

THE BODY STRUCTURE AND THE HEALTH STATUS OF CHILDREN LIVING IN THE DISADVANTAGED MICRO-REGIONS OF HUNGARY

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Abstract: *In 2001 the Hungarian Cabinet named the statistical small regions that counted as endangered and needed development. Our aim was to find out whether essential differences exist in the physical development, the nutritional status and the psychosomatic status of children living in the seriously deprived small regions when compared to the Hungarian national references.*

Altogether 3,128 children (aged 3–18 years) living in the deprived small regions of Hungary were examined. Their biological status was compared to the national references (2nd Hungarian National Growth Study 2003–2006). Children's body development was assessed by some absolute body dimensions. The nutritional status was estimated by BMI by dividing the subjects into 'underweight', 'normal', 'overweight' and 'obese' categories. A standard symptom list was used to characterise the psychosomatic status. The subjects were asked to rate their health status in terms of excellent, good, fair and poor.

The body development of children living in serious deprivation significantly differed, i.e. was retarded compared to the national references in the age-groups 7–9 and 14–17 of boys and in the age-groups 4–6 and 14–17 of girls. The prevalence of underweight nutritional status was significantly higher in children and adolescents living in the seriously deprived regions than the national references. The prevalence of overweight and obese children in the deprived regions did not differ from the national references. The body developmental retardation reflected in the health status of children and adolescents living in the deprived regions, since they rated their health status worse and they experienced more psychosomatic complaints (abdominal discomfort and fear) than the national references. The results of the present study can provide reliable data on the basis of which recommendations can be formulated and measures applicable in social, medical and public welfare policy can be shaped.

Keywords: *Disadvantaged micro-regions; Body development; Body composition; Nutritional status; Subjective health status; Children; 2nd Hungarian National Growth Study (2003–2006).*

Introduction

It has been known since a very long time that children living under varying socioeconomic conditions show remarkable differences in their physical development. Numerous auxological studies evidenced that the better economic health and wellness in a society the smaller differences could be found among the biological status of the socio-economic strata, e.g. in the growth and development pattern of children living in different socioeconomic backgrounds (Villermé 1828, Quételet 1835, Tanner 1962, Eveleth and Tanner 1990, Bodzsár and Susanne 1998, Zsákai és Bodzsár 2012a, b).

Sociodemographic conditions, the type of the region's settlements, the grade of urbanization, medical and educational resources and institutions, professional composition, regional social policy as well as developmental concepts for the respective

regions play a decisive part as macroclimate in shaping the physical and mental exfoliation of children. All these influences reach the children through their environment and their family (Tanner 1962, Eveleth and Tanner 1990, Bodzsár 2006, Tausz 2006).

In 2001 the Hungarian Cabinet named the statistical small regions that counted as endangered and needed development. The aim of the study was to find out whether essential differences exist in the physical development, the nutritional status and the psychosomatic status of children living in the seriously deprived small regions when compared to the Hungarian national references (Bodzsár és Zsákai 2012, Zsákai and Bodzsár 2012a, b).

Subjects and Methods

Altogether 3,128 children (aged 3–18 years, Table 1) in the deprived small regions (The Hungarian Government’s decree No. 24/2003: endangered small regions were graded by economic welfare indicators, e.g. the unemployment rate, industrial production, etc., Lipták 2010) of Hungary were examined. Subjects’ biological status was compared to the Hungarian national references (HNGS = 2nd Hungarian National Growth Study 2003–2006; http://antropologia.elte.hu/onv_e.html; Bodzsár and Zsákai 2008, 2012).

Table 1. Case numbers by age and gender.

Age (years)	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	Together
Boys	84	82	85	95	82	88	120	120	118	117	108	101	117	109	92	84	1,602
Girls	81	80	87	93	84	119	131	106	124	126	120	84	81	70	68	72	1,526

Children’s body development was assessed by using body mass, stature, trunk and extremal widths and circumferences (biacromial and bi-iliocrystal widths, chest and relaxed upper arm circumferences) and subcutaneous skinfold thicknesses (subscapular and triceps; body dimensions were measured by using standard instruments and techniques, Martin and Saller 1957, Weiner and Lourie 1969). Nutritional status was assessed by BMI, children were grouped into the BMI categories underweight, normal, overweight and obese by using the age-dependent cut-off points recommended by Cole and his colleagues (Cole et al. 2000, 2007).

In children and adolescents aged between 7–18 years, Currie’s standard symptom list (2004) was used to assess the experience of common psychosomatic complaints (PSCs), which was validated in Hungarian children and youth (Aszmann 1997). The findings here are based on self-report data from questionnaires. The psychosomatic complaints were divided into: somatic health complaints (headache, abdominal discomfort, vomiting, feeling dizzy), psychic health complaints (bad temper, feeling nervous, irritability, fear) and sleeping problems (difficulty in getting asleep, waking up several times at night, waking tired after a night sleep) subgroups. Subjects were asked how often they experienced the PSCs during the previous 6 months. To assess the frequency of experiencing the studied complaints a five-point scale was used (almost every day, more than once a week, once a week, once a month, seldom or never). Children were considered having complaints very frequently if they reported experiencing the studied complaints more often than once a week. Additionally, children were asked to rate their health status in terms of excellent, good, fair and poor.

Hypotheses were tested at 5% level of random error by using the SPSS v. 14.0 statistical software (χ^2 test for testing distributions' homogeneity; Wilcoxon test for comparing the age-groups' body dimensions to the national references).

Results and Discussion

Body development of children living in the deprived regions

Both the *body mass* and the *stature* of children living in serious deprivation differed compared to the national references in the of age-groups 7–9 and 14–17 in the boys and in the age-groups 5–6 (only body mass differed) and 12–16 in the girls – children of the deprived regions had smaller body mass and/or stature in these age-groups ($p < 0.05$, Wilcoxon test; Figure 1).

The *trunk widths* of deprived children differed significantly from the national references only in the age-groups of 8–10 years in the boys and in the age-groups 12–14 years in the girls (significant differences: biacromial width – boys: 8 and 15 years, girls: 13–16 years, bi-iliocrystal width – boys: 8, 13 years; $p < 0.05$, Wilcoxon test; Figure 2). As a tendency it was found that the median curves of the *extremital widths* in children living in the deprived regions of Hungary run below the national reference median curves through the whole studied age interval (Figure 3). Significant differences were found in the following age-groups: biepicondylar width of humerus – boys: 7–9 years, girls: 11–13 years, biepicondylar width of femur – boys: 5, 12–13 years, girls: 5–7 years ($p < 0.05$, Wilcoxon test; Figure 2).

By considering both the *trunk and extremital circumferences* it was observed that the circumferences in children living in the deprived regions differed, i.e. were smaller than the national references in the age-groups of boys aged between 8 and 10 years and in the girls aged between 12–14 years (significant differences were found in the following age-groups: chest circumference – boys: 9 years, relaxed upper arm circumference – boys: 6, 9, 12 years, girls: 6, 8, 11, 13, 16–18 years; $p < 0.05$, Wilcoxon test; Figure 4).

By comparing the deprived children's median curves of the *subcutaneous skinfolds thicknesses* to the national reference curves it could be stated that boys living in the deprived regions had smaller skinfold thicknesses both on the trunk and the extremities in the age-groups 4–6 and only on the extremities from the age of 11, while deprived girls accumulated smaller amount of subcutaneous fat on the trunk in the age-groups of 4–6 and 9–16 and on the upper extremities in the age groups 14–16 ($p < 0.05$, Wilcoxon test; Figure 5).

Nutritional status of children living in the deprived regions

As a general tendency it could be stated that the prevalence *underweight status* was significantly higher in children and adolescents living in the seriously deprived regions in both genders than the Hungarian references – significant differences were found in the distribution of this non-normal type of nutritional status in the following age-groups: 5–11, 14–17 in the boys and 3–5, 9, 17 in the girls ($p < 0.05$, χ^2 test; Figure 6).

The prevalence of *overweight and obese nutritional status* in children living in the seriously deprived regions was very similar to the national references ($p > 0.05$ with the exceptions of age-groups 7, 14, 18 in the boys and the age-groups 12–13, 18 in the girls, χ^2 test; Figure 6).

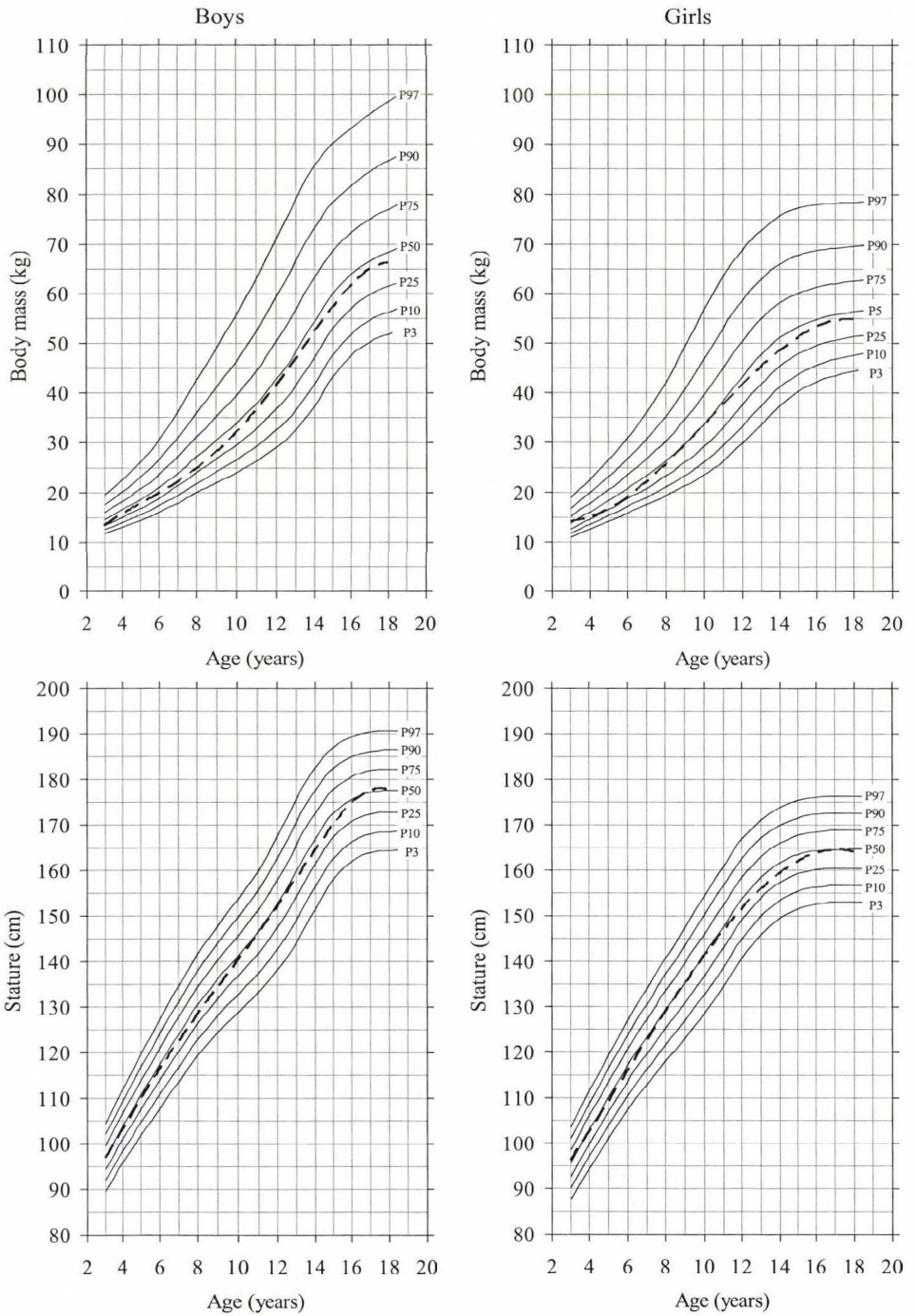


Figure 1: The median curves (- - -) of body mass and stature of children living in the seriously deprived regions compared to the national references (-, HNGS 2003–2006).

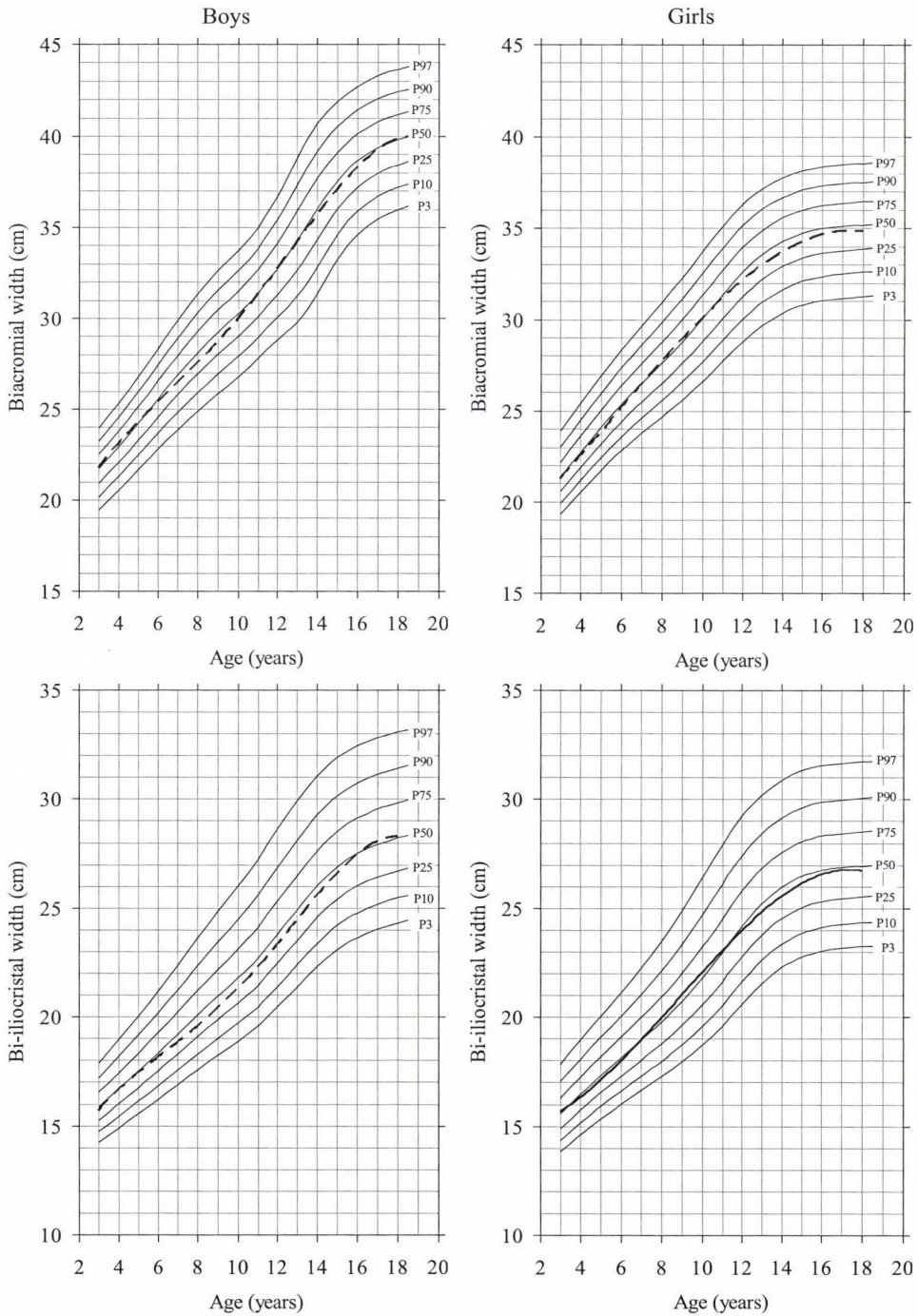


Figure 2: The median curves (---) of biacromial and bi-iliacristal width of children living in the seriously deprived regions compared to the national references (—, HNGS 2003–2006).

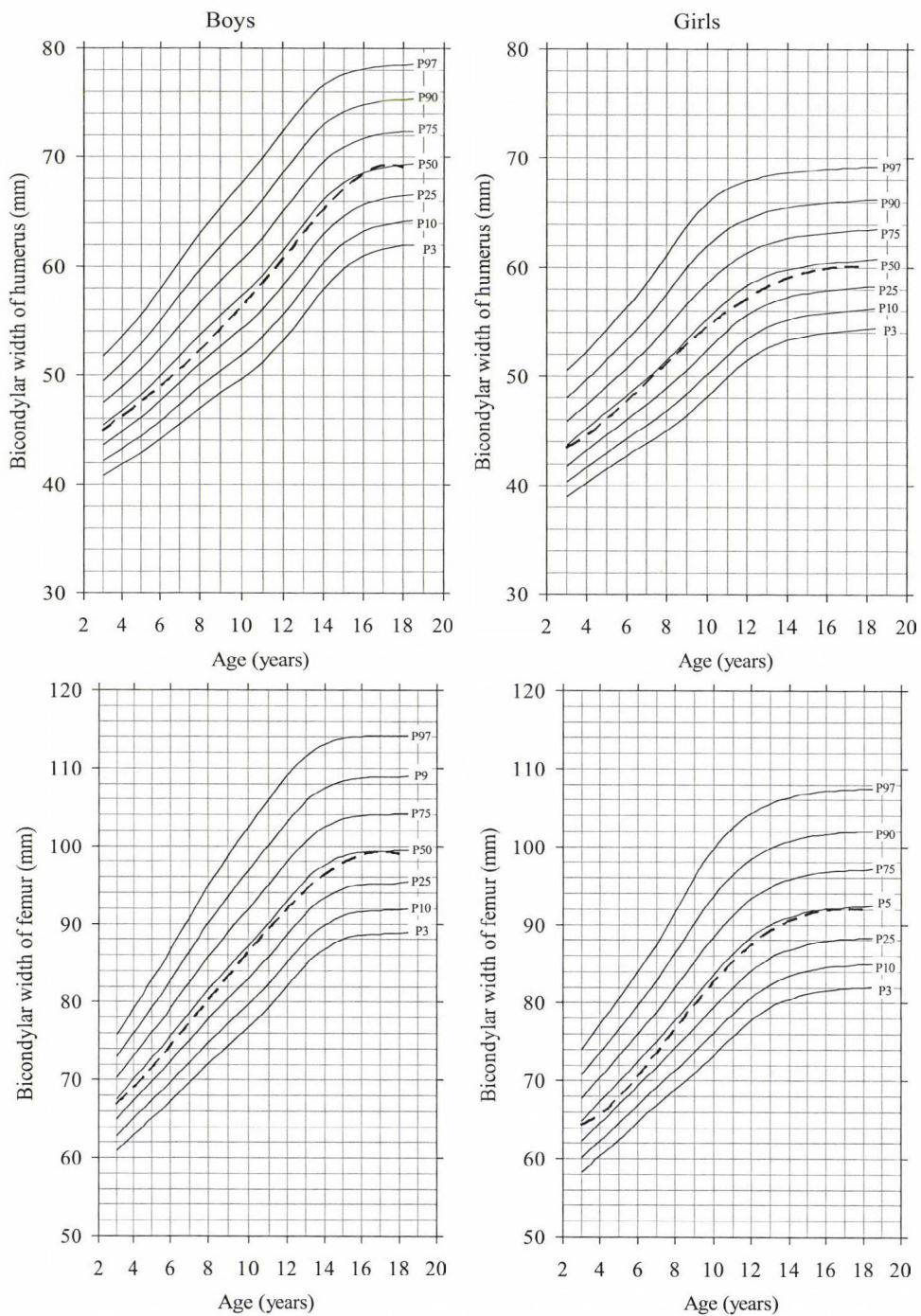


Figure 3: The median curves (---) of biepicondylar width of humerus and femur in children living in the seriously deprived regions compared to the national references (—, HNGS 2003–2006).

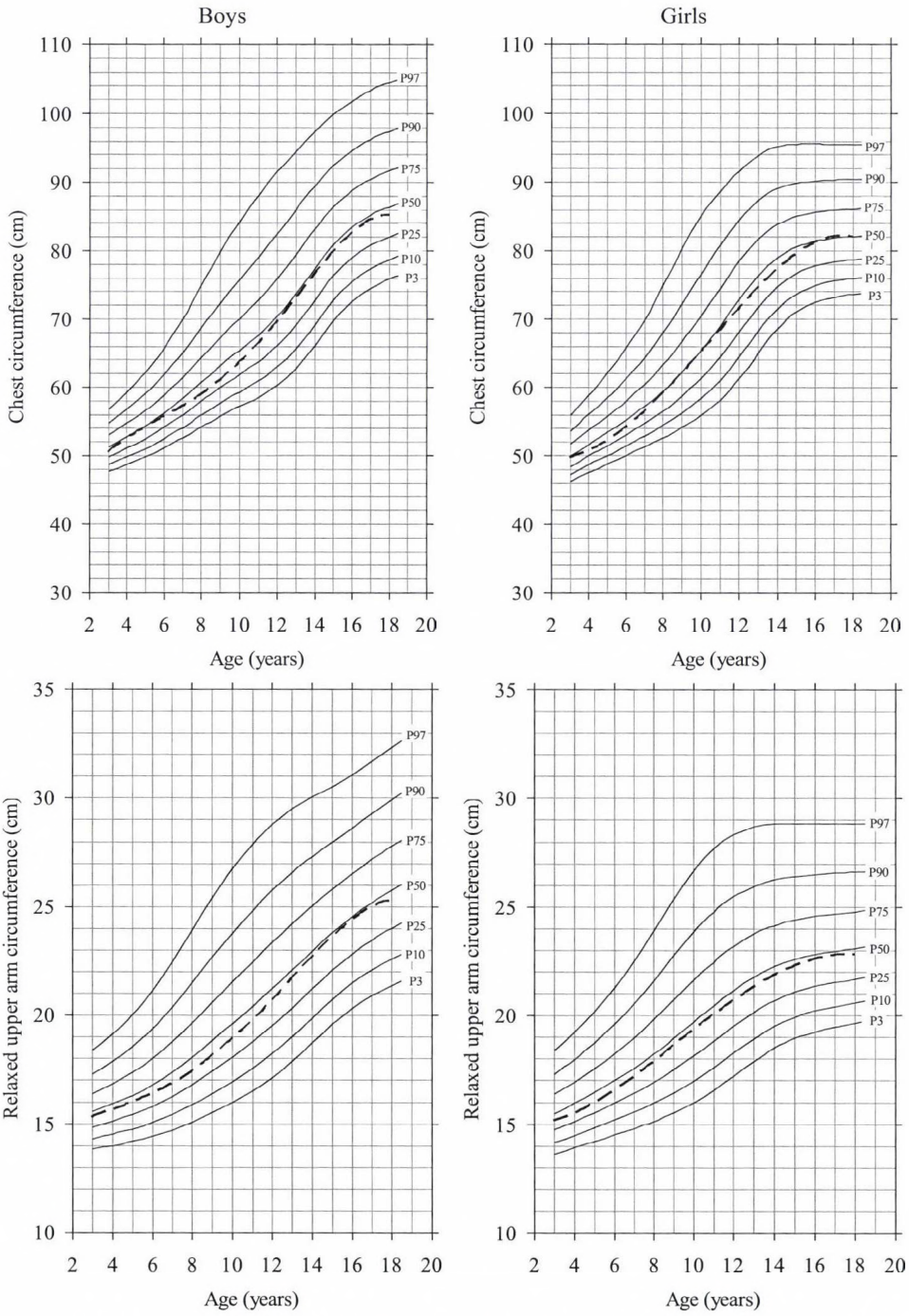


Figure 4: The median curves (---) of chest and upper arm circumference of children living in the seriously deprived regions compared to the national references (—, HNGS 2003–2006).

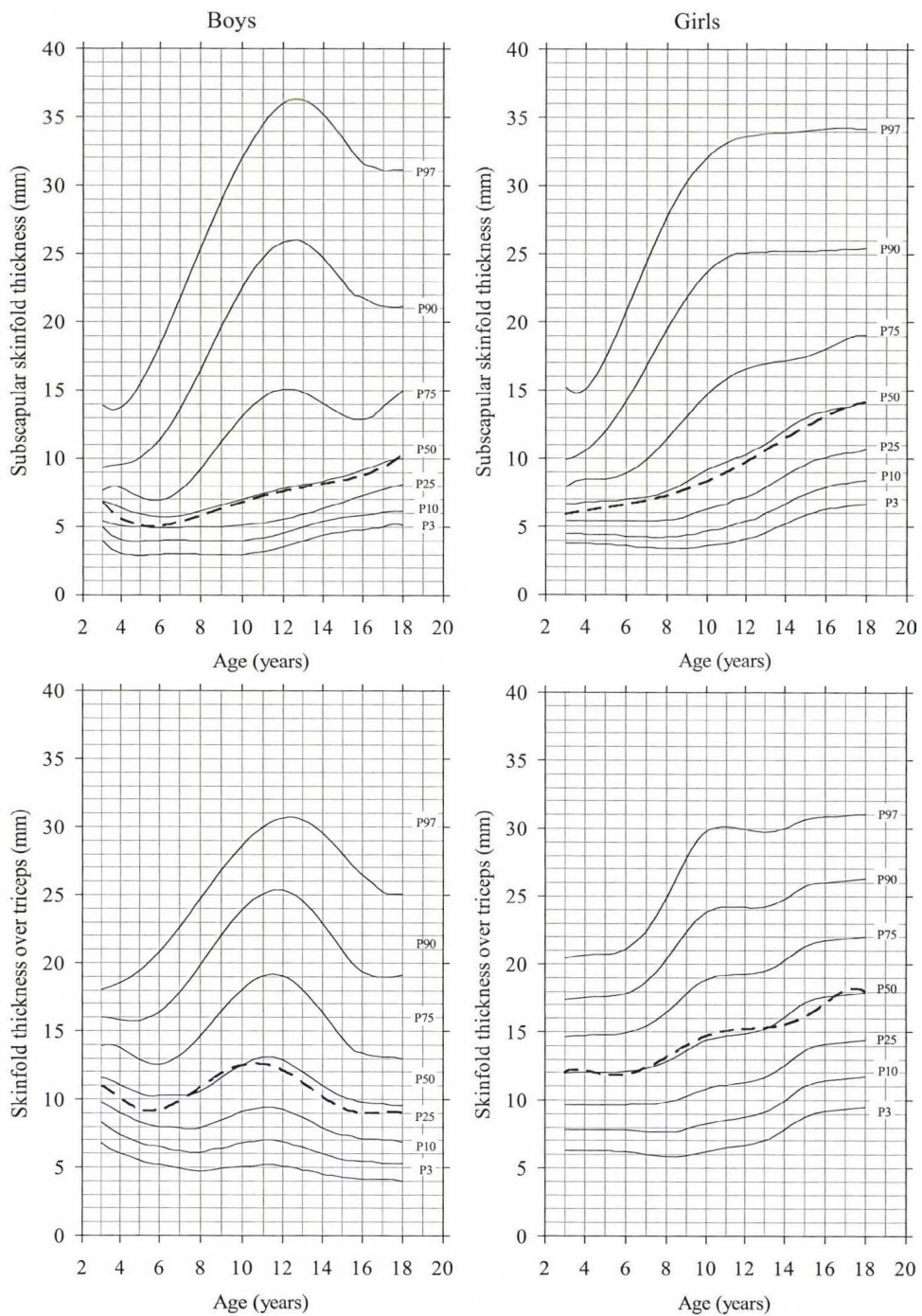
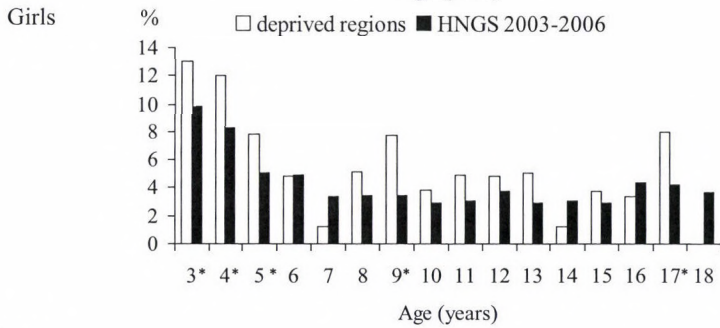
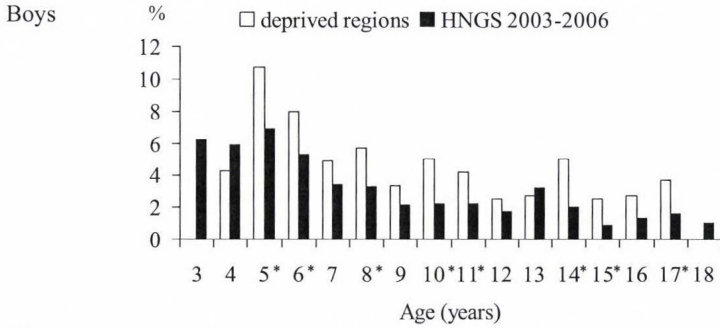


Figure 5: The median curves (---) of subscapular and triceps skinfold thicknesses of children living in the seriously deprived regions compared to the national references (—, HNGS 2003–2006).

Underweightness



Overweightness/Obesity

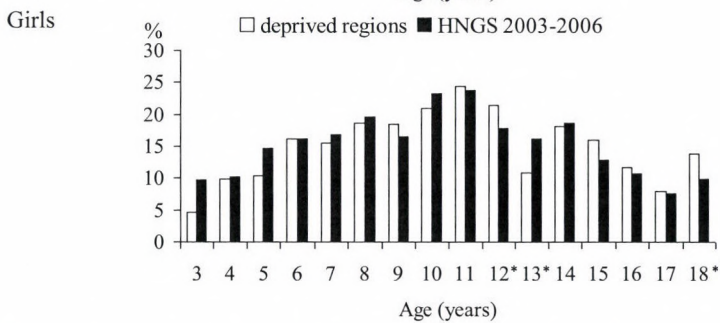
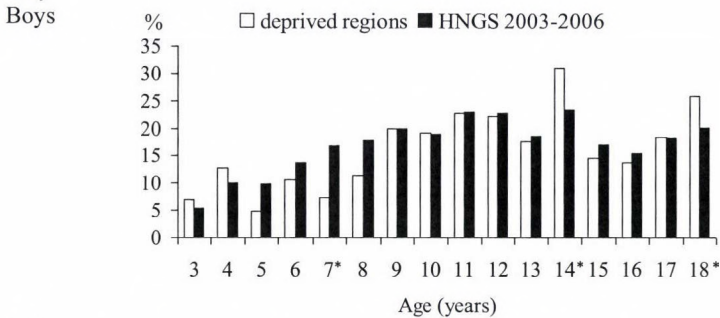


Figure 6: The prevalence of non-normal nutritional status in children living in the deprived regions compared to the Hungarian references (HNGS 2003–2006; *: significant difference).

Subjective health status of children living in deprived regions

Children and adolescents (aged between 7–18 ys) living in the deprived regions rated their *health status* worse (Figure 7) than the national references from the age of 9 till 13 in the boys and in the beginning of the studied age interval till the age of 10 in the girls.

Results on the prevalence of experiencing the *psychosomatic complaints* very frequently are presented here only for the complaints of abdominal discomfort and fear due to space limitations. By considering the other psychosomatic complaints in the deprived children, the pattern of experiencing the complaints very frequently was very similar to the national references ($p > 0.05$ with the exceptions of very few age-groups).

Deprived children experienced abdominal discomfort (one of the somatic complaints) more often than the national references in the age-groups 9–16 of the boys and in the age-groups 10, 12 and 15 of the girls (Figure 8). The only psychic complaint, which showed difference between deprived regions and national references in the pattern of experiencing the complaint very frequently, was fear. Children living in deprivation complained about fear more often than the national references in the age-groups 8–10 and 14–16 of the boys and in the age-groups 9–11, 13–15 of girls (Figure 8). Deprived children did not complain more frequently about sleeping problems than children studied in the national study.

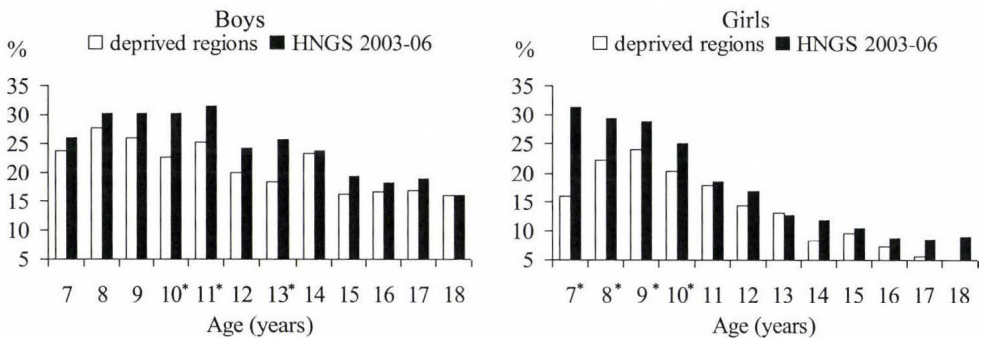


Figure 7: The prevalence of children rated their health status excellent in the deprived regions compared to the Hungarian references (HNGS 2003–2006; *: significant differences).

Conclusions

By comparing to the national references we could conclude that, children and adolescents living in the deprived regions of Hungary in the beginning of the 2000s: (1) had retarded body development in the age-groups 7–9 of boys and 4–6 of girls and in the age interval between 14–17 in both genders. (2) Children living in the deprived regions of Hungary had higher chance to develop underweight status than the national references and the prevalence of overweight and obese children in the deprived regions was as frequent as in the national references. (3) The body developmental retardation reflected in the health status of children and adolescents living in the deprived regions, since they rated their health status worse and they experienced more psychosomatic complaints (abdominal discomfort and fear) than the national references.

Since the retardation was significant in all the studied linear, transverse, girth dimensions and skinfold thicknesses as well as both on the trunk and the extremities we can state that (1) this was a general body developmental retardation, and (2) the higher

rate of underweight status in the deprived children was presumably caused by the underdevelopment of almost all the body mass components at the tissue system level (muscle, bone and fat fractions). A prospective longitudinal study could explore the influence of the hindering psychosocial environment's factors on children's growth pattern in more details.

The European tendency of the increased prevalence (higher than the national references; Evans et al. 2000, Cummins and Macintyre 2006, Taylor et al. 2006) of obesity in the lower socio-economic strata and in the deprived regions (with lower incomes, food insecurity, less education, etc.) has not been confirmed in this study. However, the similar prevalence of overweight and obese status in the deprived regions as it was published in the national references could be a remarkable indicator of this possible tendency.

The results of the present study can provide reliable data on the basis of which recommendations can be formulated and measures applicable in social, medical and public welfare policy can be shaped. Our further aim to help the system of preconditions for the eradication of child poverty is to identify the most important risk factors that endanger sound physical development by analyzing its connections with the social environment and life style.

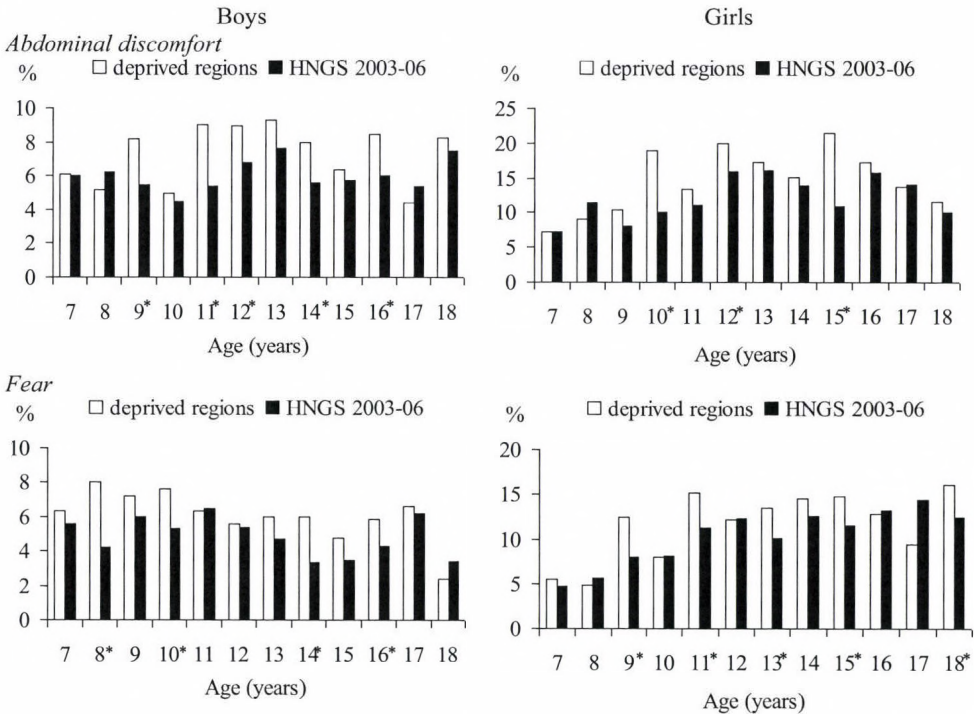


Figure 8: The frequency of children having psychosomatic health complaints very frequently in the deprived regions compared to the Hungarian references (HNGS 2003–2006).

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References

- Aszmann, A. (1997, Ed.): *Iskoláskorú Gyermekek Egészségmagatartása 1986–1993*. Anonymus Press, Budapest.
- Bodzsár, É.B. (2006): Secular change in growth and sexual maturation of Hungarian children. *Int. J. Anthropol.*, 21(1): 25–32.
- Bodzsár, É.B., Susanne, C. (1998, Eds): *Secular Growth Changes in Europe*. Eötvös University Press, Budapest.
- Bodzsár, É.B., Zsákai, A. (2008): A magyar gyermekek növekedési mintázatának szekuláris változása. *Anthrop. Közlet.*, 49: 75–95.
- Bodzsár, É.B., Zsákai, A. (2012): *Magyar gyermekek és serdülők testfejlétségi állapota. Országos Növekedésvizsgálat 2003–2006 – Body developmental status of Hungarian children and adolescents. Hungarian National Growth Study 2003–2006*. Plantin Kiadó, Budapest. pp. 240.
- Cole, T.J., Bellizzi, M.C., Flegal, K.M. (2000): Establishing a standard definition for child overweight and obesity worldwide. *Brit. Med. J.*, 320(6): 1–6.
- Cole, T.J., Flegal, K.M., Nicholls, D., Jackson, A.A. (2007): Body mass index cut offs to define thinness in children and adolescents. *Brit. Med. J.*, 335: 194–197.
- Cummins, S., Macintyre, S. (2006): Food environments and obesity – neighbourhood or nation? *Int. J. Epidemiol.*, 35: 100–104.
- Currie, C., Roberts, C., Morgan, A., Smith, R., Settertobulte, W., Samdal, O., Barnekow Rasmussen, V. (2004, Eds): *Young people's health in context. Health Behaviour in School-aged Children Study: international report from the 2001/2002*. WHO, Geneva.
- Evans, J.M.M., Newton, R.W., Ruta, D.A., MacDonald, T.M., Morris, A.D. (2000): Socio-economic status, obesity and prevalence of Type 1 and Type 2 diabetes mellitus. *Diabetic Medicine*, 17(6): 478–480.
- Eveleth, P.B., Tanner, J.M. (1990): *Worldwide Variation in Human Growth*. Cambridge Univ. Press, London.
- Lipták K (2010): Leghátrányosabb helyzetű (LHH) kistérségek munkaerő-piaci helyzete az Észak-magyarországi régióban. *Előadás a XI. RODOSZ Konferencián*, Kolozsvar.
- Martin, R., Saller, K. (1957): *Lehrbuch der Anthropologie I–IV*. Stuttgart: Fischer Verlag.
- Quetelet, L.A.J. (1835): *Sur l'homme et le développement de ses facultés*. Essai sur physique sociale. Bachelier, Paris.
- Tanner, J.M. (1962): *Growth and Adolescence*. Oxford: Blackwell.
- Tausz, K. (2006): A jóléti állam és Magyarország. In: Vizi, E.Sz., Teplán, I., Szentpéteri, J. (Szerk.) *Előmunkálatok a társadalmi párbeszédhez*. Gazdasági és Szociális Tanács, Budapest, 149–159.
- Taylor, W.C., Poston, W.S.C., Jones, L., Kraft, M.K. (2006): Environmental Justice: Obesity, Physical Activity, and Healthy Eating. *J. Phys. Act. Health*, 3(1): S30–S54.
- Villermé, L.R. (1828): Mémoire sur la mortalité en France dans la classe aisée et dans la classe indigente. *Mém. Acad. Méd.*, 1: 51–98.
- Weiner, J.S., Lourie, J.A. (1969, Eds): *Human Biology. A Guide to field Methods*. IBP Handbook, Oxford, Edinburgh, Blackwell Science.
- Zsákai, A., Bodzsár, É.B. (2012a): The 2nd Hungarian National Growth Study (2003–2006). *Ann. Hum. Biol.*, 39(5) in press.
- Zsákai, A., Bodzsár, É.B. (2012b): The relationship between body structure and the socio-economic status in Hungarian children and adolescents. *Coll. Antropol.*, 36(4) in press.

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