Kafkas University	77	3,35	,239		
Team Work	**Atatürk University**	88	3,44	,440	-3,027	,214
	Kafkas University	77	3,35	,354		

(p<0,05)

When the obtained data is analyzed, as a result of communications skills and team workability comparison of participants according to universities, a significant difference hasn't been found. (p<0,05) According to this, Atatürk University students (X=3,5±,401) have higher communication skill levels than the Kafkas University students (X =3.35±,239).

According to team workability comparison of participants universities, a significant difference hasn't been found. (p<0,05) According to this, Atatürk University students (X=3,35±,354) have team workability levels higher than the Kafkas University students (X =3.44±,440).

Table 4. Communication Skills and Team Workability Comparison of Participants according to Sports Branches. (T-Test)

	Sports Branches	N	X	s.d	t	p
Com. Skills	**Individual Sports**	67	3,39	,363	-1,117	,756
	Team Sports	98	3,45	,327		
Team Work	**Individual Sports**	67	3,41	,774	-1,459	,587
	Team Sports	98	3,55	,438		

(p<0,05)

When obtained data of communications skills and team workability is analyzed in terms of comparison of participants according to sports branches, a significant difference hasn't been found. (p<0,05) According to this, team sports players (X=3,45±,327) have communication skill levels higher than the individual sports athletes (X =3.39±,363). In comparison of participants according to sports branches, a significant difference hasn't been found. (p<0,05) According to this, team sports players (X=3,55±,438) have team workability levels which are higher than the individual sports athletes (X =3.41±,774).

Table 5. Communication Skills and Team Workability Comparison of Participants According to Departments. (One Way ANOVA)

	Departments	N	X	s.d	F	p
Com. Skills	Department of Physical Education and Sport Teaching	43	3,47	,216		
	Department of Training Education	42	3.33	,267	2,297	,104
	Department of Sports Management	80	3.46	,418		
Team Work	Department of Physical Education and Sport Teaching	43	3,39	,664		
	Department of Training Education	42	3,29	,472	,536	,586
	Department of Sports Management	80	3,32	,585		

(p<0,05)

When the obtained data is analyzed according to educational departments, no significant difference has been found in terms of communication skills and team workability comparison of participants. (p < 0,05) According to this, department of physical education and sport teaching students (X=3,47±,216) have higher communication skill levels than the other departments' students. A significant difference hasn't been found in team workability comparison of participants according to educational departments. (p<0,05) According to this, department of physical education and sport teaching students (X=3,39±,664) have higher team workability levels than the other departments' students.

Table 6. Communication Skills and Team Workability Comparison of Participants According to Classes. (One Way ANOVA)

	Classes	N	X	s.d	F	p
Com. Skills	1	36	3,39	,411		
	2	40	3,48	,234	,720	,541
	3	45	3,39	,431		
	4	44	3,45	,254		
Team Work	1	36	3,36	,423		
	2	40	3,57	,420	3,568	,815
	3	45	3,38	,425		
	4	44	3,29	,305		

No significant difference has been found in terms of communication skills and team workability when obtained data is analyzed in comparison of participants according to classes. (p < 0,05) According to this, year 2 students (X=3,48±,234) have higher communication skill levels than students of other class. In comparison of participants according to classes, a significant difference in team workability hasn't been found. (p<0,05) According to this, class 2 students (X=3,57±,420) have higher team workability levels than the other classes' students.

Table 7. Communication Skills and Team Workability Correlation Levels (Pearson Correlation)

		Communication Skills	Team Workability
Communication Skills	**Pearson Correlation**	1	.492**
	P		.000
	N	165	165
Team Workability	**Pearson Correlation**	.492**	1
	P	.000	
	N	165	165

(p<0,01)

According to the correlation analysis results, it was determined that there was a positive correlation between the communication skills and adaptation to teamwork (r=,492,p<0,01).

Discussion and Conclusion

As a result of this study, which investigates the communication skills and teamwork compatibility of undergraduate students receiving sport education according to various demographic variables, it was found that there was no statistically significant difference between the groups in terms of communication skills and adaptation to teamwork.

Considering the communication skills and adaptation to teamwork according to the genders of the participants, male participants were found to have higher averages than female participants. It has also been observed in other studies that effective communication skills may change depending on gender (Korkut, 1996, Moskal, 1997, Korkut, 2005, Gölönü and Karcı, 2010). Communication skills follow a different course of development beginning from childhood. For example, female children prefer playing alone in their early childhood, whereas male children prefer playing in groups at the same period. This may explain why males have a higher level of communication skills and a higher level of adaptation to teamwork than females.

Looking at communication skills and adaptation to teamwork according to the universities of the participants, students at the Atatürk University were found to have higher averages than the students studying at Kafkas University. Atatürk University is larger than Kafkas University in terms of its number of students. The number of students is also to the advantage of Atatürk University in terms of the sports education provided. An environment with more people can bring about more communication. Thus, this may explain the higher communication skills score averages of the students at Atatürk University. According to the correlation analysis results, it was determined that there was a positive correlation between the communication skills and the adaptation to teamwork. Accordingly, this explains the higher teamwork compatibility score average of the participants studying at Atatürk University.

Considering the communication skills and adaptation to teamwork according to sports branches of the participants, participants in team sports were found to have higher averages than the participants in the individual sports branches. When the related literature was reviewed, it was found that there was no study that investigates

the level of teamwork compatibility of the individuals who receive sports training.

In addition, there are studies showing that the athletes in team sports have a higher level of communication skills than those engaged in individual sports (Ulukan 2012).

When the participants' communication skills and adaptation to teamwork were investigated according to their departments, it was observed that the participants studying at the Physical Education and Sports Teaching Department had higher average scores than the students at the Sports Management and Coaching Education Department. On the other hand, freshmen students were found to have higher averages of communication skills and teamwork compatibility according to their years in college. In the literature review on communication skills and teamwork compatibility according to department and years in college variables, it was found that there was no study on the adaptation to teamwork, whereas there were studies on communication skills with findings similar to this study (Tepeköylü et al 2009, Korkut 1997, Pehlivan 2005).

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INFLUENCE OF PHYSICAL REHABILITATION ON SOCIAL NETWORKS AND QUALITY OF LIFE AMONG PEOPLE WITH PARKINSON'S DISEASE

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Abstract

Parkinson's Disease (PD) is the second most common neurodegenerative disease. Symptoms relate to the movement and cognitive sphere; they have a negative impact on the quality of life of people suffering from PD. Pharmacotherapy and rehabilitation slow the progression of the disease. The aim of the work was to determine the impact of physical rehabilitation on the level of social relations in the context of the quality of life of people with PD. 47 people with idiopathic PD were involved in the study, all were in the second stage of the disease according to the Hoehn & Yahr scale. The Courage Social Network Index (CSNI) was used to assess social relations. The scales: Quality of Life in Parkinson's Disease 39 (PDQ-39), Medical Outcomes Study 36-item Short-Form Heath Survey (SF-36) and Parkinson's Disease Quality of Life Questionnaire (PDQL) were applied in order to evaluate the quality of life of patients The subjects were divided into two groups: research and control. The research group took part in a rehabilitation program two times a week for 45 minutes for three months. The control group did not participate in any form of physical rehabilitation. The results of the research showed a significantly higher level of social bonds as well as quality of life of people with PD participating in physical rehabilitation. At the same time, a higher level of correlation between the level of social bonds and the level of quality of life was found in the research group. Therefore, the positive impact of physical rehabilitation on the level of social bonds and the quality of life of people with PD constituted the conclusion of the work.

Key words: *Parkinson's disease, social networks, quality of life, rehabilitation*

Introduction

Parkinson's Disease (PD), the second most common neurodegenerative disease [14], was named after the English physician James Parkinson. He was the first who undertook research and observed people suffering from characteristic symptoms and presented the results of research in the work "An essay on the shaking palsy" in 1817 [8]. The occurrence of PD is associated with age. It is estimated that about 1-2% of people over 65 years of age may struggle with the disease, and among 85 year olds this problem may affect even 4-5% of the society. Usually, the disease begins to develop around the age of 60; however, up to 10% of all cases [24] are patients under 45 years of age, who are diagnosed with the disease. According to estimates, in 2005, 4.1-4.6 million people were suffering from PD around the world, and by 2030, this number may increase up to 9.3 million [25].

PD etiology is still unknown: both genetic and environmental factors could be significant [3]. They affect the disappearance of dopaminergic cells in the pigmented volume of the brain called substantia nigra pars compacta. It leads to a reduction in dopamine production as well as dysfunction involving basal ganglia which is responsible for initiating motor skills [19]. Studies have shown that the disappearance of dopaminergic cells can be up to 70% compared to their amount among healthy people [3]. Another typical pathophysiological feature of PD is the presence of Lewy bodies, that are composed of the α-synuclein protein molecules,

the genes of which have been mutated [5]. In the course of the disease they appear both within the substantia and in the basal ganglia [21].

The characteristic motor symptoms of PD include bradykinesia which causes progressive loss of amplitude and velocity of movement. Other symptoms include rest tremor occurring in affected parts of the body in a state of rest; stiffness of the limbs and shoulders characterized by increased muscle tension during static movements; inflexibility of postural reflexes and gait disorder characterized by small "shuffling" steps, and last but not least episode symptoms resulting in, among others, frequent falls [8]. In addition to abnormalities of motor function, there are also non-motor symptoms related to neuropsychiatric problems as well as the occurrence of pain and fatigue [9]. Due to these non-motor symptoms it ought to be noted that PD can begin to develop much earlier before it is diagnosed, and symptoms may be non-specific (eg. impaired sense of smell, sleep problems or depression) [13].

PD has an adverse impact on many aspects of a patient's life, and the effect becomes more visible and noticeable as the disease progresses. The difficulties concern coping with everyday activities, they also refer to the cognitive and communication sphere. That all results in reducing well-being and decreasing the patient's quality of life [17]. In order to prevent this process, therapies are introduced in order to delay the development of the disease and the occurrence of its symptoms. The main methods of treatment are pharmacotherapy and physical rehabilitation. In pharmacotherapy L-Dopa - supplementing the deficiencies of endogenous dopamine is mainly used [15]. On the other hand, rehabilitation should maximize the patient's motor skills and minimize the difficulties associated with disorders resulting from PD progression. Rehabilitation can constitute classical physiotherapy, which is focused on movement symptoms and conditioning workouts. The therapist aims to improve the weight transfer as well as gait, upper limbs functions, prevents falls [23], but he can also focus on other forms of non-specific activities such as dance or yoga [12,18].

Taking into account the aging of the population and the increase in the frequency of PD, the aim of the study was to determine the impact of physical rehabilitation on the level of social bonds in the context of the quality of life among people with PD.

Material and methods

The study was conducted in a group of 47 people (63.58 ± 7.21 years), treated at the Department of Neurology of the Medical University of Silesia in Katowice, members of the Silesian Association for People with Parkinson's disease, diagnosed with idiopathic PD disease. Duration of the disease was 6.23 ± 4.68 years. The research was approved by the Bioethical Commission of the Academy of Physical Education in Katowice. All subjects were informed about the purpose and the course of the research and gave their written consent to participate in it.

PD diagnosis was based on the United Kingdom Parkinson's Disease Society Brain Bank criteria. The study included patients with stage II disease according to the Hoehn & Yahr scale [7]. The subjects did not have other coexisting neurodegenerative diseases. The purpose selection technique was applied. The subjects were divided into a group of those participating (A) and those non-participating in the process of physical rehabilitation (B).

In order to determine the clinical status of patients, Unified Parkinson's Disease Rating Scale (UPDRS) was used. It comprised of part I (mentation, behavior, and mood), part II (activities of daily living) and part III (motor examination) [1]. The characteristics of the subjects are presented in table 1.

Table 1. Examined characteristics.

Variable		Group A (n=21)	Group B(n=26)	Student's t-test	
		X± S	X± S	t	p
Age (years)		62,98±5,68	64,06±6,35	2,38	0,51
Disease's duration (years)		5,87±1,25	6,52±0,92	4,38	0,43
UPDRS [points]	part I	2,34±0,75	2,29±0,61	1,58	0,15
	part II	14,33±1,68	13,52±2,02	1,39	0,21
	part III	19,27±2,92	21,11±1,98	2,98	0,31
	part I, II, III	35,94±5,02	36,92±4,6	0,72	0,19

UPDRS – Unified Parkinson's Disease Rating Scale, X - arithmetic mean, S – standard deviation, t - value of t - test, p – probability.

To evaluate the level of social network, the Courage Social Network Index (CSNI) was used [26]. The CSNI scale evaluates the functioning of the three elements of the social network structure: social ties and intimacy level of relations - 8 questions (the first, separate concerning the spouse/ partner and the other seven, each of which is constructed in the same way, but concerns a different subject - parents, children, grandchildren, other relatives, co-workers, friends, neighbours), social support - 8 questions (each is constructed in the same way, but concerns other subjects mentioned above), direct contacts - 8 questions (each is constructed in the same way but concerns other subjects mentioned above). The questions contain a certain number of statements the total number of which in the questionnaire is 107. Each of the statements was assigned a certain number of points.

To determine the quality of life of the subjects, the following scales were used: The quality of life in Parkinson's disease 39 (PDQ-39) [9], Medical Outcomes Study 36-item Short-Form Health Survey (SF-36) [16] and Parkinson's Disease Quality of Life Questionnaire (PDQL) [6].

The PDQ-39 scale includes 39 questions, arranged in 8 subscales: mobility - 10 questions, daily life activites - 6 questions, emotional well-being - 6 questions, stigmatisation - 4 questions, social support - 3 questions, cognitive functions - 4 questions, communication - 3 questions, general discomfort - 3 questions. There are five options in the scoring system - from 0 to 4 points (0-never, 1-rare, 2-sometimes, 3-often, 4-always). The questions relate to the last month and are closely related to PD. Each question starts with the statement "Because of PD, over the last month, how often...?". The questionnaire was filled in by the subjects themselves. The score was calculated separately for each subscale (domain) according to the formula: sum of points of the given subscale x 100/4 x number of questions for the given subscale. The collective result of the questionnaire was given in the form of the so-called summary index (SI) in accordance with the formula: PDQ-SI = sum of points/8. The maximum number of points obtained in a given subscale was 100 and indicated the worst quality of patient's life.

36-item Short-Form Health Survey (SF-36), enables the evaluation of 8 sections concerning quality of life: physical role functioning (PF), limitation in performing roles due to physical disability (PL), bodily pain (BP), general health perceptions (GH), vitality (V), social role functioning (SF), limitations in fulfilling social roles due to emotional problems (EL) and mental health (MH). The questionnaire consists of 11

questions containing 62 statements. Each of the statements was assigned a point value. The 0 point value means the lowest quality of life, while the 100 points value - the highest one. The point value corresponds to the individual's quality of life. There are two values: quality of life in terms of physical aspects (PF, PL, GH, MH) and the quality of life in terms of mental aspects (BP, V, SF, EL).

The assessment of the quality of life of the subjects was accomplished using the PDQL scale. It consists of 37 items covering four domains. They comprise parkinsonian symptoms (14 items), systemic symptoms (difficulty walking, malaise, sleep disorder, exhaustion, constipation, urinary incontinence (7-items), emotions (9 items) and social functions (hobby, sex, recreation, leisure trips, public speaking, transport difficulties, low mood and intimidation) - 7 items. The respondent had the opportunity to choose one out of five responses regarding the prevalence of disorders mentioned above: 1-permanent, 2-most of the time, 3-quite often, 4-sometimes, 5-never.

Patients involved in the process of rehabilitation (group A) participated regularly in rehabilitation classes in the gym twice a week for 45 minutes. They had already begun at least 3 months prior to the study. The rehabilitation program was focused on individual symptoms. In the case of the slow movement and inflexibility of postural reflexes, attention was paid to the optimal use of the retained patterns for acquired and automatic movements. The procedure included: frequent repetition of movements, combining movements with the special acoustic step initiator, repetition of movements with different frequency, introduction of arbitrary movements with stimulating mechanisms: visual, auditory and sensory cues, imaginative stimulation of the movement before its performance, cognitive strategies of the equivalent reflexes induction, awareness of postural abnormalities and their correction. In the case of stiffness, rehabilitation treatment did not concern coping with stiffness itself but minimizing its negative impact, while in the case of tremors, a strategy for reducing them was implemented. The subjects were taught ways of controlling tremors through purposeful movements. During the course, each exercise was useful in terms of coping with everyday activities [2].

The obtained results of the research were statistically measured by calculating basic descriptive statistics. The homogeneity of variance in the compared groups was measured using the Levene's test and the normal distribution of features using the Kolmogorov-Smirnov test. Student's t-test was applied in order to determine the relationship between groups in the analyzed parameters. Pearson's correlation coefficient was used to specify the differences between the results of the tests concerning social bonds and the patients' quality of life.

Results

Before analyzing the results of tests evaluating the quality of life and social ties of the respondents, both groups were compared with respect to age, duration of disease and clinical condition. The conducted analyses did not reveal any statistically significant differences between the studied groups at the assumed significance level of $p<0.05$ (Table 1).

Through the use of statistical methods comparisons could be made and the results obtained in the tests completed by both groups showed that statistically significant differences between the groups occurred in all the tests. The largest absolute difference was observed in the PDQL test, while the smallest difference in the PDQ-39 test (Table 2).

Table. 2. The summary results of evaluation of the respondents' quality of life in the applied tests.

Variable		Group A	Group B	Absolute difference	Relative difference	Student's t-test	
		X1± S	X2± S	X2-X1	X2-X1 (%)	t	p
PDQ-39 (points)		19,59±3,45	23,05±4,12	3,46±0,72	15,01±2,81	2,46	0,003
SF-36 (points)	Physical Component	48,68±4,28	41,68±3,72	-7,00±0,72	-16,79±1,72	1,88	0,002
	Mental Component	51,35±5,05	43,24±3,62	-8,11±1,91	-18,76±3,78	1,89	0,03
PDQL (points)		149,28±12,64	127,26±13,46	-22,02±6,15	-17,30±4,52	5,46	0,001
CSNI (points)		67,28±7,05	59,87±4,28	-7,41±5,67	-11,01±1,028	2,58	0,001

PDQ-39 – Parkinson' Disease Questionnaire, SF-36, – Medical Outcomes Study 36-item Short Form Health Survey, PDQL – Parkinson's Disease Quality of Life Questionnaire, CSNI - Courage Social Network Index., X – arithmetic mean, S – standard deviation, t – value of t-student's test, p – probability

In order to achieve the main goal of the work the correlation coefficients between the social ties of the respondents and their quality of life were calculated. The obtained results show a negative correlation between the PDQ-39 and CSNI tests, which is more significant in the research group. There is a positive correlation between the SF-36 (PC and MC) and CSNI tests, also more significant in the research group. Whereas between PDQL and CSNI tests among patients who were rehabilitated there is a strong positive correlation, in the control group the correlation is negative and insignificant (figure 1).

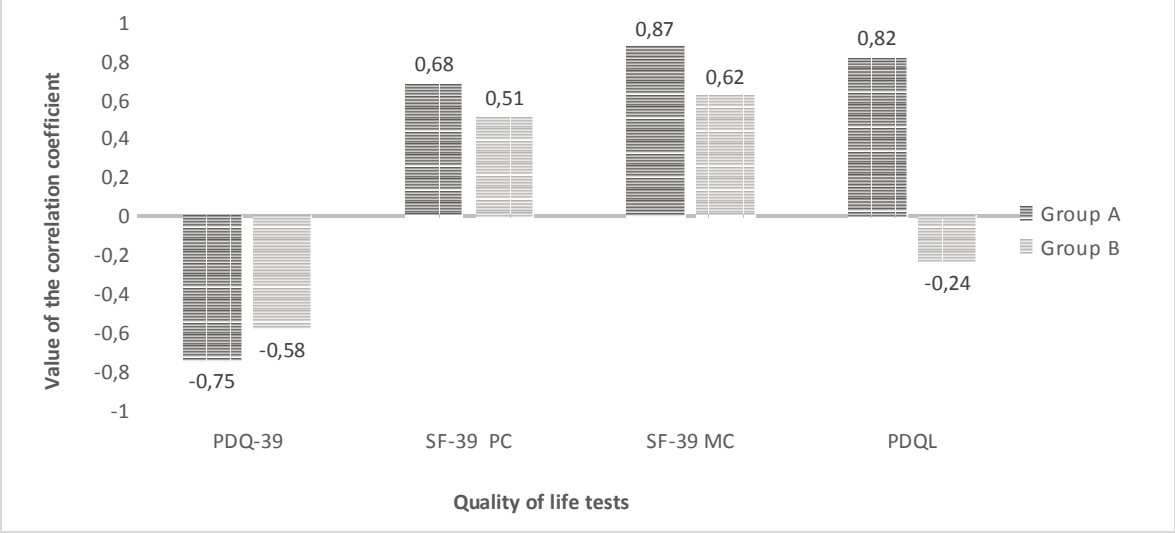

Fig.1. Correlations between the Courage Social Network Index score and the Quality of Life Tests.

Discussion

Studies have shown that the quality of life of PD patients is related to their social bonds. The correlation in the research group occurring between the CSNI and PDQ-39, SF-36, PDQL tests indicates that the better the quality of life, the higher the level of interpersonal relationships.

In addition, it can be observed that implementation of the physical rehabilitation program has an influence on the development of these relations. In the research group, the correlation between test results is higher, which shows that after the introduction of such a program aimed at improving the quality of life of people with PD, the level of improvement in the area of social network can be more accurately determined.

The obtained results indicating the connection of both these aspects of PD patients' life are consistent with the observations that Takahashi et al. made [22]. They carried out the analysis using the SEIQoL-DW test. It assumes that the patient is supposed to choose five elements that are most important to him/her in life and evaluate the possibility of their implementation using the VAS scale. The authors found that patients themselves most often indicate social relations as a critical factor affecting their quality of life. However, in the same study the results of the SEIQoL-DW test with the total results of the PDQ-39 test and with the results of each of the subscales were also compared. In contrast to the outcome we achieved, no significant correlation between the two tests was observed, but only between SEIQoL-DW and the PDQ-39 subscale which evaluated communication skills. It shows that the ability to communicate with relatives is interconnected with the quality of life of patients. The authors estimate that the lack of the relationship between the total PDQ-39 test result or other subscales, and SEIQoL-DW test is the result of its close connection with the physical sphere related to the patient's quality of life, and to a lesser extent, it affects the emotional sphere.

However, on the basis of the statement implying a high degree of connection of the PDQ-39 test with the sphere of the physical quality of life of the patient, it can be assumed that the improvement in the results of this test will, in consequence, reduce the degree of disability. In studies devoted to the influence of PD on disrupted social connectedness, Soleimani et al. [20] drew attention to the existence of four factors affecting social isolation, two of which are related to the physical aspect: progressive physical disability and shrinking of social activities. The first of these was regarded as fundamental for patients as it created limitations in the social interaction they had before diagnosis of the disease. Whereas the second factor concerned patients' jobs where they were assigned tasks that exceeded their abilities. It resulted in the loss of employment or necessity of early retirement. Research showed that due to physical rehabilitation the PDQ-39 test results improve. Therefore, it can be concluded that through rehabilitation, it is possible to influence the functional state of patients, and thus to reduce the level of social isolation.

The relationship between the quality of life and the increase in the social network was also observed using the SF-36 test. The examined connections referred to the physical and mental aspects of this test. In order to observe factors affecting the quality of life of PD patients Morimoto et al. [11] used the time trade-off method (TTO). They searched for a relationship between this method and other variables, including each of the 8 domains of the SF-36 test. They demonstrated that the level of quality of life correlates significantly with domains concerning vitality and social role functioning. Therefore, it can be concluded that rehabilitation aimed at increasing the degree of vitality and improving social function would be the most beneficial for patients. Based on the authors' results, it would be reasonable to study the relation of the CSNI test results on particular SF-36 domains in order to determine the close connections.

The observed relation between the social network and the quality of life of patients with PD seems to be mutual. This means that increasing or decreasing the value of one factor will affect the value of the other one. The improvement of the quality of life expressed in the score obtained in a given test may enhance social relations as a result of, for example, increasing mobility or reducing the intensity of Parkinsonian symptoms. Participation in physical rehabilitation allows patients to participate in family life more frequently or meet with friends. At the same time, it can be stated that social support is a significant factor improving the quality of a patient's life. In a study on the significance of the patient's

relationship with close relatives and their quality of life, Ghorbani Saeedian et al. [4] show that there is a correlation between social support and the occurrence of anxiety and depression. Rehabilitation should therefore be a comprehensive process, including activities aimed at improving physical fitness, functional independence and quality of life, but also using the positive effects of social relations.

The issue of the relation between the level of social networks and the quality of life of patients with PD is a new issue, which is only slightly raised in literature. A small amount of research hitherto suggests the necessity of developing this notion. The actual results imply a significant relationship between both these aspects of the patient's life, which only emphasizes the importance of the problem.

Conclusions

The social network of people with PD is related to the level of quality of life. Physical rehabilitation increases this state and positively affects social activities among Parkinson's disease patients.

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STAGES OF READINESS IN THE UNDERTAKING OF PHYSICAL ACTIVITY AND LEVELS OF PHYSICAL FITNESS AMONG POLISH AND TURKISH CHILDREN

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Abstract

Acquiring competences in the area of physical culture depends on the intention of physical activity, as well as on the level of physical fitness. It is important to learn the factors determining physical fitness; therefore the purpose of this research was to determine the relationship between the stages of readiness for regular physical activity and the level of physical fitness of children from Poland and Turkey. The research included pupils aged 14 living in the Raciborz area in Poland and in the area of the city of Balikesir in Turkey. Readiness for regular physical activity was assessed using a special algorithm in accordance with the concept of the transtheoretical model (TM). In this research the interpretation of TM was accepted for the assessment of intentional behavior. To determine the level of physical fitness, the European Fitness Test - Eurofit was used. Statistical analyses showed statistically significant differences. Of the 8 tests carried out, in six - a larger level was obtained by respondents from Poland and in five of them these were statistically significant differences. In 2 of the tests carried out, the young people from Turkey reached an average higher level. The correlation coefficient between the stages of readiness to undertake physical activity and physical fitness tests was calculated to achieve the main objective. The vast majority were low dependencies. On the basis of the conducted research, it was found that the studied group of Polish youth was characterized by a higher level of physical fitness than their peers in Turkey. There was no significant relationship between the stages of readiness to undertake physical activity and the results of fitness tests. The need for further research was concluded.

Key words: *physical fitness, Eurofit, transtheoretical model, nationality.*

Introduction

One of the dangerous effects of the universal consumption of post-modern mass culture and consumer civilization is, among other things, physical passivity. A reluctance to participate in physical activity creates the phenomenon of decomposition amongst the needs of the younger generation. Life based on the patterns of consumer civilization does not lead to a realization of needs that result in supporting development and human health [22]. Positive attitudes towards physical activity are the norm of a small part of society and they often appear too late. Some authors associate the reasons for the expansion of physical passivity with socio-political transformations, with the dissemination of patterns of mass Western culture. The uncontrolled growth of media techniques and information, the isolation of man from nature, the significant and various limitation of physical activity characterize phenomena dangerous for development and human health.

Acquiring competences in the area of physical culture depends on the intentions of physical activity; it also affects emotional health, including self-esteem [2,13]. Some studies point to the fact that self-efficacy determines how people spend their free time. People displaying this characteristic are more physically active. Self-

efficacy allows one not only to maintain the recommended physical activity, but also to prevent its reduction [10].

Limiting physical activity leads to a decrease in physical fitness and efficiency, especially among school-age children, which later affects their life and health. Establishing the factors determining physical fitness is an important issue here. A diverse cultural background seems justified as one of them. Available publications draw attention to the impact of socio-economic factors as the basis for reduced physical activity and consequently, physical fitness. However, in literature there is a lack of references to cultural conditions. Considering these reflections, the aim of the research was to determine the relationship between the stages of readiness for regular physical activity and the level of physical fitness of children from Poland and Turkey.

Materials and methods

The research included pupils aged 14 living near Raciborz in Poland and in the vicinity of the town of Balikesir in Turkey. These locations are similar in terms of population, demographic profile and employment structure. The selection of schools in which pupils were examined was selected randomly.

In Turkey, the age of respondents reflects completing the period of compulsory education. Under the "İlköğretim Okulu" act, compulsory education lasts eight years and includes children and adolescents aged from 6 to 14 years. The compulsory school is a uniform structure in which the primary and lower secondary school is not formally separated [29].

In Poland, during the research, the compulsory school system included a 6-year primary school and a 3-year junior high school. The research covered pupils from the first class of junior high school [28].

The inclusion criterion for both Polish and Turkish youth was their calendar age.

For a more complete characterization of the subjects, measurements were made:

- body height with anthropometric accurate to 0.1 cm,
- body weight with an electronic medical scale accurate to 0.1 kg.
- Waist and hip circumferences with an accuracy of 0.5 cm.

On the basis of the obtained data, the relative body mass index (BMI), as well as adiposity and fat tissue distribution: Waist to Hip Ratio (WHR), Waist to Height Ratio (WHtR) were calculated. The characteristics of the subjects are presented in tab.1.

Tab. 1. Examined characteristics

Variables	Polish youth		Turkish youth		Absolute difference	Relative difference
	x	S	X	S	X1-X2	X1-X2(%)
Body weight [kg]	60,69	12,61	62,83	8,48	-2,14	-3,40
Body height [m]	170,19	8,80	169,08	7,70	1,11	0,65
BMI	20,88	3,77	21,91	2,04	-1,03	-4,71
WHR	0,88	0,06	0,82	0,09	0,06	7,39
WHtR	0,45	0,06	0,43	0,05	0,02	4,33

BMI - body mass index, WHR - Waist to Hip Ratio, WHtR - Waist to Heigh Ratio.

Readiness for regular physical activity was assessed with a special algorithm in accordance with the concept of the transtheoretical model (TM). The TM indicates changes in behaviour at various stages, the presence of which is determined by other variables, with each factor

requiring involvement to a different degree. It is also referred to as a model of motivational readiness for physical activity, physical exercise / physical activity or a model of change stages [3,21,26].

In this work we adopted the interpretation of the model using the concepts, making it possible to present the type of distance that a person has to overcome in order to achieve the target of behaviour referred to as regular physical activity at the recommended intensity and frequency. These are intentional behaviours, which are the stage of change, the stage of readiness to change, and motivational readiness for physical activity. The authors [3,5,26] distinguish five stages:

1. Precontemplation (Not Ready) – this is the stage in which the person is not physically active and does not intend to be so in the next semester. This state is a consequence of not being informed about the effects of a passive lifestyle or of a negative memory of this activity.
2. Contemplation (Preparing) – a person is not physically active, but intends to change his or her lifestyle in half a year. This is an intentional stage. These are only thoughts about physical activity.
3. Preparation (Ready) – a stage during which irregular, sporadic and less than recommended physical activity occurs or the specific purpose of activity is being specified.
4. Action – physical activity is regular, but it lasts less than 6 months, it is possible that it will stop in the future. This stage includes people who are physically active, beginners.
5. Maintenance – a person is regularly physically active for more than half a year, which means that the probability of resignation is lower.

The task of the respondents was to assess which of the five statements proposed best describes their readiness for regular physical activity. The result is the assignment of the subject to one of five stages corresponding to readiness to undertake physical activity.

To determine the level of physical fitness, the European Fitness Test – Eurofit [9] was applied. The following tests were carried out: body balance, speed of hand movements, flexibility, explosive strength, static force, functional strength, running speed, cardiopulmonary endurance.

Obtained results of investigations were developed by calculating basic statistical measures. To assess the normality of data distributions, the Shapiro-Wilk test was used to determine the homogeneity of variance of the Levene test. To determine the significance of differences in mean values, analysis of ANOVA in multiple classifications was used, and to show relationships between variables Pearson's correlation test was applied.

Results

Statistical analysis of the somatic parameters of the subjects showed no statistically significant difference between the groups, taking into account body weight ($t=-1,19$; $p<0,24$), body height ($t=0,76$; $p<0,45$) and WHtR ($t=1,87$; $p<0,06$). Statistically significant differences were found in BMI ($t=-2,10$; $p<0,04$) and WHR ($t=4,16$; $p<0,01$).

The analysis of the level of physical fitness of subjects from Poland and Turkey showed statistically significant differences. Of the 8 tests carried out, in six - a larger level was obtained by respondents from Poland and in five of them these were statistically significant differences. In 2 of the conducted tests, the youth from Turkey reached an average higher level (total body balance, flexibility), but these were statistically insignificant differences. The greatest relative differences were observed in the level of functional strength (81,47%) and endurance (48,40%). The smallest in the level of flexibility (3,19%). (Tab.2).

Tab. 2. The results obtained by the subjects in individual tests

	Polish youth		Turkish youth		Absolute difference	Relative difference	t - tests
Variables	x	s	X	S	X1-X2	X1-X2(%)	p
Total body balance	1,40	0,82	1,45	0,80	-0,05	-3,33	0,74
Speed of hand movements	11,24	1,65	12,20	1,54	-0,96	-7,86	0,01
Flexibility	8,48	4,96	8,76	6,18	-0,28	-3,19	0,79
Explosive Strength	191,96	30,28	183,03	30,45	8,93	4,88	0,10
Static force	24,55	6,92	19,85	5,75	4,70	23,68	0,00
Functional strength	28,80	21,47	15,87	11,82	12,93	81,47	0,01
Running speed	19,84	2,67	20,73	1,64	-0,89	-4,31	0,00
Cardio-respiratory endurance	9,28	2,38	6,25	1,43	3,03	48,40	0,00
Stages of readiness to undertake physical activity	4,00	1,34	3,35	1,07	0,65	19,40	0,00

p – probability in t-tests

The correlation coefficient between the stages of readiness to undertake physical activity and physical fitness tests (Tab. 3) was calculated for the main purpose of the work. Only in one case was there a clear relationship. It occurred in Turkish youth between the stages of readiness to undertake physical activity and the level of endurance. In other cases, these were low dependencies.

Tab. 3. Correlation between readiness to undertake physical activity and physical fitness tests.

Variables	Polish youth	Turkish youth
Total body balance	0,02	-0,02
Speed of hand movements	-0,10	-0,05
Flexibility	0,12	0,12
Explosive Strength	0,00	0,16
Static force	-0,04	0,06
Functional strength	0,02	0,04
Running speed	-0,08	-0,21
Cardio-respiratory endurance	-0,05	0,36

Discussion

For a number of years studies have been conducted to assess the level of physical fitness of children and adolescents using a variety of research tools. The European Physical Fitness Test applied in the work allows for a comprehensive assessment of the components of physical fitness, assesses the basic areas of human mobility and creates the opportunity to

compare the results obtained by different populations.

The work presents the results of research on one age group and for this reason they are the pilot. On the basis of the conducted research it was found that the level of the majority of the parameters examined is higher in Polish schoolchildren. Based on the available literature, it can be assumed that the level of physical fitness presented by the pupils of the schools studied is directly proportional to the organizational and technical possibilities in which physical education classes take place as well as the way of spending free time [18, 25].

The educational environment plays a particularly important role in this context as children engage in physical activity and sports at school. Thus, schools and teachers facilitate the physical activity of children, as do educators in early childhood education and child care facilities and sports clubs. Modern social reforms, created in many countries, perceive the dissemination of physical activity as an important element of national health promotion programs. This is a consequence of the state of knowledge about the importance of physical activity in health prophylaxis. Physical activity of a given community depends on "socio-economic status and income inequality", which include education, amount of earnings and type of work performed. It was found that less wealthy people less often use sports and recreational infrastructure [27].

In the case of children, the role of parents, the family as well as the wider community is also important. Numerous studies concern the influence of the family. Some authors believe that shaping a child's personality depends on genes, and peers influence other factors [31]. Most, however, say that the family is the foundation of the child's socialization for physical activity. The family shapes attitudes and behaviors regarding physical activity [4, 23, 24].

The EU guidelines on physical activity [12] have emphasized that in recent years, everyday habits of children have changed due to the emergence of new models of spending free time (television, internet, video games, smartphones, etc.) and that this leads to reduced physical activity. This tendency can be explained also by time constraints, social and budgetary constraints, changes in lifestyle or the lack of proper sports infrastructure. The EU guidelines highlighted serious concerns that physical activity among children and adolescents was supplanted by more static activities [8].

Despite the general propensity of children to be physically active, their physical activity has decreased over the past 20 years. This change has coincided with increasing rates of childhood weight issues and obesity and health problems or physical disabilities such as musculoskeletal disorders. According to estimates from the WHO's Childhood Obesity Surveillance Initiative (COSI), around 1 in 3 children in the EU aged 6-9 were overweight or obese in 2010. This is a worrying increase since 2008, when the estimates were 1 in 4 [11].

Physical activity and cardio-respiratory fitness are widely recognized as factors in the prevention of diseases related to obesity, type 2 diabetes and cardiovascular diseases. It was found that racial and ethnic differences are factors affecting the frequency of their occurrence. National minorities are more at risk of civilizational diseases than white Americans. The difference is particularly visible between black and white adults [6]. Most research on race and ethnic differences in fitness and activity among teenagers indicates that minorities are less active and physically fit than their white peers. However, the results are not unequivocal due to the methodological diversity of the studies [15,16,19].

Reduced physical activity of children and adolescents is manifested by reduced efficiency and exercise capacity. In many scientific publications, insufficient physical activity among children and adolescents is found, regardless of where they live in the world [7.30].

Acquiring competence in the area of physical culture depends on the intentions of physical activity, as well as affecting emotional health, which includes self-esteem [2,13]. Research shows that a sense of self-efficacy has a great effect on physical activity and this depends on how you spend your free time. People with this attribute are more physically active. Self-efficacy not only enables the maintaining of the recommended physical activity, but also prevents its reduction [10].

The transtheoretical model (TM) indicates changes in behavior at various stages, the presence of which is determined by other variables, and each factor requires involvement to a different degree. It is also referred to as a model of motivational readiness stages for physical activity, physical exercise / physical activity or a model of change stages [3,21,26].

Comparing school-age youth from Poland, Hungary, Turkey and the USA in terms of the social and cognitive determinants of physical activity, it can be noticed that among Polish youth, statistically significant factors include: self-efficacy (ß=0,18), gender (ß=0,17), age (ß=0,12), future orientation (ß=0,15), social orientation (ß=0,08) and physical activity of peers (ß=0,28) [20].

Research suggests that Turkish children and young people have too few physical activities in educational institutions and in order to encourage their participation in recreational activities in their spare time, it would be necessary to increase the number of physical education lessons [1]. Young Turkish people spend their free time passively and only occasionally play soccer [14].

Research shows that the way of spending leisure time among young people in Turkey depends on the gender and type of school ($p<0,05$) [32]. Intercultural studies with the trans-contextual model test indicate that the strongest relationships among Polish youth occur between behavioral intentions and behaviors (ß=0,78), attitude and behavioral intentions (ß=0,47) and an index of relative autonomy in free time and behavioral attitude (ß=0,59) [17].

The research by Sasa-Nowosielski [27] confirms the thesis that a person's behavior is greatly influenced by the belief that he or she will meet the challenges. The relationships between predisposing variables were analyzed. It turned out that both variables: perceived sports competencies and self-efficacy determine to a significant extent the attitude of the respondents towards physical activity. Young people are happy to participate in physical activities that bring pleasure and are associated with something positive. An important motivating factor for the motor activities of younger subjects was the belief in their own sporting competences. On the other hand, older people were more concerned about their self-efficacy in dealing with activity barriers [27].

Studies of Turkish students indicate that the majority of young people define their attitude to physical activity as a contemplative stage (31.4%), the second position is occupied by the preparatory stage (25.3%). The activity stage is chosen only by 7.5% of the respondents. Every fifth student determines his behavior as a continuation. The student's place of residence did not affect the indicated stage: university campus, or other place [33].

Conclusions

On the basis of the research conducted, it was found that the studied group of young Polish people was characterized by a higher level of physical fitness than their peers in Turkey. There was no significant relationship between the stages of readiness to undertake physical activity and the results of fitness tests. The need for further research was concluded.

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HEALTH OR RIVALRY - MOTIVATION BEHIND AMATEUR PARTICIPATION IN LONG DISTANCE RUNNING EVENTS IN POLAND AND THE CZECH REPUBLIC

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Abstract

The aim of the study is to determine motivation of runners from Poland and the Czech Republic in the context of their participation in running competitions.

In this study, correlations between age, experience, training period and motives for participation in the competition by comparing the cross-country runners from both countries was researched. The study examined the place of health in the structure of motives.

The study involved 847 runners from Poland and 118 from the Czech Republic. The method of a diagnostic survey was carried out using questionnaires.

Competition with ourselves, overcoming our own limits, and improving physical fitness are the main motives of runners who participate in running events. Motives related to health are placed in subsequent positions. Polish runners are more sport goal-oriented; this may result from the fact that in the Czech Republic recreational sport is more grounded in culture. Running events are an important element of cross-country passion, since up to nearly 45% of runners from the Czech Republic and more than half from Poland would limit the practice, or stop it, if they did not have eligibility to participate in competitions.

Organizers of sports and recreational events involving road running should rather educate runners in the direction of healthy behaviors. They should enrich the content of health education emphasizing the value of active participation and healthy lifestyle over sports rivalry.

Key words: *runners, motivation, health promotion, running events, recreational sport.*

Introduction

Open cross-country races, including marathon running, are sports and recreational events. Their goal is to select the winners in both the general and in very popular age categories.

These events are created to promote a specific sport and a healthy active lifestyle. Events of this type are not characterized by egalitarianism; any amateur competes in the common run with professional athletes. The organizers main idea is to promote sport and a healthy lifestyle.

Physical activity is an important part of a healthy life style; popularization of it is a key strategy of public health in many countries – developing and high developed. But there is a problem with popularization of physical activity for health [1]. The culture of fans, observing sports teams, and the culture of passive participation in popular sport events is promoted disproportionately in relation to active participation in mass forms of recreation. Too low a percentage of people is physically active on a systematic basis. There is consequently is a problem with motivation to maintain regular effort [2]. One factor with regard to motivating participation in physical activity is by entering competitions. But rivalry may take many forms and can also lead to negative health consequences. Competitions may override health benefits, emphasizing the maximization of physical fitness – even at the expense of health.

Open access mass events - sports and recreational - are meetings of enthusiasts of a specific physical activity. There comprise very

diverse social groups. It is worth examining the motives of participation in competitions to be able to organize events more efficiently, because recreational events are recognized tools of promoting a healthy lifestyle [3].

In the Czech Republic recreational sport is well established and has long-standing traditions and in Poland in recent years a rapid development in mass street racing and a growing community of amateur runners has been seen [4].

The aim of the study is to determine the runners' motivations from Poland and the Czech Republic in the context of their participation in running competitions.

In this study, correlations between age, experience, training periods and motives for participation in competitions was researched through comparing cross-country runners from both countries. The study isolated the place of health in the structure of motives.

Material and methods

The study involved 847 runners from Poland and 118 from the Czech Republic. All subjects were registered on Poland's largest Internet portal for runners, uniting during the study almost 9 thousand users who have personal profiles. The method of a diagnostic survey was carried out using questionnaires. During the study of the issues, covert participant observation was also used; this helped to formulate conclusions for this study.) An anonymous questionnaire survey was sent via the Internet to verified people (regularly training and competing in competitions for at least a year). Closed questions were related to training experience and their level of training speed and attitudes to training if it does not bind with the start in the competition. However, the main task of the respondents was to assign to the 5-point scale values for each of the 14 listed motives for participation in running competitions. The collected material was statistically analyzed using Statistica 12.5. To study the correlations between variables Tau Kendall correlation was used. To assess the significance of differences between variables the non-parametric U Mann-Whitney test was applied. To group the motives, multivariate clustering analysis with Ward agglomeration was applied by using Euclidean distance. The analyses were assumed as relevant effects, for which the probability value was lower than the accepted level of significance of 0.05 ($p < 0.05$).

Analysis of results

In the group of runners from Poland 131 women (15.5%) and 716 men (84.5%) were observed and in the group of runners from the Czech Republic 39 women (33.1%) and 79 men (66.9%) were observed. The average age of respondents was: 35.8 years for runners from Poland and 36.5 years runners from the Czech Republic. The training period significantly differentiates runners from both countries (6 years old for Poles, and 23 years for Czechs), the difference is statistically significant ($Z = -15.099$, $P = 0.000$). The average number of training sessions per week (approx. 4) does not differentiate significantly between the study groups. However, the Poles mostly run more kilometers during the week (52.5 km) than Czech runners (46.9 km) ($Z = 3.046$; $p = 0.002$).

Poles are more determined than the Czechs to participate in a competition. As many as 42.9% say they would significantly reduce their training, if they did not have the eligibility to participate in competitions, and 9.3% would resign from training at all. Most of the runners from the Czech Republic (55.1%) can systematically train without the necessity of participation in competition. However, the percentage who cannot imagine running without participation in running events is disputable, because 39% would limit their training, and 5.9% of runners would stop it completely.

Motivation for participation in running events

Among many motivating participation factors in running competitions, runners from both Poland and the Czech Republic rated competing with themselves on the top ranking, followed by improving their physical fitness, tab. 1. For the Polish runners in comparison with the Czech athletes, important motives are the ability to overcome their own boundaries - setting personal records, the organization, rank and tradition of the event, but for runners from the Czech Republic it is more important to relieve

stress, the ability to improve well-being, and satisfaction with the completion of the race (to overcome a distance, e.g. a marathon). For runners, health as the participation motive in the event is very important, because the assessment of the Poles made it possible to classify it only as sixth in the rankings, and in the case of Czech runners ninth. Competition with others is a motive that both compared groups of runners classified in tenth place based on ratings. Fashion has the lowest value of all the reasons given. Runners from both countries do not rely on fashion while participating in running events.

Statistically significant differences between the values broadcast by individual motives among runners from the compared groups were calculated. In all these cases, the Poles gave higher scores for individual motives.

Tab. 1. Rank motives while participating in running events with Polish and Czech runners

Motivation factors - POLES	$\bar{x}$	rank	Motivation factors – CZECHS	$\bar{x}$
competition with himself*	4.63	**1**	competition with himself*	4.26
physical fitness	4.48	**2**	physical fitness	4.20
record of life*	4.32	**3**	relieve stress	4.13
relieve stress	4.29	**4**	the satisfaction of completion*	3.94
the satisfaction of completion*	4.24	**5**	record of life*	3.71
organization and rank of events	3.90	**6**	improving body shape	3.61
health	3.77	**7**	organization and rank of events	3.60
place of event	3.76	**8**	place of event	3.58
improving body shape	3.69	**9**	health	3.55
competition with other*	3.26	**10**	competition with other*	2.91
commemorative medal*	3.13	**11**	the size of the event*	2.74
to be in various ways attractive to others*	3.13	**12**	to be in various ways attractive to others*	2.64
the size of the event*	3.02	**13**	commemorative medal *	2.53
fashion*	1.47	**14**	fashion*	1.42

*differences statistically significant for $p<0.05$

Motivation and age, training period and the amount of training

The analysis of the runners' correlation from Poland shows that motives associated with the competition fall with age, such as beating personal records and desiring to be in various ways attractive to others, while motives such as health, getting rid of stress, satisfaction with the completion of the race and a good organization of the event grow. The length of training period is negatively correlated with most analyzed motives. With the increase in the average amount of training and mileage a decline is seen in the field of health motivation, the desire to escape stress, the satisfaction of completing a distance or receiving a commemorative medal. With the increase in the amount of training, motives associated with rivalry and the desire to improve records (athletic performance) grow.

Among runners from the Czech Republic, there was no statistically significant correlation with analyzed motives for participation in the competition connected with increasing age.

However, with regard to experience of the training period, motives related to the satisfaction of the completion of the race grow. The improvement of athletic performance, physical ability or appearance of your body also grow. With the increase in the average amount of training and completed kilometers for Czech runners, health, body shape improvement, physical fitness, satisfaction with the completion of the competition and escape from stress are less important.

The structure of motivation

With data clustering performed for all runners' motifs from Poland and the Czech Republic two large groups can be seen. In the first group motives are associated with the size of the event, the desire to compete, to obtain a symbol of success i.e. a medal for finishing which combines with the need to be fashionable and attractive to others. In the second large cluster of 9 motives two subgroups can be seen: the first one related to physical fitness, stress, records, self-rivalry and satisfaction with the completion of the competition, while the second one combines motives related to improving their health and the organization and the attractiveness of the venue.

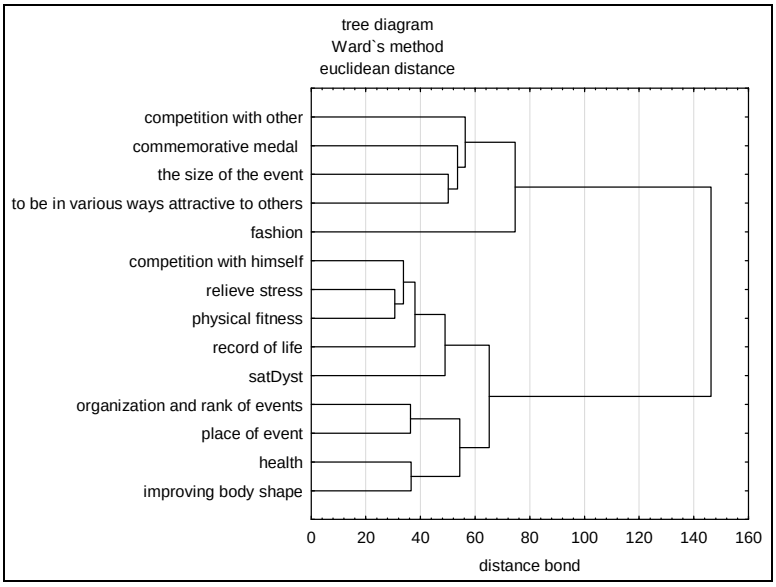

Fig. 1. Structure of the relationship between the individual motives of participation in running events

Discussion

The researchers point out that there are many factors that motivate physical activity which change with age. According to Reykowski [5] motivational tension occurs when a state of affairs, which could reduce tensity, is noticed; and also when there is a conviction that the value of gratification is available. The most effective interventions are those which are based on multi-dimensional socio-ecological strategies. One way is to create opportunities to participate in an event in which a person can check the level of his physical fitness and succeed in their abilities [6]. According to the report-Poland Runs, 95% of runners claim that they run for health and well-being and only 35% to improve sports performance. Most of those who run regularly-58% do so to compete [7].

Rivalry is a natural primary human need, recreational sport is accessible to everyone who makes a convenient platform to meet the needs of a higher order, related to social recognition and improving itself. The growing number of organized running events in Poland leads to too frequent starts and the pursuit of sporting successes, the paradigm of health should be the basis for recreational sport [8].

Many enthusiastic runners cross the border between recreational and competitive sport that brings the risk of injury and other negative physical consequences. Many people forget that this is a fun way to spend free time and surrender their whole lives to a passion that becomes an addiction with negative consequences for the runner and his environment [9, 10]. Some studies show that runners are able to train despite injury. Despite numerous injuries resulting from overloads caused by exhausting workouts or competitions, runners in the vast majority, believe that running and participating in marathons and races longer than a marathon is a healthy way of spending free time.

Most experienced runners would not interrupt or limit training, despite awareness that this may harm their health [11].

It is worth noting that from the point of view of health, systematic training and a healthy lifestyle is a valuable factor in determining public health rather than development-commercial events promoting rivalries in a different form in which a person overloads his body.

Conclusions

- Running events are an important element of cross-country passion, since up to nearly 45% of runners from the Czech Republic and more than half from Poland would limit the practice, or stop it, if they did not have eligibility to participate in the competition.
- Competition with ourselves, overcoming our own limits, and improving physical fitness are the main motives of runners who participate in running events. Motives related to health are placed in subsequent positions. Polish runners are more sport goal-oriented, this may result from the fact that in the Czech Republic recreational sport is more grounded in culture.
- Organizers of sports and recreational events focussed on road running should rather educate runners in the pursuit of healthy behaviors. They should enrich the content of health education, emphasizing the value of active participation and a healthy lifestyle over sports rivalry.

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Social Perspective

PHYSICAL EDUCATION TEACHER

We are planning to issue a volume including materials concerning the **education, improvement of qualifications and the work of physical education teachers in different countries**.

We would like to invite all physical education teachers/scholars to prepare articles on the above mentioned topic, analyzing/exploring/characterizing the situation in your country. This could be a case study regarding the entirety of the above mentioned topic or selected issues within this scope, such as:

1. The profession of a physical education teacher

- qualifications entitled to realize the program of physical education at respective levels of school education; qualifications for the realization of the various physical education programmes at all levels of learning/education
- number of didactic classes per week;
- age of retirement;
- results of research projects, as well as the characteristic foci of publications concerning this profession;

2. Studies preparing for the above mentioned profession

- types of schools educating/training physical education teachers;
- structure of educational programmes (names of subjects, the scope of classes realization of such programmes);
- professional titles of graduates;
- results of research and the characteristics of issues concerning the education of physical education teachers;

3. Improvement of professional qualifications for physical education teachers

- normative settlements regarding this problem;
- programmes and the organizational form of courses for physical education teachers;
- the results of research and the characteristic problems concerning this issue.

4. Other issues within the scope of the above topic specific to your country.

Works should be submitted (only as an attachment to an e-mail)
to the following e-mail address: **jpe_health@onet.eu** – in the form compliant with the requirements of the magazine

(vide: **www.jpe-health.pwsz.raciborz.edu.pl**).

Following a positive review, articles shall be published in following issues.

Jerzy Pośpiech
Editor

INFORMATION FOR THE PAPER AUTHORS

Journal of Physical Education & Health

Social Perspective

is a science periodical published by the following universities: Technical University in Opole (Poland), High State School in Raciborz (Poland) and University of Balearic Islands (Spain)
which discusses the following issues:

- the health of children, adolescents and adults,
- physical activity amongst children, adolescents and adults,
- attitudes towards health amongst children, adolescents and adults,
- knowledge about health amongst children, adolescents and adults,
- initiatives and programmes designed to improve health,
- physical and health education in school curricula and public services,
- the training of teachers of different specialisms,
- developing professional skills amongst teachers and
- the training and employment of teachers.

Journal of Physical Education & Health

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publishes papers only in English:
▪ original papers (anonymously reviewed), ▪ demonstrative papers, ▪ editorial papers,
▪ polemics, ▪ conference and symposium information.

Original or editorial papers (including tables, bibliography, abstract)
may not be more than 30,000 characters including spaces (about 15 pages A4).

Layout of the materials submitted to be published:

1. **page**: title, names and surnames of authors, name and address of the institution represented by authors, postal address, telephone number, e-mail, agreement,
2. **page** and following pages: title, abstract (15 to 20 lines), keywords (to 5), text.

Materials submitted for publication (text – type 12 point, 1,5 of line, tables, and figures (black-white) with numeric data describing them) should be sent only as a Word document with doc. extension as an e-mail attachment.
Text should be sent by the first author from his or her e-mail box.
Layout of the original paper only: abstract, introduction, aim, materials and methods, results, discussion, conclusion, bibliography (up to 30 positions).

Footnotes in the paper referring to the bibliography should be marked with Arabic numerals and square brackets. Bibliography listing should be numbered in alphabetical order.

The submitted paper cannot be printed or submitted for publication in another journal.

A statement confirming this condition should be on the front page of the paper.
Submitting a paper for publication and attaching other data is considered a conscious agreement to printing and publishing electronically, and also on the Internet.

The editorial office reserves the right to shorten papers, correct linguistic mistakes and make any other editorial corrections.

Authors do not receive any royalties for publishing their articles, although authors receive a copy of the journal.

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