EFFECT OF ENVIRONMENTAL CONDITIONS ON THE LEVEL OF CARDIORESPIRATORY FITNESS

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- cardiorespiratory
- fitness,
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Abstract:

The focus of this study is to compare the level of cardiorespiratory fitness (VO2max) in students aged 16 from urban and rural environments. The study examined 46 people of both genders. The Cooper test and Beep Test were used as research tools. The level of physical capacity was analyzed and presented in the form of diagrams.

The study demonstrated that the results of both tests are similar and show insignificant differences. Comparison of our results with the studies that analyzed similar problems reveals that the level of capacity in young people declines which raises concerns about future health status of this part of the population whereas the diseases of affluence are likely to become more pronounced in society.

The results represent a preliminary report (the pilot study) from the examinations conducted in the region of the Świętokrzyskie Voivodeship in Poland.

INTRODUCTION

Level of physical activity is declining and, importantly, the problem concerns mainly children and young people at the age when it affects the development (both physical and psychical) of the whole body.

In the past, fitness and physical capacity were very important to society as it helped people move quickly and efficiently, stay safe from dangers and find food.

Nowadays, a decline in physical capacity is being observed all over the world. This is attributable to rapid development of civilization, which is gathering its pace. Development of technology and industry has a negative effect on motor development of humans.

The natural environment is being degraded while the number of natural locations, such as lakes, parks and forest where people can relax actively is decreasing.

The study published by Czaplicki showed that the level of endurance capacity, which plays a critical role in health prevention (especially prevention of the diseases of the cardiorespiratory system), is reducing [Czaplicki Z.1996]

Raczek argues that the period especially important to endurance training starts in the developmental age and, more specifically, since the early school age. This view was supported by many other contemporary researchers, who find endurance training as a perfect method that is conducive to adaptation of the cardiovascular system to physical exercise [Raczek J. 1986]

Contemporary physiological examinations have shown that children are more adapted to performing long-term aerobic exercise than adults.

The researchers have also demonstrated that runs with the length of several kilometers can be practiced since the 8th and 10th year of life, and have a favorable effect on health, physical fitness and harmonious development of children. Such an exercise should stimulate physical capacity of human body, reduce body fat percentage, blood cholesterol levels, and

improve the oxygen uptake and psychophysical fitness. Furthermore, it improves performance of the cardiovascular, respiratory and motor systems.

Raczek wrote that ".... It is essential that adequate development of these abilities can have an effect on the increase in physical capacity, stabilize health and provide basis for effective development of other abilities as well as develop demanded volitional and characterological properties [Raczek J. 1986]

Strength is the ability of chronic allows work to provide desired intensity without changing the efficiency and maintaining the increased fatigue strength [Sozański H.1999]

The fundamental principle of training and conditioning says that the strength of this sub-stawa which forms the substrate to shape other motor abilities [Przybylski W., Yosef A.1998]. Methodology of strength building use in stimulating the body several times to the correct level of fatigue, which through a series of adaptive mechanisms, including the effect of the effect of psychic adaptation leads to an increase in the level of the qualities [Jaskólski a.2006]. For many years the scientific months investigating the impact of a number of factors influencing the physical performance of the human and due to the constant changes in environmental factors, the subject is still current and interesting.

Wnorowski, defines the physical capacity as the body's ability for finishing-mentation particular type of physical work, expressed the maximum level of maximum exertion possibilities and efficient course of renewal processes [Wnorowski J.2006].

Physical capacity by [Wolański N., Parizkowa J.1995] is expressed by the action of respiratory-circulatory body because oxygen is taken adequate to its handling and use, because the body does not have the storage capacity of oxygen. [Franks B.D. 1994] physical fitness is defined as following, "the subject is efficient and physically, when he has the strength cardio-respiratory freshness of mind reacts positively with other people, has the desired level of fat, strength, flexibility and healthy spine. "

STUDY AIM, MATERIAL AND METHODS

The aim of this study is to compare the level of cardiorespiratory fitness (VO2max) in students aged 16 from urban and rural environments. The study examined 46 people of both genders. The examinations were conducted among students (learning according to humanist and information technology curricula) from the Eugeniusz Kwiatkowski Economics Secondary School Complex in Sandomierz. The Cooper Test [Maksud MG, Coutts KD. 2013] and Beep Test [Chatterjee P, Banerjee AK, Das P, Debnath P, Chatterjee P. 2008] were used as research tools.

The results represent a preliminary report (the pilot study) from the examinations conducted in the region of the Świętokrzyskie Voivodeship in Poland.

Table 1. Gender in the study group

Gender in the study group	Number of study participants	%
Girls	20	44
Boys	26	56
Total	46	100

Table 2. Place of residence with division into gender

Gender	Number of study participants	Urban environment	%	Rural environment	%
Boys	26	13	50%	13	50%
Girls	20	10	50%	10	50%

RESULTS

The results show unequivocally that the group of boys from technical secondary school (with IT profile) has a very poor level of physical capacity in 63%. There were 15% of boys who demonstrated a good level of physical capacity and only 4% with very good level.

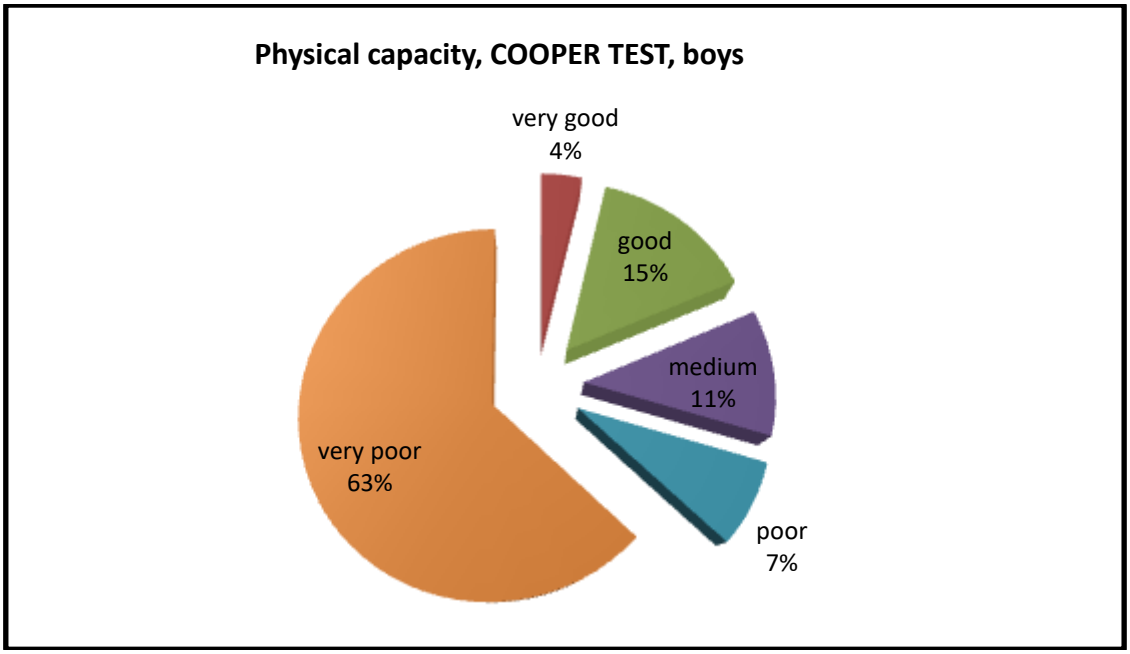

Diagram 1. Cooper test: percentage results of physical capacity in boys from both environments

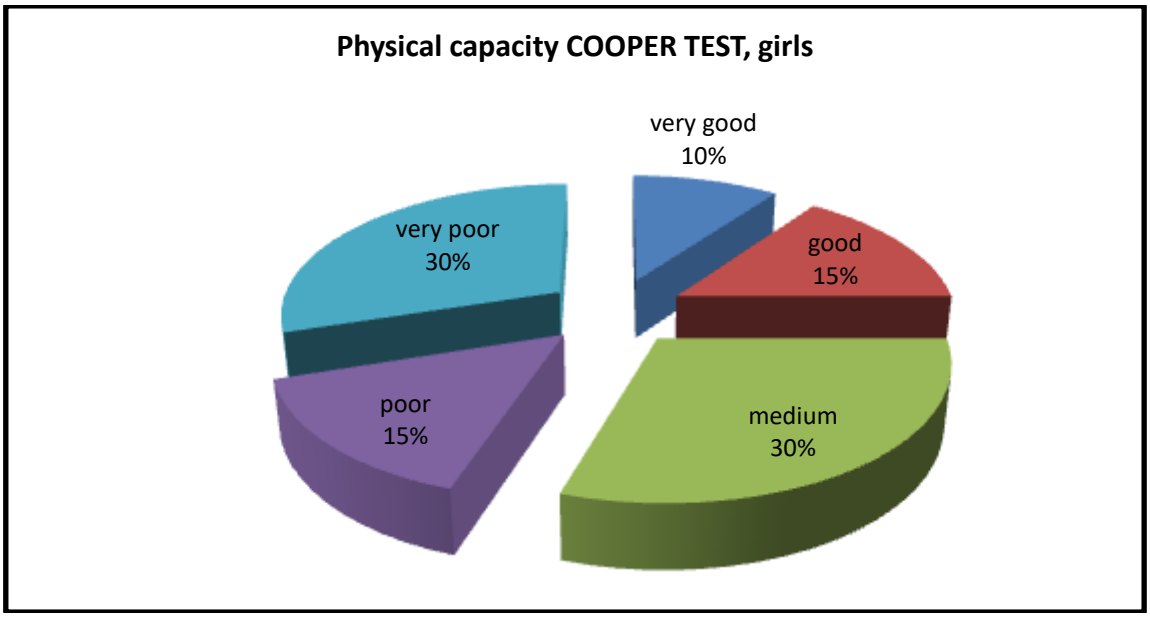

Diagram 2. Cooper test: percentage results of physical capacity in girls from both environments

Analysis of the above results reveals that the most of the respondents were within the optimal level of physical activity: a very good result was obtained by 10%, good result by 15% and mean result - by 30%. The very bad results was found in 30% of the study participants and bad - in 15%.

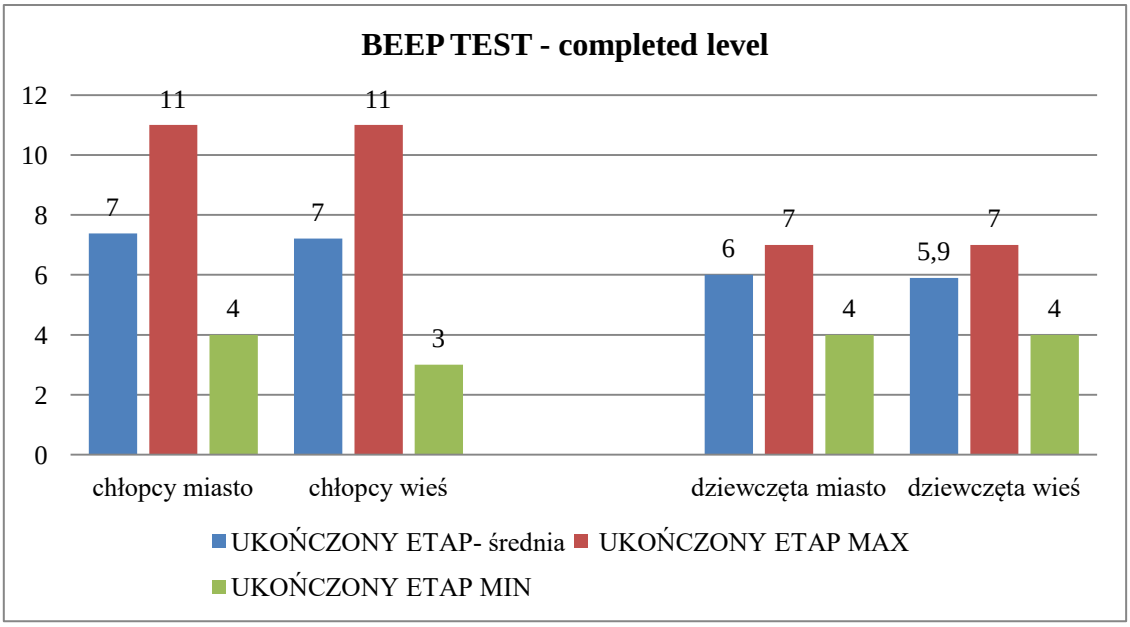

Diagram 3. BEEP TEST data, completed level
(chłopcy miasto – boys, city; chłopcy wieś – boys, rural areas; dziewczęta miasto – girls, city, dziewczęta wieś – girls, rural areas, UKOŃCZONY ETAP – średnia – LEVEL COMPLETED, mean)

The results concerning the level completed in the Beep test demonstrated that the mean completed level in boys from both urban and rural environments was 7, with the best result being 11, whereas the lowest level was 4 in the urban boys and 3 in the rural environment.

The mean level completed by girls from the urban environment was 6 whereas those from the rural environment reached the level of 5.9. The best result was the same in both environments (7), similarly to the lowest level (4).

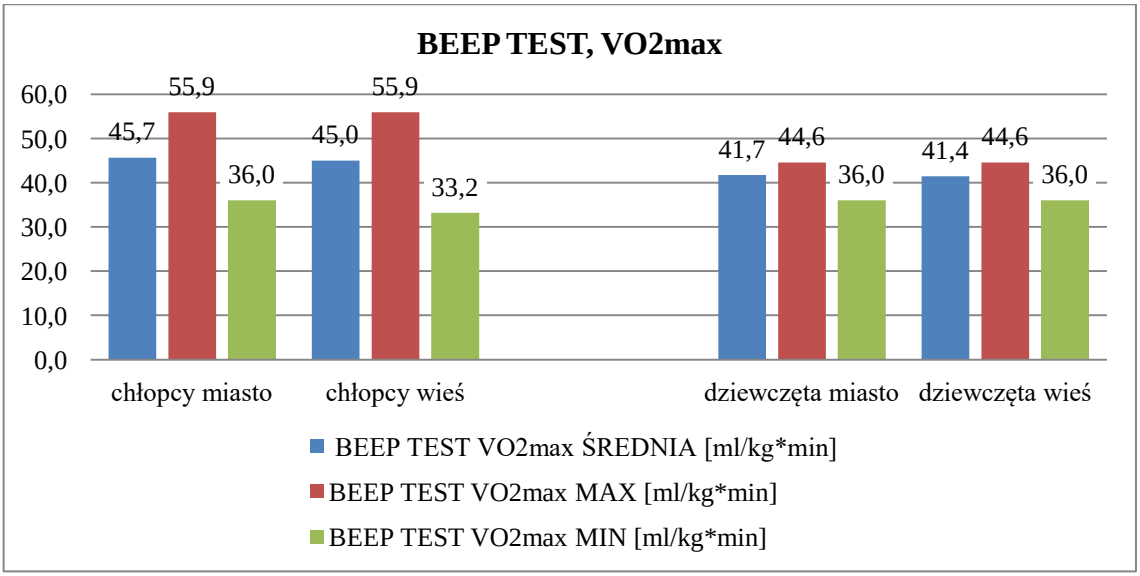

Diagram 4. BEEP TEST data, VO2max
(chłopcy miasto – boys, city; chłopcy wieś – boys, rural areas; dziewczęta miasto – girls, city, dziewczęta wieś – girls, rural areas, BEEP TEST VO2max ŚREDNIA – BEEP TEST VO2max MEAN)

The results concerning the maximal oxygen uptake in the Beep Test revealed higher mean VO2max (45.7 ml/kg/*min) in boys from the urban environment. The highest oxygen uptake was 55.9 ml/kg *min. The lowest VO2max level was recorded by a boy from the rural

environment (33.2 ml/kg *min). In girls from the urban environment, mean VO2max was by 0.3 higher (41.7 ml/kg *min). The VO2max index was equal in both environments (maximum: 44.6 ml/kg *min; minimum: 36 ml/kg *min).

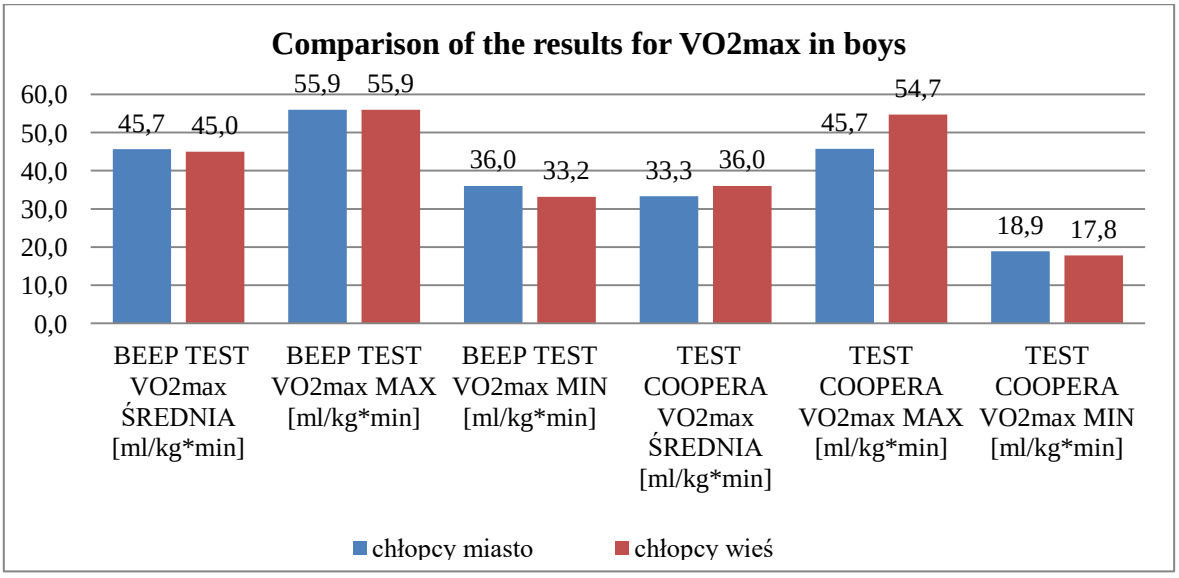

Diagram 5. Comparison of VO2max, COOPER TEST, BEEP TEST in boys
(BEEP TEST VO2max ŚREDNIA – BEEP TEST VO2max MEAN, TEST COOPERA VO2max ŚREDNIA – COOPER TEST VO2max MEAN, chłopcy miasto – boys, city; chłopcy wieś – boys, rural areas)
Source: Author's own study.

The results of both tests are very similar to each other. Greater difference was found for the maximal result in the Cooper Test: VO2max in boys from the urban environment (45.7 ml/kg *min). In the urban environment, this level was 54.7 ml/kg *min.

No significant differences were found during the analysis of the results of both tests.

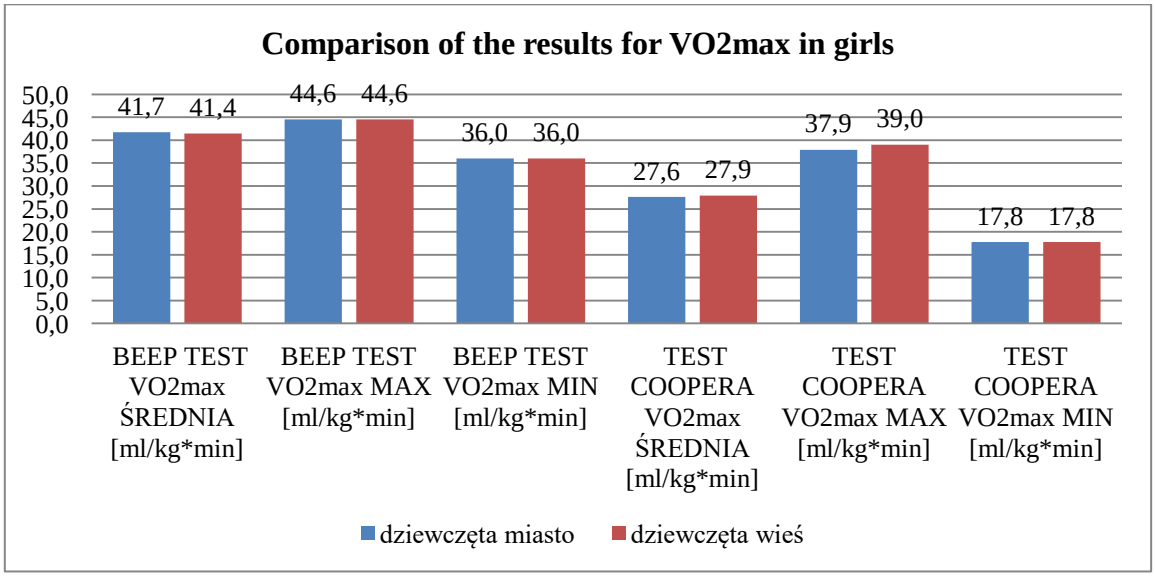

Diagram 6. Comparison of VO2max, COOPER TEST, BEEP TEST in girls
(BEEP TEST VO2max ŚREDNIA – BEEP TEST VO2max MEAN, TEST COOPERA VO2max ŚREDNIA – COOPER TEST VO2max MEAN, chłopcy miasto – girls, city; chłopcy wieś – girls, rural areas)
Source: Author's own study.

CONCLUSIONS

The results presented in the study showed the increasingly lower level of physical capacity in the young generation. The examinations conducted in this study confirm the declining level of physical activity started by young people, which is reflected by the level of physical capacity.

The results of the Beep test showed that the urban environment is conducive to higher level of cardiorespiratory fitness (VO2max) in both girls and boys. The Cooper test revealed an insignificantly higher level of cardiorespiratory capacity in the urban environment in both boys and girls.

The results of the Cooper test: mean VO2 max in the urban environment: boys: 33.3ml/kg *min, girls: 27.6 ml/kg *min; the Beep test: boys 45.7 ml/kg *min, girls: 41.7 ml/kg *min. The results of the Cooper test: mean VO2 max in the rural environment: boys: 36ml/kg *min, girls: 27.9 ml/kg *min; the Beep test: boys 45 ml/kg *min, girls: 41.4 ml/kg *min.

The study showed that higher level of cardiorespiratory capacity (VO2max) is observed in boys from both environments. In the case of the Cooper test in boys, the best VO2max result was 45.7ml/kg *min in the urban environment and 54.7 ml/kg *min in the rural environment. Beep test in boys: 45.7 ml/kg *min in the urban environment, 45 ml/kg *min in the rural environment.

The study group showed a very low level of physical capacity. The following results were recorded for boys: 4% - very good, 15% - good, 11% - medium, 7% - poor, 63% - very poor physical capacity. The results in girls were better: 10% - very good, 15% - good, 30% - medium, 15% - poor, 30% - very poor physical capacity.

The results of both tests are similar and show insignificant differences. In the Cooper test, higher level of VO2max was found in the rural environment whereas the Beep test revealed better results in the urban environment.

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