

# THE LEVEL OF PHYSICAL DEVELOPMENT OF RURAL CHILDREN FROM SZYDŁOWIEC REGION AT INITIAL STAGE OF EDUCATION

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## Abstract

The aim of the paper is the description of basic somatic features of children from rural environment at their initial stage of education and the assessment of their social diversification in comparison with the level of education of their mothers and fathers.

In order to assess physical development of children, the authors considered basic somatic features including height and body weight. These measures were fundamental for the indication of the BMI indicator. Moreover, information on the level of education of their parents was gathered. The research was conducted in ten years period and included 515 children, among whose there were 228 girls and 287 boys. They all were born in the 1995–2004 period of time and they live in Mirów commune in Mazowieckie voivodeship.

It was stated that the level of physical development of rural children from Mirów commune was lower than that one of children living in other regions of Poland. It could be the result of the civilisation delay of this area. What is more, it was stated that the level of education of parents was a factor, which significantly diversified the level of physical development of children. The higher level of education of parents, mainly of fathers, was related to higher average values of height and body weight of children, whereas in regards with the expected body weight (BMI), the authors did not state such diversification, what seemed to be evident. The research results indicated the layered social diversification of the physical development of children from rural areas. It could be especially noticeable in regards with children aged 6.5 years from rural environment, at the initial stage of education. Such period of the development is very significant for children.

**Key words:** positive health, physical development, children from rural areas, level of education of mothers and fathers

## Introduction

Research of many authors showed that for years in the rural environment there are both layered (social) and regional (geographical) diversifications. Łaska-Mierzejewska and Olszewska (2003) indicated that between three main social and professional groups in rural areas in Poland (agricultural, agricultural & working class and non-agricultural families) the diversification of life conditions are so visible that they influence biological effects within the development and the maturity of youth. Among others Jopkiewicz (2000), Saczuk and Wilczewski (2003) and Nowicki (2004) proved the existence of the layered diversification of the rural population.

The results in many research papers also indicate the existence of the diversification of the height and the body mass,

the speed of the maturity and the physical fitness in the geographical regions of Poland (Hulanicka et al., 1990; Łaska-Mierzejewska & Luczak, 1993; Przewęda & Dobosz, 2003). The reasons of this phenomenon may have the genetic assumptions, but on the other hand, they may be caused by economic differences in regards to life conditions in the regions. Significant differences are perceived in comparative studies of the development of children and youth in rural areas, which are not so far from each other. They usually come from the diversification of the educational level and the affluence of inhabitants in towns and communes, from different professional structure and the sources of living of a family, the unemployment rate or the place of living in comparison with big towns or even cities (Strzelczyk, 2005).

For years pedagogues have tried to state, which period is the most convenient for starting education, how to conduct this process and how to assess the results. This is quite difficult, because they have to consider a big diversification between populations, which is visible in urban as well as in rural areas. It is commonly known that the developmental processes depend on genetics, but in the epigenesis process we can observe the interactions between the organism, which develops under the influences of these interactions and the surrounding, which influence both the level and the speed of the development. These interactions finally decide upon the biological and the school maturity of a child.

It is necessary to underline that, according to the educational reform introduced in Poland in 1999, it is not necessary anymore to test the school maturity of a child. In 2008 the age for the school duty decreased and it caused that the time of starting school was only indicated by the date of birth. In practice, between the pupils of the 1st class, the calendar age fluctuates from 5 years and 9 months until 7 years and 5 months. The span of the calendar age is about 1.5 years. This range can be also heightened by the delay or the acceleration of the biological development, health, family, social, economical or emotional aspects (Malinowski, 2006).

The school success of a child depends on many factors influencing his development, even before the educational period. During the first years of life, children develop more intensively due to different factors coming from the environment. Thanks to it, they acquire different skills and they form their interests and hobbies. Therefore, physical development is a basis of the development and it includes the forming of somatic features, motor skills and internal organs. Physical development is treated as positive and, at the same time, as an indicator of children and youth health (Malinowski, 2006; Jopkiewicz et al., 2011).

Monitoring of physical development of children and youth is of great importance both for the individuals and the society. It plays a significant role in the development of the appropriate social and economic programmes, which could enable to ensure optimal life conditions for children and youth (Bielicki et al., 1997, 2003; Jopkiewicz et al., 2011). Many statistical analyses on social and economic changes in Poland indicate that the highest speed of transformation takes place in rural environment. The access of Poland to the European Union, similarly to other countries of Central and Eastern Europe, and programmes supporting the development of rural areas, which give chances of working outside the rural sector, change the traditional structure of the society. What is more, in the last two decades, the access to higher education increased significantly. It influenced the civilisation development of rural environment and created more favourable conditions for the development of children and youth.

However, there are still significant gaps in the development of children from rural areas (Nowicki, 2004), mainly from the so-called Eastern Wall, including Podlaskie, Lubelskie and

Podkarpackie regions and some areas in Świętokrzyskie and Mazowieckie voivodeships. Due to a significant regionalism of this problem, we did research on the physical development of children living in rural areas at their initial stage of education. We focused on children from Mirów commune, which is situated in the borderland between Mazowsze and Kieleckie regions, in Szydłowiec district (sub-region of Radom).

### Aim

The aim of the paper is the description of basic somatic features of children from rural environment at their initial stage of education and the assessment of their social diversification in comparison with the level of education of their mothers and fathers.

### Methodology

The research included 515 children – 228 girls and 287 boys from Mirów commune, born in the 1995–2004 period, at initial stage of education. The average age of girls was 6.45 years, whereas of boys – 6.61 years. The whole material was gathered in the 2002–2011 period. The measures of the height was made within to an accuracy of 0.5 cm, with the use of the tape measure and the square, which were put on the wall. A child was in a standing position next to the wall. The head was put in the auriculo-orbital plane, called the Frankfurt plane. The body weight was made within to an accuracy of 100 g with the use of the certified medical weight “Seca”. Based on the height and the body weight results, the formal body weight (BMI) was calculated.

80% of parents had vocational (61.1%) and secondary (20.6%) levels of education. Most of women were characterised by secondary and higher levels of education, whereas most of men were characterised by vocational and basic educational levels (Figure 1). In comparison with other rural areas in Poland (Dmochowska, 2004), parents of children, who took part in the research, were characterised by a little different educational structure. In our research, they had vocational, secondary and basic levels of education, whereas in regards with the rural areas in Poland, parents were characterised by basic, vocational and secondary educational levels (Dmochowska, 2004).

In the paper the authors used statistical methods. The significance of the differences between average arithmetic values were calculated with the use of the t-Student test, whereas the social diversification – with the use of the analysis of variance

and NIR test, with the gravity indicator  $p < 0.05$  taken into consideration (Guilford, 1964).

### Results

Boys were about 1.63 cm higher than girls and this difference was statistically significant. They were also heavier, but it came from the fact that they were older than girls. The differences between girls and boys in regards with the expected body weight (BMI) were not significant and not statistically important (Table 1).

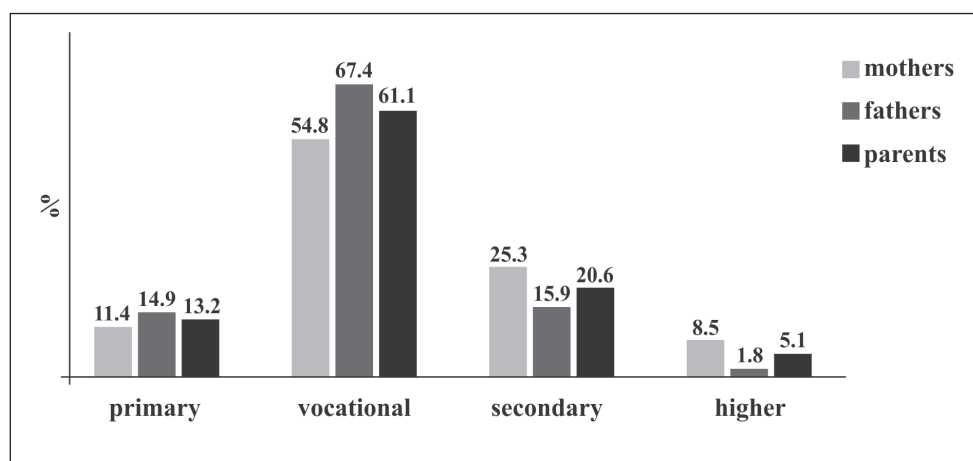
In tables 2–5 the authors presented the social diversification of physical development of children in comparison with the level of education of their parents, however the tables only present these features, which indicate statistical diversification. The BMI indicator did not indicate any diversification in regards with the educational level of parents. The indicators of body weight of girls (Table 2) and of height of boys (Table 3) were statistically significant. Their average values differed. They turn from lower into higher, depending on the educational level of mothers.

Sons of mothers with the higher level of education were 3.42 cm higher than their colleagues. Boys, whose mothers had secondary educational level, were 4.21 cm higher than boys, whose mothers were characterised by basic educational level. Only the average height of boys, whose mothers had secondary educational level, was not higher than the height of boys, whose mothers were characterised by the vocational educational level (Table 3).

Similarly, the level of education of fathers influenced the height and the body weight of girls aged 6.5 years. Girls, whose fathers had secondary educational level, were the tallest, whereas those ones, whose fathers had basic educational level, were the shortest. The average difference of the height is very significant – 3.22 cm and it shows a huge difference in the living conditions of these families. Similarly, the average body weight of girls increased with the increase of the level of education of fathers. The girls, whose fathers were characterised by the higher educational level, were the heaviest (Table 4).

The level of education of fathers higher, the average body weight of boys bigger. We can observe here the monotonic dependence between the educational level of fathers and the body weight of boys. The average difference in regards with the body weight of boys, whose fathers were characterised by higher and basic educational level, was 4.32 kg. Such a difference constitutes about one standard deviation (Table 5).

**Figure 1.** The level of education of parents, whose children took part in the research [%]



**Table 1.** Characteristics of basic somatic features of children aged 6.5 years from Mirów commune

Physical development	Height [cm]		Body weight [kg]		BMI [kg/m <sup>2</sup> ]	
Statistical measures	Boys	Girls	Boys	Girls	Boys	Girls
N	287	228	287	228	287	228
M	120.3	118.6	23.3	22.1	16.0	15.6
Minimum	104.0	100.0	15.1	15.7	11.8	11.6
Maximum	140.0	132.0	45.5	38.0	25.7	26.6
Variance	34.4	28.9	20.1	15.9	4.7	4.7
SD	5.9	5.4	4.5	4.0	2.2	2.2
CV	4.9	4.5	19.3	18.0	13.5	14.0
SEM	0.4	0.4	0.3	0.3	0.1	0.1

Note: SEM – standard error of mean, CV – coefficient of variation

**Table 2.** Level of education of mothers vs. body weight of girls aged 6.5 years from Mirów commune (NIR test)

Level of education of mothers	Body weight [kg]			
	{1}	{2}	{3}	{4}
	M = 22.64	M = 21.48	M = 23.17	M = 23.69
Basic {1}	–	0.20436	0.59304	0.39899
Vocation {2}	0.20436	–	0.00861*	0.02661*
Secondary {3}	0.59304	0.00861	–	0.62329
Higher {4}	0.39899	0.02661	0.62329	–

Note: \* – differences statistically significant

**Table 3.** Level of education of mothers vs. body weight of boys aged 6.5 years from Mirów commune (NIR test)

Level of education of mothers	Height [kg]			
	{1}	{2}	{3}	{4}
	M = 118.33	M = 120.72	M = 119.12	M = 122.54
Basic {1}	–	0.02581*	0.50349	0.00638*
Vocation {2}	0.02581*	–	0.05395	0.15801
Secondary {3}	0.50349	0.05394	–	0.01347*
Higher {4}	0.00638*	0.15801	0.01347*	–

Note: \* – differences statistically significant

**Table 4.** Level of education of fathers vs. the height and the body weight of girls aged 6.5 years from Mirów commune (NIR test)

Level of education of fathers	Height [kg]			
	{1}	{2}	{3}	{4}
	M = 117.95	M = 118.03	M = 121.17	M = 120.10
Basic {1}	–	0.94185	0.01379*	0.39742
Vocation {2}	0.94185*	–	0.00172*	0.38711
Secondary {3}	0.01379*	0.00172*	–	0.67033
Higher {4}	0.39742	0.38711	0.67033	–
Level of education of fathers	Body weight [kg]			
	{1}	{2}	{3}	{4}
	M = 22.18	M = 21.73	M = 24.82	M = 26.50
Basic {1}	–	0.63394	0.06160	0.20011
Vocation {2}	0.63394	–	0.00341*	0.11809
Secondary {3}	0.06160	0.00341*	–	0.74462
Higher {4}	0.20011	0.11809	0.74462	–

Note: \* – differences statistically significant

**Table 5.** Level of education of fathers vs. the body weight of boys aged 6.5 years from Mirów commune (NIR test)

Level of education of fathers	Height [kg]			
	{1}	{2}	{3}	{4}
	M = 22.18	M = 23.08	M = 24.82	M = 26.50
Basic {1}	–	0.23436	0.00657*	0.06128
Vocation {2}	0.23436	–	0.02101*	0.12426
Secondary {3}	0.00657*	0.02101*	–	0.46474
Higher {4}	0.06128	0.12429	0.46474	–

Note: \* – differences statistically significant

## Discussion

The research results indicate that the level of education of parents is a significant factor, diversifying the level of physical development of children aged 6.5 years, from rural area. The negative connotations related to the basic educational level of parents are significantly remarkable. Our results confirm the research results of many Polish auxologists, among others Bielicki et al. (1997, 2003), Dutkiewicz (1980, 1990), Jopkiewicz (2000), Jopkiewicz and Suliga (1999), Kaczmarek (1995), Łaska-Mierzejewska and Łuczak (1993), Łaska-Mierzejewska and Olszewska (2003, 2007), Malinowski (2005, 2010), Przewęda and Dobosz (2003), Wolański (1992, 2005), Jopkiewicz et al. (2011), who worked on the social stratification of physical development.

Many researches concerning the influence of environmental factors on the physical development of children and youth indicate that homogeneous conditions of biological and geographical environment cause significant differences of the development level at every stage of the ontogenesis. It was stated many times that children from higher social classes and urban areas are taller and heavier than their colleagues representing lower classes (Bielicki et al., 1997, 2003; Dutkiewicz, 1980, 1990; Jopkiewicz, 2000; Kaczmarek, 1995; Łaska-Mierzejewska and Łuczak, 1993; Malinowski, 2005, 2010).

Taking into consideration very similar environmental conditions – all children came from rural areas and this environment is indicated by many authors as homogeneous, the diversification of height and body weight was significant. The research results confirm the phenomenon of the diversification of the height and the body weight in social groups, especially in regards with boys (Jopkiewicz, 2000; Jopkiewicz and Suliga, 1999). The average height and the body weight of boys and girls aged 6.5 years decrease with the lower educational level of their parents. As it is commonly known, the level of education of parents can influence indirectly the physical development. It depends on nutritional state, hygienic conditions, the frequency of incidence, anti-healthful habits and addictions, etc., and other health behaviour, which decide upon the state of a child's health. It is necessary to underline that the characteristics of physical development of children at this age is very significant, as the initial stage of education is considered as the most important period in children's life and many adaptation skills are developed at this time.

Different level of education of parents means not only different awareness level or different income for one family member, but above all, different way of budget management, including different nutrition model, funds for hygiene, health, culture and activities undertaken in free time. The level of education, similarly like other factors of social environment, strongly influences indirectly and as a group (Bielicki et al., 1997), however, our research show that the educational level of fathers influence a little bit more than that one of mothers. It can be linked with the patriarchy model of a family in which the living conditions are indicated by a father.

The level of education is strongly linked with the profession and the possibility of doing an appropriate job. A little different structure of the educational level of parents from Mirów commune in comparison with parents from other regions in Poland (Dmochowska, 2004) is related to the fact that the biggest part of Mirów commune includes poor rural areas, where we can observe many small households, without specialised production. Such conditions made farmers take a job in industrial companies in near towns. It contributed to the existence of the two-profession groups „a peasant farmer, who works in a factory”, characterising by basic vocational educational level.

The level of physical development of children aged 6.5 years coming from Mirów commune, in comparison with

children living in other regions in Poland born in 1999 (average age – 6.8 years, research was conducted in the 2005–2006 period) is surprisingly low (Kopik, 2007). The average boy aged 6.5 years from Mirów is about 2.99 cm shorter and about 1.57 kg lighter, whereas the average girls aged 6.5 years is about 3.47 cm shorter and 1.81 kg lighter. Such differences probably come from the difference in calendar age, as children who took part in the research were about 0.3 year younger, but above all, the difference comes from lower living status of their families.

In comparison with the research results conducted in Kielce area in regards with children aged 7.0 years (Jopkiewicz, 2000), so coming from the same region, and children living in Lubuskie area (Malinowski et al., 2005), we can observe significant differences, which are unfavourable for children from Mirów. These differences are more significant in comparison with children from Lubuskie area, who live in the south-western part of Poland. It can be the result of the civilisation delay of the Mirów area, where children live and which constitutes so called East-wall. The parents here are characterised by lower level of education. The research results confirm the results obtained by many authors, among others Łaska-Mierzejewska and Łuczak (1993), Łaska-Mierzejewska and Olszewska (2003, 2007), Malinowski et al. (2005), who indicated that the difference in living conditions between social and educational groups in rural areas in Poland were so significant that they evidently influenced biological effects of the development of children and youth.

During the last two decades, due to social and economic changes, the structure of different groups and social classes diversified (Jopkiewicz et al., 2011). The living conditions are better, but at the same time, the social and economic differences between social groups, including rural areas, are more and more perceived. It is thus important to monitor the diversification of the development of basic somatic features of children and youth, including height and body weight and the BMI indicator with different social factors, e.g. the level of education of parents, taken into consideration.

## Conclusions

The level of education of parents is still a factor, significantly diversifying the development level of rural children. The basic level of education of parents is not a favourable factor for children development. It is commonly confirmed that knowledge and psychological culture of parents, so-called “awareness level”, decide upon the organisation of life in a family and the standard of their life.

The diversification of physical development of children at their initial stage of education in rural areas is mostly linked with the educational level of their fathers than mothers. It comes from the patriarchy model of a family in a rural area, where the level of living mainly depends on a father.

The low development level of children, in comparison with other research results, comes from civilisation delays of this region. Moreover, it constitutes an evidence of the territory (geographic) diversification of physical development, which is a positive indicator of the health state of children and youth.

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