

# **Lifestyle, body dimensions and motor performance of Ukrainian secondary school children**

PhD thesis

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## **INTRODUCTION**

In the last decade, there has been much attention and focus on perceptions of body image and the associated feelings of satisfaction or dissatisfaction of one's body image. This has occurred within the context of a growing prevalence of overweight and obesity in many populations. Lack of physical activity, sedentary behavior (e.g., TV-viewing, using the computer, and playing video games), and the unhealthy food consumption (calorie-dense foods) exert strong influences on body image and self-evaluation of body weight (Furnham at al. 2002). Regular physical activity, with appropriate diet, can help to maintain normal body weight. Regular physical activity can also increase muscle mass and decrease fat mass, develop physical power and capacity, increase aerobic capacity, result in higher levels of physical fitness (Wayne at al. 1996).

It is our hypothesis that the political and socio-economical changes in Central-East Europe have resulted in increasing hypoactivity and changed nutrition habits causing an increase in prevalence of overweight and obesity, and also a decrease in motor performance in secondary school children.

The relationship between the regular physical activity and health promotion need further investigation. Thus the aim of the present study was to investigate physical activity and inactivity of youth in the west Ukraine region. This study is important because studies in this part of Europe are rarely conducted. Thus, there is a lack of information about the physical activity of Ukrainians. Also, the study of physical activity and fitness in this location is important because of its unique socio-cultural background.

## **OBJECTIVES**

The increasing prevalence of overweight and obesity is a global phenomenon and is seen in most continents. Therefore, not only the USA and the western countries need to be working to solve the problem of overweight and obesity. According to Janssen's review of obesity in 10-16 year old youth from 34 countries, the prevalence of overweight was <10% in Ukraine where it was similar to six other Eastern European countries (Janssen at al. 2005).

The aim of the study was to describe the lifestyle, state of health, socio-economic level, physical activity and sedentary behaviors (computer using, TV viewing, DVD watching, reading and playing video games) of Ukrainian youth. This was determined from a sample of 940 subjects. A further aim was to compare the Ukrainian sample with a Hungarian (N=912) sample and describe similarities and differences between the genders. We also analyzed the self-perception of body weight and health state of Ukrainians.

Beside the lifestyle variables, we describe body dimensions related to physical fitness (body height, body mass, BMI and fat percent, body type indices) and assessed the prevalence of underweight, overweight and obese status in the Ukrainian boys and girls.

Running performance of Ukrainian youth was determined by the 20m shuttle run test and the related maximal heart rate, the maximal running speed, and the estimated  $\text{VO}_2$  peak in a smaller sample of secondary school students.

## **SUBJECTS**

Girls and boys, with an age range of 14,5-18,5 years, from eight public secondary schools from Mukachevo and Uzhgorod locations were the study participants. The head teachers granted approval and the subjects took part voluntarily in this data collection. The lifestyle questionnaires were administered to 940 subjects, and from that group 465 subjects volunteered for the anthropometric measurements. From those volunteering for the anthropometric measurements, a smaller group of boys and girls (N=292) were selected to participate in the 20m shuttle run test. The subjects represented 4% of the total population of secondary school children in those locations.

The Hungarian data were collected by Ferenc Ihász from the West Hungary University. The schools were located in the following cities: Győr, Mosonmagyaróvár, Pápa, Pécs, Miskolc. The number of subjects in the Hungarian sample was 912 (461 girls and 451 boys).

## **METHODS**

A validated life-style questionnaire was administered according to the protocol described by in Page et al. 2005 and the anthropometric measurements were taken according the International Biological Program (Weiner and Lourie 1969). The body built was described by the Conrad's metric and plastic indices (Conrad 1963). Nutritional status was assessed by the BMI and percentage of body fat was estimated using Parízková method (Parízková 1961). Physical capabilities were tested by the 20 m shuttle run test scores (Testing Physical Fitness 1983).

The questionnaire results of boys and girls and also the Hungarian vs. Ukrainian results were analyzed by nonparametric Kolmogorov-Smirnov and Mann-Whitney U-tests. The anthropometric data (body dimensions, metric and plastic indices and body fat) of boys and girls were analyzed by Students'-t test. The running performance test results were analyzed with ANOVA, and the differences in nutritional status were compared with Chi-

square tests. Linear regression analysis was used to characterize the relationship between the body fat and the running performance results.

## RESULTS

The results of the questionnaire showed that Ukrainian girls were more satisfied with their appearance like boys, but they rated themselves lower in health status than the Ukrainian boys. In terms of sedentary behavior, boys used the computer and spent more time TV viewing time than girls. Reading in free time was much less than the time spent in front of the screen, but the physical activity of the students was also significant and much more than expected. The benefit of regular physical activity might explain the healthy body dimensions, body fat and nutritional status. The subjects reported that two or three times a week they do endurance training or resistance training, which were surprisingly good results. There was no significant difference in the parents' level of education between the boys and girls. Girls' perception of socio-economic status was higher based on the 10 step ladder than the boys'.

Results show that boys and girls had age- and gender-appropriate body compositions and body shapes, and that there were no extremes and the overweight and obesity was not significant in this sample. Normal biological development and maturity was seen in the body dimensions, the hypoactivity and the sedentary behavior effect was not seen in the anthropometric results.

Overall the Ukrainian boys' and girls' body dimensions and body composition, as well as their results in the motor performance tests, were within healthy ranges and their aerobic fitness level, according to their strong motivation, was higher than the international standard. The following is a summary of the results:

1. Ukrainian boys' and girls' leisure time spent on watching TV and DVD was similar, with 56% of the girls and 60% of the boys spending 1-3 hours with those activities.
2. Ukrainian boys spent significantly more time using the computer than girls.
3. Ukrainian girls spent significantly more time for reading than boys.
4. Hungarian youngsters spent significantly more time for watching TV and using computer, and also spent much less time for physical activity than their Ukrainian counterparts.
5. Ukrainian boys were significantly more active than girls, 49% of the boys were active 1-3 hours a day.

6. Ukrainian boys were significantly more satisfied with their health status than girls, and self rated them selves as healthy.
7. In the weight-related satisfaction was no significant difference between the genders. They were generally satisfied with their weight.
8. There was no significant difference in the parents' level of education between the boys and girls. The boys' socio-economic status was lower based on the 10 step ladder than the girls'.
9. According to the body dimensions, the body development of the subjects was age and gender appropriate. There were significant differences in the height, weight, plastic index, and body fat means, but Body Mass Index and metric index means were similar.
10. In the 20m shuttle run test, the Ukrainians performed better than Hungarians. The Ukrainian and Hungarian boys performed according to the international standard. The Hungarian girls underperformed the standard, but the Ukrainian girls performed above the international average.
11. The prevalence of overweight or obesity was 11% (10+1) and 9% (8+1) in Hungarian boys and girls respectively. The 11% (10+1) of the Ukrainian boys and 3% (3+0) of the girls were classified overweight or obese.
12. Twenty-one percent of the boys and 13% of the girls were classified as underweight, and this difference is significant.
13. The relationship between the body fat and motor performance could not be confirmed in the Ukrainian sample because of the significant proportion of normal and underweight participants.

The conclusion of the study is that longitudinal and cross-sectional investigations are needed to get more information about secondary school children' physical development and motor performance. Health promotion and health education programs should get more attention, especially in those countries in which the underweight is a more significant problem than overweight and obesity.

## CONCLUSION

According to the aims the following hypothesizes were drawn:

H1. We hypothesized that the Ukrainian and Hungarian youths' lifestyle, physical activity, and sedentary behavior is significantly different. The amount of boys' and girls' time spent on TV viewing and computer using is similar.

H2. We hypothesized that the Ukrainian boys' and girls' self perception of body weight and health status is similar.

H3. We hypothesized that according to the previous international study the prevalence of overweight and obesity would be 10-15% (Janssen et al. 2005), and the rate of underweight would be less than the rate of overweight and obese.

H4. We hypothesized that the Ukrainian youths' aerobic fitness would be good or medium, similar to the Hungarian counterparts. The boys' motor performance would be significantly different from the girls' performance.

After the analysis of the results the following answers were found:

H1. There is a significant difference in the free time activities of Ukrainians and Hungarians, the Ukrainians spent less time in front of the TV and computer. In the Ukrainian gender comparison, we found that boys spent significantly more time with video games and computer use than girls; however their time spent on TV viewing was the same.

H2. Ukrainian boys rate their health status higher than girls, but the most of the subjects were satisfied with their health status. There was no significant difference in the weight self perception of boys and girls, but girls were slightly more satisfied with their outlook than the boys.

H3. The third hypothesis is also not fully accepted if we analyze the genders separately, because only 3% of the girls were overweight and there was not an obese girl in the group. The boys' results were more close to the international rate, where a prevalence of 11% of overweight and obese was found.

The other part of the hypothesis in which the prevalence of underweight is lower than the overweight and obese was not true. Based on the results, the rate of the underweight subjects is significant in both genders. Altogether, the problem of underweight is still more serious in Ukraine than the problem of overweight and obesity.

H4. The hypothesis was not accepted because we found significant differences in the Ukrainian vs. Hungarian boys' and girls' performance. The Ukrainian youths' performance was significantly higher than the Hungarians; their aerobic performance level indicated good physical fitness. The Hungarian girls' had the lowest running performances, their means were under the age appropriate standards. Generally, it was true that the boys performed much better than the girls.

According to our results, the Ukrainians' better performance might be explained with their higher motivation and concentration, and also with their lower body mass and healthier

body composition. This was the first time that the subjects took part in a scientific study, and their 20m shuttle run test performance was registered. Consequently, higher motivation and stress level may also explain the significantly higher maximal heart rates of the Ukrainians.

The cultural background, the role of the sport in the society, the participation of the children and adolescents in physical work, and socio-economic factors might have strong effect on their active and passive recreation. According to our results, we hypothesize that the cultural attitudes might differ in Hungary and Ukraine. Sport and physical activity participation, in general, greater role in the Ukrainian society, being sporty means being healthy and more efficient in work, and also being an athlete provide opportunities to break out of poverty.

## LIST OF PUBLICATIONS

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