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Study of adolescent competitive athletes' health status and health behaviour

Theses of PhD dissertation

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Introduction

The lifestyle of individuals shows itself in their everyday activities, and regarding the result, these can be health maintaining, preventive or risk-increasing (*Matarazzo*, 1984). Some of these activities are simple everyday activities, which can be closely related to health without being considered health behaviour, such as sleeping, eating, exercise, smoking and drinking (*Kasl* and *Cobb*, 1966). Their effect on health can be demonstrated by the fact that the most important risk factors for all the population of the Earth considering life year loss and life quality deterioration are unhealthy eating, inactive lifestyle, active and passive smoking and alcohol consumption (*Lim* and *Colleagues* 2012). While unhealthy eating and addiction have been considered a lifestyle risk factor for a long time, inactive lifestyle has just been listed as one of the biggest lifestyle risk factors lately. The increase in its effect is related to its global spreading and according to research this tendency is going to continue in the coming decades as well (*Ng* and *Popkin*, 2012).

The above mentioned main risk factors can be observed in the lifestyle of adolescents too. The interrelated risk and preventive behaviour patterns are important not only for this age group, but also from the point of view of the health status and lifestyle of adults. The risky eating habits of this age group are characterized by the increase in fast food consumption, drinking of sugared beverage, eating fewer vegetables and fruits and skipping breakfast more and more often. Unhealthy eating habits can lead to obesity but they are not the only reason (*Nicklas, Yang, Baranowski, Zakeri* and *Berenson*, 2003). Different eating types are often accompanied by typical physical activity patterns. According to the results of the HELENA survey the teenagers who considered themselves physically active, also ate in a healthier way than their less active companions (*Ottevaere, Huybrechts, Béghin, Cuenca-Garcia, De Bourdeaudhuij, Gottrand, Hagströmer, Kafatos, Le Donne, Moreno, Sjöström, Widhalm, De Henauw,* and *the HELENA (Healthy Lifestyle in Europe by Nutrition in Adolescence) Study Group*, 2011). *Németh* (2007) also certified a relation between physical activity and eating habits: active adolescents were characterized by having breakfast, consuming food rich in fibres and vitamins regularly, while watching TV was accompanied by eating meals that are rich in calories but low in nutritive. Besides eating habits, addictions can also be related to physical activity. According to the ESPAD research in 2007 the pupils who did sports on a weekly basis smoked less, got drunk and drank a big portion of alcohol less often than the pupils who did sports less often (*Elekes* 2009). Regular physical activity in childhood and in adolescence

cannot only be negatively related to the above mentioned risk factors, but they also positively influence the physical and mental development of children and teenagers and the health status of adult age (*Landry* and *Driscoll*, 2012).

More emphasis has been put on the physical education of young people due to the fact that the positive effects of regular activity on health have become widely known. Social expectations have changed regarding physical education at schools, doing sport has become more important and people appreciate the effects of sports on the physical development and health of school children (*Hamar*, 2008; *Elbert*, 2010; *Vass* and *Kun*, 2010). Extra-curricular physical activity also gives youngsters a chance to exercise with the right intensity and frequency and in this way the health protecting effects of exercise can be achieved (*Strong, Malina, Blimkie, Daniels, Dishman, Gutin, Hergenroeder, Must, Nixon, Pivarnik, Rowland, Trost* and *Trudeau*, 2005). One of the popular forms of extra-curricular physical activity is competitive sport. In Hungary there are about 100 000 young athletes registered. (*OSEI*, 2012). Being aware of the positive effects of physical activities, we may find it right to suppose that competitive sport, that is regular, intensive physical activity, can be a good option to make use of the health protecting effects of exercising. Researches dealing with the health status and health behaviour of athletes call our attention to the fact that doing sport can also lead to illnesses besides their indisputable positive effects. Among these the risk of sport injuries are well known, but special literature also mentions other pathological issues as the result of overloading or overworking. Sports can lead to pathological eating habits as well. *Resch* (2007) published an article in which she rated the occurrence of eating disorders 23-25%. Performance pressure can contribute to the use of illicit drugs. The use of anabolic is wide spread among athletes who do not compete; the rate of users among teenaged boys is 3-12% in the USA and in Europe according to researchers (*Korkia* and *Stimson*, 1997, *Bahrke, Yesalis* and *Brower*, 1998, *Nilsson, Spaak, Marchland, Baige* and *Allebeck*, 2004). Researches on health behaviour of athletes got controversial results as far as smoking and drinking habits are concerned (*Taliaferro, Rienzo* and *Donovan*, 2010; *Lisha* and *Sussman*, 2010; *Mikulán,* 2007b). Smoking tends to be less frequent, but doing sport was found to increase alcohol consumption.

In publications examining the effects of physical activity, the activity of the sample is characterized in two ways: either by the activity level of the individual (active – inactive) or by the status (athletes – non-athletes). In spite of the literature being rich, we can rarely see publications that deal with the differences between athletes, such as competitive or spare time sports, individual or team sports.

So the question may arise: how can we describe the health status and the health behaviour of athletes? In this respect we were especially interested in the relation – if there is any – between competitive sports and the risk factors related to the most important non- infectious, chronic diseases, namely smoking, alcohol consumption and eating habits, and all this during adolescence, which is a very important period as far as future lifestyle is concerned.

The Aim and the Hypothesis of the Research

The aim of our research is to examine the effects of competitive sport on the health status, eating and drug taking habits of adolescents.

After looking at the literature, we have chosen the following topics to study in details: in order to characterize health status we asked the participants to estimate their health status and we looked at their psychological well-being and psychosomatic symptoms. As for eating behaviour we emphasized body mass control. Drug consumption included smoking, alcohol consumption and illicit drug use.

During our study we have set up questions and hypothesis (H) for the age and gender characteristics of adolescent competitive sport, for the effects of the main kinds of sport (individual/team) and for the comparison between competitive athletes and non-athletes.

I. Age differences:

- How can we characterize the health status of adolescent and young adult athletes?
- How does eating behaviour change from adolescence to young adulthood?
- What are the similarities and differences in the drug consumption of adolescent and adult athletes?

H_1: There is no significant difference in the health status and eating behaviour of adolescent and adult athletes, but the risk profile of adults is unfavourable.

II. Gender differences:

- Is there a difference in the health status of male and female teen-age athletes?
- How can we characterize the weight control and eating habits of male and female athletes?
- Is there a gender difference in the drug consumption of adolescent athletes?

H_2: Male athletes have a better health status and eating behaviour than female athletes, there is no difference in their smoking habits, but boys consume more alcohol and illicit drugs than girls.

III. Health status and health behaviour of individual athletes and team athletes:

- How can we characterize the health status of individual and team athletes?
- What are the differences in the eating behaviour of individual and team athletes?
- Is there a difference in the drug consumption of individual and team athletes?

H_3: Team athletes have a better health status, a more favourable body mass control, but they consume more alcohol and illicit drug than individual athletes. There is no difference in their smoking habits.

IV. Health status and health behaviour of competitive athletes and non-competitive athletes:

- What are the similarities and differences in the health status of competitive and non-competitive adolescent athletes?
- How can we characterize the body mass control and the eating habits of competitive and non-competitive adolescent athletes?
- What are the differences in the drug consumption of competitive and non-competitive adolescent athletes?

H_4: Competitive athletes have a better health status, more favourable eating habits and they smoke less than non-competitive athletes, but they consume alcohol more frequently. There is no difference in their illicit drug use.

Methods

Four samplings and five examinations were made during our research. The chapter contains the examinations in chronological order.

Examination 1.

The aim of examination 1. was to analyse the health status and the drug consumption of athletes and their correlation.

1.1. The circumstances of data collection and the sample

The sampling was made in 2005, the athletes who wanted to extend or apply for the competition permission came to the Sport Medicine Outpatient Department and they took part in the examination. Participation was voluntary and there were no other restrictions for getting into the sampling. First I informed the athletes about the purpose of the data collection and the questionnaire. I asked them to contact me if there was anything they did not understand. They had to fill in the questionnaire in the surgery and it took them about 10 minutes. I could collect 158 questionnaires. I evaluated the answers of adolescent and young adult athletes.

Table. 1. The main characteristics of sample 2005

Age groups	Adolescents	Adults
n=147	54 persons	93 persons
Genders	22 boys/32 girls	34 men/59 women
Average age	16.20±0.9 yrs.	24.2 ±4.9 yrs.

1.2. Measures

The measures for characterizing health status

During data collection we used global health indicators for characterizing the physical and mental state of the individuals: Psychological Well-being Scale, Self-rating of Health Status and Psychosomatic Symptoms Scale (*Kroenke* and *Wood*, 1988; *Pikó* and *Barabás*, 1996; *Farmer* and *Ferraro*, 1997)

Measures for examining drug consumption

When examining drug consumption we asked athletes about their alcohol, illicit drug consumption and smoking habits. The questions covered the consumption of the last twelve months

1.3. Data analysis No. 1.

Data analysis was made with a program called SPSS 20. The differences in the parameters of psychsomatic symptoms and psychological well-being were tested with a two-sampled t-test or variance analyses and it was completed with a Pearson correlation test. The differences appearing in the other variables were controlled by Mann-Whitney U test or Kruskal-Wallis test, which was completed with Spearman rank correlation analyses. The p values of not more than 0.05 were considered significant (*p<,05, **p<,01).

Examination 2.

In examination 2. the analysis of the previous research was widened with the examination of body mass control and eating habits of athletes.

2.1. The circumstances of data collection and the sample

The second sampling was made in 2007 in the same way as described at the first sampling. Since there were more elements in the questionnaire, it took about 15-20 minutes to fill them in. We managed to collect 149 appraisable questionnaires.

Table. 2. The main characteristics of sample 2007

Age groups	Adolescents		Adults	
n= 149	94 persons		55 persons	
Genders	44 boys	48 girls	38 men	17 women
Average age	15.55±1.1 yrs.		21.1±3.3 yrs.	
BMI and weight percentile	21.8 (normal) 65%	21.3 (normal) 62%	23.7±3.0 kg/m²	21.5±3.6 kg/m²

2.2. Measures

The measures used to analyse health status

They were the same as the ones used in the first examination, with the modification of the answers' scores.

The measures used to analyse drug consumption

They changed compared to the first data collection. From that time on we examined the alcohol and drug consumption and smoking habits of athletes from the past month (*Kann*, 2011)

Measures used to examine body mass control

The questions asked were based on international research (*Neumark-Sztanier, Wall, Perry* and *Story*, 2003; *Cartwright, Wardle, Steggles, Simon, Croker* and *Jarvis*, 2003). We studied the self-rated body weight, the worry about gaining weight, the frequency of slimming diet and the attention to eating healthy food.

The measures used to examine eating habits

In order to examine eating habits we studied the regularity of meals, the frequency of fruit and vegetables consumption and eating several foods (e.g. sweets, hamburger/hot dog, pizza).

2.3. Data analyses

They were the same as indicated in 1.3, plus the differences in the life prevalence of smoking and alcohol consumption were examined by chi-square test.

Examination 3.

In examination 3. we looked at the health status of athletes and their drug consumption, bearing in mind their socio- economic status and sport motivation.

3.1. The circumstances of data collection and the sample

The third sampling was made in 2009 with the participation of adolescent athletes using the same method as before. There were 179 appraisable questionnaires and 54.7% were filled in by boys and 45.3% by girls.

Table. 3. The main characteristics of sample 2009

Number of participants	Boys	Girls
Genders	98	81
Average age	15.4±1.2 yrs.	15.6±1.1 yrs.
BMI	21.9±3.0 kg/m²	20.3±2.8 kg/m²
Weight percentile	(72%)	(55%)

3.2. Measures

The measures used to analyse health status, drug consumption and body mass control were the same as in the previous examination with the only difference being that the Psychosomatic

Symptom Scale was not included. In this research about drug consumption in the case of monthly prevalence the variables were dichotomized, that is the state of drug consumption (yes/no) was a variable, independent of frequency, during the logistic regression analyses.

Measures used to examine socio-economic status

In our research the socio-economic status of the athletes were analysed with the help of the father and mother's qualification and the estimated family affluence. The family affluence was described as upper class, upper-middle class, middle class, lower-middle class and lower class (*Pikó* and *Fitzpatrick*, 2007). The lower the class was, the higher points they got.

Measures to examine sport motivation

We applied a scale of 5 with 18 elements to look at the sport motivation of athletes. Motivation factors covered all the internal and external orientation methods and it was based on the SMS (Sport Motivation Scale) (*Pelletier, Fortier, Vallerand* and *Tison*, 1995).

3.3. Data analyses

The methods described in 2.3. were accompanied by factor analysis and logistic regression analysis.

Examination 4.

In examination 4. the health status, alcohol and drug consumption, smoking habits, body mass control, eating habits, academic record and sport motivation of secondary school pupils – competitive athletes and non-competitive athletes - were examined.

4.1. The circumstances of data collection and sample

The fourth sampling was made in three secondary schools of Szeged – Radnóti Miklós Experimental High School, Dugonics András Catholic School and Gábor Dénes Technical High School - in 2013. Participation was voluntary. There were no further restrictions for getting into the sample. The questionnaires were filled in in the presence of teachers, usually on PE lessons or during tutor's lesson, with the permission of the leader of the institute. I informed the teachers about the examination and I asked them to pass on the information to the pupils and also to help them if any difficulty arose. We got back 317 appraisable questionnaires, 48.6% of the participants were competitive athletes and 51.4% were non-competitive athletes.

Table. 4. The main characteristics of sample 2013

Number of participants	Non-competitive athletes 163 persons		Competitive athletes 154 persons	
	Boys	Girls	Boys	Girls
	127	36	92	62
Average age	16.55±1.1 yrs.		16.13±1.3 yrs.	
BMI and weight percentile	22.1±3.6 kg/m² 68%	20.9±2.9 kg/m² 53%	22.6±3.1 kg/m² 75%	20.1±2.4 kg/m² 50%

4.2. Measures

The measures used to analyse health status, drug consumption, body mass control, socio-economic status and sport motivation were the same as in the previous examination.

During our examination we asked the pupils what marks they got at school generally. The possible answers were 5, 4-5, 4, 3-4, 3, 2-3, 1-2.

4.3. Data analyses

It was the same as described in 2.3, but in order to be able to compare, we dichotomized the variables, that is the state of athlete was a variable (competitive athlete/non-competitive athlete) during further analyses.

Examination 5.

During examination 5. we made no new sampling. We prepared the sample by using the database of adolescent athletes of the surveys made in 2007, 2009 and 2013. In this way we created a new sample, the so-called summarized or 2014 sample in order to examine the health status and the health behaviour of individual and team athletes and to complete the results of previous examinations.

5.1. The sample

Taking into consideration that on the one hand no significant changes were made between 2007 and 2013 in the general regulations of competitive sports and the characteristics of competitive sports in Szeged (registered competitive athletes, the number of city sport halls, sport clubs), and on the other hand the same measures were used in the surveys, we summarized the data related to adolescent competitive athletes of surveys 2007, 2009 and 2013, creating thus a so-called summarized/2014 data base. We used the data from this greater sample (427 persons) to

examine the health status and the health behaviour of individual athletes (139 persons) and team athletes (287 persons), the differences in gender (236 boys and 191 girls) and sport motivations.

5.2. Measures and data analyses

The measures used were the same as in the previous examinations. The data were examined statistically in the same way as described in 3.3 and a new analysis was added. In order to further examine the health status and the health behaviour of male and female athletes we made a discriminant analysis.

Limitations of the Research

For the interpretation of the results, we have taken into account the limitations arising from the relatively small size of our samples and the lack of definition for level of sport.

Because of this, it was not possible to observe the effects of the level of sport and the types of sports.

Results

1. The comparison of the health status and health behaviour of adolescent and young adult competitive athletes

1.1. The examination of health status

In our research we examined the health status of adolescent and young adult athletes in two surveys. We found no difference in the features that we looked at. They usually considered their health status good or excellent, their psychological well−being and the occurrence of psychosomatic symptoms were similar. The similarity of the psychosomatic symptoms of adolescents and young adults was not proved by other research in the same topic, according to which there were more symptoms as adolescents grew older (*Ostberg, Alfven* and *Hjern,* 2006; *Gerber* and *Phüse,* 2008; *Költő* and *Kökönyei,* 2010; *Jernbro, Svensson, Tindberg* and *Janson,* 2012).

The strongest of the relations between the characteristics of health status was the negative one between psychological well−being and psychosomatic symptoms. The increase in the number of psychosomatic symptoms meant less favourable well−being. This negative relation was stronger in adolescence than in adulthood (2005: adolescents:−,495**, adults:−,447**, 2007: adolescents:−,589**, adults:−,369**).

1.2. The examination of eating behaviour and drug consumption habits

In our research into eating behaviour we could not prove a significant difference between the eating habits and the body weight control of adolescents and young adults. Even when we looked at the genders as well, we found that the eating habits and the body weight control of adolescents and young adults were similar.

When examining drug consumption we found that young adults smoked more and consumed more alcohol. In both age groups examinations showed that the increase in the use of one drug caused the increase in the use of the other. Illicit drug consumption was either not present or was very low in our samples.

2. Gender features of the health status and health behaviour of competitive athletes

2.1. The examination of health status

2.1.1. The self−evaluation of health

Our surveys showed no significant difference between the self−evaluation of the health status of girls and boys.

The self−evaluation of the health status of both genders showed a significant, positive relation with their psychological well−being, a better psychological well−being meant a better evaluation within both genders (boys: ,298**, girls: ,330**). Psychosomatic symptoms only showed a significant, negative relation (−,186*) with self−evaluation in the case of boys. Other publications suggest a worse evaluation with more frequent symptoms, independent of gender (*Pikó,* 2000; *Erginoz, Alikasifoglu, Ercan, Uysal, Ercan, Albayrak Kaymak* and *Ilter*, 2004). On the basis of our results we must consider the possibility that competitive sports, especially with girls, decreases the strength of the relation between psychosomatic symptoms and the self−evaluation of health status.

Looking at the significant relations between the body weight control and the evaluation of health status we must stress that the one between self−evaluation and healthy eating was the only relation within the group of boys (,154*)and the strongest significant relation within the group of girls (,412**). The research made by *Bailis*, *Segall* and *Chipperfield* (2003) proved that the efforts made to preserve health had a positive influence on the self−evaluation of health status, especially a change in eating habits.

In our research we examined the relations between drug consumption and the self−evaluation of health status. In our research we found only one significant relation that was between smoking and self−evaluation in the case of girls (−,186*). In the case of smoking a negative relation has been proved in many publications (*Vingilis, Wade* and *Adlaf*, 1998; *Johnson* and *Richter*, 2002; *Tremblay, Dahinten* and *Cohen*, 2003).

2.1.2. Psychosomatic symptoms

We could prove no significant difference between the occurrence of psychosomatic symptoms of male and female athletes. This result contradicts the literature, because publications usually find a higher occurrence in the case of girls (*Ostberg* and colleagues, 2006; *Sweeting, West* and *Der,* 2007; *Gerber* and *Phüse,* 2008; *Költő* and *Kökönyei* 2010; *Kelly*, *Molcho*, *Doyle* and

Gabhainn 2010; *Jernbro* and colleagues, 2012). Our athletes mostly complained about exhaustion, backache and sleeping disorders. Other researchers found similar complaints too (*Larsson* and *Zulaha*, 2003; *Kelly* and colleagues, 2010; *Kinnune, Laukkanen* and *Kylmä*, 2010; *Költő* and *Kökönyei*, 2010). It is remarkable that the frequency of backache shows a growing tendency (17.3%, 26.1%, 40.3%) in our research.

As far as psychosomatic symptoms are concerned, we must emphasize that body weight control did not show a significant relation with the number of symptoms in the girls' case, but with boys the more concerned they were about gaining weight, the more symptoms they produced (,336**). This result is different from the consequences of surveys dealing with the reasons for higher symptom production of girls, according to which one of the strongest explaining factors is the fear of gaining weight (*Sweeting* and colleagues, 2007).

Between drug consumption and the frequency of psychosomatic symptoms a significant, weak relation was proved in both genders.

2.1.3. The examination of psychological well−being

In our research both girls and boys reported a similarly good well−being. According to literature, in adolescence change in the body image can alter psychological well−being (*Vogt Yuan*, 2010; *Gray* and *Leyland*, 2009; *Schmid, Schönlebe*, *Drexler* and *Mueck-Weymann*, 2010). In our research, just like in literature, the psychological well−being of girls showed a significant, negative relation to body weight self−evaluation (−,158**) and to concern about gaining weight (−,213**).

According to the results of surveys dealing with the relations between drug consumption and mental health, drug consumption usually shows a negative relation to psychological well−being (*Silva, Horta, Pontes, Faria*, *Souza, Cruzeiro* and *Pinheiro*, 2007; *Saban* and *Flisher*, 2010; *White, Chan, Quek, Connor, Saunders, Baker* and *Kelly,* 2013). In the research of *Green, Zebrak, Robertson, Fothergill* and *Ensminger* (2012) this relation was proved only in the case of girls, just like in our research: with girls a significant correlation was proved between drug consumption and psychological well−being, but with boys no such correlation was to be found.

2.2. Body weight control and eating habits

2.2.1 Body weight control

Our results comply with the literature: a higher rate of girls found themselves fat and went on diet than boys. In every examination girls were significantly more worried about gaining weight than boys.

With both genders a significant, positive relation was proved between the self−evaluation of body weight and the concern about gaining weight (boys: ,389**, girls: ,330**) and between the self−evaluation of body weight and the frequency of diets (boys: ,357**, girls: ,318**). The more concerned they were about gaining weight, the higher the frequency of diets was in both genders (boys: ,467**, girls: ,596**).

Regarding body weight control we examined the attention of athletes paid to healthy eating. We could see one tendency: girls paid more attention to eating. They judged their fiends' attention similarly: more girls thought their friends ate healthily than boys.

2.2.2. Eating habits

According to the results of the examinations of eating habits athletes do not eat junk food or snacks on the daily basis, but they do eat sweets every day. There was a difference in gender in the consumption of fruits: girls ate them more often every day, but the vegetable consumption was similar. As far as the frequency of meals is concerned, there was a difference in gender: girls ate less frequently in one day than boys.

2.3. Drug consumption habits

In our research into the smoking habits of athletes we proved a difference in gender only in one case: in the sample of 2005 adolescent boys did not smoke regularly in the previous twelve months. In the other examinations, when we asked about the previous month's consumptions, the smoking habits of the two genders were similar. As for drinking habits, with the exception of sample 2005, where the drinking habits of the two genders were similar, we found that more boys had had alcohol before than girls and the monthly prevalence of consumption and the monthly prevalence of a bigger portion at one time was higher in their case. Trying illicit drug was low: in the summarized sample 6.8% of boys and 4.7% of girls had ever tried any illicit drug. Regular drug abuse is not typical at all.

2.4. Sport motivations

In our research we examined the motivations of athletes. We could determine four big motivation factors: "Fame and victory", "Body, strength and health", "Outsiders' expectations" and "Fun and friends". As the names suggest, the sport motivations of athletes were complex, we could find inner and outer motivations among them. The strongest factors were "Fame and victory" and "Body, strength and health". The same motivation structures were found by the

research of *Pikó, Pluhár* and *Keresztes* (2004) among adolescents and by *Bollók, Takacs, Kalmar* and *Dobay* (2011) among youngsters of 17−19 years.

In our research "Fame and victory" was a significantly stronger factor for boys than for girls. However we could see a strong tendency on the case of "Fun and friends" factor (p=0.052): it was more important for girls. The logistic regression examination of correlations between drug consumption and motivation factors proved for the whole sample the protecting effect of "Outsiders' expectations" (0.77*) and the predisposing effect of "Fun and friends" (1.29*) on alcohol consumption and also the predisposing effect of "Fun and friends" on drinking a larger amount of alcohol at one time (1.31*).

2.5. The effect of the qualification of parents and the estimated family affluence

Our results complied with the literature saying that the higher qualification of the parents and the better family affluence meant a better health status and a better health behaviour, but they were different from the literature at the same time, because no significant relations were proved in the case of drug consumption.

3. The health status and health behaviour of individual and team athletes

3.1. Health status

In our research we found that individual athletes reported a better health status than team athletes: they evaluated their health better, they had a better psychological well−being and less psychosomatic symptoms than team athletes. Our result contradicts the statements made by *Eime, Young, Harvey, Charity* and *Payne* (2013), which says that taking part in team sports leads to a better psychological status than doing individual sports. We checked whether the type of sport made a difference in genders and found only one in the case of health self−evaluation: female individual and team athletes had the same self−evaluation, but in the case of boys a significant difference was proved.

3.2. Body weight control and eating habits

Summarizing our results we can state that no real differences were proved between individual and team athletes. Taking similarities and differences into consideration we can suppose that female team athletes are less worried about body weight. Although a little more of them considered themselves a bit fat than female individual athletes, they were equally worried about gaining weight and they went on diet with similar frequency than slimmer female individual athletes and those who considered themselves a bit slim. They also paid less attention to healthy eating than individual athletes.

Our consequences comply with literature, which says that team athletes are less disposed to dangerous body weight control (*Fulkerson, Keel, Leon* and *Dorr,* 1999; *Filaire, Rouveix, Bouget* and *Pannafieux,* 2007). In spite of the fact that female individual athletes have a lower body mass index and a slimmer body picture, we can see a tendency that they are more worried about gaining weight and they go in a diet more often, which enhances the theory that they are more likely to have eating disorders (*Resch*, 2007; *Javed, Tebben, Fischer* and *Lteif,* 2013).

3.3. Drug consumption habits

In our research we found no difference in the drinking habits and illicit drug consumption of individual and team athletes (trying, regular consumption, binge drinking). However there is a difference in smoking habits: fewer individual athletes tried smoking and the occurrence of smoking was lower too. In the case of boys, individual sport showed a protective effect on regular smoking.

Our results contradicted the literature. Several researches showed that team sports had a predisposing effect on alcohol consumption and binge drinking (*Martha*, *Grélot* and *Peretti-Watel*, 2009; *Wichstrom* and *Wichstrom*, 2009; *Kulesza, Grossbard, Kilmer, Copeland* and *Larimer,* 2014). Unlike us, *Pincés* and *Pikó* reported less favourable smoking habits in the case of individual athletes.

3.4. Sport motivations

The sport motivation of individual and team athletes differed in two factors only: “Body, strength and health” was stronger in the case of individual athletes, while team athletes considered “Outsiders’ expectations” more important.

3.5. The effect of the qualification of parents and the estimated family affluence

In our research we could prove few significant relations, but we can state that a more favourable family affluence meant better health and better eating habits and a more important "Fun and friends" motivation factor.

4. The health status and health behaviour of competitive athletes compared to non−competitive athletes

4.1. The examination of health status

Our results show that competitive athletes considered their health status a lot better compared to that of their mates than non−competitive athletes. We found the same difference when we looked at the two genders separately: the self−evaluation of health status of both male and female competitive athletes was better than that of the non−competitive athletes. Other researches got similar results (*Tremblay* and colleagues, 2003; *Kahlin, Werner, Romild* and *Alricsson,* 2009; *Hosseini, Maghami, Kelishadi, Motlagh, Khoshbin, Amirkhani Heshmat, Taslimi, Ardalan* and *Hosseini*, 2013; *Galán Boix, Medrano, Ramos, Rivera, Pastor-Barriuso* and *Moreno*, 2013).

Another important characteristics of adolescents' health status is psychosomatic symptoms. In our research competitive athletes reported a lot fewer symptoms than non−competitive athletes and those doing no sport at all. When we looked at the effects of competitive sport on the two genders we found that girls, male and female athletes had significantly fewer complaints. This makes us suppose that competitive sport has a favourable effect on psychosomatic symptoms and it is especially important for girls and women, because it causes a drop in the number of symptoms. *Sweeting* and colleagues (2007) also found in their research that a more frequent physical activity means fewer psychosomatic symptoms in the case of girls.

In our research we examined psychological well−being as well. Similarly to psychosomatic symptoms, the well−being of competitive athletes was considerably better than that of non−competitive athletes. Literature proves our results: The relation between physical activity and psychological well−being is usually positive (*Sacker* and *Cable*, 2006; *Palen* and *Coatsworth,* 2007; *Trainor* and colleagues, 2010).

When looking at the correlation between the characteristics of health status we can see differences between the statuses of athletes. Female competitive athletes had a significant relation only between psychosomatic symptoms and psychological well−being (−,502**). In the case of male competitive athletes, like others, the increase in the number of psychosomatic symptoms led to worse well−being (−,575**) and just like in the case of non−competitive athletes, to a worse self−evaluation of the health status (−,243**).

4.2. Body weight control and eating habits

Our research could not prove a significant difference between the eating habits and the body mass control of competitive, non−competitive athletes and those doing no sport at all. In the analysis of body mass control of competitive and non−competitive adolescent athletes we could see differences in the worry about weight gain and the frequency of diets, if we analysed the data according to genders and sport status. In spite of evaluating their body weight in a similar way, female competitive athletes had a better body weight control, than female non−competitive athletes, they were less worried about weight gain and went on diet less frequently, even if they were of the same body mass index. Among boys there was no important difference.

We found no difference in the eating habits of competitive and non−competitive adolescent athletes.

When we examined the correlations of body weight control we found that they were independent of gender and status: if the athletes considered themselves fat, they were more worried about weight gain and went on diet more frequently. As far as body weight control and health status are concerned we must state that an increased fear of weight gain was accompanied by more psychosomatic symptoms in the case of male competitive athletes and female non−competitive athletes, and by a worse psychological well−being in the case of boys in general. Female competitive athletes reported only one important relation: the more attention they paid to healthy eating, the better they evaluated their health status.

4.3. Drug consumption

The examination of the relation between drug consumption and sport is a very interesting field of sports medicine research. Most of the publications state that doing sports has a protective effect on smoking and illicit drug consumption (*Bovard*, 2008; *Bollók, Vingender, Sipos, Tóth* and *Nagy*, 2009; *Lisha* and *Sussman*, 2010; *Diehl, Thiel, Zipfel, Mayer, Litaker* and *Schneider*,

2012). As far as alcohol consumption is concerned there are two contradictory opinions. Some of the publications found a positive relation between doing sports and drinking (*Bollók* and colleagues, 2009; *Taliaferro* and colleagues, 2010; *Lisha* and *Sussman*, 2010; *Diehl* and colleagues, 1012). Other publications found a negative relation or no relations at all (*Pate, Trost, Levin* and *Dowda*, 2000; *Elder, Leaver-Dunn, Wang, Nagy* and *Green*, 2000; *Thorlindsson* and *Bernburg*, 2006).

We made two surveys about smoking habits. In one of them both genders of adolescent competitive athletes smoked significantly less than non−competitive athletes or those doing no sports at all (*Mikulán*, 2007b). The other survey proved no differences between the groups of different status. If broken down to genders, the data showed a strong tendency in the case of female competitive and non−competitive athletes. Fewer competitive athletes tried smoking ($p=0.067$) and they smoked less in the previous month ($p=0.055$).

None of our examinations showed any difference between groups of various sport status when looking at alcohol consumption.

As far as illicit drug consumption is concerned we could prove a significant difference in both life and monthly prevalence: more non−competitive athletes tried any kind of illicit drug or consumed more in the previous month than competitive athletes.

Then we looked at the relation between drug consumption and health status of groups of different sport status: alcohol and illicit drug consumption showed no significant relations and there was only a weak negative correlation between smoking and the health status of male competitive athletes and female non−competitive athletes. Male non−competitive athletes and female competitive athletes reported similar relation: an increased frequency of smoking was accompanied by a worse psychological well−being and more psychosomatic complaints.

4.4. Academic achievement of competitive and non−competitive athletes

In our research we saw that competitive athletes had better marks at school than non−competitive athletes. When we looked at the genders as well, we found this difference could be explained by the much better performance of girls, as there was no difference in the case of boys. Our results comply with other publications, which show a positive relation between doing sports and academic achievement. Several surveys also proved a better academic achievement only in the case of female athletes (*Fox, Barr-Anderson, Neumark-Sztainer* and

Wall, 2010; *Shachaf*, *Katz* and *Shoval*, 2013; *Bradley*, *Keane* and *Crawford*, 2013; *Busch*, 2014).

Examination of the Hypotheses

H1. In our hypothesis about the health behaviour of adolescent and young adult athletes, that is their health status, eating habits and drug consumption, we supposed that their health status, body mass control and eating habits were similar, but the risk profile of adults was less favourable.

Our results proved most of these statements. The health status, eating habits and body weight control of adolescents and adults were similar. Smoking and alcohol consumption was higher with young adults, but drug consumption was similarly low in both groups.

Summarizing our result we can state that we could only find a significant difference in the drinking and smoking habits of adolescent and young adult athletes. This makes us think that doing competitive sport in adolescence does not have a protective effect on frequency of drinking and smoking in adulthood. The similarity in the occurrence of psychosomatic symptoms shows the positive effect of competitive sports on symptom production.

H2. In our hypothesis about the gender differences in the health behaviour of adolescent athletes, that is their health status, eating habits and drug consumption, we supposed that male athletes had a better health status, a better body weight control, better eating habits and consumed more alcohol and illicit drugs than girls, but their smoking habits were similar.

Our results partly proved and partly contradicted our hypothesis. The idea that boys have a better health status failed. In our research the self−evaluation of their health, the psychosomatic symptoms and the psychological well−being of boys and girls were similar. In the relations of health characteristics however there were some gender differences to be seen. It is remarkable that the negative correlation between psychosomatic symptoms and the self−evaluation of health status could only be proved in the case of boys. The negative correlation between smoking and the self−evaluation of health status was verified in the case of girls only. It is also to be stressed that, contrary to what we had expected, only boys showed more psychosomatic symptoms with higher fear of weight gain.

Our hypothesis, that boys had a better body weight control was completely proved, and the other hypothesis, that they had better eating habits than girls, was partly verified. More girls found themselves fat, were more worried about weight gain, went in a diet and skipped breakfast more often, but also they paid more attention to eating and they consumed more fruits than boys.

Our hypothesis about the gender differences in drug consumption was mostly proved. Boys and girls had similar smoking habits, but more boys had drunk alcohol before and they usually drank more than girls. More boys had tried illicit drugs than girls, but regular use was not typical of either gender.

On the whole we can state that doing competitive sports does not change the gender characteristics of body weight control and alcohol consumption described in literature. The gender differences in psychosomatic symptom production could not be really verified, and this makes us think that doing competitive sports has a favourable effect on psychosomatic symptom production.

H3. In our hypothesis about the health status and the health behaviour of individual and team athletes we supposed that team athletes had a better health status, a better body mass control and eating habits, but they drank more alcohol and used more illicit drugs than individual athletes. We thought their smoking habits were similar.

The part of our hypothesis which refers to health status failed completely. Individual athletes' self-rated health and psychological well-being were better, and had generally less psychosomatic symptoms. Our statement about body weight control was verified in the case of girls, the one about eating habits failed again. When we examined body weight control and genders together, we found that there is no difference in the case of boys. Female team athletes were less worried about body weight. A higher rate of them considered themselves a bit fat than individual athletes, but they were similarly worried about weight gain and went on a diet with similar frequency as female individual athletes, who considered themselves a bit slim or slimmer. The attention they paid to healthy eating was smaller than that of the individual athletes.

Our hypothesis about drug consumption failed. We found no difference in the alcohol and drug consumption of individual and team athletes. However we did in the case of smoking: fewer individual athletes had tried smoking and occurrence of smoking was lower among them. When looking at gender, this latter statement was proved only in the case of male individual athletes, as girls had similar smoking habits. Male individual athletes smoked considerably less than team athletes.

Summarizing our results we can state that choosing a sport can influence the health behaviour of the athletes, their health status, eating habits and drug consumption. On the basis of the gender differences we can say that this effect considerably changes according to genders.

H4. Comparing the health behaviour of competitive and non−competitive athletes, their health status, eating habits and drug consumption, we supposed that competitive athletes had a better health status, eating habits, body weight control and smoked less than non−competitive athletes, but they consumed alcohol more often. We thought their drug consumption was similar.

Part of our hypothesis was proved, as far as health status is concerned, competitive sport usually had a favourable effect on the characteristics of health status we looked at. Only in the case of female we found consequently significant results: female competitive athletes had a better psychological well-being and fewer psychosomatic symptoms than non-competitive athletes.

Some of the statements we made about body weight control of competitive and non-competitive athletes were proved, but none of those about eating habits were verified, as we could not prove a real difference between the eating habits and the body mass control of different athletes. When we analysed the data broken down to genders and sports status, we found that girls of a similar body mass index (who also evaluated their body weight in a similar way), female competitive athletes had a better control: they were less worried about gaining weight and went on a diet less frequently than female non-competitive athletes. In our other survey we only found a significant difference when we examined the attention paid on healthy eating: male competitive athletes and their friends definitely paid more attention than pupils doing no competitive sports.

The part of our hypothesis about drug consumption was mostly false. In the case of female athletes the probability of competitive sports' protecting effect against smoking and in either gender protecting effect of competitive sports against illicit drug consumption was confirmed but no enhancing effect on binge drinking or more frequent drinking was proved in either gender.

Summarizing our results we can state that competitive sport can influence favourably the health status of adolescents, the body weight control of girls and the attention of boys on healthy food. Competitive sport might have protecting effect against smoking in case of girls and against illicit drug use in case of either gender and no enhancing effect on binge drinking or more frequent drinking.

Summary

Inactive lifestyle in adolescence has become general, which can be seen in the increased time spent in front of a screen. This can reduce the time spent on physical activity and the chance to development its health protecting effects. That is why the importance of physical education and extracurricular activities has increased. A popular form of this latter is the competitive sport.

In our research we studied the main characteristics of adolescent competitive athletes' health status and the health behaviour.

The main results of the dissertation:

(1) Confirmation of the competitive sport's favourable influence on the health status and the health behaviour of adolescents.

(2) Calling attention to the gender characteristics of competitive sport's influence on the health status and the health behaviour of adolescents.

When looking at the different features of competitive sport, like age, main types of sport, athlete status, we found gender differences, which showed that the health status and health behaviour of girls have changed more due to competitive sports, than in case of boys:

- As far as health status is concerned, a more favourable symptom production can be emphasized in the case of female competitive athletes: they reported fewer symptoms than female non-competitive athletes, while symptom production was similar in the case of different groups of boys. The increase in symptoms as age goes up was not typical either, and they did not report more symptoms than men, which is otherwise typical of women.
- Regarding their body weight control, there was a difference between the status and the type of sport in the case of girls, while there was no such difference in the case of boys. Female competitive athletes were less worried about weight gain and went on a diet less often than female non-competitive athletes and team athletes had a better approach to their body weight than individual athletes.
- The examination of academic record (academic achievement) showed that female competitive athletes had better marks than female non-competitive athletes, but there was no difference between boys.

In our research we found that some features of the health status and health behaviour of different groups were similar. We would like to highlight two of them:

- As far as eating habits are concerned, we found that the regularity of meals of competitive and non-competitive athletes is similar: breakfast is the meal that is skipped with the

greatest frequency. Female competitive athletes also skipped snack and dinner more often than male competitive athletes. These results show that female competitive athletes do not pay enough attention to regular eating, even if they have a better body weight control than male competitive athletes and female non-competitive athletes.

- We found no difference in drinking habits between the groups of different athlete status and type of sport. Thus we joined the researchers who think that competitive sport does not predispose to excessive alcohol consumption.

In the case of smoking we could see the favourable effect of competitive sports on it:

- Female competitive athletes smoke less and fewer of them have ever tried smoking than female non-competitive athletes.
- In the case of male competitive athletes, individual sport is a protecting factor against smoking.

In our research we found two tendencies that were unfavourable to health: the increase in the occurrence of backache when examining psychosomatic symptoms and female individual athletes had a worse attitude to their body weight when we compared individual and team athletes.

Our results can be put into practice in health care and in some fields of public education. School doctors and paediatricians must be informed about the more favourable symptom production of female competitive athletes and the increased occurrence of backache in the case of competitive athletes. Competitive sports can be recommended as part of a therapy or a therapy itself in the treatment of psychosomatic symptoms of adolescent girls. When pupils complain about backache, we must consider the effect of sports, competitive or non-competitive, and we suggest checking the training plan and consulting specialists, like sports medicine physicians or orthopaedic specialists. On the basis of the results about drug consumption, we suggest that sport clubs and schools should take into account the positive effects of competitive sports on smoking habits and illicit drug consumption, keeping in mind that they do not protect athletes from alcohol consumption. Parents and teachers should be informed about the positive relation between competitive sports and academic achievement. However eating healthy is a precondition of good physical and mental performance. Parents and all the specialists who work with athletes must pay attention to healthy eating habits of athletes and they must support them in practice (e.g. making breakfast, snacks, checking nutritive and fluid intake before, during and after training and tournaments).

As a final conclusion we can say that competitive sport is a good alternative in adolescence to do the necessary daily physical activity in order to enjoy the health protecting effects of exercise.

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