ACADEMIC PHYSICAL EDUCATION.
HEALTH, LIFESTYLE AND MOTOR ABILITIES

CONTENTS

FOREWORD

In Poland, the traditions of conducting scientific researches in the scope of students' physical education date back to nineteen century. The first papers considered the health state, physical development as well as the hygienic habits. More and more the growing problem of civilization diseases is a reason for the importance of pro-health behavior. The monitoring of healthy behavior among students seems to be especially important. Knowledge about health is an important factor infuencing a man's attitude towards some values. Medical information gathered from different sources are eagerly absorbed and together with the knowledge got as a result of the educational interactions in family and the planned health education it influences an individual's attitude towards health – one of the most important values. The analysis of studies show that behaviours described in the field of medical science as healthy are the most important in lifestyle. Lifestyle expressed in healthy behaviours is considered to be an essential health factor. The choice of a proper lifestyle can only be made when an individual has a proper level of knowledge about it. The faculty clearly differenciates students in terms of the sources of knowledge about health. The level of knowledge about health and illness does not have a significant impact on taking healthy behaviours, however you may indicate a possitive character of thoese correlations, which may mean that students with a higher level of knowledge follow a more sensible diet, take physical activity more often, follow doctor's recommendations refering to the results of check-ups, avoid strong emotions and stresses.

Taking into account the meaning of the feeling of self-reliance in taking some activities, also educational, it is important to remember about improving health education, which will lead to a higher level of knowledge among students and will strengthen the conviction about the competences in this field.

In this paper *Academic physical education, Health, lifestyle and motor abilities*, there are presented the latest results of researches in the scope of problems connected with this issue carried out among students from academic institutions in : Lublin, Rzeszow, Krosno, Cracow. We hope, that the gathered material would inspire to the health education development, which would result with the higher level of knowledge of students, as well as increase the belief about the owned competences.

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SCHOOL PHYSICAL EDUCATION AND ACADEMIC SPORT IN THE NEW MILENNIUM

SZKOLNE WYCHOWANIE FIZYCZNE I SPORT AKADEMICKI W NOWYM TYSIĄCLECIU

If in the broader context sport is to demonstrate its dimensions in the whole spectrum of social framework, then it has to become a permanent part of lifestyle of most people, beginning from pre-school children, continuing with the primary school students and ending with university students as mature people, all educational factors and institutions have to make effort in order to create a positive attitude of the educated individuals towards this activity. As we speak about a lifelong process, it is never too late. Gone are the times when the children threw away their school bags and told their parents: We are going out! Nowadays their interest focuses on various videogames, films, internet, etc. It is alarming that only 10 per cent of children involve in physical activity in their leisure time despite the fact that they positively incline towards sport.

The changes of the political system that our country underwent at the end of the 20th century have significantly influenced the field of sport, especially the area of sport preparation. Professional unpreparedness, absence of experience and hesitation in terms of what has proved to be effective within physical education and sport practice has resulted in the fact that the system of sport preparation of children has deteriorated and through unfinished restructuralization of sport movement its organized forms and means terminated. All Governments of Slovak Republic have within their Program declaration stated to be ready to support the development of physical and sport activity of Slovak citizens ranging from school sport to national teams, however, no action was taken whatsoever. The Ministry of Education of SR as the central authority of state administration that is in charge of the field of sport

within the framework of Program declaration has elaborated, or to a large measure only innovated and revived the activity of the institutes for talented youth that include school sport centres, sport classes, sport schools, the centres for talented youth and federation centres of sport preparation of youth. In the previous year there were 1544 institutions of this type, which included 43.987 young athletes that represent just 4.99% of the population attending elementary and secondary schools. Moreover, in their case as well we see several deficits regarding the functioning of the whole system of physical education and sport preparation at schools. This task is one of the primary ones, which may be beneficial for further advancement.

Scientific research has shown that 5-6-year-old children should involve in physical activity which is timewise equivalent to 60% of time of being awake. At least 3 hours of activity should reach the intensity equal to minimal average zone of 150% required to stimulate the circulatory system. Our long-time scientific experience based on the weekly time records of children of the aforementioned period have revealed that the time span for particular types of physical activity amounts to 3 hours and 12 minute with most of the activities being organized with low intensity. Despite this the creators of primary educational and methodology material and the kindergarten teachers themselves do not confine their attention to the issue. It is often the case that the female teachers perceive physical education as their own rest from their demanding work or other components of educational program that require examplary organization and discipline.

In the domestic environment children exercise for 2 hours and 20 minutes during the week and at the weekend the time devoted to physical activity amounts to almost 5 hours. In this case not at the kindergarten facilities. Within the overall time of being awake cca 39% of time devoted to physical activity is at kindergartens and 41% at home. During the weekend only by almost 38% of child's daily time of being awake (JUNGER, 2000).

In our opinion the most serious problems regarding sport at this age are as follows:

– insufficient development of children's organism induced by the absence of movement stimuli in their lives (as a biological need)
– disrespect for the principles underlying the development of human organism in this particular ontogenetic phase (biological age). Large extent of joint flexibility termed as elasticity of ligament apparatus tempts us to use the flexibility during the preparation aimed to achieve certain sport performance, which later in life may result in pathological consequences.
– Early sport preparation – conditions for the commencement of sport training are favourable as late as the late childhood period.

Longtime experience regarding sport practice as well as theoretical knowledge has confirmed that it is necessary to devote one's time to the

selection of the physical activity for the schoolchildren. The need results from the changes in the lives of children induced by the start of school. The start of school for a child represents next critical period typical only for the human being. For children sitting behind the school desk brings so far unknown load, which is deemed inevitable, while dynamic stimulation is getting more and more limited. Based on this knowledge KUČERA - KORBELÁŘ (1994) recommend to adhere to the principle of identical time of spontaneous physical activity when compared to the time spent sitting at school in case of spinal axis deviation and Scheurmann.

Due to the fact that children at this age do not make decisions concerning the contents of their daily regime, the time they devoted to physical activity in the past decreases due to the increase of other duties. School physical education could become a certain type of psychohygienic replacement. However, the number of physical education lessons decreases and does not meet the minimum standards set by the curricula. At present we may only admire the project of British government „Physical Education School Club Links", which aims to provide all children at all elementary and secondary schools with four physical education periods a week (ANTALA-LABUDOVÁ, 2006). There has been a positive response from the side of the countries of Eastern Europe, which also increased the number of physical education periods (Poland, Ukraine, Slovenia, etc.). What may be perceived as a negative fact is that high percentage of children do not attend physical education classes (cca 11%), while almost half of them do not suffer with any health problems (HALMOVÁ - ŠIMONEK - KANÁSOVÁ, 2005).

This fact exerts negative effect on the sport preparation of children, which includes other imperfections as well:

– lack of interest in sport activity at schools and in families (education of children towards movement) has transformed the selection of children into mass recruitment
– the most significant selection criterion of children for the centres are the outcomes of motor testing, not the selection of gifted children (which leads to the preference of somatically accelerated children)
– the inadeaquate ratio of special and general preparation period, which should at the start of the sport training represent the ratio 20:80% in favour of the general preparation.

In the middle and late childhood it is not only necessary to accept, but also place particular emphasis on the developmental principles. Changes in pubescence result in different physique, internal environment, organism's potential as well as the need to move, which culminates in a variety of developmental dysbalancies. KUČERA et al. (1998) in connection with sport point out the development of muscular strength, which does not respect the growth of tendons, ligaments and ossification. Disrespect for this principle may

lead to pathological overload. The danger lies in the fact that during this period the specialized sport preparation in majority of sports is at a high level and in early adolescence the children achieve very good performance level.

Right in this period, which is characteristic of the end of the preparation for the next phase of life in a job and sport preparation as well, it is necessary to focus attention to formation of stereotype in terms of the need to move within compensation for the whole-day load. The findings of the researches as well as our personal experience have confirmed that it is usually vice versa. Besides the decrease in the number of classes, there appears to be lower quality of teaching. This results from insufficient financial suppport of teachers, stagnating and declining fitness of children, inadequate sport facilities with highly overused aids, but often also from the making the life of physical education teacher easier (BEBČÁKOVÁ – LUKÁČ, 2005).

The next serious problem of this period is the radical increase of pupils who do not participate in physical education classes. The number of boys that do not exercise ranges from 27.7% to 39.6% and number of non-exercising girls from 38.2% to 48.1% (ŠIMONEK – HALMOVÁ – KANÁSOVÁ, 2005, SLEZÁK, 2004).

Till 1989 it was not necessary to deal with the relevance of physical education in particular within the university studies. The situation was affected by the state policy which included the military education having been supported by a strong lobbyist – army. The function of the state consequently faded due to the social changes, unfortunately at the expense of the health benefits of physical activity. By incorrect interpretation of democratic principles the issue of health started to be regarded as a personal value. i.e. private matter and interfering in the private matters is unacceptable (HRUBÝ, 2005).

The information, which an individual encounters in family environment, education process, institutions and media, in the cognitive sphere lead to the formation of opinion on the benefits of physical activity and movement in human life. By the end of the compulsory education, every individual should be informed about the benefits of regular and adequate physical activity, the way of its realization from the aspect of its content, intensity, volume and frequency. Every individual may then on the basis of their own decision choose their sport and the type of physical activity.

From this standpoint, the teaching process should follow the aforementioned principles. The implementation of the credit system of study and the decrease in the number of contact classes, however, leads to the elimination of physical education from the basic program. This trend has for a long time existed at schools abroad. The difference is that the students if these schools are from the period of early childhood led towards the benefits of healthy lifestyle (each omission of a relevant factor has exerts significant

financial impact) and the realization of optional subject is supported by existing complete material and spatial equipment.

An important factor that inclines child towards physical activity is the family. Research aimed to monitor the families with pre-school children has shown that only 9 % of fathers and 3.6% of mothers exercise on regular basis at a minimum 3 times per week, and the other 26.8% engage in regular exercise at least once a week. The rest of them exercise irregularly, or do not exercise at all.

Researches targeted at physical activity in adult population have demonstrated that the physical activity from the aspect of age groups displays decreasing tendency from 26 to 35 years of age. The study of 3.779 Slovak respondents aged 15-65 has shown that 15% of males do sports and more than 33% exercise irregularly. Females have displayed significant decline in the quality of physical activity. Almost 20% of females do not exercise at all and more than 40% participate in exercise irregularly (ŠIMONEK – HALMOVÁ – KANÁSOVÁ, 2005, SLEZÁK, 2004).

We may generally state that spontaneous physical activity of the citizens bears seasonal character, being more frequently carried out in summer time when compared to winter time. Research based on time monitoring has indicated that adults spent most of their time sitting (approximately 56 hours per week), standing (approximately 29 hours per week), moving (28 hours per week) and for the rest of the time lying (approximately 55 hours). This means that during the day people move approximately for 4 hours, however, we tend to sit twice as much – 8 hours. Regarding sport itself irrespective of any age categories, we display positive relation to sport, but we perform little exercise. Two thirds of people are of the opinion that sport is important, but only every third person exercises at least once a week.

It is interesting that issues regarding the benefits of movement for human life, the issues concerning the teaching of physical education arise at the time of each school reform. As an example may serve the response to the contents of curriculums for city schools that was introduced 70 years ago: "A new school has to emerge. The child is going to be active. The child will actually deal with programs within each subject from 5 to 8 hours a day at school and for several hours at home. The one and only movement will be the transition from classroom to classroom and 15-minute break, during which the child is supposed to go to the restroom and prepare for next classes. As the city schools are attended by children mostly from poorer families who are prone to suffer from spine curvature deviations due to badly balanced nutrition, the children are not going to be helped by constant order to sit straight. They simply will not be able to maintain the weight of the trunk in the appropriate position"(Těl. Vých. Sport. Mlád., 2001).

What an incredible coincidence with the present situation. The issue of nutrition does not primarily lie in the poverty, but in preference of unhealthy foods or diets targeted at weight loss especially in girls. How many of the girls know that good-looking figure is on muscular activity or movement dependent? The opinions of not only the laic public define movement as dynamic motor activity characterized by isotonic contraction. This issue is being discusses and is the matter of interest. Its effect on the functioning of human organism has been and still is scientifically confirmed from the aspect of health, functionality, sociology, psychology, etc. However, just few people are aware that when attempting to maintain the desired body posture the second form of muscle activity is necessary – static contraction of postural muscles. Its presence or absence immediately reflects in the feedback afferent influence on the subcortical area of the central nervous system as well as on other systems and organs. Through its direct effect the static contraction influences the overall state of organism, which is evident in the case of bedridden patients, in whom even intensive rehabilitation does not prevent the development of osteoporosis, the atrophy of postural muscles and the vegatative system impairment. The consequences of this state are to appear later, when the patient gets better and is capable of elementary locomotion (RADVANSKY-KUČERA, 1999).

The next issue, which on the other hand confirms previous statements, is the involvement or non-involvement of children in school physical education. The medical examinations have confirmed that the most frequent reason for not involving the child into exercise is the impairment of the motor system. There still are a lot of general practicioners who due to various reasons in case of any deviation from the norm decide in first place to ban physical education despite the fact that in case of these disorders brings one-sided static load with long-term maintenance of posture higher risk as compared to dynamic physical activity. Dysbalance worsens most of both the structural and functional disorders of the motor system (RADVANSKY-KUČERA, 1999).

This "institutionalized process" of formation of the way of life is assisted by parents, pupils and students themselves. The outcome is the aforementioned increase in the applications for the deliberation from physical education due to any health deviation. The deliberation itself approved by "family doctors" is sheer nonsense. One of the reasons is embodied in the Act N. 277/1994 Coll. on the free choice of doctor. While till the end of this year the university students were supposed to undergo an entry medical check-up carried out by the university doctor resulting in the decision to involve or not involve the student into the physical education process, this year the students need confirmation from a doctor they freely select.

The issues regarding the position of sport in the life of children and youth at this age period may be summarized into the following aspects:

From the standpoint of the contemporary lifestyle of children and youth most of us recognize the benefits of physical activity for the healthy development of an individual, but actually the interest in regular physical and sport activity of all age groups and especially schoolchildren has decreased. The contemporary times typified by high scientific-technical revolution is concurrently the beginning of changes regarding the position of production power outside the epicentre of the production process requiring lower energy expenditure and increased mental stress. It is the first time in the history of mankind that the lack of physical activity induced by changes in the manufacturing process and lifestyle could not be replaced or eliminated. The issue lies in the fact that the mankind over thousands of years developed in the environment with lower amount of food, but with high volume of physical activity in life. That means that the mankind adapted to the lower energy input and higher output. At present is the situation reversed, but the new adaptability of the man to this state has not been established. The change in nutrition and especially implementation of physical activities into the daily regime have been so far the one and only and seemingly the most effective solution lying in the preservation of fylogenetically pre-conditioned features and in limiting of the influence of stronger retardation effects. The refusal to accept these principles of development leads more and more to the gradual disturbance of natural balance in the functioning of particular life functions.

Few of us care about the fact that this manner does not correspond with the existing fylogenetic development and denies the relevance of inherited motor traits such as upright stance, bipedal walk, fine motor skills of hands, reversed finger, etc. As we speak about longtime developmental process, whose changes cannot be registered during our own ontogeny, we forget that at places with no new incoming impulses are no positive responses, being at most degenerative and destructive. Few of us realize that man within his development has released himself from the nature, but not from the influence of laws of nature. Biological norms formed throughout the fylogeny are encoded in his genetic code and are constant through several generations. Let us not forget that ancient medicine thanks to the work of Hippocrates placed emphasis on the function of movement and its irreplaceable character. This father of medicine literally wrote: "organ designated to function has to function, otherwise it dies".

And right this aforementioned and seemingly a generally formulated issue, has to arouse interest in all of us from the viewpoint of sport of children and youth. We all know that movement represents one of the elementary human needs being similar to food, drinking and sleep. The man evolved through movement. How then can we deliberate ourselves from a biological need? Why not try it with food or drinking?

The outcome of such attitude present at the majority of Slovak schools that evidently results from the disturbance of balance in life culminates to poor

body posture of children apparent as early as pre-school age, increase in the number of physically handicapped children, lower motor performance and fitness and shift of fully accepted benefit of physical education and sport to the verbal context to the exclusion of its practical realization. To defend the teachers and partially parents we may add that their iniciative is marked by their own childhood experience and they are of the opinion that the children have positive attitude towards physical activity, which they present within their leisure time. This conclusion has been confirmed by our latest studies, where the parents and teachers at selected schools presented the opinion that physical activity belongs to one of the most favourite activities of children, while the children themselves prefer informal social activities, passive rest and various types of fun.

These are only some of the examples confirming that the accompanying characteristics of a lifestyle without movement are becoming an issue on a national level. However, the findings obtained through experiments conducted on humans as well as animals in artificial conditions have before long shown that long-term absence of physical activity is the source of a variety of health disorders and impairments. Hypo-dynamics impairs the metabolic processes, contributes to the origination of dystrophy processes, resistance decline and work capability of human organism, etc.

On the other hand, there are studies that confirm the benefits and irreplaceability of physical activity in child's life and its positive impact on the development and function of other systems. Among one of the most interesting arguments regarding the need to participate in regular exercise belongs the proof of its positive influence on knowledge acquisition, i.e. the learning process. The pupil thus benefits from the movement twofold. The first benefit is enhanced performance, physical fitness exerting considerable effect on his health status. The second is the reinforcement of cognitive processes. The principle is quite simple. The blood, which is brought to brain at a higher speed as a consequence of physical activity, supplies it with oxygen and glucose, the latter being the same as petrol for a car. While breathing, which takes place every day during most of energetically undemanding activities, one is able to exchange only as little as 10% of oxygen in the brain. This state induces disorientation, stress, problems with concentration and memory. Physical activity also contributes to the secretion of endorphins that support relaxation, alertness and reduce the symptoms of depression. By exceeding the medial axis, physical activity integrates the brain hemispheres and in this way creates conditions for optimum learning. Through its content physical activity strengthens eye muscles, by which the peripheral vision and reading may be improved. Research targeted at brain activity and physical activity and conducted on the sample of 250.000 children has shown that the students who intentionally move during learning of theoretical terms, store information better.

Most physical activities are carried out at elevated emotion, which subsequently results in attention and self-discipline improvement. There is majority of evidence confirming the benefits of movement on other systems and especially the health status of an individual (DOBRÝ, 2006).

We are left to believe that competent institutions will create a univocal attitude towards the position of school physical education and development of sport of children and youth, which is going to be the first step directed towards adhering to the motto set within the National Program of Development of Sport in Slovakia "Let us return sport to schools". If our children will have to fight problems associated with basic locomotion skills and organism's performance not providing for the functioning in everyday life, then all the investments put into the reform regarding the organization structure and sport governance become useless due to the fact that sport without basis and general preparation at an adequate level will not be done at all. What we have to realize is that where the being leaves behind the consciousness, the opinions are different from attitudes; we have to reform the consciousness in order to assist the being. Even at the cost of "ex offo" through appropriate legislative regulations. Let us not forget that we refer to life and orientation towards values of 95 per cent of primary and secondary schoolchildren, who are potentially an inexhaustable source of talents for competition and top level sport. However, let us not forget that the general preparation is an inevitable prerequisite for sport specilization of higher quality in those 5 per cent, who are included in the institutions for talented youth.

Only such understanding and practical realization of physical education may become the firts as well as the decisive predisposition for the formation of creative attitude towards the realization of one of the most important life needs of the man and formation of the value orientation of children and youth regarding sport.

Let us return the Professional preparation of those who specialize in the sport education and preparation of children – trainers, instructors and exercise session leaders. In order to do so, let us use the legislative environment, which is provided for by the Ministry of Education of SR and which was verified long time ago in the developed countries of EU. Let us not try at all costs to maintain this area under jurisdiction of sport federations when the federations do not provide adequate conditions and our activity should be directed towards different goals.

Last but not least, let us utilize the potential of vocational schools and two specialized faculties so as to solve the scientific tasks aimed at the development of sport in SR ranging from the enhancement of sport performance, injury prevention, functional diagnostics, etc. to the explanation of negative phenomenons present in contemporary sport. In order to do that, it is vitally important to build the sport diagnostic centres, space and material facilities and especially increase the offer for solving the scientific tasks in form of state and

resort calls. Geographic position of the faculties covers the whole area of SR and meets the requirements of all regions. The decision to build a single centre represents the decision to annihilate sport, because sport-talented children are born in the whole area irrespective of the fact where the National Sport Centres are located.

In terms of the fact that every individual, both a healthy and physically handicapped one, passes through the school system during his life, the obtained results, relations and newly-established system of values will later within the change of generations transfer into families, for the origination of which no qualification and education is necessary, but plays a decisive role in the upbringing of children.

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ABSTRACT

If in the broader context sport is to demonstrate its dimensions in the whole spectrum of social framework, then it has to become a permanent part of lifestyle of most people, beginning from pre-school children, continuing with the primary school students and ending with university students as mature people, all educational factors and institutions have to make effort in order to create a positive attitude of the educated individuals towards this activity. As we speak about a lifelong process, it is never too late.

Key words; school physical education, academic sport

STRESZCZENIE

Jeżeli sport ma być przedstawiany w szerokim kontekście całego spektrum społecznej kultury wtedy musi stać się trwałą częścią stylu życia większości ludzi, zaczynając od dzieci w wieku przedszkolnym poprzez najważniejszy dla tego procesu wiek szkolny a kończąc go na szczeblu akademickim z dojrzałymi już studentami. Wszystkie instytucje prowadzące edukacje i biorące udział w tym procesie kształcenia muszą starać się wytworzyć pozytywne nastawienie osób do tej działalności. Ponieważ mówimy o dożywotnim procesie, nie jest nigdy zbyt późno.

Słowa kluczowe; szkolne wychowanie fizyczne, sport akademicki

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THE LEVEL OF KNOWLEDGE ABOUT HEALTH AND HEALTH BEHAVIOUR AMONG STUDENTS

POZIOM WIEDZY O ZDROWIU A ZACHOWANIA ZWIĄZANE ZE ZDROWIEM WŚRÓD MŁODZIEŻY AKADEMICKIEJ

Introduction

Both in the social consciousness and in numerous attempts to define health by representatives of different science disciplines: medicine, sociology, pedagogy, psychology [1,2,3,4] health is considered to be a special good that a man desires to own and a lack of which influences his or her life activities. As numerous studies showed, among various factors influencing man's health there are the following: environmental factors, genetic conditionings, professional health care and lifestyle which is considered to be the most important one in the formation of individuals and social groups' health [4,1,5]. The concept of lifestyle has become the most crucial for the promotion of health and its understanding in relation to health protection and health improvement activities usually refers to some behaviours connected with health risks [6,7]. Health improvement or health deterioration depends on the lifestyle that an individual chooses and the lifestyle has been described in literature as healthy or unhealthy [7]. The analysis of studies show that behaviours described in the field of medical science as healthy are the most important in lifestyle. Lifestyle expressed in healthy behaviours is considered to be an essential health factor [4,1]. The choice of a proper lifestyle can only be made when an individual has a proper level of knowledge about it [8]. Information about health and illness gathered from different sources are eagerly absorbed and together with the knowledge got as a result of the educational interactions in family and the the

planned health education it influences an individual's attitude towards health. Depending on the stage of development, sociocultural conditionings, health experiences and the present health condition, the formation of the perception component of the attitude towards health is still modified [9].

Aim of the Work

The aim of the study was to assess the correlation between the level of knowledge about health and health behaviour among students.

Material and Method

The study was carried out between January and June in 2006. 337 student from University of Rzeszow representing humanities and medical faculties were assessed in this study. They were second and third year students and the choice was deliberate. The participation in the study was voluntary and anonymous. By giving back the survey questionnaires students agreed to take part in this study. Two kinds of questionnaires were used in this research: a new oryginal type of Survey Questionnaire and a Health Behaviour Inventory *Z.Juczyński* [10] describing the intensity of health behaviours. The level of knowledge of every student was described by analysing the proper answers. The results were presented in a form of a scale assessig the level of knowledge. To do this, students were presented with twenty statements with information about good diet, the correlation between some elements of a diet, studies and between some civilisation illnesses (cancer and circulatory system diseases), the influence of addictive substances on health, the role of physical activity and prophylactic measures. The level of students' knowledge was assessed by analysing the number of correct answers and using a scale.

– Giving proper answers to minimum 18 out of 20 questions (between 90 and 100% of proper answers) was indicative of a very high level of knowledge
– Giving proper answers to beteen 17 and 15 questions (between 85 and 75% of proper answers) was indicative of a good level of knowledge
– Giving proper answers to between 14 and 10 questions (between 70 and 50% of proper answers) was indicative of a low level of knowledge
– Giving proper answers to only 9 questions (less than 50% of proper answers) was indicative of a very low level of knowledge

In this study the analysis was done by comparing different faculties. The data gathered was presented statistically. To present the results statistically the chi-square test of independence and the correlation rank Spearman were used. The following levels of relevance were used: $p>0,05$ – lack of statistical relevance; $p<0,05$ – statistical relevance (*); $p<0,01$ – high statistical relevance (**); $p<0,001$ – very high statistical relevance (***).

Results

Among the studied groups of students there were mostly women (155 – 91,7% representing humanities and 162 - 97,0% representing medical faculties). More than a half of the students (57,2%) were aged between 19 and 21. In this age group there were mostly students representing medical faculties (79,8%). Among students aged between 22 and 25 there were more than a half of students representing humanities (65,1%) and every fifth student representing medical faculties (20,2%).

More than a half of the students came from a village (55,4%). Other results were the following: 17,8% of the students came from small towns (with below 50 000 inhabitants), 13,9% came from big cities (with above 100 000 inhabitants). It might be assumed that they were mostly inhabitants of the city of Rzeszow. Every tenth student came from a city with the number of inhabitants between 50 000 and 100 000.

TABLE I The level of students knowledge about health and the faculty.

Faculty / Level of knowledge about health	Humanities N=169		Medical faculties N= 168		In total N= 337	
	N	%	N	%	N	%
High	4	2,4	16	9,5	20	5,9
Good	62	36,0	104	61,9	166	49,3
Low	97	57,4	45	26,8	142	42,1
Very low	6	3,6	3	1,8	9	2,7
p	**<0,001*** **					

As the results show, faculty is the factor that clearly differentiates between the level of knowledge about health. The chi-square test of independence showed a statistically relevant difference ($p<0,001$). Generally almost a half of the students possessed a good level of knowledge. The highest level of knowledge (good and high) was possessed by students representing medical faculties (61,9%; 9,5% respectively). Students representing humanities mostly have a low and very low level of knowledge about health determining factors. (57,4%; 3,6% respectively). To sum up, only 5,9% of the students had a high level of knowledge about health and illness (Table I).

The results presented in table 2 show that among 44,7% of the students the level of intensity of healthy behaviours is low and among 41,7% of the students this level is medium. The analysis showed a statistically relevant difference between faculties ($p<0,05$). The highest percentage of students with a high intensity of healthy behaviour was among students representing medical faculties (18,3%). Among 46,0% of students representing humanities and 43,0%

of students representing medical faculties the level of healthy behaviours was low (Table II).

TABLE II The level of intensity of healthy behaviours among students

Faculty / Level of intensity of healthy behaviours	Humanities N= 166		Medical faculties N=158		In total N=324	
	N	%	N	%	N	%
Low	77	46,0	68	43,0	145	44,7
Medium	74	44,9	61	38,7	135	41,7
High	15	9,1	29	18,3	44	13,6
p	**<0,05***					

TABLE III The level of knowledge about health determining factors and the intensity of healthy behaviours.

Level of knowledge about health / Level of healthy behaviours	high		good		low		very low		
	N	%	N	%	N	%	N	%	p
Low	3	15,9	64	40,2	72	52.5	6	66,6	
Medium	15	78,9	68	42,8	49	35,8	3	33,4	**<0,01****
High	p	5,2	27	17,0	16	11,7	0	0,0	

The results presented in table 3 show that there are statistical correlations between the students'level of knowledge about health and between the intensity of healthy behaviours ($p<0,001$), which can indicate that students with higher level of knowledge about health determining factors take healthy behaviours more often.

To assess the correlation between the the level of knowledge about health and the intensity of healthy behaviours on each faculty the correlation rang- Spearman was used. The negative mark of the correlation results from the kind of coding the values of both features.

On both faculties there are little statistical correlations of a positive correlation character between the level of knowledge about health and the intensity of healthy behaviours (humanities $r = -0,11$; medical faculties $r = -0,19$), which can indicate that students with a higher level of knowledge about health take healthy behaviours more often (Table IV).

To describe where students take the most information about health from, the students were presented with a list of 10 sources of knowledge and told that

they could choose a few sources. Students considered the following as the most important sources of knowledge: books (80,1%), television (67,0%), press (66,4%), family (55,4%), curriculum of faculty (52,5%), Internet (50,7%), health care workers (49,2%). Students also mentioned the following sources: relatives (34,4%), radio (28,1%), school (24,3%).

TABLE IV The level of knowledge about health determining factors and the intensity of healthy behaviours on different faculties (the correlation rang- Spearman).

Faculty	The correlation rang-Sperman
Humanities and medical faculties (in total)	-0,17
Humanities	-0,11
Medical faculty	-0,19

The ranking of the sources of knowledge was different. Students representing humanities consider the following sources of knowledge as the most popular among them: books 97,0%), television (75,0%), press (72,0%) and family (67,0%). Students representing medical faculties considered different sources of knowledge as more popular. For them the curriculum of faculty was the most important source of information (92,0%); next they mentioned books 98,3%), Internet (61,0%), press (61,0%). For students representing humanities the least important sources of knowledge were: studies (14,0%), school (21,0%), radio (32,0%). Students representing medical faculties considered radio (24,0%), school (28,0%) and relatives (30,0%) as the least important sources of knowledge. For 49,2 % of the students health care workers were an important source of information. For students representing humanities they were more important than the knowledge got from Internet. For students representing medical faculties the Internet (61,0%) was more important than health care workers.

Discussion

People's beliefs about the importance of a lifestyle in keeping healthy understood as intelectual state of certainty about rightness of some health behaviours are formed on the basis of knowledge about health behaviours that people possess [9]. The level of knowledge was assessed on the basis of twenty statements containing information about sensible diet, the correlation between some elements of diet, studies and some civilisation illnesses, the influence of addictive substances on health, the role of physical activity and prophylactic measures. The study showed that students had knowledge about the influence of physical activity on people's psychophysical condition, circulatory system diseases and high blood pressure, inluence of stress and bad eating habits on stomach and duodenum ulcer, bad influence of a computer screen and smoking

cigarettes by pregnant women on the foetus development and others. What causes some reservations is the lack of knowledge about the preventive measures for tooth decay, basic rules of physical training and its influence on health, relation between drinking alcohol and the development of civilisation illnesses. Generally almost a half of the students had a good level of knowledge and students representing medical faculties were the most numerous in this group. The correlation is simple and connected with the fact that there are more subjects about health in the curriculum on medical faculties. But there were a lot of students with a low level of knowledge. What is consoling is the fact that only some students did not have basic knowledge about health determining factors and health risks. Looking at the above analysis, we can pose the question whether students' beliefs about the role of healthy behaviours in the formation of good health correspond with the supply of knowledge about the factors influencing those healthy behaviours, for example their relation to the development of civlisation illnesses. It turned out that the level of knowledge about health and illness does not have a significant impact on taking healthy behaviours, however you may indicate a possitive character of thoese correlations, which may mean that students with a higher level of knowledge follow a more sensible diet, take physical activity more often, follow doctor's recommendations refering to the results of check-ups, avoid strong emotions and stresses. A detailed analysis of the correlations showed that in the group of students representing nursing and midwifery these correlations are a little bit stronger and we can say that higher level of knowledge corrrelates positively with healthy behaviours. The formation of the cognitive component of the attitude towards one's own health is still modified and it is dependent not only on health experiences or present health condition, but also on the stage of development, sociocultural conditions and the kind of the sources of knowledge [9]. The faculty clearly differenciates students in terms of the sources of knowledge about health. For representatives of humanities books, television, press and family were the most important sources of knowledge. But the ranking of popularity was different. Students representing humanities used books most often, also television or press. The results concerning the sources of knowledge were diferent with student representing medical faculties. For these students the following sources of knowledge were the most important: studies, literature, internet and press. All the presented sources of knowledge provide information from different fields of life. It must be remembered that media are a passive source of information and serve disinterested education very often replacing searching through the ins and outs of knowledge on one's own [11]. Books enriched with subjects about health are most often a reliable and formal source of knowledge and the sociomedical field considers family as a health team responsible for the promotion of health and medical culture [12]. Students representing medical faculties considered studies as the most important source

of knowledge about health because there are more subjects about health in the curriculum. Students representing humanities did not consider studies as important source of knowledge because there are not enough subjects about health on this faculty.

Taking into account the meaning of the feeling of self-reliance in taking some activities, also educational, it is important to remember about improving health education, which will lead to a higher level of knowledge among students and will strengthen the conviction about the competences in this field.

Conclusion

From the above analysis it can be stated that:

1. 49,3% of the students have a good level of knowledge about health and issues connected with health-oriented behaviour, but 42,1% of the students have a low level of such knowledge.

2. Among 44,7% of the students we can observe low intensity of healthy behaviors and among 41,7% of the students this intensity is medium.

3. The level of knowledge about health and illness is clearly different among students of different faculties. Students representing medical faculties had the highest level of knowledge because there are more subjects about health and illness in the curriculum than on other faculties.

4. Higher level of the health's knowledge among students do not have a significant impact on taking healthy behaviours more often.

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ABSTRACT

Knowledge about health is an important factor infuencing a man's attitude towards some values. Medical information gathered from different sources are eagerly absorbed and together with the knowledge got as a result of the educational interactions in family and the planned health education it influences an individual's attitude towards health – one of the most important values.

The aim of the study was to assess the correlation between the level of knowledge about health and health behaviour among students.

337 students from University of Rzeszow as representatives of humanities and medical faculties were assessed in this study. They were second and third year students and the choice was deliberate. Two kinds of questionnaires were used in this research: a new oryginal type of Survey Questionnaire containing tests assessing the level of knowledge about health and a Health Behaviour Inventory describing general frequency of health behaviour and the degree of intensity of the four categories of health behaviour: healthy diet, prophylactic behaviour, healthy practices and positive psychological attitude.

To present the results statistically, the chi-square test of independence and the correlation rank Spearman were used.

The results of the analysis showed that 49,3% of the students had a low level of knowledge about health and 42,1% of them had a good level of such knowledge. The level of the knowledge about health was different on different faculties. Among students of the medical faculties level of this knowledge was the highest. Among 44,7% of the students the intensity of health behaviours was low and among 41,7% of students it was average.

Higher level of the health's knowledge among students do not have a significant impact on taking healthy behaviours more often.

Key words. knowledge about health, health behaviour, students.

STRESZCZENIE

Wiedza na temat zdrowia jest istotnym elementem kształtowania u człowieka postawy wobec wartości. Zdobywane z różnych źródeł informacje medyczne są przeważnie chętnie przez niego przyswajane i w połączeniu z

wiedzą otrzymaną w ramach oddziaływań wychowawczych w rodzinie i planowanej edukacji zdrowotnej wpływają na kształtowanie się jego indywidualnej postawy wobec jednej z ważniejszych wartości, jaką jest zdrowie.

Celem pracy jest ocena związku pomiędzy poziomem wiedzy o zdrowiu a zachowaniami związanymi ze zdrowiem wśród młodzieży akademickiej.

Badaniami objęto grupę 337 studentów Uniwersytetu Rzeszowskiego reprezentujących kierunki humanistyczne i medyczne. Dobór do próby badawczej był celowy, badane osoby były studentami drugiego i trzeciego roku studiów stacjonarnych (dziennych). W pracy wykorzystano autorską wersję Kwestionariusza Ankiety zawierającą test oceny poziomu wiedzy o zdrowiu oraz Inwentarz Zachowań Zdrowotnych określający ogólne nasilenie zachowań sprzyjających zdrowiu oraz stopień nasilenia czterech kategorii zachowań zdrowotnych takich jak: prawidłowe nawyki żywieniowe, zachowania profilaktyczne, praktyki zdrowotne oraz pozytywne nastawienie psychiczne. Do opracowania statystycznego zastosowano współczynnik korelacji rang Spearmana oraz test niezależności chi- kwadrat.

W wyniku analizy stwierdzono, że 49,3% studentów posiadało dobry poziom wiedzy o zdrowiu a 42,1% poziom niski. Poziom wiedzy na temat zdrowia badanych studentów był wyraźnie zróżnicowany specyfiką studiów. Najwyższy poziom wiedzy charakteryzował studentów kierunków medycznych. U 44,7% ankietowanych stwierdzono niskie nasilenie zachowań sprzyjających zdrowiu, u 41,7% przeciętne.

Wyższy poziom wiedzy o zdrowiu nie wpływa w sposób znaczący na częstsze podejmowanie zachowań pozytywnych wśród badanej młodzieży akademickiej.

Słowa kluczowe: wiedza o zdrowiu, zachowania zdrowotne, młodzież akademicka

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THE PREVALENCE OF TOBACCO SMOKING AMONGST STUDENTS OF PHYSICAL EDUCATION FACULTY OF RZESZOW UNIVERSITY

ROZPOWSZECHNIENIE PALENIA PAPIEROSÓW WŚRÓD STUDENTÓW WYDZIAŁU WYCHOWANIA FIZYCZNEGO UR

Introduction

The escalation of civilization diseases, like circulatory system diseases, tumor and malignant neoplasm or metabolic diseases, is the reason that the personal health behavior aroused the interest of researchers.

The life style may exert positive and negative influence on health, indirect and adjourned in time as well. Papers in the field of health psychology and sociology of medicine give a number of definitions and classifications of the pro-health behavior. The classification into two groups is the mostly used one. The first one includes the health promoting activities, preventing from diseases, making recovery easier and the second – activities threatening health, making recovery more difficult [3,5]. At present, tobacco smoking and alcohol abuse are considered the most risky habits for the public health [3].

The majority of people are subject to contact with smokers to a large extent and the tobacco products are legal and accessible almost everywhere. However more and more often the discussions and many actions are undertaken to reduce the harmful effect of tobacco. The anti-tobacco campaigns, smoking prohibition in public areas, education on the negative effects of tobacco use have to change the social acceptance of this habit or addiction in some extent. Following the scientific revelations one can state that tobacco consumption is the main possible to be eliminated cause of premature death in the world [5]. However

the susceptibility to experiment with this strong stimulant especially in the period of adolescence may easily lead to addiction. The social and epidemiological research unambiguously indicates the ineffectiveness of anti tobacco campaigns amongst young people, particularly girls.

The monitoring of healthy behavior among students of physical education seems to be especially important because they should be responsible for the health promotion on the level of school or local milieu [2]. But one of the conditions of their efficacy in the health education is to set a good example.

The purpose of this paper is the estimation of the prevalence of tobacco smoking by PE students in relation to the habits of the members of their families.

Materials and methods

The research was carried out by means of the anonymous questionnaire in the academic year 2008/09 among students of PE Faculty – majors: Physical Education and Tourism & Recreation. 363 respondents were encompassed. The questionnaire included questions concerning the attitudes of students and their families members towards tobacco smoking. Demographic part concerned age, sex, place of residence, parents education. The statistical significance of analyzed relationships was done by means of the independence test chi-square. The following statistical rules were admitted: $p>0,05$ – lack of statistical significance, $p<0,05$ – statistical significance(*), $p<0,01$ – high statistical significance(**), $p<0,001$ – very high statistical significance.(***). Furthermore the selected values of analyzed parameters were calculated, namely:

– arithmetic average – mean level of the variable
– median(mean value) – a half of values of given parameter are higher and a half are lower than the median
– maximal and minimal values
– centile 25^{th}(lower quartile, c_{25}) – every fourth value is lower than that and every fourth one is higher than centile 75^{th}(upper quartile c_{75})
– standard deviation(s) – distribution of values with reference to arithmetic average

Results

The collected data allowed to characterize the studied group. This group included 363 persons – students of Rzeszow University, Physical Education Faculty. 35,8% were women and 64,2% - men. As a place of residence 37,2% announced a village, 41% - small town and 21,8% - city. The number of respondents with division into majors and the mode of studying is presented on Fig 1.

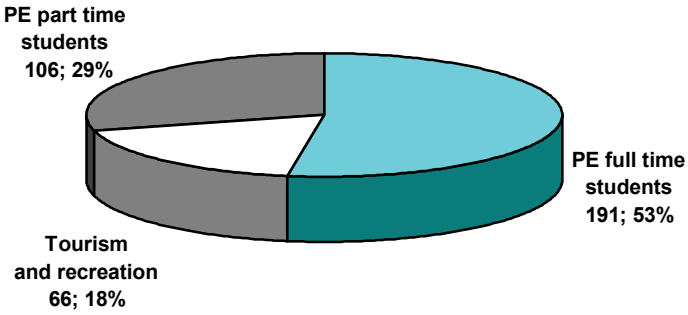


Fig.1. Numbers of students

Almost two third of the group were between 21- and 24-years-old. The table I presents the age of respondents.

Tab. I.

Age (years)	N	$\bar{x}$	Me	Min	Max	c_{25}	c_{75}	s
	363	23,3	23,0	19	43	21,0	24,0	3,0

The greatest number were students-children of parents with vocational and secondary education (Tab II)

Tab. II.

Level of education	Mother's education		Father's education	
	Number	Percentage	Number	Percentage
elementary	14	3,9%	14	3,9%
vocational	105	28,9%	164	45,2%
secondary	152	41,9%	132	36,4%
Bachelor's degree	13	3,6%	4	1,1%
higher	79	21,8%	46	12,7%
lack of data	0	0,0%	3	0,8%

Bachelor's degree and higher education level were put together for further analysis.

Every seventh person declares to be a regular smoker and every tenth – an irregular one, all in all every fourth person smokes (Fig. 2)

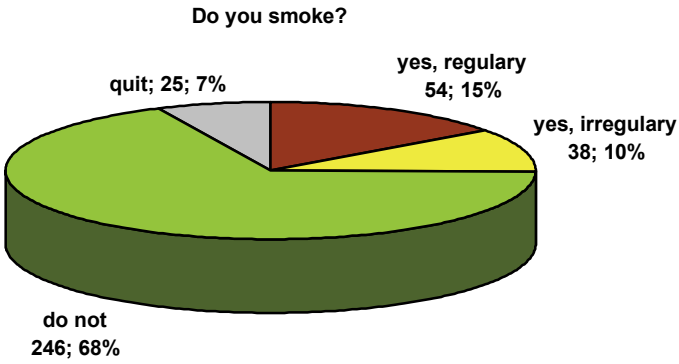


Fig. 2. Habits related to smoking

The number of cigarettes smoked per day by the regular smokers varies between 2 and 40. On average it is about 12. For every fourth smoker it is 15 and more. (Tab. III)

Tab. III.

	N	$\bar{x}$	Me	Min	Max	c_{25}	c_{75}	s
Number of cigarettes	53	11,8	10,0	2	40	8,0	15,0	6,7

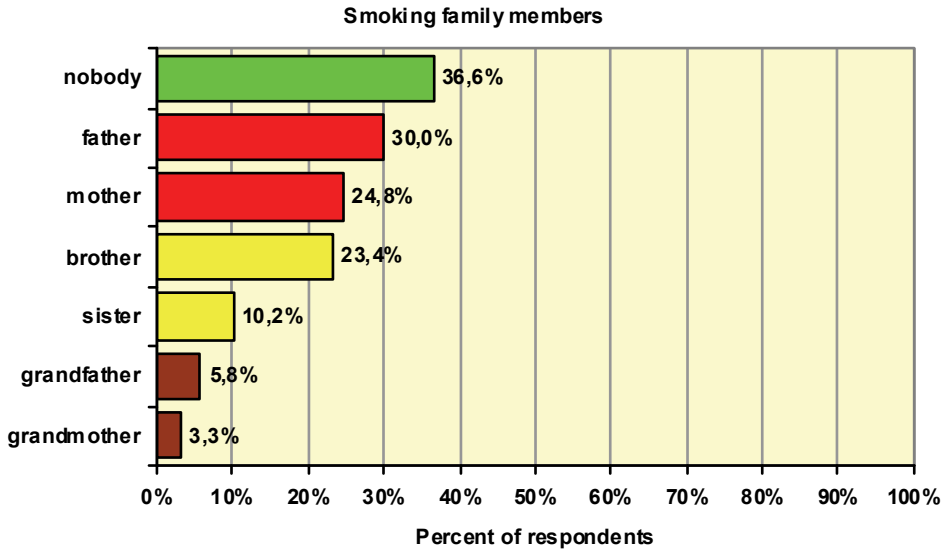
The smokers started their habit aged between 8 and 27 years. In such a situation any conclusion can be based on the average that is why the values of median and both centiles were taken into consideration. Every fourth person started smoking being 16 or younger and every fourth one being 18 or older, so the majority was within the range 16 – 18-year-old. (Tab. IV).

Tab. IV.

	N	$\bar{x}$	Me	Min	Max	c_{25}	c_{75}	s
Age	78	17,1	17,0	8	27	16,0	18,0	3,0

The analysis of the phenomenon of nicotinism in the respondents' family milieu based on the question concerning family members who smoke shows that the highest percentage of smokers are men: fathers, brothers and grandfathers (Fig. 3).

What seems to be interesting is the number of smoking family members. In case of more than 35% families of respondents there is only one person who smokes (Fig. 4).



Ryc. 3. Family members-smokers

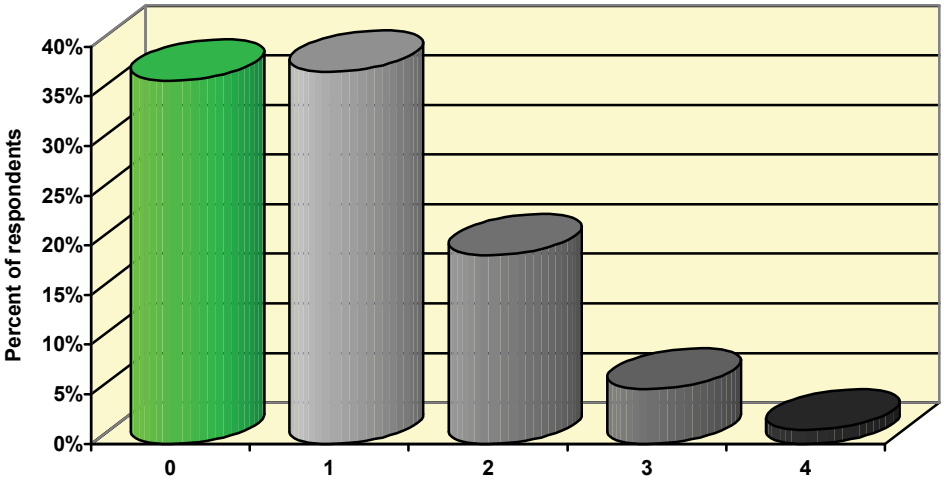


Fig. 4. Percentage of smoking respondents vs number of family members-smokers

The influence of selected factors (except age because of relatively high homogeneity of studied group) on the tobacco consumption was pondered. The results are presented in tables of contingency with the result of independence test chi-square. In principle no statistical significance was found for any factor (Tab. V-IX).

Tab. V.

Major	Do you smoke? (p = 0,0680)				Sum
	yes, regularly	Irregularly	No	Quit	
Physical Education – full time students	23 (12,0%)	22 (11,5%)	132 (69,1%)	14 (7,3%)	191
Tourism and recreation	16 (24,2%)	9 (13,6%)	40 (60,6%)	1 (1,5%)	66
PE – part time	15 (14,2%)	7 (6,6%)	74 (69,8%)	10 (9,4%)	106
Sum	54	38	246	25	363

Tab. VI.

Sex	Do you smoke? (p = 0,8225)				Sum
	yes, regularly	irregularly	No	quit	
females	18 (13,8%)	14 (10,8%)	87 (66,9%)	11 (8,5%)	130
males	36 (15,5%)	24 (10,3%)	159 (68,2%)	14 (6,0%)	233
Sum	54	38	246	25	363

Tab. VII.

Place of residence	Do you smoke? (p = 0,0625)				Sum
	yes, regularly	irregularly	no	quit	
village	13 (9,6%)	16 (11,9%)	101 (74,8%)	5 (3,7%)	135
town	31 (20,8%)	14 (9,4%)	92 (61,7%)	12 (8,1%)	149
city	10 (12,7%)	8 (10,1%)	53 (67,1%)	8 (10,1%)	79
Sum	54	38	246	25	363

Tab. VIII.

Mother's education	Do you smoke? (p = 0,5605)				Sum
	yes, regularly	irregularly	no	quit	
elementary	2 (14,3%)	0 (0,0%)	12 (85,7%)	0 (0,0%)	14
vocational	11 (10,5%)	13 (12,4%)	72 (68,6%)	9 (8,6%)	105
secondary	23 (15,1%)	18 (11,8%)	101 (66,4%)	10 (6,6%)	152
Bachelor/higher	18 (19,6%)	7 (7,6%)	61 (66,3%)	6 (6,5%)	92
Sum	54	38	246	25	363

Tab. IX.

Father's education	Do you smoke? (p = 0,3689)				Sum
	yes, regularly	irregularly	no	quit	
elementary	1 (7,1%)	0 (0,0%)	13 (92,9%)	0 (0,0%)	14
vocational	23 (14,0%)	17 (10,4%)	114 (69,5%)	10 (6,1%)	164
secondary	19 (14,4%)	15 (11,4%)	89 (67,4%)	9 (6,8%)	132
Bachelor/higher	11 (22,0%)	6 (12,0%)	27 (54,0%)	6 (12,0%)	50
Sum	54	38	243	25	360

Much more evident is the result of the comparison of the number of smoking students and the number of smoking family members (Tab. X and Fig. 5). Although two last age groups are not numerous, the result of chi-square test is still lower when treated altogether (p = 0,0040**).

Tab. X.

Number of smoking family members	Do you smoke? (p = 0,0064**)				Sum
	yes, regularly	irregularly	no	quit	
0	11 (8,3%)	12 (9,0%)	99 (74,4%)	11 (8,3%)	133
1	20 (14,7%)	13 (9,6%)	95 (69,9%)	8 (5,9%)	136
2	13 (18,8%)	11 (15,9%)	42 (60,9%)	3 (4,3%)	69
3	7 (35,0%)	2 (10,0%)	8 (40,0%)	3 (15,0%)	20
4	3 (60,0%)	0 (0,0%)	2 (40,0%)	0 (0,0%)	5
Sum	54	38	246	25	363

The collected data was analyzed with a view to check the possible influence of smoking parents on the habits of the respondents. Due to the complexity of the analysis only the dichotomous split (smokers – 92 and non-smokers – 271 persons) was taken into account. If the only smoker is a father the percentage of smoking respondents (less than every fourth person) is similar to the situation when parents are non-smokers. If it is the case of mother – every third person is a smoker and the result of the independence test shows the statistical significance (p = 0,0018**). This percentage is still higher – more than 40% - when both parents smoke (Fig.6).

The analysis of the relationship between smoking respondents and their smoking siblings was also carried out. No statistical significance was found and on the other hand low number persons of these groups prevent from drawing the conclusions. The next analysis concerned the possibility of the influence of grandparents. As it turned out in this case more distinct was the "example" set by smoking grandfather. Statistical significance (p = 0,0033**) indicates that his

habit was adopted. The influence of smoking grandmother is almost on the same level as in case of a father or siblings (Tab. XI, Fig. 7)

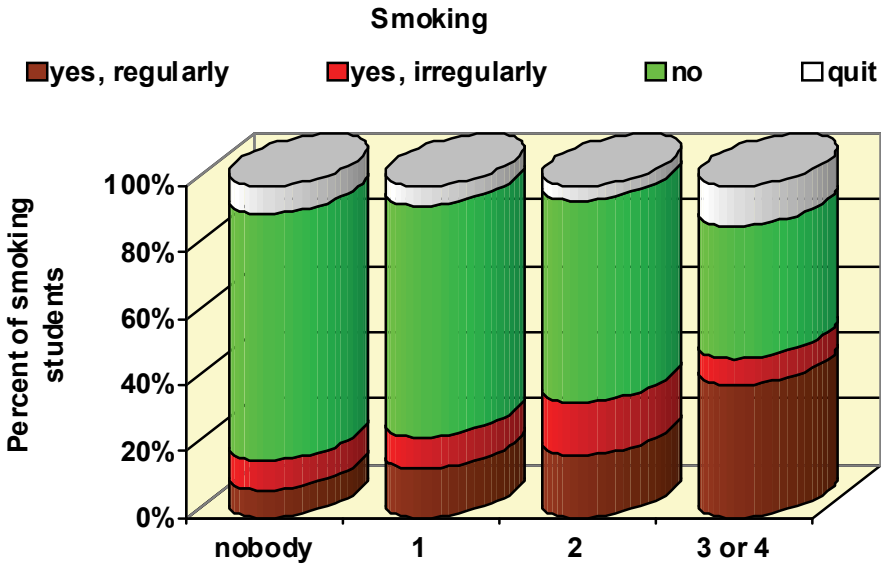


Fig. 5. Percent of smoking students vs number of smoking family members

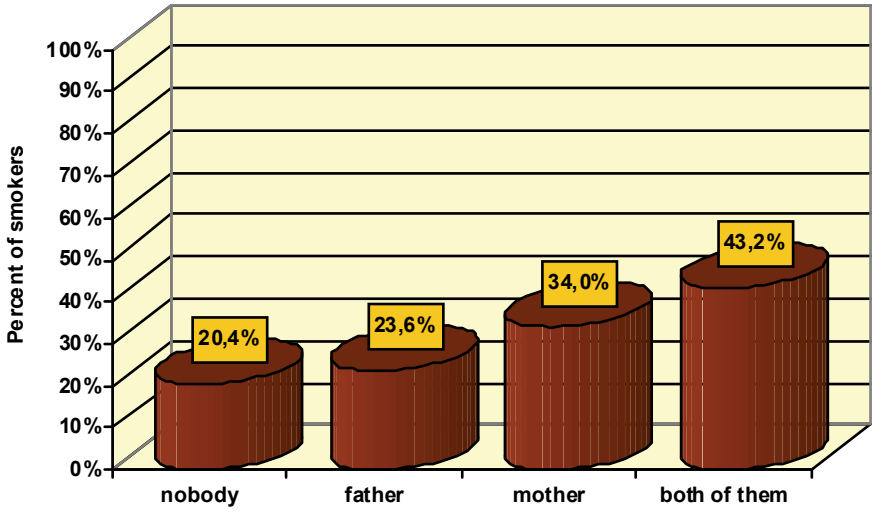


Fig. 6. Percentage of smoking respondents vs smoking parents

Tab. XI.

Smoking grandparents	respondents		Sum
	non-smokers	smokers	
Non-smokers	253	79	332
	76,2%	23,8%	
grandfather	10	9	19
	52,6%	47,4%	
grandmother	8	2	10
	80,0%	20,0%	
both	0	2	2
	0,0%	100,0%	

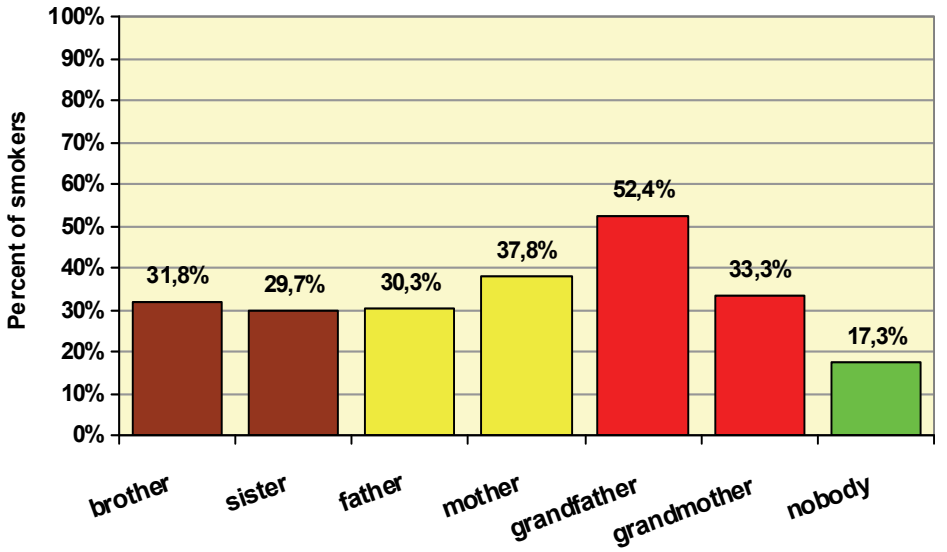


Fig. 7. Percentage of smoking respondents vs. smoking family members

The next analysis concerned the relationship between the sex of respondents and smoking parents. As already mentioned above smoking father does not influence the habits of children regardless of their sex. Much greater is the influence of smoking mother, particularly on daughters (Tab. XII).

No statistical significance was found in relationship between the fact of cigarettes smoking by respondents and the education level of their parents.

The relationship between cigarettes smoking and the frequency of the consumption of different types of alcohol was also analyzed to check out if they can be factors conducive to smoking. Tables XIII-XV and Fig. 8 present the results.

Tab. XII.

Sex of respondents	Smoking mother	respondents		Sum
		smokers	non-	
females (p = 0,0008***)	Non-smokers	81	17	98
		82,7%	17,3%	
	smokers	17	15	32
		53,1%	46,9%	
males (p = 0,1590)	Non-smokers	134	41	175
		76,6%	23,4%	
	smokers	39	19	58
		67,2%	32,8%	

Tab. XIII.

Beer consumption	Do you smoke? (p = 0,0098**)		Sum
	No	yes	
Few times per week	64 (67,4%)	31 (32,6%)	95
Few times per month	118 (71,5%)	47 (28,5%)	165
Few times per year	60 (88,2%)	8 (11,8%)	68
Teetotaller	29 (82,9%)	6 (17,1%)	35
Sum	271	92	363

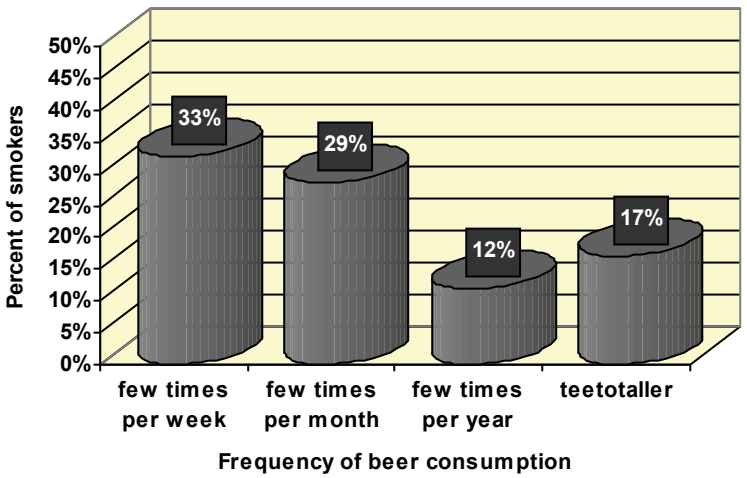


Fig. 8. Beer consumption vs cigarettes smoking

Tab. XIV.

Wine consumption	Do you smoke? (p = 0,3281)		Sum
	no	yes	
Few times per week	7 (63,6%)	4 (36,4%)	11
Few times per month	47 (69,1%)	21 (30,9%)	68
Few times per year	114 (79,2%)	30 (20,8%)	144
Teetotaller	103 (73,6%)	37 (26,4%)	140
Sum	271	92	363

Tab. XV.

Vodka consumption	Do you smoke? (p = 0,0801)		Sum
	no	yes	
Few times per week	6 (50,0%)	6 (50,0%)	12
Few times per month	82 (70,1%)	35 (29,9%)	117
Few times per year	126 (77,8%)	36 (22,2%)	162
Teetotaller	57 (79,2%)	15 (20,8%)	72
Sum	271	92	363

Discussion

The collected data show that the majority of Physical Education Faculty students (68%) belong to the non-smoking part of population. The results of the researchers from other academic centers on smoking prevalence among students of different majors are similar to ours. Kanicka et all. (2007) report that 68,3% of the surveyed students of Medical University in Lodz and 68,6% of the group of students of Medical University in Bialystok are non-smokers. According to the research of Ordys and Eszyk (2003) 68,1% of Silesian students never smoked. The results of Binkowska-Bury et all (2007) concerning students of Rzeszow Technical University and students of three faculties of Rzeszow University (without Physical Education Faculty among others) revealed 71,2% non-smoking persons. The highest percentage of non-smoking students – almost 92% - has been reported by Puto et all. (2007) among students of the University of Agriculture in Krakow. Thus all these papers – the ours included – confirm that non-smoking is in fashion among students [7].

Nevertheless, in the light of our data one should stress the 25% of smoking students of PE Faculty. Should not be the priority for students of PE or Tourism and Recreation to promote healthy habits and to set a good example by themselves? That is why one should expect only the marginal percentage of smokers, if not non-smokers exclusively, among them. But to achieve such an attitude the adequate activities ought to be undertaken on the level of grammar

school. Pupils start to smoke mostly around this age and the prevalence of smoking among 15-year-old girls and boys tends to increase [9]. Our respondents mostly reached out for cigarettes at the age of sixteen.

The next serious problem is the influence of the family milieu and smoking family members, of smoking mothers in particular. Almost 30% of smoking respondents are children of smoking mothers. In case of both smoking parents this influence is still stronger and exceeds 40%. The health education and the educational campaigns – less educated people are more likely to smoke - aimed at the development of people's awareness of health risk of active and passive smoking also called the tobacco-related harm will contribute to elimination of this bad habit.

One should believe that in the future the present students supported by the anti tobacco policy of European Union will create non-smoking families and the non-smoking society in prospect. At present almost 70% of citizens in Europe do not smoke[8,9] and more than 86% of respondents opt for banning or restriction on smoking in workplaces and 84% in other closed public places [8]. The non-smoking part of society ought to be prevented from the exposure to tobacco smoke, the more so because it is generated by unquestionable minority.

Conclusions:

1. Considerable majority of questioned students of Physical Education Faculty declare themselves as non-smokers.
2. Smoking students started this habit in junior high or secondary school.
3. Attitudes of the students families members towards smoking evidently impinge on their own decisions concerning the tobacco consumption.
4. Mothers - smoking or not – significantly determine the attitudes of daughters.
5. Smokers are especially stimulated by the consumption of beer.

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ABSTRACT

Introduction. More and more the growing problem of civilization diseases is a reason for the importance of pro-health behavior. They became a very special area of the research. Smoking is nowadays numbered among the most risky for the public health. This is the main cause of premature deceases possible to be eliminated.

The goal. The goal of the research is to estimate how common is smoking amongst the students of the Physical Education Faculty of Rzeszow University and their family milieu.

Materials and methods. The survey was carried out by means of an anonymous questionnaire and encompassed 363 persons. The questionnaire included questions concerning attitudes of students and their families towards smoking and personal data: age, sex, place of residence and parents education. The statistical analysis was performed using a chi-square test.

Results. Every fourth person of the questioned population is a smoker. The regular tobacco consumers smoke 12 cigarettes per day. Most of them started at the age of 16-18. No statistical significance was found for the following factors: major, sex, place of residence and parents education as factors which can influence the attitudes of young people towards smoking. However very significant results were obtained by comparison of the number of smoking students with the number of their families members who smoke. The result of chi-square test p amounts to $0{,}0040^{**}$ for the cases of 3 or 4 smoking family members. It is also clearly visible that smoking fathers do not influence their children habits. In contrast to the influence of mothers who smoke ($p = 0{,}0018^{**}$). Smoking mothers "set the example" for their daughters in particular. The respondents stress also the beer consumption as a factor stimulating smoking.

Key words: pro-health behavior, nicotine dependence, life style

STRESZCZENIE

Wprowadzenie. Narastanie chorób cywilizacyjnych spowodowało, że zachowania zdrowotne jednostki stały się podstawowym obszarem zainteresowań badawczych. Współcześnie do zachowań o najwyższym ryzyku dla zdrowia publicznego zalicza się przede wszystkim palenie tytoniu. Tytoń

jest główną, możliwą do wyeliminowania przyczyną przedwczesnych zgonów na świecie.

Cel. Celem badań jest ocena stopnia rozpowszechnienia palenia papierosów wśród studentów Wydziału Wychowania Fizycznego oraz przedstawienie zjawiska nikotynizmu w środowisku rodzinnym badanego.

Materiał i metody. Badania za pomocą anonimowego kwestionariusza ankiety przeprowadzono wśród studentów Wydziału Wychowania Fizycznego UR. Prezentowany materiał oparto na grupie 363 respondentów studiujących na kierunku Wychowanie Fizyczne oraz Turystyka i rekreacja. Kwestionariusz zawierał pytania z zakresu postaw ankietowanych oraz członków ich rodzin wobec palenia papierosów. Ponadto ankietowani wpisywali swój wiek, płeć, miejsce zamieszkania oraz wykształcenie rodziców. Istotność analizowanych zależności badano za pomocą testu niezależności chi-kwadrat.

Wyniki badań. Wśród badanej grupy studentów wydziału WF, co czwarta osoba pali papierosy. Regularnie palący wypalają średnio ok. 12 papierosów dziennie. Zdecydowana większość z nich rozpoczęła palenie w wieku 16-18 lat. Dla czynników takich jak kierunek studiów, płeć, miejsce zamieszkania oraz wykształcenie rodziców nie znaleziono statystycznie istotnego wpływu na fakt palenia papierosów. Bardzo wyraźne wyniki uzyskano natomiast porównując liczbę osób palących w najbliższej rodzinie z paleniem papierosów przez badanych. Po połączeniu grupy osób, w których rodzinach pali 3 lub 4 osoby wynik testu niezależności chi-kwadrat wyniósł p = 0,0040**. Wyraźnie widoczne jest, że w rodzinach, gdzie pali tylko ojciec odsetek palaczy jest podobny jak w rodzinach gdzie nie pali żadne z rodziców. Z kolei wpływ palenia papierosów przez matkę na palenia papierosów przez respondentów jest znamienny statystycznie (p = 0,0018**). Fakt palenia papierosów przez ojca nie miał żadnego znaczenia, bez względu na to, czy respondent był płci żeńskiej czy też męskiej. Natomiast wpływ palenia papierosów przez matki był dużo wyraźniejszy wśród kobiet. Spożywanie piwa jest czynnikiem sprzyjającym paleniu papierosów wśród studentów wydziału WF.

Słowa kluczowe: zachowania zdrowotne, nikotynizm, styl życia

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ASSESSMENT OF STUDENTS' PHYSICAL EFFICIENCY IN THE CONTEXT OF HEALTH PROMOTION SYSTEM

OCENA WYDOLNOŚCI FIZYCZNEJ STUDENTEK W KONTEKŚCIE SYSTEMU PROMOCJI ZDROWIA

Introduction

Organized physical activity improves particular physiological system, internal organs functioning, enables proper development during childhood period, as well as prevents many diseases. It also helps develop ambitious of individuals, and decide for responsible choices in the respect of one's health and wellbeing.

It is difficult to relate the meaning of human's physical activity only with the attainment of biological needs, as if the issue of motion activity of human results also from deep psychical and social sphere [15]. Positive psycho-physical effects of physical activity might be multiply, and what is even more important, all of them help to achieve good physical, psychical and social state, and that is, according to world's standards, health [7]. A modern concept of health does not stand only for lack of disease, but it stands for general good state, enabling vigorous achievement of everyday tasks, aspirations realization and copping with variable environmental conditions. Among factors determining health's state 50% is assigned to proper lifestyle, which key element is physical activity. Multilateral positive impact of physical activity increase on human's state of health, is about improving the activity of some organs, systems, as a result of developing training changes .

According to Kozłowski, Nazar, a concept of physical training means the process leading to increase the ability to is physical effort. This ability increases in train training, through changes made in the organism, as an effect of

repetitious physical efforts. The essence of training is the repetition of physical efforts, and its starts the training state with changes in ultastructural, morphologic, biochemist and functional characteristic of organism. Those changes develop as a result of training and have adaptive character [8].

According to Szopa and co. [18] motor abilities of human are complexes predispositions integrated with common, and dominative biological and motion base, shaped by genetic and environmental factors, as well as being with interactions. Along with motion abilities they create potential motor side, conditioning readiness state of organism to effective performing different type of motion tasks. Among motor abilities the following are distinguish: strength, speed, stamina, coordination [18].

In sport, recreation, rehabilitation, physical exercises are the main training source shaping the mentioned above human's motor abilities. The essence of training is about using adaptive mechanism, which in response to stimulus exceeding until now strength, lead to rebuild with compensation (hyper compensation) [14]. The aim of health training is shaping motion efficiency, and above all its features related with health state, civilization diseases prevention, and when needed abate of those diseases [6]. As in sport training, the fundament rule of health training is regularity of performed exercises. The impact of physical training enables not only to achieve sport successes, but also causes the decrease of everyday fatigue. Sedentary lifestyle, which became a normal one in civilized society leads to not normal genes expression, and that might be the cause of chronic illness, determined as civilization diseases, among which are: ischemic heart disease, hypertension, obesity and Type 2 diabetes. The prevention of circulation system diseases is about diagnosis and modifications of risk factors of: ischemic heart disease, hypertension, cerebrovascular disease. Risk factors of those diseases are those factors, which presence in organism, or in environment, in which this organism lives, increase the probability for disease to occur or to speed its development. Regular physical exercises might effectively slow down the changes related with ageing, improve functioning and extend the period free of disease. In clinic studies of people systematically training, central and peripheral adaptation of circular system to physical effort, which include hemodynamic changes, morphologic and metabolic in heart muscle, was found out. Regular physical effort improves the function of endothelium vascular, as well as to advance modifies blood clotting and fibrinolysis. Cardio protection of systematic physical activity is about its advance impact on many risk factors of ischemic heart disease, and that to lower blood pressure, modify lipid disorder, reduce body mass and percentage hypodermic fatty tissue, lower insulin resistance and improvement of glucose tolerance. The increase of physical efficiency, decrease of catecholamine concentration during the effort, increase the activity of antioxidant system, an effect of calming down among those performing exercises- are also the advantages of systematic motion activity essential in cardio

prevention [4]. More than a half of growing up youth, when leaving school, became physically not active. Polish society is characterized by low physical activity. It might be estimated, that hardy approximately 30% of children and youth and 10% of adults in Poland practice sport, which type and intensity of exercise loads, attain physiologic body needs [12]. Percentage of people performing regular physical exercises is although higher than 10-15 years ago, but still 50-60% of Polish adults is characterized by too low physical activity. Almost 35% of participants of WOBASZ study (37% women and 32% man) do not perform any kind of physical exercises for at least 30 min a day in the free of work or study time [5]. Physical activity seems to be related with heart diseases. It is stated, that the results of effort tests among people with negative cardiologic history, are the factors, which predict heart diseases [11]. Physical training has an advantage impact on the course of atheromatosis, giving the total death reduction for about 20-25 % [19]. Optimal level of physical efficiency related with an effective functioning in everyday life and prophylaxis of an early death for men between 20-30 yrs values 46-52 VO2 max, and for women 42-48 VO2 max [13]. A significant reduction of heart attack risk might be achieved with an effort of approximately 2000 kcal per week. Physical activity related with an energetic expenditure> 1000 kcal/weekly (4200 kJ/weekly) is related to 30% total morality reduction [3]. Table 1 presents classification of the physical efficiency level of women in different age, with reference to the maximum value of oxygen uptake in l/min (ml/min/kg) [8].

Table 1. Maximum oxygen uptake by women in different age l/min (ml/min/kg) [Kozłowski]

Sex	Age (yrs)	Efficiency				
		very low	low	average	high	very high
Women		≤ 1,69	1,70 – 1,99	2,00 – 2,49	2,50 – 2,79	≥ 2,8
	20–29	**≤ 28**	**29 – 34**	**35 – 43**	**44 – 48**	**≥ 49**
		≤1,59	1,60 – 1,89	1,90 – 2,39	2,40 – 2,69	≥ 2,70
	30–39	≤27	28 – 33	34 – 41	42 – 47	≥ 48
		≤1,49	1,50 – 1,79	1,80 – 2,29	2,30 – 2,59	≥2,60
	40–49	≤25	26 – 31	32 – 40	41 – 45	≥ 46
		≤1,29	1,30 – 1,59	1,62 – 2,09	2,10 – 2,39	≥ 2,40
	50–59	≤21	22 – 28	29 – 36	37 – 41	≥ 42

Popular observation, as well as researches [9], help to notice a general unwilling attitude of society, and women in particular, to undertake physical activity. Among youth it is observed a decrease of activity in older age groups in many EU countries. Significantly much decrease is present among girls, out of whom, in Poland, every fifth in age of 11 yrs declares an average or high daily physical activity, and in age of 15 yrs it is only every 10^{th} person [20]. One of natural physiologic body functions of woman is birth child giving. Pregnancy and delivery generate physiological challenge for all organism's systems of

pregnant and delivering woman. Adaptive changes, occurring thanks to performing systematic physical exercises, increasing the efficiency ability of pregnant woman, might have a meaning during delivering [17]. From the available data results it tours out, that health training also prolongs life's length, and not smoking people, maintain a proper body mass and performing a proper dosage of exercises live on average 5-7 years longer than their peer not performing any rules of healthy lifestyle [5].

The aim of the study was the physical efficiency state assessment of different faculties students' of State Higher Vocational School in Krosno, due to an early identification of people with low physical efficiency, as well as inspiring them an authorities to undertake activities aimed on health promotion.

Materials and methods

The study was carried out among 176 students from State Higher Vocational School in Krosno, in age of 20,55 ± 1,64 yrs, studying on different faculties: Philology (33 people), Pedagogic (38 people), Tourism and Recreation (52 people), Agriculture (29 people) and Physical Education (24 people). To assess trim and effort tolerance a standard 20 meters balance test run (Beep test version 2_6) with an increasing maximum load (average evaluation VO2 max) was used. The test was carried out on gymnasium (forego with 5-min. warm up) and was about balance run on the distance of 20 m back and forth, with an increasing tempo given by time signal, until refusal (fatigue) of testified person, or the decrease of run's tempo not accordingly to time signal [10]. Include criteria: students with negative history of start effort readiness, after filling in questionnaire (Physical activity readiness questionnaire), whom had given a written agreement to participate in the study and have up-to date check-up. Excluding criteria: positive history of start effort readiness (at least one positive answer for questions included in Physical activity readiness questionnaire), refusal to participate in the study, lack of up-to date check-up, bad wellbeing before or during an effort test.

Before an effort test, there had been marked height with an antropometer, and body mass components with Tanita TBF 300 weight scale. All results were statistically compiled with the usage of Statistica PL. In data analysis and tables' description there had been used the following abbreviations: (Fat - body fat), (FFM – Free Fat Mass), (TBW – Total Body Water), BMI- Body Mass Index).

Results

No statistically significant difference had been noticed on somatic build between studied students and the particular faculties. The highest average indicator BMI 21,73±3,89, Fat % 22,84± 7,41, Fat (kg) 14,76±7,55 was noticed

among Philology faculty. The highest average indicator FFM 45,60± 2,6 was noticed among Physical Education faculty.

Arithmetic mean of absolute value V02 max for studied group of SHVS in Krosno values 37,51 ± 5,79 ml/min/kg, and place them in the range below the middle distribution (39 V02 max) of average level of efficiency between 35-43 V02 max. An average value of run distances of Beep test valued accordingly: Level 6,83 ± 1,70 and Shuttle 4,51±2,26 (table 2).

Table 2. Characteristic of studied group and results of Beep test of SHVS in Krosno students

Students N=176	Age	Height	Weight	BMI	Fat (%)	Fat (kg)	FFM	TBW	Level	Shuttle	Absolute VO2max
Average	20,55	164,94	57,33	20,91	21,09	12,93	44,55	32,60	6,83	4,51	37,51
SD	1,64	12,64	9,91	3,46	7,14	6,42	4,45	3,25	1,70	2,26	5,79
Min	19	152	41,9	15,7	4,1	2,4	38,6	28,3	3	1	23,8
Max	23	185	105	36,3	42,7	44,8	60,2	44,1	11	9	52

Arithmetic mean of absolute value V02 max for studied group of SHVS in Krosno Philology students values 33,86±4,91 ml/min/kg, and place them in the range of low efficiency level 29-34 V02 max. An average value of run distances of Beep test valued accordingly: Level 5,82±1,53 and Shuttle 4,45±2 (table 3).

Table 3. Characteristic of studied group and results of Beep test of SHVS in Krosno Philology students

Philology N=33	Age	Height	Weight	BMI	Fat (%)	Fat (kg)	FFM	TBW	Level	Shuttle	Absolute VO2max
Average	20,27	165,15	59,31	21,73	22,84	14,76	44,94	32,90	5,82	4,45	33,86
SD	0,55	6,18	11,50	3,89	7,41	7,55	4,09	2,99	1,53	2,00	4,91
Min	19	153	41,9	16,4	4,5	6	38,6	28,3	3	1	23,8
Max	22	178	105	36,3	42,7	44,8	60,2	44,1	9	9	44,6

Arithmetic mean of absolute value V02 max for studied group of SHVS in Krosno Agriculture students values 35,63±4,50 ml/min/kg, and place them in the range close to limiting for reference value of average efficiency level between 35-43 V02 max. An average value of run distances of Beep test valued accordingly: Level 6,32±1,39 and Shuttle 4,43±2,50 (table 4).

Table 4. Characteristic of studied group and results of Beep test of SHVS in Krosno Agriculture students

Agriculture N=29	Age	Height	Weight	BMI	Fat (%)	Fat (kg)	FFM	TBW	Level	Shuttle	Absolute VO2max
Average	20,46	165,54	56,90	20,76	20,25	12,36	44,68	32,71	6,32	4,43	35,63
SD	0,58	6,89	10,40	3,60	7,78	7,08	4,16	3,04	1,39	2,50	4,50
Min	20	156	43,7	15,9	7,8	3,4	39,3	28,8	4	0	26,2
Max	22	185	88,1	34	38,1	33,6	56,3	41,2	10	8	48,3

Arithmetic mean of absolute value V02 max for studied group of SHVS in Krosno Pedagogic students values 36,17±4,50 ml/min/kg, and place them in the range of an average efficiency level 35-43 V02 max. An average value of run distances of Beep test valued accordingly: Level 6,32±1,39 and Shuttle 4,43±2,50 (table 5).

Table 5. Characteristic of studied group and results of Beep test of SHVS in Krosno Pedagogic students

Pedagogic N=38	Age	Height	Weight	BMI	Fat (%)	Fat (kg)	FFM	TBW	Level	Shuttle	Absolute VO2max
Average	20,23	163,13	53,08	20,01	18,18	10,57	42,74	31,29	6,67	4,25	36,17
SD	0,48	4,86	7,90	3,23	7,82	5,96	2,34	1,71	1,53	2,17	6,23
Min	20	152	42	16	4,1	2,4	38,7	28,3	3	1	23,8
Max	22	175	80,4	31,4	41	33	48,2	35,3	10	9	48

Arithmetic mean of absolute value V02 max for studied group of SHVS in Krosno Tourism and Recreation students values 39,80±4,36 ml/min/kg, and place them in the range above the middle of distribution (39 VO2 max) of an average efficiency level between 35-43 V02 max. An average value of run distances of Beep test valued accordingly: Level 7,28±1,25 and Shuttle 4,86±2,23 (table 6).

Table 6. Characteristic of studied group and results of Beep test of SHVS in Krosno Tourism and Recreation students

Tourism N=52	Age	Height	Weight	BMI	Fat (%)	Fat (kg)	FFM	TBW	Level	Shuttle	Absolute VO2max
Average	20,91	167,02	58,07	20,87	21,79	12,89	45,18	33,04	7,28	4,86	39,80
SD	0,89	5,40	6,79	2,11	5,63	4,96	2,45	1,77	1,25	2,23	4,36
Min	19	154	46,9	15,7	10,3	4,9	40,6	29,7	5	1	30,3
Max	23	177	79,1	27,4	35,9	28,2	50,9	37,3	11	9	51,1

Arithmetic mean of absolute value V02 max for studied group of SHVS in Krosno Physical Education students values 43,49±4,75 ml/min/kg, and place them in the range of the middle of distribution of an average efficiency level between 35-43 V02 max., near value 44 V02max, and that is the lower limit of high efficiency level. An average value of run distances of Beep test valued accordingly: Level 8,56±1,47 and Shuttle 4,49±2,66 (table 7).

Table 7. Characteristic of studied group and results of Beep test of SHVS in Krosno Physical Education students

P.E. N=24	Age	Height	Weight	BMI	Fat (%)	Fat (kg)	FFM	TBW	Level	Shuttle	Absolute VO2max
Average	21,46	167,15	58,76	21,01	21,87	13,17	45,60	33,38	8,56	4,49	43,49
SD	0,84	4,88	6,54	1,90	5,23	4,57	2,46	1,80	1,47	2,66	4,75
Min	20	160	49	18,2	11,9	5,8	41,8	30,6	6	0	35,1
Max	23	178	79,6	25,1	35,1	27,9	51,7	37,8	11	9	52

Against the physical efficiency the majority of studied students fit into (values very diffused in the whole range) values of an average efficiency level between 35-43 VO2 max. Only students of Philology were evaluated on the low efficiency level between 29-34 V02 max (Figure1.)

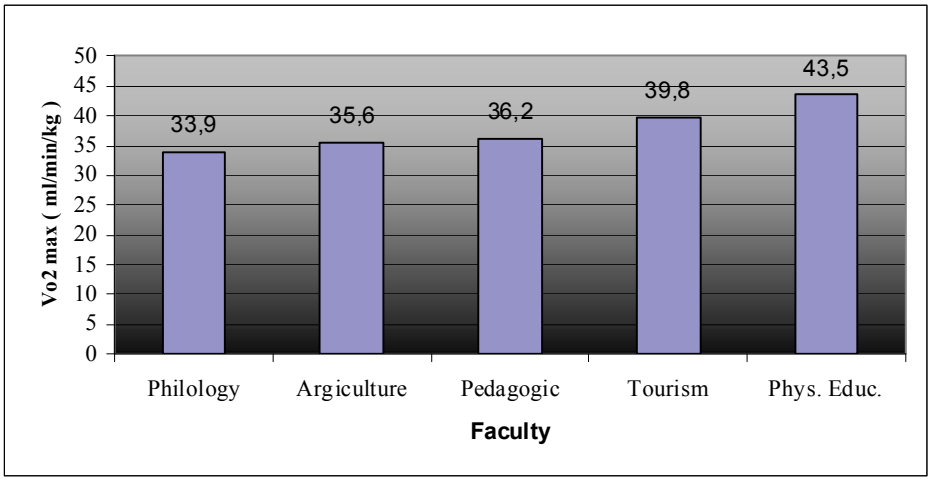

Figure 1. Arithmetic mean of absolute values VO2 max among students according to faculty

More than 50% low efficiency level was noticed among students of Philology (60,6%), and Agriculture (51,7%). Only among students of Physical Education there was not noticed students with low efficiency level (table 8).

Table 8.Distribution of physical efficiency level (< 35 VO2 max) according to studied group with reference to faculty

Faculty N=176	Philology N=33	Agriculture N=29	Pedagogic N=38	Tourism N=52	Physical Education N=24
Level VO2max	< 35 VO2 max	< 35 VO2 max	< 35 VO2 max	< 35 VO2 max	< 35 VO2 max
No. of people	20/33	15/29	17/38	11/52	0/24
%	60,6	51,7	44,7	21.1	-
Average	30,42	32,36	31,44	33,69	-
SD	3,11	2,68	3,56	1,50	-
Min	23,8	27,2	21,8	30,3	-
Max	34,8	34,8	34,8	34,8	-

Almost 80 % (78,9%) students of Tourism and Recreation and as many as 100 % students of Physical Education fit into above value of V02 max 35 ml/min/kg, and that is the low limit of an average efficiency level (table 9)

In total specification of physical efficiency level among studied students of SHVS in Krosno, it was noticed, that 35,7% (and in specification without analysis of P.E faculty 41,5%) the altogether studied women were characterized by physical efficiency below V02 max 35 ml/min/kg value (table 10) (Figure 2).

Table9 . Distribution of physical efficiency level (> 35 VO2 max) according to studied group with reference to faculty

Faculty N=176	Philology N=33	Agriculture N=29	Pedagogic N=38	Tourism N=52	Physical Education N=24
Level VO2max	> 35 VO2 max	> 35 VO2 max	> 35 VO2 max	> 35 VO2 max	> 35 VO2 max
No. of people	13/33	14/29	21/38	41/52	24/24
%	39,4	48,3	55,3	78,9	100
Average	39,33	39,12	40,41	39,67	43,2
SD	2,715	3,25	3,76	3,85	4,86
Min	35,1	35,5	35,1	35,1	35,1
Max	44,6	48,3	48	51,1	52

Table 10. General characteristic of efficiency level of SHVS in Krosno students

Level VO2max	< 35 VO2 max N=176	> 35 VO2 max N=176	< 35 VO2 max without Physical Education N=152	> 37 VO2 max With Physical Education N=152
Level VO2max	63/176	113/176	63/152	89/152
No. of people	35,7	64,3	41,5	58,5
%	31,73	40,81	31,73	40,22
SD	3,18	3,94	3,18	3,56
Min	21,8	35,1	21,8	35,1
Max	34,8	52	34,8	51,1

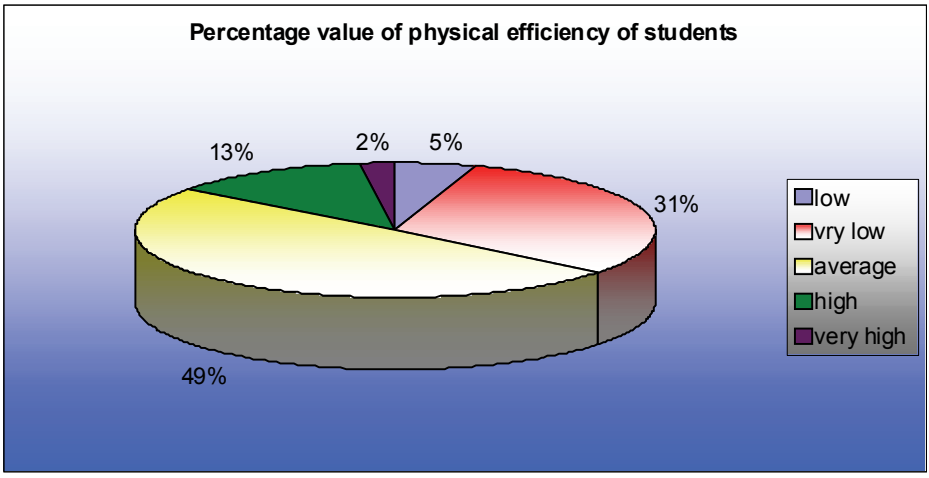

Figure 2. Percentage value of physical efficiency of students PWSZ in Krosno

In the group of 176 studied students it was found out, that 63 people are characterized by physical efficiency below an average level. In that group there were 9 people, among whom the physical efficiency was classified as very low one (≤ 28 V02 max) and 54 people as low one (< 35 V02 max). It is worth to underline, that physical efficiency of 1 person of Tourism and Recreations and 3 people of Physical Education was classified as very high one (≥ 49 V02 max) (table11).

Table 11. Numeral and percentage distribution of physical efficiency level according to faculty

Faculty/ efficiency	V02 max ≤ 28 very low	V02 max 29-34 low	V02 max 35-43 average	V02 max 44-48 high	V02 max ≥ 49 Very high
Philology N=33	4	16	11	2	-
Agriculture N=29	2	13	13	1	-
Pedagogic N= 38	3	14	17	4	
Tourism N=52	-	11	33	7	1
Physical Education N=24	-	-	13	8	3
No. of people N=176	9	54	87	22	4
%	5,1	30,6	49,4	12,5	2,27

Discussion

Maximum oxygen uptake by organism is lower on average 20-30% among women than men in the same age. The difference is lower after calculating for kg body mass (approx. 17%). Tempo of decrease along with maximum oxygen uptake by organism is quite higher among women than men in the same age. The cause of lower maximum oxygen uptake among women than men in the same age is above all heart size (lower maximum volume throw), lower blood volume and lower hemoglobin content in blood. The efficiency of oxygen supply functions increase among children and youth until approximately up to 20 yrs, and then stays on the same level, and since 25 yrs gradually starts to decrease. It is known, that physical training causes increase of physical efficiency, nevertheless it is not known, in which degree it influences the everyday physical activity. Studies show a significant participation of heavy physical efforts on shaping physical efficiency [8] A relation of physical efficiency with physical efforts in everyday life explains concerns considering follow-ups of progressive elimination of physical efforts out of human's life, due to civilization development. In carried out study, the results in physical

efficiency test, among faculties related with requirements of increased physical activity (Tourism and Recreation, Physical Education), in comparison to other studied faculties. It might be debated, if higher efficiency of those people was the result of their hard work, which is don during obligatory classes, as well as sport trainings, or if it the matter of selection and natural predispositions. Quite worrying it seems the fact, that as many as 63 people (35%) gained results below an average efficiency level. Majority of them (52) were students, where sedentary education predominates, and there are lower requirements against the evaluation of physical efficiency level (Philology, Agriculture, Pedagogic). Only on those faculties there were selected people (9) with very low physical efficiency.

According to the present study [22] and others practicing sport in the past has an influence on undertaking physical activity in adult life. The cause of lack of physical activity, in the opinion of women is lack of willingness, which strictly relates with the lack of need for physical activity [23].

Delivering the baby, requires from delivering woman an effort, leading to a state of extreme exhaustion and unsocialised homeostasis. Among women with low physical efficiency, with a little effort, which states for 20-30% of maximum oxygen uptake, there exist metabolic changes, indicating for unsocialised homeostasis [2].

In the study of Brodziński [1] physiological delivering is classified as "major effort", as close to dangerous for the studied Polish population, may cause unsocialised homeostasis, and states of sudden fetus dangerous in the period of delivering [16].

By shaping abilities and motion habits, since childhood, there is a chance to develop need, which last until late old age, and which might come up during motion activity in different period of ontogenesis. Study period is the last stage of education, where on the large scale, health education, focused on developing, maintaining and monitoring activity and physical efficiency, in order to prevent civilization diseases (particular heart diseases), can be carried out. That goal is thought to be achieved by implementation on physical efficiency of students and the lifestyle monitoring programme, due to an early identification of people with risk factors [21]. Low physical efficiency is one of them. Among studied group there was observed 63 healthy women with very low physical efficiency.

Findings

1. Arithmetic mean of absolute value V02 max for studied group of SHVS in Krosno place them in the range below the middle distribution of average level of efficiency.

2. In carried out study, the results in physical efficiency test, among faculties related with requirements of increased physical activity (Tourism and Recreation, Physical Education), in comparison to other studied faculties.

3. Philology is the only faculty, which students taking apart in study achieved the average values of physical efficiency for the general of studied group on the low level of physical efficiency.

4. With every third studied student it was found out a low or very low level of physical efficiency.

5. Among studied group with low physical efficiency level, there should be implemented educational activities, focused to inspire them to undertake regular physical activity, due to improvement of existing state.

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ABSTRACT

It might be estimated, that hardy approximately 30% of children and youth and 10% of adults in Poland practice sport, which type and intensity of exercise loads, attain physiologic body needs.

The aim of the study was the physical efficiency state assessment of different faculties students' of State Higher Vocational School in Krosno, due to an early identification of people with low physical efficiency. In the study participated 176 students of State Higher Vocational School in Krosno, in age between 20,55 ± 1,64 yrs, studying on different faculties. Arithmetic mean of absolute value V02 max for studied group of SHVS in Krosno place them in the range below the middle distribution of average level of efficiency. With every third studied student it was found out a low or very low level of physical efficiency.

Key words: physical efficiency, women's physical activity, physical education, health promotion

STRESZCZENIE

Można szacować, że zaledwie około 30% dzieci i młodzieży oraz 10% dorosłych w Polsce uprawia formy ruchu, których rodzaj i intensywność obciążeń wysiłkowych zaspokajają potrzeby fizjologiczne organizmu. Celem pracy było określenie stanu wydolności fizycznej studentek studiujących na różnych kierunkach studiów w Państwowej Wyższej Szkole Zawodowej w Krośnie celem wczesnej identyfikacji osób z niską wydolnością fizyczną. W badaniach uczestniczyło 176 studentek Państwowej Wyższej Szkoły Zawodowej w Krośnie w wieku 20,55 ± 1,64 lat studiujących na różnych kierunkach studiów. Średnia arytmetyczna bezwzględnej wartość V02 max dla badanej grupy studentek PWSZ w Krośnie plasuje badaną grupę w przedziale poniżej środka rozkładu poziomu wydolności średniej. U co trzeciej badanej studentki stwierdzono mały lub bardzo mały poziom wydolności fizycznej.

Słowa kluczowe; wydolność fizyczna, aktywność fizyczna kobiet, kultura fizyczna studentów, promocja zdrowia

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ANAEROBIC EFFICIENCY OF STUDENTS WITH SLIGHTLY HIGHER OF ACTIVITY GROUNDS TO RESEARCH OF THE HANDBALL PLAYERS OF AZS-UMCS

WYDOLNOŚĆ BEZTLENOWA STUDENTÓW O PODWYŻSZONEJ AKTYWNOŚCI RUCHOWEJ W OPARCIU O BADANIA PIŁKARZY RĘCZNYCH AZS - UMCS

Introduction

Modern training in sport is an extremely complex process. Its effectiveness is influenced by an extensive group of factors, the knowledge of which constitutes the basis for the whole range of training activities. For the training process to be conducted properly one should constantly monitor its course with the use of various testing methods. Handball is a rather complex sports discipline engaging the movement potential of the human body both as far as the physical features of players are concerned and with respect to the sources of energy used in the actual game conditions. (2)

The analysis of the offensive actions during a handball match reveals that the game becomes more and more dynamic with a clear domination of short actions the time of which as a rule does not exceed 30 sec (4). Therefore, anaerobic efficiency becomes especially important for this sports discipline and the changeable character of physical effort and the tempo of the game result in the fact that the dynamic power, speed and speed endurance become the core features of the handball player's motor activity. (3)

Many authors, theorists and people practicing team sports claim that the technical and tactical training are rather uncomplicated in practice but shaping of the physical efficiency specific for a given discipline is especially demanding even for the most advanced-level teams.

The authors of the hereby research study attempted to asses the anaerobic capacity of the handball players of the University Sports Club AZS-UMCS in Lublin in different training periods of an annual training cycle.

Aim of the research

The aim of the research, the results of which are presented in the hereby study, was the assessment of the anaerobic power parameters of the handball players of AZS UMCS.

The following questions were formulated for the needs of the study:

1. What is the level of the anaerobic power parameters of the tested handball players?
2. Are there any differences between the obtained values of the Wingate test parameters in players playing on different court positions?
3. Are there any differences between the results of the tests performed in different periods of the annual cycle of the handball team preparations?

Materials and methods

Sixteen handball players representing the sports club AZS UMCS Lublin constituted the research material analyzed in the hereby study. The handball team of AZS UMCS Lublin in 2001 won the first place in the younger junior league, for one season played in the second league and in the last season advanced to the First Handball League. The average training period for players was approximately 10 years. The team attends the training practice 5 times per week. The tests were performed in the final phase of the first round of the initial period of the sports season of 2007/2008 (October, November 2007) and in the middle phase of the second round of the initial period of 2007/2008 (April, May 2008). The average age of the tested players was 20,25±1,48, and respectively the average body height - 185,0±6,04 and weight - 79,6±11,58.

The research was carried out in the laboratory of Centrum Kultury FizycznejUMCS w Lublinie. For the purpose of assessment of the anaerobic potential of the tested group of players the so called Wingate Test was applied (30 sec maximal efforts on cycle ergometer).

For their research the authors selected the Wingate Test as it is supposed to be the most often applied laboratory test used for the assessment of the muscle power, endurance and fatigue. Wingate is also highly estimated as the test used for the purpose of analyzing the physiological response of the organism to the supra-maximum exercise (1)

The test meets the following conditions:

– provides information concerning the attainment of the peak power, muscle capacity and muscle fatigue,
– objectivity - test results are not dependant on their interpretation,
– reliability – the obtained results reflect the actual supra-maximum anaerobic power,
– sensitivity – the test indicates each change of power in the course of test performance,
– repeatability – test results reflect the actual test performance, however they may change in the following tests.

The Wingate test is an extremely reliable test:

1. when the test is performed on the same day, its correlation ratio equals 0.95-0.98,

2. when performed within the period of 1-2 weeks, the correlation ratio equals 0.90-0.93(7)

High correlation ratios can also be observed when comparing the Wingate Test to other tests of similar kind:

a) anaerobic efficiency – sprint 40m 0.86,
b) anaerobic efficiency - swimming 25m 0.87-0.90,
c) anaerobic power – Margaria Test 0.79, (7)

The test was performed with the use of Monark 824ε cycle ergometer and the MCE version 4.2 software applied for measurements and registration of the workload realized on the cycle ergometers (6).

The relevant test workload was preceded by a 5 minute warm-up in the form of workout on the cycle ergometer with the resistance leading to the heat muscle contraction rate up to 140-150 contractions/min.

After a few minutes' break the tested player performed the effort on the cycle ergometer for the period of 30 sec with the maximum speed of the pedal rotation and individually matched resistance depending on the weight of the tested person. As based on the so-far experience, the optimum workload enabling the highest possible mechanical work capacity in the period of 30 sec. maximal effort should equal 75g/kg of weight.

The tested player begins his workout on signal and his task is to attain in the shortest possible time the maximum pedal rotation and sustain it for the period of 30 sec.

The number of the pedal rotations is registered with the help of an electronic meter enabling to calculate the value of the mechanical work performed in the period of the test performance, which in turn constitutes the basis for assessment of such parameters as:

- value of the generated peak power defined as the mean power value as attained from the number of pedal rotations meeting the requirement within the range of ≤ peak power value – 2.3% (w/kg),
- mean test power calculated as the quotient of the work done and the effort duration (w/kg),
- time of the peak power attainment (sec),
- time of the peak power sustention (sec).

Test results

The obtained test results are presented in tables no. 2,3.

Peak power of the players of the University Club AZS UMCS Lublin in the I and II rounds of the initial period of the annual cycle were registered on the level of 832.75W and 919.78W; in relative values: 10.56 W/kg and 11.56 W/kg. The value of the time of the power attainment in the I and II period were as follows: 4.23 s 4.18s, and the times of the power sustention respectively: 2.45s and 2.98s

The differences between the values obtained in the I and in the II test prove that in the initial period of the sports season 2007/2008 the players improved their anaerobic efficiency:

1. peak power – by 87,03 W, and in relative values by 1 W,
2. mean power - by 46.86 W
3. time of the power attainment - by 00.5 s
4. time of the power sustention – by 0.53 s.

The team achieved good results as far as the peak power parameters and the times of the power attainment and sustention were concerned. In the course of assessment of the anaerobic power parameters obtained by the players playing on different court positions it can be stated that the best results with respect to the peak power attainment were achieved by the wing and backcourt players, respectively: 12.32 and 11.58W/kg with the time of power attainment on the level of 4.35s and 4.38s and the time of the power sustention – 3.23s and 2.61s

Differences between the results of Test I and Test II prove the improvement of the anaerobic power parameters of all the players playing on different court positions:

a) goalkeepers:
   - peak power – by 8.8W,
   - mean power - by 90W lower,
   - time of power attainment – by 1.08s longer,
   - time of power sustention – by 0.32s longer,
b) backcourt players:
   - peak. power – by 153W higher,
   - mean power – by 31.87W higher,

- time of power attainment – o 0.15s shorter,
- time of power sustention – o 0.73s longer,

c) pivots:
- peak power – by 60W higher,
- mean power – by 84W lower,
- time of power attainment – by 0.52s longer,
- time of power sustention – by 0.7s shorter,

d) wings:
- peak power – by 124W higher,
- mean power – by 37W higher,
- time of power attainment - by 0.7s shorter,
- time of power sustention - by 0.35s longer.

Discussion and conclusions

The Wingate Test applied in the presented research study enables the assessment of a few aspects of the anaerobic power generation abilities. In the hereby study the anaerobic efficiency was assessed based on the basic parameters: value of the peak power generation, mean testing power, time of power attainment and sustention.

According to the norms specified by Norkowski (5), handball players of the UMCS team achieved the results on the following levels: "good" for the peak power parameter – the range (12.53W/kg-11.96W/kg), "very good" for the mean power parameter – the range (10.26W/kg – 9.70W/kg) and "good" for the power sustention parameter – the range (3.66s – 2.72s).

While analyzing the training tasks as noted between the I and II Tests it has to be explicitly stated that that the main aims of the initial period were: shaping of the strength endurance ability and the increase of the aerobic and anaerobic efficiency. The above mentioned aims were realized with the use of mixed type aerobic-anaerobic means. Preliminary analysis of the data presented in tables 2 and 3 points at clear diversification of the values of the power parameters registered in the I and II testing period.

In order to find an answer to the question concerning the range and character of alterations observed between particular tests results the analysis of significant average differences was made with the application of the t-Student test for independent testing attempts.

Test results proved significant statistical differences between average values for tests I and II with respect to the anaerobic potential parameters (P.pik $p< 0.05$, P peak $p < 0.05$, P. mean $p < 0.05$). Summing up the above we can assume that the analysis of the results of the two tests carried out with the use of Wingate Test leads to the conclusion stating that the increase of the whole range of anaerobic power parameters as observed in the tested players

proves that the training methods applied in the course of the training process were proper.

The results of the tests prove that fact that the team was properly prepared both with respect to the physical parameters of the players and to the energy sources used in the actual game conditions.

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ABSTRACT

The authors of the hereby research study attempted to asses the anaerobic capacity of the handball players of the University Sports Club AZS-UMCS in Lublin. The research was carried out twice – in autumn and in spring of the sports season of 2007/2008. The aim of the study was to find the answer to the question whether there occur any changes in the parameters of the players' anaerobic power as measured during the sports season and resulting from the work-out process.

The research comprised 16 handball players at the age of 20,25 ±1,48, with body height of 185,0±6,04 and weight of 79,6±11,58; average period of training – approximately 10 years.

The research was conducted in the laboratory of Centrum Kultury Fizycznej UMCS (Physical Education and Sports Department at the University of Maria Curie-Skłodowska). For the purpose of assessment of the tested players' anaerobic potential the Wingate Test was applied (30 sec maximal efforts on cycle ergometer).

The test was carried out with the use of MONARK 824e cycle ergometer and the MCE version 4.2 software. Test results indicated the improvement mainly in the peak and mean power parameters and in the times of power attainment and sustention.

The obtained results of the Wingate Test parameters proved that players' efficiency level was "good" – which confirmed the effective preparation of the team to the anaerobic-type exercise.

Key words: handball, anaerobic efficiency

STRESZCZENIE

W opracowaniu podjęto próbę określenia wydolności anaerobowej zawodników sekcji piłki ręcznej KU AZS-UMCS w Lublinie. Badań dokonano dwukrotnie w sezonie 2007/2008 na jesieni i na wiosnę. Celem pracy było znalezienie odpowiedzi na pytanie czy istnieją zmiany parametrów mocy anaerobowej w trakcie sezonu pod wpływem procesu treningowego.

W badaniach uczestniczyło 16 zawodników w wieku 20,25 ±1,48 lat, o wysokości ciała 185,0±6,04 i masie ciała 79,6±11,58 – średni staż zawodniczy około 10 lat.

Badań dokonano w laboratorium Centrum Kultury Fizycznej UMCS. W celu oceny potencjału anaerobowego badanej grupy zastosowano 30 sekundowy maksymalny wysiłek na cykloergometrze – Wingate test.

Test wykonano przy użyciu cykloergometru MONARK 824e oraz programu informatycznego MCE wersja 4.2.

Wyniki badań wskazały na poprawę parametrów głównie mocy maksymalnej i średniej oraz czasów uzyskania i utrzymania mocy.

Uzyskane wyniki parametrów testu Wingate są na poziomie „dobrym", co świadczy o skutecznym przygotowaniu zespołu do wysiłków o charakterze beztlenowym.

Słowa kluczowe; piłka ręczna, wydolność beztlenowa

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SELF-EVALUATION OF BACK PAIN IN FEMALE STUDENTS OF PHYSICAL EDUCATION

SAMOOCENA STANÓW BÓLOWYCH KRZYŻA U KOBIET STUDIUJĄCYCH WYCHOWANIE FIZYCZNE

INTRODUCTION

The term „back pain" refers to nagging pain of low lumbar spine, which may overwhelm the patient during its exacerbation [5].

Back pain or low back pain in particular is the most common human ailments. It is estimated that about 80% of people suffer from low back pain at least once in their lifetime, 10% get treatment for this ailment during a year and 4% suffer from low back pain persisting for over 6 months. Half of those patients are not able to get back to work soon. Thus, it is a problem of sociomedical and economic importance, especially if we take into account cost of treatment, sickness benefits and allowances [20].

Back pain very often results from every day movement errors, which are subconscious and therefore remain uncorrected. These most of all include faulty posture, incorrect outfit and footwear, lack of physical activity or obesity caused by bad diet [15].

There are numerous causes of this situation. Firstly, human spine had not been properly prepared to the upright position in the evolution process and its low part constitutes the weakest spine link. Secondly, technological development changing the lifestyle into completely deprived of or very poor in physical activity has resulted in muscle weakening, including antigravitational muscles. The rest is done by excessive eating, passive resting and being unaware of principles of body biomechanics. Occasional physical work and exercise exceeding ability and capacity of the movement system are also harmful [6].

Back pain is usually caused by the disease of intervertebral discs, which are responsible for spine stability, free flow of spinal nerves through the spinal

canal and in radicular canals and counteracting microvibrations that have a negative effect on the spinal cord and brain [6]. The majority of people living in civilisational environment have had ailments related to the spine. According to Stodolny, low, middle and upper back pain is the most common ailment of human movement system. It was claimed for many decades that back pain developed as a result of tissue inflammation, especially with regard to the nervous tissue. Scientific investigations into this matter excluded, with regard to statistical significance, inflammatory background and the hypothesis had to be changed. Still, some of the disease names remained in use (e.g. radiculitis, neuritis, discitis, spondylitis, myositis) [25]. From that time, degenerative changes occurring in about 60-80% of the population over 50 years of age have been considered main causes of spinal changes. They are also found in 25% of subjects below 40 years of age [18]. However, no correlation has been observed between pain intensity and concurrent degenerative changes in spinal joints. Causes of spinal changes are the most difficult to explain in young people of 20-40 years of age, since degenerative changes are hardly observed in this age group. Stodolny claims that a lot of people have degenerative changes accompanied by only slight pain. Therefore, the term *spinal overload syndrome* that has recently appeared seems to be logical and precise [25]. On the other hand, Rakowski uses the term spinal-related pain to refer to ailments of the movement system emphasizing that these spinal dysfunctions are reversible and therefore treatable [21]. Terminology is of great importance, especially for physiotherapists, since the name of a disease together with its most frequent synonyms and Latin equivalents is the first source of information enabling them to understand physical examination mentioned in the referral [17]. English researchers claim that back pain are experienced by 80% of the society.

There are so many spinal diseases and dysfunctions causing back pain, that it would not be possible to mention all of them here. The most common ones include spinal degenerative changes, intraspinal nodules, spondylolisthesis, rheumatoid spondylitis and others. Sensitive spinal structures that contribute to development of back pain also include spinal canal content, intervertebral discs, facet joints, spinal ligament and vertebral bodies. According to Dziak, as long as intervertebral discs are properly hydrated and anulus fibrosus fibres are well-nourished, there are no immunologically active inflammatory substances in the organism. Back pain development is probably highly dependant on changes from fluid retention to excretion in the nucleus pulposus [6]. Spinal stability depends on efficiency of intervertebral discs and ligament system. Low back is especially subjected to great physical pressure and overload on various planes. Even if the ligament system and vertebrae are not impaired, the intervertebral disc undergoes progressive degeneration. Since spinal strength is inversely proportional to overload duration, rapid overload increase is of high importance in pain development. The spine is then exposed to vibrations and its resistance

to injury may be lowered. From a mechanical point of view, the spine is an elastic column supported by spinal muscles and such chambers as the abdomen and thorax. Muscle contraction and filling the chamber with air and incompressible fluids constitute spinal protection. Muscle strength of subjects suffering from back pain is reduced by about 25%. Scientific experiments show that intra-abdominal pressure during carrying heavy weights is the same in groups of different muscle strength. Tension duration in various muscles, e.g. in back extensor muscles is longer in subjects with back pain. Since low back is one of the most overloaded spinal regions, each weakening of natural spinal tissue strength causes significant back ailments. Resistance to various overloads of the low back does not probably depend on the size and type of pressures, but rather on inborn intervertebral disc strength, which may determine premature degenerative changes and subsequent disc impairment [6].

Disorders of spinal motor functions and resulting ailments involve three basic syndromes: overload, radicular and psychogenic syndrome. All ailments and motor function disorders, however, always result from local or overload of movement organs. Irritation of connective or muscle tissue is usually caused by static imbalance. Mechanical factors causing changes may be divided into internal (e.g. effect of internal organ diseases on movement organs or result of mental stress) and external factors, e.g. heavy physical work or gravitation in incorrect static body postures [21].

The overload syndrome includes mainly degenerative overload changes of the spine, which are among the most common diseases of recent years. The aetiology of the syndrome is an ongoing change in lifestyle, reduced physical and movement activity and development of facilities resulting from technological progress.

Degenerative changes in the spine are induced by unfavourable changes in the intervertebral disc that may result from acute or chronic spine overload or from spine injury whose progress does not involve continuity disruption of bone structure but impairs the intervertebral disc.

The system ageing, overloads and intervertebral disc injuries result in the loss of elasticity, disc height reduction, nucleus pulposus dehydration, anulus fibrosus atony and changes in the content of intervertebral joints Changes also include lowered stability of intervertebral space, longitudinal ligament stretching and loss of amortization function of the intervertebral disc. Intensive movements cause vertebral body edges to rub against each other, which results in formation of marginal exostoses on vertebral body edges and stretching ligament attachments.

It may often happen that degenerative changes are not accompanied by any serious symptoms or neurological deficits. A slight injury may sometimes induce pain or neurological disorders. Injury accompanied by vertebral canal narrowing may result in tension of vessels or spinal roots on vertebral exostoses

with spinal ischaemia, which is often connected with paresis of upper limbs or even with quadriparesis (usually more intense in lower limbs) [12].

At the beginning, the pain is not very intense and it usually regresses spontaneously. It is usually evoked by overload resulting from carrying heavy weights or prolonged incorrect body position. As pathological changes develop, back pain occurs more and more often.

A similar mechanism of degenerative overload change development may be observed in all spine sections. Due to remarkable overload, the changes often develop in the low section of the lumbar spine, especially in the L4 – L5 region. Degenerative changes in the intervertebral disc lead to a remarkable intervertebral space narrowing, which affects the surface of intervertebral joints. Gradually, degenerative and productive changes develop in facet joints [12].

Another quite common disease is spondylolisthesis, which refers to a slow forward slippage of one vertebral body with respect to the one beneath it. It is usually slippage of L5 over S1, but it may also occur in the L4 – L5 and very rarely in the L3 – L4 region. Ever rarer is retrospondylolisthesis, or so called rotary spondylolisthesis, which is also called pseudospondylolisthesis. The latter often occurs with scolioses [18].

Kiwerski defines spondylolisthesis as forward slippage of the fifth, fourth or rarely third lumbar vertebra with respect to the vertebra beneath it. The displacement refers to one of the above-mentioned vertebrae with the whole vertebral column located above [12].

Spondylolisthesis may be caused by a congenital defect called spondylolysis, which predisposes to vertebral dislocation. The main cause, however, are slow and multiform overload conditions with developing instability.

Slippage is mainly caused by interruption in the base of superior articular process arch.

Numerous authors claim that spondylolisthesis results from poor accretion of vertebral bone formation points. Yet others see spondylolisthesis development as a result of vertebral isthmus overload originating from spinal malformation.

On rare occasions, angioreticuloma may occur in the spinal cord. It is more often located at the back of the skull than in the spinal core and is usually found in young subjects [12].

In the group of subdural tumours, neuromas are the most common. They originate from Schwann cells and are claimed to be the most common tumours of the vertebral canal. A separate group is formed by neurofibromas, which develop from the connective tissue of nerve roots and peripheral nerves. These are usually multiple tumours and they most frequently occur in neurofibromatosis. Meningiomas are quite often recognised in the thoracic vertebral canal. These tumours are quite compact and they adhere closely to the

meninx. Another type of vertebral canal tumours are lipomas, which rarely occur in the spinal cord. Intravertebral tumours are mainly subjected to surgical treatment [12].

Another injury is the flexion mechanism of injury, which results from bending the spine forward to an extent exceeding borders of physiological movement range. Such injury results from powerful forces acting upon parieto-occipital or occipital area of the skull or on the back region. It may also result from an indirect injury that causes a rapid forward movement of the head or body, which is especially dangerous while the lower parts of the body are stabilized. This often occurs during car accidents, when the driver or the passenger is stabilized by a seat belt. In case of injury of the lower part of the spine, the main force is usually directed to the interscapular region of the back, which causes a rapid forward bending of the spine. Injury to the interscapular region with hematoma or frequent fracture of paraspinal ribs may sometimes lead to vertebral dislocation in the thoracolumbar segment. Flexion injuries may result in interspinous and supraspinous ligament breakage, tensioning or breakage of intervertebral joint capsules with complete or incomplete joint dislocation, impairment of posterior longitudinal ligament and the intervertebral disc [12].

A consequence of flexion mechanism injury is bending of the vertebral canal axis and vertebral body displacement, or breakage of the anterior vertebral body with remarkable wedge-shape appearance. Breakages are more common in young people, whose efficient and elastic ligament system is able to resist the injury and does not allow vertebral displacement. Therefore, it does not undergo complete destruction. Older people may experience breakage of non-elastic posterior ligament elements, which are often changed by degenerative processes, thus resulting in intervertebral join dislocation and vertebral body displacement [12].

Extension mechanism of injury occurs when the injury force is directed from the anterior part of the spine, leading to its hyperextension, which results in anterior longitudinal ligament fracture and impairment of the intervertebral disc. This injury occurs in the cervical region of the spine and usually affects older subjects. Lower spine sections are very rarely impaired in the extension mechanism.

The etiology of spinal injuries in the thoracic and lumbar region includes mainly road accidents (car, bike, motorcycle accidents and knocking over), falls (from trees, ladder, roof, suicidal attempts and falls from wagons or horse-pulled cars), squeezes, etc.

About 55% of subject were diagnosed with complete spinal cord injury at admission to hospital, 19% with partial spinal cord injury and 26% had no neurological disorders.

The most numerous group comprises subjects with injuries to the thoracic and lumbar region (Th12 – L1) and they constitute more than 45% of all injuries to the thoracic and lumbar region of the spine. This is the place of transition from a physiologically compact and stable thoracic region into largely movable lumbar region that is related among other things to placing of process arches almost in the fibular plane and to high intervertebral discs. As a result, injury directed to the thoracic spine usually causes injuries to the thoracic and lumbar region, as well. Injuries like fracture or dislocation at Th12 – L1 occur in about 20% of all subjects treated for back injuries and they most frequently result from injuries to the upper back [12].

Injuries to the thoracic and lumbar region occur most frequently in the flexion mechanism (52.7%), then in the compression mechanism (44.7%) and the extension mechanism was related to 0.8% of injuries to this region. Low mobility of the thoracic region is the reason why fractures with vertebral displacement occur only if significant forces are applied to this region [12].

Low back pain belong to the most common human ailments. One of the most common ailments of the low back is *sciatic neuralgia*. This condition is characterised with low back pain irradiating along the sciatic nerve. The pain is more intense while coughing or sneezing and also while attempting too bend the body. The subject is unconsciously acquiring a position of lateral curvature of the spine. This ailment is accompanied by muscle paresis (especially in the fibular section) and even by urination disorders [18].

The etiology of back pain includes the above-mentioned degenerative changes and injury to the intervertebral disc anulus fibrosus, which may lead to nucleus pulposus projection at nonuniform vertebral pressure. Other factors causing pain in this region include overloads usually resulting from incorrect posture while performing various activities, like lifting and carrying heavy objects, especially at muscle and ligament weakening (so called fatigue pain that occurs at the end of the day or on the next day).

The disease is divided into two periods: chronic (with static and dynamic disorders) and acute (with intense pain). Initially, the pain is manifested as lumbago or disc protrusion. After anulus fibrosus disruption, prolapse of the nucleus populus occurs and the condition is referred to as disc herniation [18].

When practicing sport, low back is subjected to great physical pressure and overload on various planes. In sportsmen, spinal overload usually results from overestimating adaptive and compensatory ability of the movement system, and also from overlooking congenital defects during qualification examinations. In numerous sport disciplines, spinal overload highly exceeds permissible standards for the organism [7]. Incorrect training overload strategy, both with regard to work area and frequency, may lead to overtraining. This condition may result in disorders related to reduced physical endurance, adrenocortical hypofunction and numerous other chemical and physiological changes in the

organism, including pain and muscle spasms. Physiological symptoms of overtraining syndrome are quite varied and they may have different manifestations in individual subjects, depending on individual efficiency, nervous system structure and environmental factors. It is also called systemic overload syndrome. Fatigue is and indispensable element of every human activity. It is a natural condition, as long as it does not acquire pathological character, i.e. it does not exceed the physiological optimum [22].

MATERIAL AND METHODS

The study included 109 female students of 3rd year of Physical Education at Rzeszów University. It was conducted in 2007 and 2008 as a survey research collecting data by asking questions that were directly or indirectly related to particular research issues [17]. The research issue was the correlation between ailments self-reported by female students and physical overloads accompanying curriculum performance and resulting from students' own physical activity.

Prior to study initiation, three research hypotheses were assumed:

1. Occurrence of back pain depends on the frequency of sport activities.
2. High physical activity affects the prevalence of back pain.
3. Sedentary positions contribute to back pain intensification.

The hypotheses were preceded by the following questions:

1. Do young women suffer from back pain and to what extent?
2. Do women practicing sport suffer from back pain more often?
3. What type of body build is usually related to back pain?
4. What body position contribute to back pain intensification?
5. Does increased physical activity affect the intensity of back pain?

The survey was prepared as an auditorium questionnaire consisting of two parts that included close-ended questions and half open-ended questions. In constructed by authors of present study the whole. The first part of the questionnaire included questions concerning basic anthropometric details, which were subsequently used to calculate the body mass index and to determine the body type of the examined women.

The other part of the questionnaire included 10 questions concerning:

- frequency of doing sport,
- methods of carrying heavy weights,
- ways of sitting and bending,
- duration of overload with sitting and standing position and with didactic classes,
- ways of spending free time
- frequency of back pain

The opinion of building of body was executed on basis of the Kretschmer theory

RESULTS

Tables 1 and 2 show results of the first part of the questionnaire, whereas Tables 4-10 show results of the second part of the questionnaire.

Table 1. Body mass index (BMI) of the examined women

		N	%
BMI category	underweight	9	8.26
	standard	94	86.24
	overweight	6	5.50

The majority of students had correct body mass index.

Table 2. Body build types of the examined women

		N	%
Body build	asthenic	33	30.28
	pyknic	20	18.35
	athletic	56	51.38

The majority of the examined women had athletic body type with 20% advantage over the asthenic build.

Table 3. Answers given by the respondents (in numbers and percentages)

		N	%
1	2	3	4
Doing sport	no	37	33.94
	once a week	21	19.27
	twice a week	25	22.94
	3 times a week	14	12.84
	more often	12	11.01
Method of carrying heavy weights	incorrect	30	27.52
	correct	79	72.47
Carrying excessive weights	never	11	10.09
	rarely	79	72.48
	often	19	17.43
Way of sitting	incorrect	66	60.55
	correct	43	39.45
Working in bent position	rarely	62	56.88
	often	47	43.12
Time spent in standing position	less than 4 h	16	14.68
	4-6 h	27	24.77
	7-9 h	36	33.03
	more than 9 h	30	27.52
Time spent in sitting position	less than 6 h	22	20.18
	7-10 h	31	28.44
	11-14 h	24	22.02
	more than 14 h	32	29.36

1	2	3	4
Didactic classes	up to 4 h	32	29.36
	up to10 h	41	37.61
	more than 10 h	36	33.03
Spending free time	passive	39	35.78
	active	70	64.22
Frequency of back pain	never	17	15.60
	once in a lifetime	14	12.84
	a few times a year	54	49.54
	a few times a month	15	13.76
	more often	9	8.26

In order to verify the hypotheses concerning the correlation between back pain prevalence and the stated factors, a non-parametric $\chi 2$ test was used, since the correlation was each time related to two qualitative features based on a nominal scale.

The null hypothesis that the two variables were not related was rejected when the calculated value $\chi 2$ was higher than the border value (at significance level p=0.05). In each case it was observed that a particular factor affects (differentiates) frequency of back pain [23].

Testing was not performed with regard to two factors, i.e. BMI category and the frequency of carrying excessive weights, due to insufficient numbers in certain categories concerning the frequency of back pain. For the same reason, the calculations in the remaining cases were performed after cumulating the numbers from the frequency of back pain category: “never” with “once in a lifetime” and “a few times a month” with “more often".

Calculated values $\chi 2$ are shown in Table 4.

Table 4. Effect of selected factors on the prevalence of back pain calculated $\chi 2$ values and boundary significance level

Factor	χ^2	$p_{boundary}$
BMI category	-	-
Body build	7.330*	0.046
Frequency of doing sport	11.042*	0.026
Method of carrying heavy weights	1.646	0.439
Frequency of carrying excessive weights	-	-
Way of sitting	6.469*	0.041
Frequency of working in bent position	2.905	0.234
Time spent in standing position	4.131	0.659
Time spent in sitting position	2.500	0.868
Overload with didactic classes	2.232	0.693
Spending free time	6.776*	0.034

** rejection of hypothesis that the two variables are unrelated (p=0.05)*

Calculated $\chi 2$ values allow rejection of hypothesis that the variables are independent only with regard to the following factors: body build, frequency of doing sport, way of sitting and way of spending free time. Therefore, only these four factors differentiated self-evaluation of back pain.

Table 5. Frequency of back pain depending on the body build of the examined women

			Frequency of back pain		
			never or once in a lifetime	a few times a year	more often than a few times a year
Body build	asthenic	N	9	20	4
		%	27.27%	**60.61%**	**12.12%**
	pyknic	N	6	9	5
		%	30.00%	45.00%	25.00%
	athletic	N	16	25	15
		%	28.57%	44.64%	26.79%

Values presented in Table 5 indicate that female students of asthenic build more often suffer from back pain occurring a few times a year (60.6% of choices in this segment and about 45% choices in the remaining segments), whereas females of pyknic and athletic build more often suffer from pain occurring a few times a month or even more often (over 25% of choices and only 12% of choices in the group of women of asthenic build).

Table 6.Occurrence of back pain depending on the frequency of sport activities.

			Frequency of back pain		
			never or once in a lifetime	a few times a year	more often than a few times a year
Doing sport	never	N	7	19	11
		%	**18.92%**	51.35%	29.73%
	once or twice a week	N	15	27	4
		%	32.61%	58.70%	**8.70%**
	three or more times a week	N	9	8	9
		%	34.62%	**30.77%**	34.62%

More than 30% of students practicing sport (independently of frequency) claim that they have never or only once had back pain in their life. In the group of students who do not practice sport, the value is only 19%. Almost 31% of respondents practicing sport three or more times a week suffer from back pain a few times a year, while in the remaining segments the percentage is over 50%. Frequent pains (occurring more often than a few times a year) occur mainly in women who do not practice sport (about 30% of choices) and in those practicing sport three or more times a week (about 35% of choices).

Table 7.Occurrence of back pain depending on the way of carrying weights and the way of sitting.

			Frequency of back pain		
			never or once in a lifetime	a few times a year	more often than a few times a year
Method of carrying heavy weights	incorrect	N	7	14	9
		%	23.33%	46.67%	30.00%
	correct	N	24	40	15
		%	30.38%	50.63%	18.99%
Way of sitting	incorrect	N	17	30	19
		%	25.76%	45.45%	**28.79%**
	correct	N	14	24	5
		%	**32.56%**	**55.81%**	11.63%

Incorrect way of sitting has a strong influence on the occurrence of back pain. Students reporting incorrect way of sitting more often suffer from back pain (about 30%, while the remaining students - 11.6%). On the other hand, the percentage of students who never or only a few times a year suffer from back pain is higher in the group declaring a correct way of sitting.

Table 8. Frequency of back pain depending on body position.

			Frequency of back pain		
			never or once in a lifetime	a few times a year	more often than a few times a year
Working in bent position	often	N	12	21	14
		%	25.53%	44.68%	29.79%
	rarely	N	19	33	10
		%	30.65%	53.23%	16.13%
Time spent in standing position	less than 4 h	N	5	6	5
		%	31.25%	37.50%	31.25%
	4-6 h	N	9	15	3
		%	33.33%	55.56%	11.11%
	7-9 h	N	8	18	10
		%	22.22%	50.00%	27.78%
	more than 9 h	N	9	15	6
		%	30.00%	50.00%	20.00%
Time spent in sitting position	less than 6 h	N	8	10	4
		%	36.36%	45.45%	18.18%
	7-10 h	N	7	18	6
		%	22.58%	58.06%	19.35%
	11-14 h	N	7	10	7
		%	29.17%	41.67%	29.17%
	more than 14 h	N	9	16	7
		%	28.13%	50.00%	21.88%

Table 9. Frequency of back pain depending on overload with didactic classes

			Frequency of back pain		
			never or once in a lifetime	a few times a year	more often than a few times a year
Daily overload with didactic classes	up to 4 h	N	10	17	5
		%	31.25%	53.13%	15.63%
	up to10 h	N	10	19	12
		%	24.39%	46.34%	29.27%
	more than 10 h	N	11	18	7
		%	30.56%	50.00%	19.44%

Table 10. Frequency of back pain depending on the way of spending free time

			Frequency of back pain		
			never or once in a lifetime	a few times a year	more often than a few times a year
Spending free time	active	N	24	33	13
		%	**34.29%**	47.14%	18.57%
	passive	N	7	21	11
		%	17.95%	53.85%	**28.21%**

The way of spending free time determines the frequency of back pain, since the number of students who spend their free time in an active way and suffer from back pain is twice lower. In more than 28% of students who spend their free time in a passive way, back pain occurs more frequently than a few times a year (the percentage is only 18.6% in the remaining respondents).

Summary and conclusions

Human body is adjusted to overcoming physical overloads. Even at rest, all the systems and organs are ready to take up more intense actions. Maximal overloads are followed by supercompensation. In this phenomenon, energy reserves, metabolism and regulation mechanism that had been used for a particular activity, do not come back to the state from before exercise, but they exceed its level for a short period of time. This way exercise ability of the organism is enhanced. Repeated overloads with adequate rest periods result in increased effect of supercompensation and improvement in systemic efficiency, which in turn increases overload limits. Regulated training overload cause adaptive changes in morphology. Higher oxygen demand contributes to an increase in mitochondrial mass and increased amount of enzymes on mitochondrial cristae [4]. Vascularisation is an effect of increased oxygen demand in working muscles. Sport and increased physical activity, even at advanced age, leads to an increase in muscle mass and force. In addition to physiological effects, there are also psychological and social consequence.

These include less frequent needs to contact health care or increased working abilities in older people. Physical activity is effective for the organism if it exceeds every day activity by 1000 kcal a week. In terms of exercise, one should be active for 40 minutes 7 days a week. Such activity lowers, or even regresses, changes related to the aging process and it lowers the prevalence of coronary diseases. It also improves glucose tolerance by its increased transport to muscles and it improves many other biochemical processes in the organism, too [9].

Practicing sport by young people should contribute to health improvement and versatile development. If these aspects of doing sport and increased physical activity are discarded, it may result in pathological condition. Improving training form should be based on balance between overload and rest. Otherwise, it may result in overtraining, injury, mental depression and lack of resistance [1]. Sport training that takes into account intensity, frequency and capacity of exercise should be accompanied by prevention of overtraining syndrome. There is a wide range of preventive activities, including shaping correct movement patterns, doing compensation exercises, protection from microinjury accumulation and proper warm-up prior to training. Warm-up duration should take into account overloads that are planned for the oncoming training. For example, a general warm-up of 5-10 minutes is sufficient for light or recreational sport activity. However, duration of warm-up for a sprinter prior to competition should be over 1 hour [8]. A great role in prevention of overload changes is played by the final part of training, when one should remember about warm-down cooling. This stage involves exercises of diminishing intensity until complete rest is achieved, thus protecting the competitor from orthostatic collapse [8]. The first commandment of a sportsman, according to Dziak and Tayra, is: do not shorten all-developmental training, whose aim is to develop muscles protecting joint stability and to teach body suppleness helping to avoid injuries. Further commandments concern correct movement patterns, regular physical exercise and behaviour in case of overload symptoms [7].

During overload changes, protective mechanisms of the organism are employed, including pain. Pain is defined as an unpleasant sensory and emotional experience associated with actual or potential tissue damage or described in terms of such damage. Pain is a subjective phenomenon, a kind of feeling experienced by man influenced by various factors [18].

The research issue being one of the subjects of the present study referred to the pain of lower section of the lumbar spine, called low back pain. Such pain was reported by female students of physical education, i.e. by persons practicing increased physical activity, including sport. On the basis of the above-mentioned problems of spinal overloads resulting from various factors and effects of this pathological condition, the aim of the study was to explain the importance of this issue for people practicing sport or leading a very active

lifestyle. Results of the conducted studies allowed verification of hypotheses concerning the correlation between back pain frequency and 9 selected factors. The following factors were analysed: body build, frequency of doing sport, method of carrying heavy weights, frequency of carrying excessive weights, way of sitting, frequency of work in bent position, time spent in standing position and sitting position, overload with didactic classes and the way of spending free time.

The analysis of own studies revealed that more than 80% of female students were within the body mass index standard and the majority of them had athletic body build. Also, the majority of respondents were practicing sport at various frequencies. Most of them twice a week. The examined women were familiar with movement standards used while lifting heavy objects (28% estimated that they were doing that incorrectly). 72% of respondents claimed they were not carrying excessive weights or they were doing it very rarely. Incorrect sitting positions were self-reported by as many as 60% of students. A smaller number of students (by 14%) performed work in bent position, while most of them were spending more time in standing position (from 6 to more than 9 hours- according to 85% of respondents). This was probably the time spent on trainings and didactic classes, in which high positions were prevailing. The women declared that they were spending from below 6 hours to over 14 hours a day in sitting position. This was presented be percentages from 20%, 28 and 22%, to 29%. It may be supposed that students spending their free time in an active way, spend about 6-10 hours a day in sitting position (probably during didactic classes). Similarly, the biggest group (38%) reported 5-10 hours of every day university classes. The remaining women (29% and 33%) claimed that their didactic overload was up to 4 hours and over 10 hours respectively. The majority of respondents (64%) reported active spending of free time.

Asked about the frequency of back pain, nearly half of the examined women (49.5%) stated the frequency to be a few times a year. Few respondents had never experienced back pain (16%) and only 8% claimed that they often suffered from low back pain (Table 3).

To estimate the effect of the above factors on the back pain frequency, an analysis with the $\chi 2$ was performed, at significance level set at 0.05. This way, the effect of the examined factor on the occurrence of back pain was estimated. Correlations were present between body build, frequency of practicing sport, way of sitting and spending free time and frequency of back pain (Table 4).

On the basis of the presented results, the first hypothesis should be verified. According to the students, frequency of back pain depends on training overload occurring every week. Almost 31% of respondents practicing sport three or more times a week suffer from back pain a few times a year. A similar number of students (about 30%) who did not practice sport also suffered from low back pain more often or a few times a year. Thus, it may be stated, that low back pain

occurs both in women practicing and not practicing sport. So, they occur independently of the frequency of sport activity.

As far as the second hypothesis is concerned, it should be mentioned that the way of spending free time affect the occurrence of back pain. Students declaring spending their free time in an active way reported less low back ailments than those preferring spending their free time in a passive way (Table 10). This may lead to conclusion that physical activity determines the frequency of low back pain. In other words, increased physical activity of the respondents had a positive influence on low back pain, i.e. it reduced pain sensation. With regard to the way of sitting, incorrect models may contribute to the occurrence of back pain (about 30%; the remaining -11.6%). Students self-reporting correct way of sitting experience back pain to a smaller extent.

The above-mentioned statements answer 5 research questions. Back pain is not the condition of older people exclusively. It may also occur in young people, both active and passive in their spending free time. Ignorance with regard to correct movement patters in sitting positions affect the frequency of back pain. Women of slim body build more often report back pain than those of athletic or pyknic build.

On the basis of the above considerations it should be stated that physical activity promoting health does not only include physical exercise and doing sport but it also includes correct behaviour in every day situations. If supported with knowledge, it will contribute to health and satisfaction from physical activity.

Conclusions

Back pain occurs in female students independently of their physical activity.

Practicing sport does not eliminate back pain in the examined subjects.

Spending free time in an active way contributes to a decrease in low back pain.

Body build type has an influence on pain sensation in the low back region.

Incorrect sitting positions contribute to back pain intensification.

Physical activity is one of basic factors the favourable health.

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ABSTRACT

Low back pain is the most common ailment of human movement system. When practicing sport, low back is subjected to great physical pressure and overload on various planes. Spinal overload usually results from overestimating adaptive and compensatory ability of the movement system, and also from overlooking faulty posture and congenital defects during qualification examinations.

The study was conducted in 2007–2008 as a survey research including 109 female students of 3rd year of Physical Education at Rzeszów University. The aim of the study was to analyse the correlation between ailments self-reported by female students and physical overloads accompanying curriculum performance and resulting from their own physical activity. Three research

hypotheses were assumed. One of them stated that high physical activity affects the frequency of back pain.

In order to verify the hypotheses concerning the correlation between back pain prevalence and the stated factors, a non-parametric χ^2 test was used, since the correlation was each time related to two qualitative features based on a nominal scale. The obtained results show that female students experience back pain independently of sports practiced, but they are lower in subjects that are physically active.

Key words: pain, back, overloads, physical education, females.

STRESZCZENIE

Bóle kręgosłupa lędźwiowego są najpopularniejszą dolegliwością w narządzie ruchu człowieka. W sporcie kręgosłup lędźwiowy poddawany jest dużym naciskom i obciążeniom, działającym w różnych płaszczyznach. Do przeciążeń kręgosłupa dochodzi przede wszystkim z powodu nieliczenia się z możliwościami adaptacyjnymi i kompensacyjnymi narządu ruchu, oraz w skutek przeoczenia w badaniach kwalifikacyjnych, istniejących wad postawy ciała i wad wrodzonych.

Badaniami objęto 109 studentek III roku Wychowania Fizycznego Uniwersytetu Rzeszowskiego i przeprowadzono je w latach 2007–2008 przy zastosowaniu badań ankietowych. Problemem badawczym były zależności pomiędzy deklarowanymi stanami bólowymi kobiet, a obciążeniami fizycznymi towarzyszącymi podczas realizacji programu studiów oraz wynikającymi z własnej aktywności fizycznej. Założono trzy hipotezy badawcze. Jedna z nich brzmiała: duża aktywność fizyczna ma wpływ na częstotliwość występowania bólów krzyża.

Celem weryfikacji hipotez o istnieniu zależności częstotliwości występowania bólów krzyża od wytypowanych czynników zastosowano nieparametryczny test χ^2, gdyż zależności te dotyczyły za każdym razem dwóch cech jakościowych opartych na skali nominalnej. Otrzymane wyniki badań wskazują, że u studentek występują bóle krzyża bez względu na uprawiane sporty, są jednak mniejsze u aktywnych fizycznie.

Słowa kluczowe: ból, krzyż, obciążenia, wychowanie fizyczne, kobiety.

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SUBJECTIVE DETERMINANTS OF CANDIDATES' FOR P.E. TEACHER OCCUPATIONAL IDENTITY

SUBIEKTYWNE DETERMINANTY TOŻSAMOŚCI ZAWODOWEJ KANDYDATÓW NA NAUCZYCIELI WYCHOWANIA FIZYCZNEGO

1. Preface

In the contemporary world, an identity problem is more often reviewed by specialist of different fields. This process is susceptible to civilization's change, depends on social interactions and has different interpretations directions. It might be regulated by everything, that is present in human's space, but it also, apart from internalization's level, might become less or more effective attitudes and behaviors regulator. Identity has become a problem of modernity, that steam from the western individualism. It is concerning how it is formulated and which normality affects its development? It should be noticed, that it constitutes internal human's activity, which has an impact on its permanent shaping, as well as is directed on structure's integrity. The process of creating identity flirt between two poles: "the view of conscious past: and "visualized future vision". On this stage of creating it heads to self-understanding, which becomes the essence of this process. Thanks to constant introspection, self-assessment of the adequateness of behaviours to the set goals, which are based on achieved personal life experience and the present situation, is possible. Determined events, which are visualized through narration, integrate created structure. Another characteristic of this process is the consciousness of the lapse of time, which determine the boundaries of individuals activity. It turns out, that not only physical shaper shapes human's identity. Today, it is assumed, that corporeality, due to strive to health, fashion, laziness or negligence, also have impact on the answer for the question : who am I? Localized between chance and calculated risk. No one is able to confirm weather what we do, to what we strive is a positive action. Risk is a side consequence of personal life aspiration of each person. Success is possible when a human becomes authentic,

disclosures true or false about him/her self. Struggle between chance and risk is a natural existential view of each human being, which not only is so called life experience (i.e child's birth, future profession choice making, struggle of disease), and complications of the above human's activities formulates his/her integrated identity. (Kwiatkowska 2005)

According to Kwiatkowska (2005), due to interdisciplinary definition complexity, there exist difficulties in the precise interpretation of the identity term. The author uses two points of view – Mead and Erikson. The first one explains this term taking into consideration interactions in small groups and brings this process to situational conditioning, and the second one "binds identity with individuals' biography. Apart of the above points of view there appears one more trihotomy explanation: health model, interaction model, worldview model. In relation to Erikson theory identity is an important determinant of proper psychical functioning. It is considered in the meaning of the organism , ego and the representative of the specific society. Organism is constituted by verbal and non-verbal communication, ego is a link of individual's experiences with existentional adjustment, and the category of the member of society considers the play of a specific role. Ego becomes superior structure, from which there depends the harmonic functioning of individual in the are of two other level, a has a ultimate influence on psychical health of each society's representative.

Interpretation of the second model is based on Mead's suggestions. In accordance with theory, thanks to social interactions (labilis), and penetrate of different views or attitudes, there shapes an individual's identity. It can be explained by self-concept, and that is the structure relatively fixed individuals attitudes, which could be made by human's environment. Other picture (dynamic) explains this problem in the connects of subjective and objective determinants of individual's identity. This problem might be explained by negotiable approach, and that apart of the role and personal status, identity projection by interested people.

Worldview model is based on ethos. It is conditioned by stand-alone activity in social reality. Depends on social changes, for example: pressures, warrants, interdictions or opinions, individual's adjust one's identity, which becomes a dynamic figment of human (Kwiatkowska 2005)

Factors conditioning the identity shape were specified and explained by Stryker and Burkea (2000). They have proved, that the final identity shape of individual depends on the impact of ethos - structural factors (external i.e.: parents, students, media, other specializations teachers), as well as predispositions, self-assessment, or awareness – cognitive factors (internal). According to Carlson (1988), society formulates individually identified personality, with the help of influence (i.e. pressure, opinion). At the beginning of adolescent period parents exact to observe standards, values. Teenager is "testified" by peer and occupational groups. The higher positive influence of a „specialist" group (i.e. teachers), the better chance to shape personality strongly identified with the profession.

A second component – internal, includes evaluation, as well as ego and identity interpretation (intensity and hierarchy). The intensity indicates the level of choice making in various situations, which determine the probability to identify with a selected social role. Hierarchy, as a second internal indicator, determines a level of occupational identity, classified by individuals among different variety. (Abbott, Weinmann, Bailey, Laguna 1999)

External and internal factors have an influence on the structure of attitudes against ourselves and other people. It turns out, that apart from those two determinants causing changes of the attitude to profession, a significant factor of variable motivation are difficulties met on the teacher's path. Taking into consideration some motivational theories it might be states, that the highest level of motivation on teacher occurs within moderate probability to achieve a set goal. (Atkinson 1964; Cieśliński 1982)

Just to explained analyzed problem Kwiatkowska (2005) has presented 3 types of identity. The first one is shaped since the youngest years, and conditions human's distinguishing characteristic, manifested one's personal opinions, or behaviours. It is understood as diversity, and that is variety against others. It is strictly related to mentioned cognitive factor (internal).

The second type is inseparably related to personal identification and is determined as social identity. Through identification with a specific social group, a person in social life uses values system or standards consistent with preferences close to environmental structure (external factor).

Occupational identity is the third identity interpreted by Kwiatkowska. Depending on occupational stage of the teacher, identification with a profession has different forms. An anomic identity, which is based on individual's actions according with one's benefits, not once individually or institutionally overnormative to gain maximum results of environmental acceptance (i.e. to desire prize, to avoid punishment) is revealed at the beginning on educational path.

A temporary identification stage is a so called role's identity, which stands for performing didactic-educational tasks and at the same time observing determined by profession's environment, standards, values, styles or rules. Autonomic identity is a final for and is characterized by mature professionalism, critically discovering occupational reality.

The above reflections contributed to create diagnostic sound method and attempted to explain a level of differentiation of identification with the profession of the future P.E. teachers, with reference to education' s level. The answers for the following questions were desired: 1) does exist a differentiation of intensity identification and occupational valuation by students on the following academic years?; 2) does exist a different type of occupational identification dependence on educational stage?; 3) does exist a differentiation of occupational identity between P.E. teachers and their continuators – candidates for this profession?

2. Occupational identity scale for candidates' for P.E. teacher

Identity scale construction is based on Carlson's theory (1988) and performed by Kwiatkowska (2005) process analysis, and constitutes a test enabling to diagnose of respondent's identification intensity with P. E. teacher profession. That test consists of 48 closed questions and 1 open question. Received strict results and standard deviation (Sx) of each group were used to determine typical ranges (Brzeziński 1980; 1999; Brzeziński, Maruszewski 1978; Brzeziński, Stachowski 1975; Claus, Ebner 1972). Thanks to those ranges, verbal evaluation of identity indicators among the selected studied group was possible.

Depending of paper's need M. Rokeach's survey questionnaire (Brzozowski 1989), with 18 instrumental values (WI) was used and modified by adding additionally two values (physical activity and physical efficiency). On the left hand, next to each value there is a special spot to determine ranks. Respondent's task was to put in order hierarchy of WI scale values. Received results determined the view of values hierarchy acknowledge by respondent, further aims and even final respondent's aspirations. An appropriate number was assigned to each value. Ranks determination of individual values was the first procedural step during results analysis. For this purpose, data normalization method, suggested by Hayes (Brzozowski 1989) was used. It helped to receive hierarchy of values for each studied sub-group.

3. Characteristic of studied group

The research was carried out among 340 physical education students (stationary study) of University of Rzeszow. With reference to the level of education, there have been made six studied groups. A detailed numerical distribution presents table 1.

Table 1. Numerical distribution of physical education students

Studied Group / Sex	Physical educations students											
	I P.E. BA program		II P.E. BA program		III P.E. BA program		I P.E. MBA program		II P.E. MBA program		Total	
	N	%	N	%	N	%	N	%	N	%	N	%
Women	34	50	34	50	34	50	34	50	34	50	170	50
Men	34	50	34	50	34	50	34	50	34	50	170	50
Total	68	100	68	100	68	100	68	100	68	100	340	100

Table 1 also presents percentage distribution of studied group, with reference to sex. A precise comparison of studied problem was possible due to even sample selection (34 women and men in each year).

Table 2. Numerical distribution of physical education students with significant sport

Studied group	Physical educations students			
	Woman		Man	
	N	%	N	%
With sport achievements	68	40	44	26
Without sport achievements	102	60	126	74
Total	170	100	170	100

An elimination victory in Polish Championships, medals in Academic Polish Championships, as well as significant regional achievements, were declared by students (Tab. 2) as answers to a question about sport successes during last two year, included in questioner. The majority of respondents 40% was represented by " medal women". Slightly less sport successes were represented by male students 26%. A comparable groups (60% women and 74% men) represented those without sport successes.

4. Analysis and interpretation of study

A main stage of the present study is to determine an occupational identity of candidates for P.E. teachers. Simple sequence variation determination was the first procedural step during results analysis (Tab. 3).

Table 3. Simple sequence variation

Physical Education students			
N	Occupational identity		
	$\bar{x}$	(xi - $\bar{x}$)²	Sx
340	196,3	251,4	15,8

Table 3 presents average answers for questions included in occupational identity scale for the whole studied group ($\bar{x}$), simple sequence occupational identity variation (xi - $\bar{x}$)² as well as standard deviation (Sx). Thanks to such a study, verbal evaluation of received results was possible. (Brzeziński 1980; 1999; Brzeziński, Maruszewski 1978; Brzeziński, Stachowski 1975; Claus, Ebner 1972, Stupnicki 2003)

Table 4. Typical ranks for group of P.E. students

Physical education students		
Ganges	Occupational identity	
	$\bar{x}$	Verbal evaluation
Low	1,0÷180	Low level of occupational identity
Average	181÷212	Average level of occupational identity
High	213÷240	High level of occupational identity

The above procedure (Tab. 4) was used to determine a verbal evaluation along with occupational identity analysis of candidates for P. E. teachers. Thanks to that it was possible to qualify studied group into three with a differed identification with future didactic activity intensity (low, average and high level).

Table 5. Numerical distribution of P.E. students with reference to the level of occupational identity

Studied group / Verbal evaluation	Physical education students									
	I P.E. BA program		II P.E. BA program		III P.E. BA program		I P.E. MBA program		II P.E. MBA program	
	K	M	K	M	K	M	K	M	K	M
Low level of occupational identity	9	10	9	9	8	6	6	5	4	7
Average level of occupational identity	21	21	21	20	19	22	18	22	19	18
High level of occupational identity	4	3	4	5	7	6	10	7	11	9
Total	34	34	34	34	34	34	34	34	34	34
χ^2	13,0794									
C Pearson	0,2253									
V Cramer	0,1389									
Df	18									
P	0,1091									

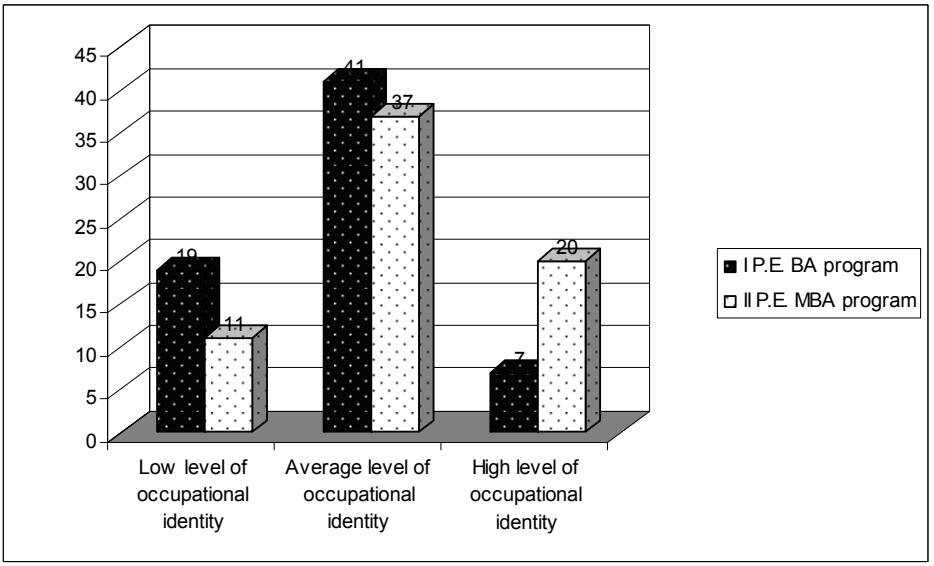
Table 5 presents numerical distribution of P.E. students with reference to the level of occupational identity of its members with profession. Taking into consideration educational stages as well as sex of studied group, it turned out, that the main problem of the present study did not indicate for statistically significant differences between respondents ($p < 0,05$). It is satisfactory, that a quite many respondents (average 21 individuals of studied group) feel an optimal relationship with the future profession. Results analysis (Tab. 5) with reference to students with high level of identity proved, that occupational identity depends on the year of study. There exist a minimum, however visible, progressive numerical distribution of studied respondents, i.e.: 7 people from I-year BA and 20 people from II-year MBA.

A true explanation of the problem of present study force to catch extreme numerical distribution for particular studied group. It turned out, that there exists statistically significant differences in identification of the future profession in groups "extremely educational". Students of I-year BA (7 people) rarely than II-year MBA (20 people) represent a high level of occupational identity. With two last degrees of freedom (df) differentiation, which is proved by chi-squre test, C-Pearson, V-Cramer, as well as P-factor, it is noticeable, important to understand a problem. (Brzeziński 1980; 1999; Brzeziński, Maruszewski 1978; Brzeziński,

Stachowski 1975; Claus, Ebner 1972, Stupnicki 2003) A strength of calculated relations should be determined as an average. (Lewicki 1998)

Table 6. Numerical distribution of I-year BA program and II-year MBA of P.E. students with reference to the level of occupational identity

Studied group / Verbal evaluation	Physical education students	
	I P.E. BA program	II P.E. MBA program
	N	N
Low level of occupational identity	19	11
Average level of occupational identity	41	37
High level of occupational identity	7	20
Total	136	
χ^2	8,5907848	
C Pearson	0,3211	
V Cramer	0,2523	
Df	2	
P	0,0136	



Graph 1. Numerical distribution of I-year BA program and II-year MBA of P.E. students with reference to the level of occupational identity

Graphic interpretation (Graph 1) presents differentiation of described problem of a study. Numerical distribution of respondents from low indicators group gives and information, which help to formulate thesis, that, along with the increase of occupational identity level of first year, it decreases on the last stage of education. Along with an interpretation of a high indicator, an increase of the level of

occupational identity of students on last educational stage is related to low identification with profession of people beginning the preparation to the profession.

As it results from theoretical analysis of the present study, individuals with a high occupational level of identity should consider, everything, that is related to physical efficiency, as an important element of social functioning. Noticing that relation was another stage of gathered results interpretation.

A M. Rokeach's survey questionnaire, with a modified SW value scale with WI instrumental values group, was used. This group of values included: 1) ambitious, 2) neat, 3) intellectual, 4) loving, 5) logical, 6) independent, 7) with imagination, 8) responsible, 9) brave, 10) calm, 11) physically efficiency, 12) with wide horizontals, 13) cheerful, 14) helpful, 15) obedient, 16) honest, 17) kind, 18) talented, 19) forgiving, 20) active. Classification was made based on data normalization method, suggested by Hayesa (Brzozowski 1989).

In the ranking of preferred by MBA students' values (Tab. 7), the first position presented values considering individual's activity (20), ambition (1), courage (9), responsibility (8). The ranking is closed with: global world perception (12), obedience (15) and forgiveness (19).

Results were compared in table 8 indicate on the similarity in instrumental valuation of both studied groups. A similar, high positions of values consider the sphere of affection (4), ambition (1), responsibility (8), and low positions consider kindness (17) and the ability to forgive (19).

Table 7. WI value ranking in the group of II-year P.E. MBA program students

WI Scale	Z	Rank
20	0,256	1
1	0,321	2
9	0,360	3
8	0,380	4
4	0,433	5
11	0,450	6
2	0,464	7
14	0,470	8
16	0,471	9
13	0,483	10
10	0,492	11
3	0,552	12
7	0,557	13
17	0,568	14
6	0,593	15
18	0,611	16
5	0,636	17
19	0,640	18
15	0,641	19
12	0,718	20

Table 8. WI value ranking in the group of I-year P.E. BA program students

WI Scale	Z	Rank
4	0,200	1
8	0,356	2
2	0,406	3
16	0,417	4
1	0,433	5
20	0,456	6
5	0,494	7
11	0,499	8
10	0,517	9
3	0,522	10
9	0,528	11
14	0,528	12
15	0,533	13
17	0,533	14
6	0,539	15
12	0,544	16
7	0,567	17
19	0,639	18
13	0,706	19
18	0,722	20

Values: 1, 4, 8 and 20 take first place, and intellect (3) for both studied group is placed in the middle of importance hierarchy.

Table 9. WI value ranking in the group of I-year P.E. BA program and II-year P.E. MBA program students

Rank	II P.E. MBA program	Instrumental values	I P.E. BA program	**Rank**
1	20		4	**1**
2	1		8	**2**
3	9		2	**3**
4	8		16	**4**
5	4		1	**5**
6	11		20	**6**
7	2		5	**7**
8	14		11	**8**
9	16		10	**9**
10	13		3	**10**
11	10		9	**11**
12	3		14	**12**
13	7		15	**13**
14	17		17	**14**
15	6		6	**15**
16	18		12	**16**
17	5		7	**17**
18	19		19	**18**
19	15		13	**19**
20	12		18	**20**

Tabular interpretation of ranks' values WI (Tab. 9) helps to show the position of the following values, in the opinion of I-year P.E. BA and II-year P.E. MBA students: physically efficiency (11) and activity (20). It turned out, that in the opinion of many respondents hold those two values in very high esteem. Both of them are placed high in the hierarchy.

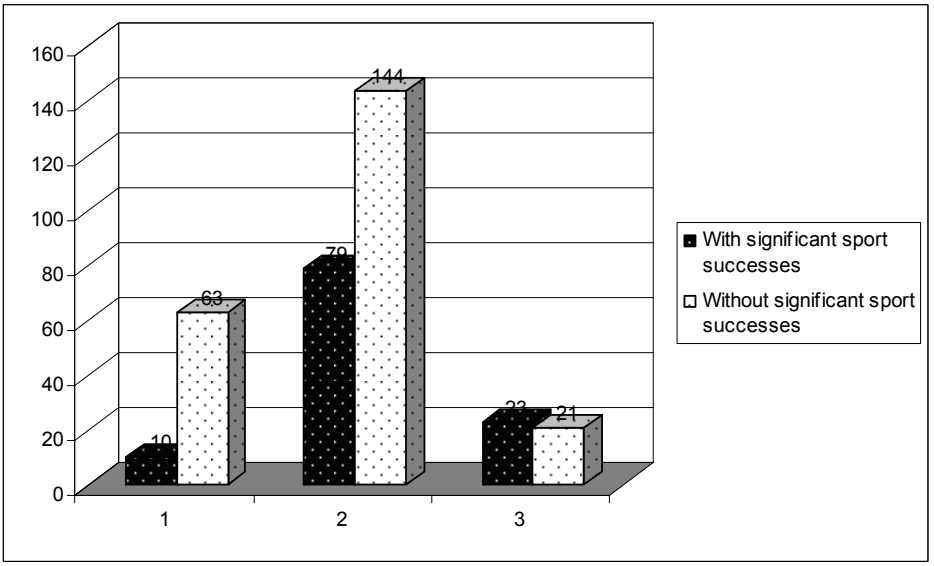
A significant shift of the value of activity is noticed in the case of two studied groups- I-year P.E. BA and II-year P.E. MBA students. MBA students, compare with BA students place activity on higher position in the hierarchy. MBA students put that 5 position higher than BA students, whom place it on 20 position (Tab. 8) Physically efficiency (11) is less valued by BA students.

Table 10. A set of identity indicators for studied group of students with and without significant sport successes

Studied group / Identity indicator	Physical education students			
	With significant sport successes		Without significant sport successes	
	N	%	N	%
Low level of identity	10	6,3	63	29,0
Average level of identity	79	70,5	144	63,1
High level of identity	23	23,2	21	7,9
Total	112	100,0	228	100,0
χ^2	20,303426			
C Pearson	0,3116			
V Cramer	0,2444			
Df	2			
P	0,0000			

Both studied groups were represented by students with and without significant sports successes. Gathered results presented in (Tab. 10) and statistical significant value ($p<0,05$) prove, that there are significant differences between I-year P.E. BA and II-year P.E. MBA students.

Noticeable diversity identity indicators, with reference to sport successes in groups with average and low level of identity. Graphic interpretation (Graph 2) presents quite high similarity in both groups of student with high level of identification with the future profession. Taking into consideration percentage division, it turns out, that significantly more P. E. teachers, whom declare sport successes (23,2%), compared with those, who do not declare such successes(7,9%), represent high level of occupational identity. A different arrangement is noticeable in the case of people with low identity identification with the future profession. As many as 29% of students were qualified to the group of students without sport successes. Significantly less students 6,3% are proud of sport achievements on sport competition arena.



Graph 2. A set of identity indicators for studied group of students with and without significant sport successes (1 – low level of identity; 2 – average level of identity; 3 – high level of identity)

According to the criterion suggested by Kwiatkowska (2005), an attempt to explain the problem of the present study was taken (Tab. 11). It turned out, that there are statistical significant differences in the studied group, with reference to occupational identity. The majority of students was represented by people characterized by anomic identity. Leaders in this structure were MBA students (80%), and the minority was represented by BA students (53,4).

Table 11. Numerical distribution of P.E. students of the following years against occupational identity

Studied group / Verbal evaluation	Physical education students									
	I P.E. BA program		II P.E. BA program		III P.E. BA program		I P.E. MBA program		II P.E. MBA program	
	N	%	N	%	N	%	N	%	N	%
Anomie identity	50	73,3	41	60	36	53,4	55	80	45	66,7
Role identity	14	20	18	26,7	23	33,3	9	13,3	14	20
Autonomy identity	4	6,7	9	13,3	9	13,3	4	6,7	9	13,3
Total	68	100	68	100	68	100	68	100	68	100
χ^2	16,157961									
C Pearson	0,2490									
V Cramer	0,1541									
df	8									
P	0,0402									

Numerical distribution of students shows the role identity. The majority of students was represented by III-year BA students (23), and the minority by I-year MBA students (9). There are minimum differences in the quantity of people studying on the further stages of education.

The least studied people are qualified to the last phase of occupational identity- autonomy. The majority was represented by II and III year BA students and II year MBA (13,3). Only 4 students in both groups represented I year of first and second stage of education. Calculated strength of the relation should be determined as weak (Lewicki 1998)

5. Conclusions

1. It turns out, that the majority of studied group was qualified to the group with an average level of occupational identity (Tab. 5). It was seen, that progress of quantity of students was related to the educational stage. Among–I year BA students, 7 of them represented high level of occupational identity, and among II year MBA it was represented by 20 of them. Different numerical distribution was seen during analysis of low level of occupational identity. The majority was represented by I year BA students (19). There are only minimal differences of occupational identity indictors in the particular groups, created due to educational stage. It might be said, that along with increase of educational experience, increase the quantity of students with high occupational identity, and decrease the quantity of students with low occupational identity. On this stage reasons for this relations is not significant statistically. The differentiation was seen, when the problem was interpreted with reference to two, regarding educational stage- extreme groups , representing I year BA and II year MBA students. At that time, the strengthen of this relation was calculated as average.
2. Among II year MBA student it was observed, that values like: physical efficiency and activity, were place higher in hierarchy, with compare to I-year BA students. Valuation of those values was determined by the gathered occupational experience (Tab. 9).
3. Based on strict results included in table 10 and statistical significant value ($p<0,05$) it is proved, that there are significant differences between created groups of students with or without sport successes. Students proud of sport successes, more often were characterized with higher occupational identity, than those without them.
4. Based on mentioned above theory, it might be stated, that (Tab. 11), definite majority of respondents- 227 studied groups, were there people with anomic attitude to profession. Those people would want to prove with their work their professionalism in education environment. A hidden goal of those didactic-educational activities is a success, related to prizes, which may

strengthen the position of a young teacher on the labour market. The minority of studied group (35 people) was represented by autonomic individuals, whom based on their own experience, are confident of the proper occupational preparation, and use a selection of expected educational activities.

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ABSTRACT

Human activity is regulated by motivational processes, which intensity level depends on desired object usefulness, as well as the attainability level. The stronger the motif is, the more efficient the human behavior's control is, and that, in turn, conditions psychological stress resistance, fatigue related to that temptation and treat. Motif's intensity depends on the stimulation's level to achieve a specific goal, and that is set in motion, with the help of negative factors (e.g. pain, fear, etc.), as well as positive factors (e.g. to arouse interest). There are situations, when people wrongly adjust intensity to the motif of set goal, mainly in case of personality immaturity. (Tomaszewski 1977)

The aim of this paper is to recognize relation between the level of occupational involvement and factors, demining pedagogical efficiency of P.E. teacher (occupational difficulties, occupational identity, organization's atmosphere recognition, tendency to occupational burnout), as well as verifying mean of diagnostic survey - own questionnaire. Specific character of work, a necessity of exceeding immunity against negative environmental stimulus (noise, variable work conditions, weather conditions), the level of occupational

identity, or organization's atmosphere, more or less motivate educators to perform educational activities.

In statements of motivational theory, there can be found a relation between the level of motivation and a possibility to achieve a set goal. (Atkinson 1964; Cieśliński1982). Those statements has provoked to prepare and verify Occupational Motivation Scale for P.E. Teacher. A construction of Occupational Motivation Scale for P.E. Teacher is based on complicacy of questionnaire placed in J. Kozłowski's paper (1966) and three scales (occupational identity scale, organization's atmosphere scale, burnout scale), which were prepared by the author of this paper, based on the knowledge included in the literature (Stryker i Burke 2000; Braun-Gałkowska 1994; Carlson 1988; Winch 1995; Chernissa 1983).

Key words: P.E. teacher, motivation, occupational difficulties, occupational identity, occupational burnout,

STRESZCZENIE

Głównym celem pracy jest określenie stopnia zróżnicowania tożsamości zawodowej kandydatów na nauczycieli wychowania fizycznego. Badaniem objęto 340 studentów wychowania fizycznego (studia stacjonarne) Uniwersytetu Rzeszowskiego. Większość badanych studentów zostało zakwalifikowanych do grupy ze średnim stopniem utożsamiania się z zawodem nauczyciela wychowania fizycznego. Studenci, którzy mogą się poszczycić sukcesami na niwie sportowej, częściej charakteryzują się wyższym wskaźnikiem tożsamości.

Słowa kluczowe: nauczyciel wychowania fizycznego, determinanty tożsamości zawodowej

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BEHAVIOR SUPPORTING COACHES AND PSYCHOLOGICAL FUNCTIONING OF STUDENTS AT ACADEMY OF PHYSICAL EDUCATION IN KRAKOW

ZACHOWANIA WSPIERAJĄCE TRENERÓW SPORTOWYCH A FUNKCJONOWANIE PSYCHOLOGICZNE STUDENTÓW KRAKOWSKIEJ AWF

Introduction

Motivation and its development in situations of sports training at Academy of Physical Education

Motivation of student to take up and continue sports training included into classes at Academy of Physical Education is various. Some of them choose a way of an academic education offered by the Academy and are not particularly interested in going in for sport. However, there are some students who are seriously engaged in training, going to training camps, they carefully and without preferential treatment prepare for competitions, sometimes at the expense of study. Most of them are good at reconciling studies with going in for sport. Moreover, motives for going in for sport are also different. For some of them it is a way of self- coming into being- during a competition, among friends, in front of themselves, when they defeat their own weaknesses. There are people who want particularly make their results better, care about facing up to successive challenges, are looking for new adventurousness or they want to learn how to teach others in the future. Of course, there are students who only want to receive a credit for a class positively.

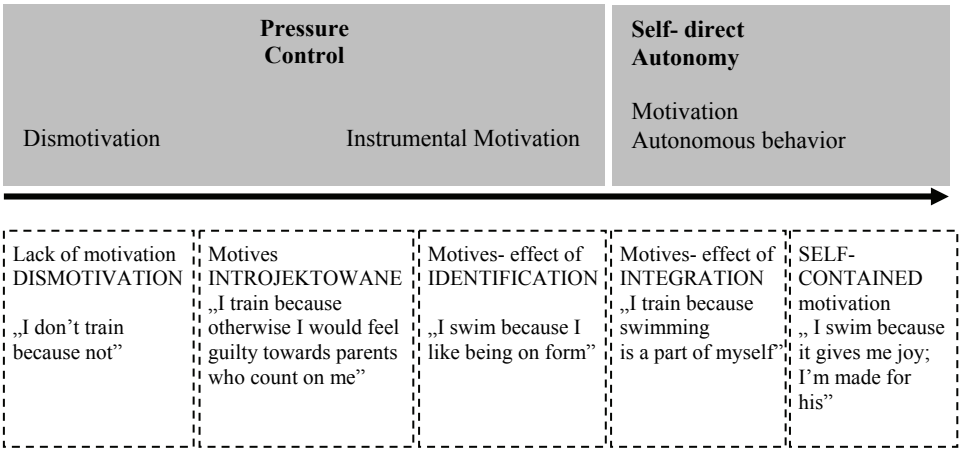
A big part in creating attitude to undertaken discipline as well as motivation for undertaken daily effort to improve condition and skills play coaches at Academy. There is no doubt that they influence on students in their charge not

only in their functioning especially by their behavior and their attitude to students.

Basic matter in explaining and understanding these issues is self-determination theory which pays attention to significance of training climate and it's consequences for motivation and effects of work of people who are trained.

Self- determination theory in sports psychology

According to *Self-Determination Theory* (SDT) [2,3], human behavior is different in respects of the issue if they are taken up independently (spontaneously, freely) or under pressure. Controlled behavior is a result of outer pressures (in forms of awards and punishment) or pressure from an internal *inspector* like feel of duty, willingness to avoid fear or feeling of guilt. Independent behavior is motivated spontaneously. They appear from self-orientation what means that they are independent of beyond subjective strengthens, situational or interpersonal factors. They are considered as personally significant and valuable. An individual experiences them as coming out from itself, dependant only on its free will. Undertaking them is companied by interest, joy and sense of self-engagement and results in sense of self-accomplishment (autonomy) and competence. Into group of autonomous behavior there are also included behavior that originally were evoked by outrageous factors but gradually thanks to integration of values and aims they became more internal and seemed as taken up from own free will [11,12]. In the picture 1 there is introduced continuum of possible motivation forms set apart by SDT theorists for reasons like self- orientation against control and pressure of regulation the behavior (e.g. going in for sport).

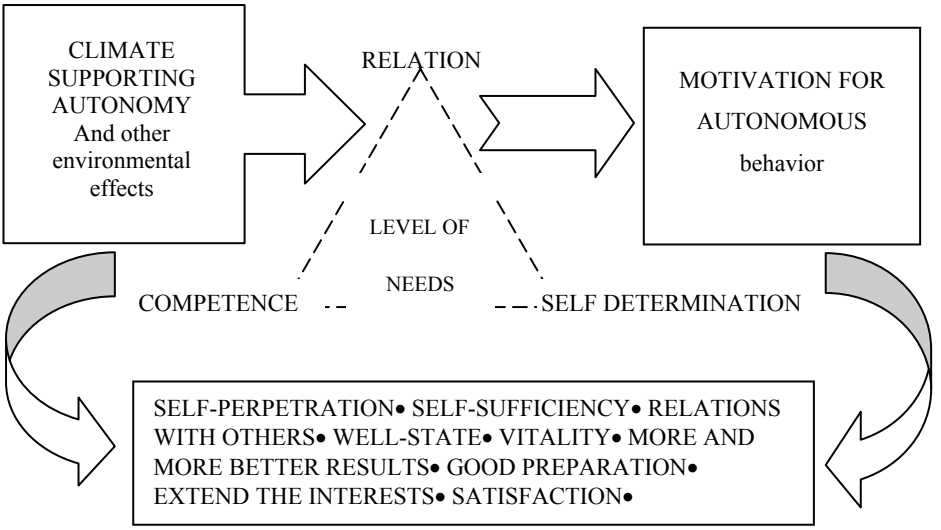


Drawing 1. Types of mechanism and motivation behavior according to self- determination theory (SDT) depending on majority of control or self- state (own study).

The level of self-orientation (self-determination) depends on the level of fulfilling three basic psychological needs including need of autonomy (self-state), need of competence (effectiveness) and meaningful relations with others (especially with someone significant). According to SDT theory, every undertaking behavior including going in for sport is to fulfill basic human psychological needs. If training for someone means opportunity to fulfill those needs, self-contained motivation will raise (self-determination).

Deci and Ryan [3,11,comp.4] prove that the level of fulfilling basic psychological needs and acting under self-contained motivation influence positively on human functioning. It displays in cognitive sphere (e.g. by broadening area of interests or increase of work), emotional sphere (sense of prosperity, vitality, satisfaction), volitif (increase of perseverance and involvement) and also on the level of actions' results (more and more better results) (picture 2).

Picture 2 (Drawing 2)



Drawing 2. Direct and indirect effects of climate's influence supporting autonomy on person's functioning (own study)

According to SDT theorists [comp.6] grade of fulfilling basic psychological needs depend on individual factors (as sense of self- effectiveness, specificity of self-regulation mechanisms) as well as environmental determinants dependant on the climate in which specific person works (at home, work or during training). People who are responsible for creating favorable climate and fulfilling psychological needs of sportspeople are also very important for them like parents (especially when talking about children and young people), doctors or physiotherapists (in case of injury) and especially coaches.

On the ground of SDT theory it is accepted that the environment provokes to undertake behavior regulated outside by the control. There is no connection between course of behavior and condition of it by outer circumstances (punishment and award) as well as specific internal condition of a person (like sense of duty, compulsion, pressure). Functioning determined by control can have a form of submissiveness or resistance to demand of environment or itself. It is connected with feel of pressure and compulsion and is strengthened. It's also linked up with going through what is controlled and a controller (outer or internal) what supports appropriate functioning.

The environment supporting someone's autonomy (picture 2) strengthens a tendency to self-orientation and full improvement as well as optimal functioning mainly by fulfilling basic human needs. According to this thought sports coaches create climate supporting autonomy and can indirectly influence on creating the level and type of motivation among their charges because they influence directly on how sportspeople see their level of competence, self-determination and relations with others (in other words they influence on the level of fulfilling their basic psychological needs) [16].

The results of conducted tests among young gymnastics show that exaggerated expectations of coaches and parents, sense of pressure (according to SDT theory it's no supportive climate, meant as control) can increase stress, pain and tendency to self- humiliate in case of failure. On the other hand, support and strengthening them in their efforts (climate supporting autonomy) leads to sense of joy, readiness to take up challenges and strengthen sense of high self-esteem [7].

Specific relation between coach and athlete

Supporters of self- determination theory point out specific role of environment and so called motivational climate for creating and strengthening autonomic behavior. There's no doubt that coaches spend a lot of time with athletes, they accompany them in preparations to competitions, they play a significant role in creating their experiences connected with sport. They influence in reality not only on gained scores and their form but also can influence on the way of their psychological functioning, for example sense of well- being, level of fulfilling basic psychological needs, perseverance, strength or type of displayed motivation [16,10,1]. That's way it's seems to be important what kind of climate in terms of sports training is created for charges and how psychological functioning of competitors is created.

Relations between competitors and coaches are specific because first of all coach's role is associated with rigorous control of training, diet and competitor's regeneration. Autonomy is not taken into consideration. It seems that training involves non favorable climate of pressure. Moreover, it demands

keeping precisely determined rules about improving game, quality, quantity and frequency of trainings. It is common that during training course are given rewards for carrying out a task and as it is generally known rewarding causes almost automatically decrease of self- motivation for training work. Dates of contests announced in advanced outline time frameworks for trainings and prompt pressure of "deadline" of preparations. Competitors are almost always under observation and judged by interested people who care about results (coaches, parents, peers, rivals). Generally they are limited in making choices – coaches are those who take responsibility for draw out training schedules and strategy of defending sports rivals. That is reality. It is dependant on the coach if he treats this as occasion to take control over competitor or he will support competitor's autonomy in these specific conditions. Coaches who prefer controlling style behave towards their charges in a commanding way (e.g. "You play as I tell you or you'll sit on the bench"). Those who support autonomy give more freedom, opportunity to take a decision and display initiative (e.g. "We've trained three different moves, during a game you'll decide which one use").

Number of tests' results conducted in past twenty years shows explicitly that there is a connection between coach's behavior and sense of satisfaction among his charges. Identified factor system influencing on quality of relations coach- sportsman is described in picture 3 [17]. There is a short review below.

Coaches who serve with support also give positive turning information and prefer democratic style of making decisions, they bring up competitors with higher level of satisfaction. Tests' results also show that coaches supporting autonomy have charges with higher level of self- motivation and have high self –esteem than coaches who prefer control style. It turns out that for creating motivation and sense of self- competence among sportsmen, it is not only realistic style of trainings is important but also subjective way of seeing it by trained [15]. The climate supporting autonomy becomes legally and meaningful in personal discovery of sportsman in situation when he is able to establish contact and agreement with his coach and has sense of support from the coach. Describing factors creating style of coach's behavior (supporting autonomy or controlling) personal issues (general style of control) or situational context (circumstances in which he works) cannot be omitted. It turns out that the more coaches feel controlled and under pressure (e.g. when their career and finances depend on contestant's success), the more they are ready to control their charges. Moreover, the way of how contestant's looking at motivation influence on style of coach's behavior. It's proved [16] that if coach seems his charge as self- motivated and self- directed, he is less principal towards sportsman. However, when he see him as outwardly motivated , he has tendency to behave in a control way to make sure that contestant keeps rules and does his duties.

Recent researches [1]show explicitly that supporting the autonomy by sports coaches results in fulfilling of psychological needs of his charges,

improving motivation for undertaking autonomous behavior, increasing their perseverance, sense of vitality as well as negative connection with state of none motivation and symptoms of physical diseases.

Methodology

Hypothesis and research questions

Our research problem concerns looking for a connection between the climate created by the coach and psychological functioning of his charges. There have been no researches like these in Poland up till now. There has been planned a research project which should find answers for following questions: *How high is the level of fulfilling basic psychological needs of students at Academy depending on the level on which sense of autonomy is strengthened? If and how differences between levels of personal resilience are created depending on climate of conducted trainings?* Basing on self- determination theories a hypothesis can be made that seeing own coach as supporting autonomy during training (according to SDT, creating positive climate of training) concerns fulfilling of basic psychological needs (autonomy, competence, relations and need of safety) of students and higher level of personal resilience. Resilience meant as [14] specific system of personal characteristics determining ability to effective coping with realization of daily tasks in variable conditions, sometimes very stressful. It is a indicator of personal determinant of well functioning, psychological health and dynamics of tendency to development.

The group of respondent was made of 230 students in last year of Academy of Physical Education in Krakow. The average age of respondent was 24. Tests were conducted in a group form during classes in 2007. They were voluntary and anonymous.

Sport Climate Questionnaire (SCQ). It is an acknowledged method to research how a contestant see the relation with his coach or instructor, as supporting autonomy or giving sense of being controlled. The scale is made of 15 statements, on which the respondents answers by circling one of seven numbers where 1 means "I absolutely not agree", 4- "I'm not decided" and 7 stand for "I absolutely agree". After summarizing the results in 15 items (still remembering about turning away scoring in the item 13) we get general indicator described as WA (supporting autonomy's indicator). It can has a value from 15 to 105 scores). The highest it is, the more understandable and acceptable is the contestant in relations with his coach and the bigger is sense of having an opportunity to make a choice and strengthening in choosing own paths of taking actions including making questions and initiating new forms of taking actions. It is accepted that style of supporting the autonomy creates favorable conditions for creating and strengthening sense of self- stating among

coach's charges. Low level of WA indicator speaks for control style of the coach. Indicator of the diligence in SCQ method is 0,97 [9].

Basic Psychological Needs Scale by E.L. Deci and R.M. Ryan [13] translated and worked out by Z. Uchnast. It contains 21 items. Person who is examined writes in every statement a number from 1 to 7 to specify to what extend the statement refers to him. Moreover, number 1 means "fully false", 4 – "partly true" and 7 stands for "completely true". This method allows to measure the level of fulfilling three (according to SDT they are basic) psychological needs:

1. Need of autonomy- directing oneself, opportunity to work in atmosphere of freedom to make choices, independence and accomplishment own aims.
2. Need of competence- influencing on the course of events, take up challenges, faith in own skills, improvement of own capabilities.
3. Need of relations with others- natural need of contacts, affiliation, care about others and cooperation; going into relations that are faithful and open; satisfaction from contacts.

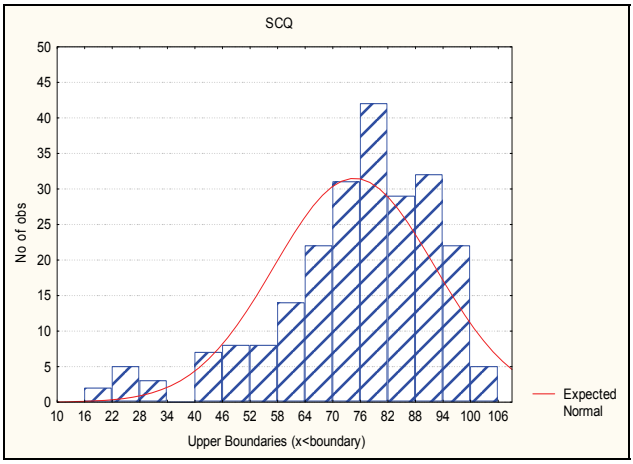
Fourth summary indicator is set after using this method, it is general and reflects fulfilling all psychological needs.

Established after English attempt Cronbach alfa rate is α=0,73 and α=0,84 for an individual scales of this method.

PB – PO Questionnaire worked out by Z. Uchnast [14] it is a scale made of 30 items allowing to measure following dimensions:

1) Closeness (B1) – indicator of need of affiliation and love,
2) Stability (St) – indicator of need of security,
3) Faith in oneself (Zs)- indicator of need of respect to oneself,
4) An average indicator of sense of security (Pb),
5) Personal resilience (PO).

High results in personal resiliance indicator (PO) show sense of closeness and faith in others, opening to current matters and engaging into them, they also determine happiness, courage and sense of competence. Moreover they suggest ability to stay calm and keep presence of mind and recovering very fast in stressful and new situations, sense of strength and readiness to take a risk. Low results indicate over care about providing oneself sense of security and stabilization. In new and unexpected situations an individual with low results has tendency to lose presence of mind, control over impulsiveness and emotions. He is characterized by sensitivity, low level of frustration, small liberty of being and spontaneity also towards strangers keeping distance and caution.The examined person marks own attitude to individual statements of KPB- PO on five- step scale Likert's type. Reliability and stability indicators, as well as other indicators are relatively high and come to 0,76 and 0,92 in individual scales [14].



Graph 1. Schedule of results in SCQ of all examined people.

Results of the tests

For every individual there has been worked out results in SCQ. In the graph 1 there is presented a histogram of results' schedule with covering line of normal schedule.

The average result gained by 230 students at Academy in SCQ is M= 74,7 with a standard deviation SD= 17,48. value of kurtosis (1.25) indicates significant of the schedule what means distinct concentration around the average. Slant's coefficient (- 1,08) indicates asymmetry in left side of the schedule (longer left side of schedule) so most values is on the right side and in the middle of schedule. Minimum of the result in that group was 16 points but maximum was 105 alongside with theoretical gap between 15 and 105 point.

We should pay attention to the fact that according to these results definite majority of students at the Academy assesses coaches as good or very good. They see them as friendly and supportive in their autonomy. Only minor part of the group (10 students)got very low results (below two standard deviations from the average) what shows that they construe the atmosphere of training as completely unsatisfying. This group should get cases treatment, especially to establish causes of such state, however it is beyond the aim of this study.

For testing the relation between climate created by the coach and psychological functioning of students At the Academy, there were distinguished two groups taking into consideration a quarter deviation of got results in SCQ. One group was made of students perceiving their coach as clearly strengthening their autonomy (this group will be shortly called W- WA). To this group got 59 students (including 32% women and 68% men) whose results were between 88 and 105 points. Second group was made of 58 students (including 38% women

and 62% men) who see their coaches as less supportive in their autonomy and representing more control style. The results of this group (called shortly N-WA) were the lowest among all tested students and placed between 16- 67 points.

Contestants creating the W- WA group (high level of supporting their autonomy) have sense that they are accepted by their coaches. They trust him fully and feel that they can be open towards them. Moreover, they are sure that the coach cares about them as people and show consideration for them. They also see their coach as a person who is trying to understand their point of view firstly and then offers own solution. They feel he gives them opportunity to make own choices and believes in them. He encourages them to take up a critical thinking and making questions and the answered answers at length. These students admit that they feel comfortably in relation with him.

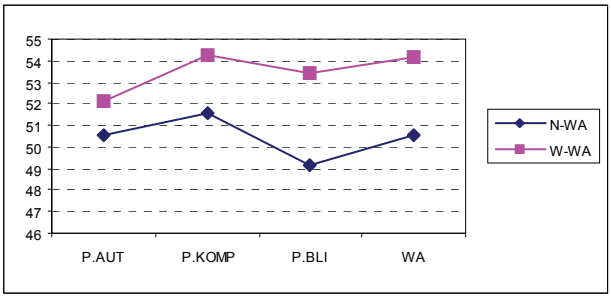
Contestants creating the N- WA group (low level of felt support In their autonomy) feel treated with a disdain or over-controlled by their coaches. They signal lack of communication with them, lack of trust and sense of not giving opportunity to make own choices and co- deciding in a matter that concerns them.

It was checked how the results shape in described two extreme groups in the SCQ as well as PB – PO Questionnaire. Table 1 introduces full list of statistical data. Their preliminary analysis shows that there is statistically significant difference between groups W- WA and N- WA in the scope of the level of results in the need of relations with others scale ($p < 0,039$) and stability factor ($p < 0,046$). There were also revealed distinct tendency suggesting differences between the level of result in need of safety scale ($p < 0,069$) and general indicator of the level of fulfilling basic needs ($p < 0,062$) in these two groups.

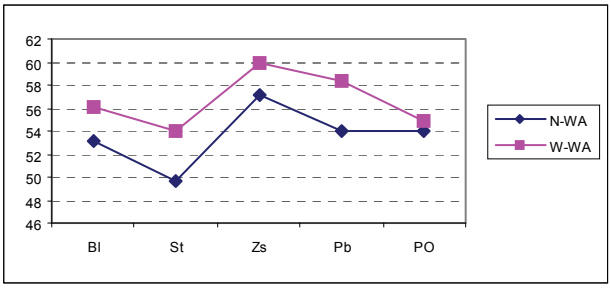
Table 1. The average of results (M)), standard deviations (SD) and indicators of statistic differences between Basic Psychological Needs Scale and PB- PO Questionnaire of two distinguished extreme groups (N- WA and W- WA).

Factors *SPPP* and *KPB-P*	N-WA (N=58)		W-WA (N=59)		**t**	**p**
	M	**SD**	**M**	SD		
Need of autonomy	50,59	9,68	52,08	9,74	-0,83	0,406
Need of competence	51,60	8,74	54,24	10,25	-1,50	0,138
Need of relations	49,14	10,41	53,39	11,56	-2,09	0,039
General indicator (WA)	50,52	9,51	54,12	11,08	-1,88	0,062
Closeness (Bl)	53,17	10,38	56,07	11,31	-1,44	0,152
Stability (St)	49,64	10,79	53,98	12,42	-2,02	0,046
Trust in oneself (Zs)	57,10	12,61	59,90	12,56	-1,20	0,232
Need of safety (Pb)	53,95	12,16	58,29	13,34	-1,84	0,069
Personal resiliance (PO)	53,95	9,67	54,88	10,07	-0,51	0,61

The graphs below are illustrations of data included in Table 1 – there is introduced separately the average of results got by the person form extreme groups in the factors of Basic Psychological Needs Scale (graph 2) and factors of PB – PO Questionnaire (graph 3).



Graph 2. The average of results in factors of Basic Psychological m Needs Scale Got by people with high (W- WA) and low sense of supporting autonomy (N- WA).



Graph 3. The average of results in global of PB- PO Questionnaire Got by people with high (W-WA) and low sense of supporting autonomy (N-WA).

Students of the Academy who train in a supportive climate (the W-WA group) function in a psychological respect in different ways alike as those who don't have such a possibility. Those who have coaches supporting their self-determination are characterized by high level fulfilling needs of close relations with others. They have friendly attitude towards others and oneself and feel liked by them. They experience a lot of kind care from others and especially from the coach. Need of relations, affiliation and close emotional contacts is practically fulfilled. They cooperate with others without sense of loss of independence or own initiative. They are also characterized definitely higher level of sense of safety. What is more, they have sense of functioning in an organized world which rules are clear. They are able to predict future course of matters and have sense they can influence on it. They don't feel pressure which could disorganize their actions.

Students whose sense of self- determination isn't strengthened in contacts with the coach (the N- WA group) have sense of lack of possibility to influence on the course of matters. They are characterized by staunchly lower level of sense of safety. They feel lost on account of demands of the situation, it's hard for them to pull themselves through sport and in the studies because probably their aspirations are at variance. Moreover, they are characterized by sense of tension and randomness, emotional lability, they have tendency to feel general anxiety. The level of fulfilling significant relations with others (especially with the coach) is considerably lower among them. It should be supposed that it in a significant way has a negative effect on their physical and mental state and work effectiveness.

Summary and conclusion

We should admit that the results of conducted tests allow to positively verify only part of initial hypothesizes. The climate created by the coach can be connected only with the level of need of relations (measured with Basic Psychological Needs Scale) and need of security (measured with stability factor PB- PO questionnaire). Contrary to expectations, there is no revealed correlation between it and need of autonomy and competence as well as personal resilience. These results diverges a little bit from those got in test of the academic climate (created by the thesis supervisor) conducted on the same group of students [15,13]. Where did these differences come from? Possibly they appear from the specificity and complexity of relation between coach and contestant and specific training at the Academy. It can be also supposed that some mediating variables can have modifying role and weren't taken into consideration, e.g. how long does the relation create between coach and sportsmen, what kind of sports discipline does the student go in for, is it an individual or group sport?

During the analysis and interpretation of gained scores, it should be noticed that identifying differences in a way of functioning of sportsmen whose autonomy is supported or not is connected with needs fundamental for general needs of functioning - need of safety and close relations. Revealing these differences can be a base of important conclusion.

At first, it should be marked that in western culture a person who is an authority should take strong actions and be directive [10]. According to undertaking tests, directive and control training and academic styles [5,13] are disadvantageous in influencing on the quality of psychological functioning among students at sports higher education institutions.

From Mageau and Vallerand's tests arises that coaches very often are not aware of own control behavior which can be an answer to (not expressed straight) contestants' expectations. Usually contestants got used to receiving

attitude, they accept passively sent information and they succumb to given expectations. In this context, especially because of negative effects of such system (athlete's passivity – coach's control style) attracting coach's attention (maybe within training courses) to the specific, learning to identify and resign from control behavior for behavior supporting athlete's self- state seem to be very important.

Theorists and researches working in SDT trend [8,10] give some guidelines for eager to create positive climate of sports training. When they want to fulfill basic needs of their charges and strengthen at a profit autonomic motivation effects to go in for a sport, they should:

– Try to be specially conscious of own behavior towards charges- avoid control (by arousing sense of guilt, used system of punishment and rewards) and give them more opportunity to make choices and decisions in matters that concern them directly (of course together with necessary limitations);
– During trainings athletes should be allowed to create their own aims and make own choices, e.g. what at first they would like to learn; strengthen every indication of own initiative and involvement;
– Argue own proposals well about the order of undertaken actions and so on; they also should justify proposed solutions;
– Monitor the level of workmanship and possible progress- indicate it giving quickly precise turning information about achieved successes, proper behavior; pay attention to made mistakes without criticizing but informing;
– Avoid over- control and criticism on every level of training;
– Award system should be used in a thought over and cautious way;
– Try to inside into charges' feelings and understand their point of view when solve the problem or give advice;
– Give the contestant opportunity to show own initiative during trainings;
– Try to create and strengthen self- monitoring among contestants- create internal standards about level of performance and teach self- awarding;
– Care about good climate in the group and co- operation of people who play together;
– Make the contestants feel that they are involved in their matters and that you act in their business; that you assess them, accept, listen, support members of group and individually as athletes but first of all as close person.

All these efforts are to create climate of athlete's personal responsibility for course of own training. It cannot be hidden that it demands from the coach specific skills and interpersonal competence as well as undertaking conscious effort. Face to positive effects, this effort seem to be worth taking up.

Remembering about dependence sense of „being under pressure" from the coach on tendency to enhance control over contestants [15] what is especially frequent in situation when coach's work depends on the form and results of contestant, it is important to provide for coaches work conditions without

exaggerated pressure and give them opportunity to undergo specialist psychological courses and supervision.

To add up, self- determination theory allows to pay attention to not only a problem of sports trainings methods but more general motivation climate created in relation between coach and athlete for an optimal functioning of contestant and achieving best scores. In this light not only effectiveness of coach's actions is important but also how an athlete goes through it, assesses and sees the relation formed with own coach. It should be marked that the climate favorable for training comes into being as the contestant convinces himself according to his experiences that fundamental coach's desire is not controlling him but support in personal development, making optimal choices and decisions in matters that concern him as well as strengthen in self- state not only in sports field.

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ABSTRACT

Motivation of student to take up and continue sports training included into classes at Academy of Physical Education is various.

Basic matter in explaining and understanding these issues is self-determination theory which pays attention to significance of training climate and it's consequences for motivation and effects of work of people who are trained.

Our research problem concerns looking for a connection between the climate created by the coach and psychological functioning of his charges. There have been no researches like these in Poland up till now.

The group of respondent was made of 230 students in last year of Academy of Physical Education in Krakow.

For every individual there has been worked out results in SCQ.

Sport Climate Questionnaire (SCQ). It is an acknowledged method to research how a contestant see the relation with his coach or instructor, as supporting autonomy or giving sense of being controlled.

It should be marked that the climate favorable for training comes into being as the contestant convinces himself according to his experiences that fundamental coach's desire is not controlling him but support in personal development, making optimal choices and decisions in matters that concern him as well as strengthen in self- state not only in sports field.

Key words; sports training, behavior supporting, psychological functioning

STRESZCZENIE

Motywacja studentów do podjęcia i kontynuowania szkolenia sportowego w ramach zajęć na Akademii Wychowania Fizycznego bywa różna.

Podstawy do wyjaśnienia i zrozumienia tych kwestii daje teoria autodeterminacji, która zwraca uwagę na rolę klimatu szkolenia i jego konsekwencje dla motywacji i efektów działania osób trenowanych.

Podjęty przez nas problem badawczy dotyczy poszukiwania związku pomiędzy tworzonym przez trenera klimatem szkolenia sportowego a psychologicznym funkcjonowaniem osób trenujących pod jego kierunkiem. Dotąd nie przeprowadzano tego typu badań na gruncie polskim.

Badania przeprowadzono na 230-osobowej grupie studentów IV i V roku oraz II roku SUM Akademii Wychowania Fizycznego w Krakowie.

Dla każdej z badanych osób obliczono wyniki w Kwestionariuszu klimatu szkolenia sportowego (SCQ). Sport Climate Questionnaire – SCQ, jest to uznana metoda do badania tego, jak sportowiec postrzega relację ze swym trenerem, instruktorem czy szkoleniowcem - jako wspierającą jego autonomię czy też dającą poczucie bycia kontrolowanym.

Na podkreślenie zasługuje fakt, iż klimat sprzyjający szkoleniu sportowemu, powstaje w miarę, jak zawodnik przekonuje się, w oparciu o własne doświadczenie, że zasadniczym pragnieniem trenera nie jest kontrolować go, ale wspierać w osobistym rozwoju, dokonywaniu optymalnych wyborów, podejmowaniu decyzji w sprawach go dotyczących i wzmacniać w samostanowieniu nie tylko w dziedzinie sportu.

Słowa kluczowe; szkolenie sportowe, zachowania wspierające, funkcjonowanie psychologiczne

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EFFECT OF BASIC SKI TRAINING IN STUDENTS GROUP ON POSTURAL STABILITY. THE EFFECT OF FATIGUE IN TERMS OF A BALANCE

WPŁYW PODSTAWOWEGO SZKOLENIA NARCIARSKIEGO GRUPY STUDENTÓW NA STABILNOŚĆ POSTAWY. EFEKT ZMĘCZENIA A UTRZYMANIE RÓWNOWAGI

Introduction

Recent years have seen a dynamic development in skiing. Continuous evolution in skiing, after a period of stagnation, was the main reason for 'revolution' which took place at the turn of the century. The changes, mainly dictated by ski manufacturers, contributed substantially to the fact that learning skiing skills has become easier and faster, with its impact on popularization of this discipline of sport. Equipment evolution has sparked changes in skiing technique and also contributed to increased load in bone – joint – ligament system.

Enhanced physical fitness can significantly guarantee fast learning and decreased risk of injuries (Raschner et al. 2004). Among motor skills essential to teaching and learning of skiing, balance is listed as the most significant for progression (Mynarski, Żywicka 2004). Referring balance to skiing classifies this skill as a dynamic balance, i.e. the skill which allows for keeping or recovering of balance while moving or immediately after this activity (Raczek 1991). Importance of this skill to the described discipline of sport was proved by balance tests conducted during selection of young Alpine skiers in sports schools in Austria (Raschner et al. 2004). The attempts were made to make the level of skiing technical skills (determined on the basis of giant slalom skiing) related to the level of dynamic balance in adults who started a ski training (Tchórzewski, Szczygieł 2008).

Authors of scientific papers pay increasingly more attention to the development of information-related properties, such as coordination skills, seeing them as a source of success in sport (Pöhllmann 1986, Raczek Mynarski Ljach 2003, Juras 2003, Mynarski 2000). Coordination, or coordination motor abilities (Hirtz 1985), comprise a set of skills such as : rapid response, spatial memory, rhythm, balance and kinesthetic differentiation. This group includes balance, also defined as a sense of balance, which can be characterized as an ability to keep the body in a balanced position (static balance) or keeping and recovering of the balance while moving or immediately after the movement (dynamic balance). There is also locomotive balance, referring to the movements made in one directions and rotational balance for the movements made around your own axis.

Stability, according to Błaszczyk (1993), is a concept definitely wider than body balance. It is defined as 'an ability of the body to regain a predetermined position after cessation of the destabilizing stimulus.

Analysis of the processes of controlling of motor activity, the control of balance is often unfairly treated marginally (Juras 2003 p. 23)

It was empirically proved (Juras 2003 p. 23) that coordination abilities comprise one of the main factors which condition the learned motor activity i.e. keeping body balance.

These reports were an attempt to evaluate effect of basic ski instruction and the related fatigue on postural stability in physical education students under two-week skiing coaching.

Material and Methods

Tests were carried out among the group of 12 healthy students of tourism and recreation in the Faculty of Physical Education at Rzeszow University. The investigated persons have never attended skiing instruction.

Age average 20,07

Weight average 78,04

Growth average 177,9

All the investigated persons were advised about the goal and nature of the tests and expressed their verbal consent for the examination.

Tests which evaluated postural stability were performed in DW Beskid, Krynica Zdroj in January 2009 before the beginning of skiing instruction (downhill skiing) and just after its end.

All the attempts were registered by means of AMTI Accugait platform and a compatible computer with Balance Clinic software for acquisition and processing of diagnostic tests. AMTI ACCUGAIT platform allows for measurement of objective parameters connected with evaluation of balance.

Each measurement was registered with the frequency of 40Hz – 40 readings per second (at maximal efficiency of the equipment of 1200 Hz).

On first day of training (before its beginning) 2 measurements were carried out. Each measurement took 30 seconds. Free standing – open eyes (1 measurement), free standing – closed eyes (1 measurement). The procedure was repeated on a final day of training.

Statistical analysis was carried out by means of Balance Clinic software package.

Basic elements of descriptive and inductive statistics were employed. Statistical description of variables from the domain of physical education and sports exclusively by means of central tendency measurements is insufficient and often leads to false conclusions.

Due to this fact, it would be justifiable to employ measures of dispersion as a basic source of knowledge of homogeneity, concentration and asymmetry of the investigated variable and interrelation of the characteristics (correlation).

Results

Free standing, open eyes, before training

Table 1. The results of tests with open eyes before training.

Parameters	Max	Min	Avg	SD
COP-X Avg (cm.)	1,19	-1,373	0,139	2,678
COP-Y Avg (cm.)	0,769	-5,511	-2,383	6,072
COP-X Max (cm.)	1,373	0,475	0,784	0,872
COP-X Min (cm.)	-0,427	-2,092	-1,125	1,857
COP-Y Max (cm.)	5,511	1,229	2,652	4,822
COP-Y Min (cm.)	-1,148	-4,347	-2,173	3,21
Standard Deviation - X COP	0,497	0,217	0,342	0,297
Standard Deviation - Y COP	1,873	0,446	0,988	1,475
Avg. Displacement along X (cm.)	0,354	0,171	0,259	0,178
Avg. Displacement along Y (cm.)	1,099	0,332	0,653	0,775
Avg. Radial Displacement (cm.)	1,179	0,511	0,753	0,683
Standard Deviation - Radial Disp.	1,486	0,338	0,74	1,237
Correlation Coefficient	0,724	-0,818	-0,09	1,779
95% Ellipse Slope	86,095	-85,753	-21,071	256,685
SD - Major Axis of 95%Ellipse	1,562	0,341	0,664	1,443
SD - Minor Axis of 95%Ellipse	1,291	0,294	0,742	1,179
95% Ellipse Area (cm..cm.)	9,617	3,199	4,962	6,194
Avg Velocity (cm/sec)	2,231	1,272	1,75	0,889
Length (cm.)	66,936	38,167	52,494	26,673

Source: *self study*

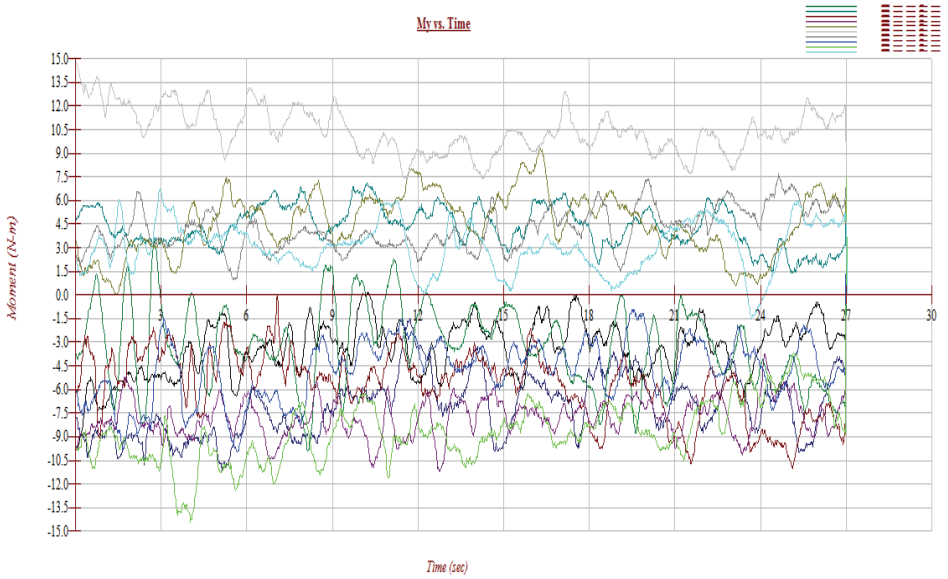

Fig. 1. Diagram of M Y vs. time

Free standing, closed eyes, before training

Table 2. The results of tests with closed eyes before training

Parameters	Max	Min	Avg	SD
COP-X Avg (cm.)	1,522	-1,627	0,386	3,222
COP-Y Avg (cm.)	1,726	-5,441	-2,22	7,08
COP-X Max (cm.)	1,627	0,444	0,863	1,047
COP-X Min (cm.)	-0,598	-2,424	-1,398	2,156
COP-Y Max (cm.)	5,441	0,702	2,627	5,304
COP-Y Min (cm.)	-1,118	-5,304	-2,421	3,98
Standard Deviation - X COP	0,604	0,185	0,394	0,437
Standard Deviation - Y COP	1,908	0,438	0,99	1,654
Avg. Displacement along X (cm.)	0,413	0,146	0,289	0,275
Avg. Displacement along Y (cm.)	1,153	0,306	0,657	0,906
Avg. Radial Displacement (cm.)	1,252	0,462	0,764	0,861
Standard Deviation - Radial Disp.	1,504	0,269	0,754	1,401
Correlation Coefficient	0,831	-0,844	-0,053	2,082
95% Ellipse Slope	86,491	-84,351	1,615	254,969
SD - Major Axis of 95%Ellipse	1,246	0,292	0,6	1,018
SD - Minor Axis of 95%Ellipse	1,569	0,378	0,876	1,404
95% Ellipse Area (cm..cm.)	11,687	2,229	5,271	8,926
Avg Velocity (cm/sec)	3,35	1,315	2,164	1,696
Length (cm.)	100,496	39,443	64,924	50,885

Source: self study.

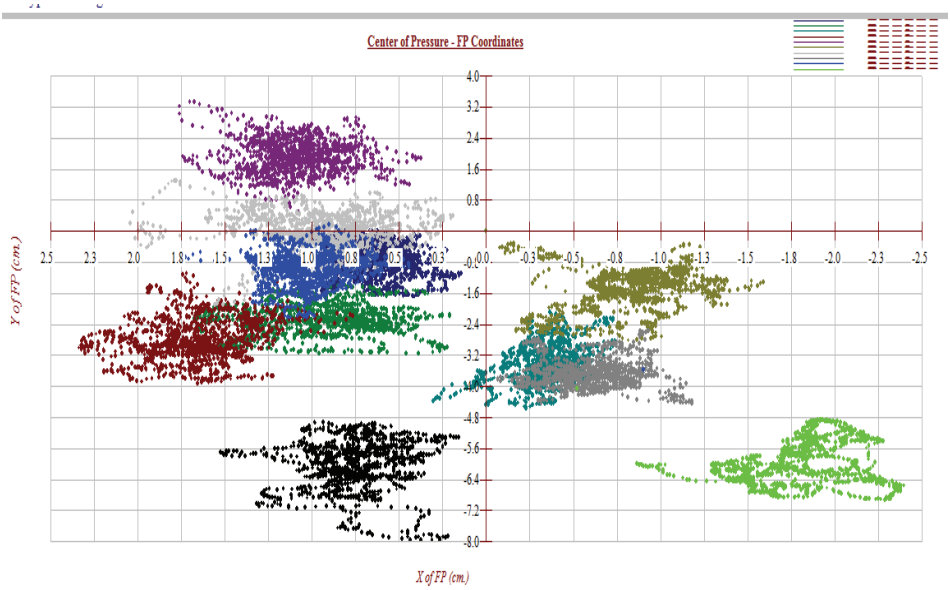

Fig. 2. Distribution of COP

Free standing, open eyes, after training

Table 3. The results of tests with open eyes on the last day of training

Parameters	Max	Min	Avg	SD
COP-X Avg (cm.)	4,093	-2,803	0,581	5,586
COP-Y Avg (cm.)	2,295	-6,328	-2,832	9,139
COP-X Max (cm.)	2,803	0,435	0,958	2,16
COP-X Min (cm.)	-0,042	-4,093	-1,266	3,772
COP-Y Max (cm.)	6,328	0,736	3,192	7,334
COP-Y Min (cm.)	-1,015	-8,168	-1,95	6,584
Standard Deviation - X COP	1,423	0,141	0,5	1,307
Standard Deviation - Y COP	2,384	0,477	1,34	2,312
Avg. Displacement along X (cm.)	0,888	0,077	0,345	0,817
Avg. Displacement along Y (cm.)	1,344	0,396	0,85	1,175
Avg. Radial Displacement (cm.)	1,512	0,598	0,988	1,098
Standard Deviation - Radial Disp.	1,972	0,457	1,1	1,995
Corelation Coefficient	0,403	-0,975	-0,551	1,496
95% Ellipse Slope	12,84	-88,928	-68,618	97,451
SD - Major Axis of 95%Ellipse	2,366	0,31	1,011	2,461
SD - Minor Axis of 95%Ellipse	2,067	0,324	0,88	2,052
95% Ellipse Area (cm..cm.)	16,073	1,397	6,694	15,358
Avg Velocity (cm/sec)	2,237	0,423	1,591	1,39
Length (cm.)	67,123	12,694	47,724	41,688

Free standing, closed eyes, after training

Table 4. The results of tests with closed eyes on the last day of training

Parameters po	**Max**	**Min**	**Avg**	**SD**
COP-X Avg (cm.)	4,619	-1,951	0,732	5,804
COP-Y Avg (cm.)	2,443	-7,717	-3,094	10,176
COP-X Max (cm.)	2,324	0,428	0,968	2,214
COP-X Min (cm.)	-0,39	-4,619	-1,364	4,163
COP-Y Max (cm.)	7,717	1,174	3,655	7,703
COP-Y Min (cm.)	-0,983	-2,443	-1,613	1,351
Standard Deviation - X COP	1,62	0,162	0,542	1,455
Standard Deviation - Y COP	2,609	0,578	1,343	2,31
Avg. Displacement along X (cm.)	1,019	0,127	0,374	0,9
Avg. Displacement along Y (cm.)	1,566	0,41	0,867	1,248
Avg. Radial Displacement (cm.)	1,72	0,587	1,014	1,4
Standard Deviation - Radial Disp.	2,046	0,311	1,079	2,083
Corelation Coefficient	0,464	-0,978	-0,32	1,536
95% Ellipse Slope	89,924	-89,959	-32,423	239,854
SD - Major Axis of 95%Ellipse	2,53	0,529	1,234	2,317
SD - Minor Axis of 95%Ellipse	1,602	0,295	0,786	1,25
95% Ellipse Area (cm..cm.)	26,203	2,778	9,223	27,433
Avg Velocity (cm/sec)	2,857	1,379	1,989	1,511
Length (cm.)	85,7	41,365	59,68	45,336

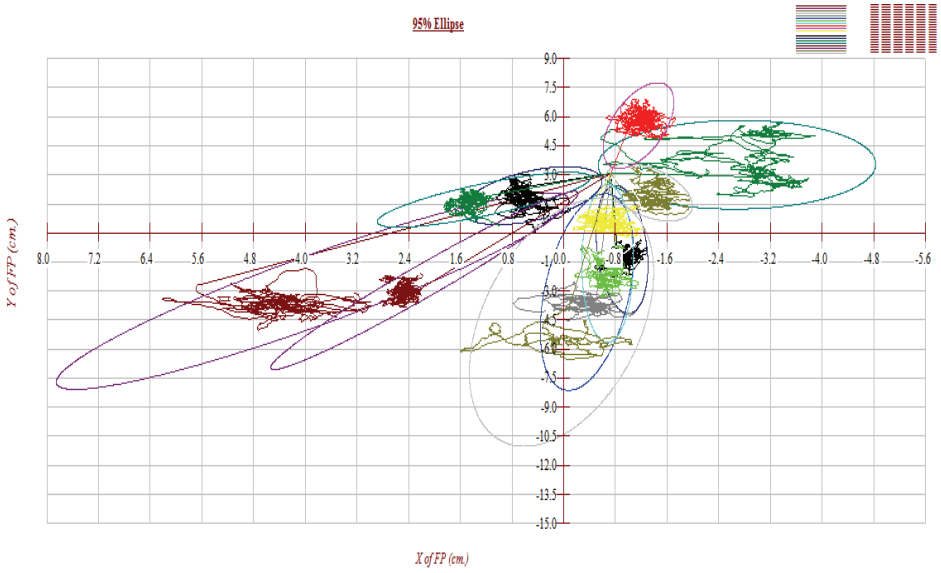

Fig. 4.

Discussion

1. OO free standing before beginning of the training, average standard deviation (X COP = 0,342 , Y COP =0,988)
2. OO free standing after training average standard deviation (X COP = 0,5 , Y COP =1,34)
3. OZ free standing before beginning of the training, average standard deviation (X COP =0,394 , Y COP =0,99)
4. OZ free standing after training average standard deviation (X COP = 0,542 , Y COP =1,343)
5. Correlation coefficient for OO test before training amounts to: -0.09 (relationship strength – low)
6. Correlation coefficient for OO test after training amounts to – 0.55 (relationship strength – high)
7. Correlation coefficient for OZ test before training amounts to -0.053 (relationship strength – low)
8. Correlation coefficient for OZ test after training amounts to -0.32 (relationship strength – average).

Average value of velocity of COP displacement for OO free standing before training amounts to 1.75 (cm/sec).

Average value of velocity of COP displacement for OO free standing after training amounts to 1.591 (cm/sec).

Average value of velocity of COP displacement for OZ free standing before training amounts to 2.164 (cm/sec).

Average value of velocity of COP displacement for OZ free standing after training amounts to 1.989 (cm/sec).

Average length of COP displacement for OO test before training amounted to **52.494** cm

Average length of COP displacement for OO test after training amounted to **42.724** cm

Average length of COP displacement for OZ test before training amounted to **64.924** cm

Average length of COP displacement for OZ test after training amounted to **59.68** cm

Conclusions

1. Empirical data analysis:

rise in standard deviation value in both cases (free standing, OO, OZ) points to increased sway range

2. In terms of maintaining balance, the time of COP displacement is shortened, allowing for optimization of muscle tone

3. Skiing instruction affected shortening of COP pathway in a statistically significant way

4. The result of the presented test are similar to the results from other authors who indicated moderate or high correlation coefficient values.

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ABSTRACT

These reports were an attempt to evaluate effect of basic ski instruction and the related fatigue on postural stability in physical education students under two-week skiing coaching.

Tests were carried out among the group of 12 healthy students of tourism and recreation in the Faculty of Physical Education at Rzeszow University. The investigated persons have never attended skiing instruction.

All the attempts were registered by means of AMTI Accugait platform and a compatible computer with Balance Clinic software for acquisition and processing of diagnostic tests.

Skiing instruction affected shortening of COP pathway in a statistically significant way

Key words: ski training, postural stabillity

STRESZCZENIE

Artykuł jest próbą określenia wpływu podstawowego szkolenia narciarskiego i związanego z nim efektu zmęczenia na stabilność postawy u studentów wychowania fizycznego objętych dwutygodniowym szkoleniem narciarskim.

Badanie przeprowadzono na grupie 12 w pełni zdrowych studentów kierunku Turystyka i Rekreacja Wydziału Wychowania Fizycznego Uniwersytetu Rzeszowskiego. Badani nigdy wcześniej nie uczestniczyli w szkoleniu narciarskim.

Wszystkie próby rejestrowano za pomocą platformy AMTI Accugait i kompatybilnego komputera z oprogramowaniem do pozyskiwania i przetwarzania testów diagnostycznych Balance Clinic.

Szkolenie narciarskie istotnie statystycznie wpłynęło na skrócenie ścieżki COP.

Słowa kluczowe; trening narciarski, stabilizacja postawy