

Biological effects of socio-economic changes in the rural environment of the Krosno province in 1967–1997

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Abstract

Village girls in the age of 9–18, inhabiting Krosno region, were surveyed in 1967 (n=1134), 1977 (n=1028), 1987 (n=1255), and 1997 (n=1992). Based on the source of income of the families, three groups were separated: farmers, farmers-workers and nonfarmers. The girls were also divided on the basis of the number of children in the family, and the educational status of their fathers and mothers. The age at menarche for entire region was 13.94 ± 0.06 in 1967, and 13.38 ± 0.05 in 1997. During the period of 30 years the acceleration of maturation was 0.54 of a year. This result does not reflect the real socioeconomic situation inside the rural population. In the period 1977–1997 the deceleration of menarcheal age was registered in nonfarmers group, in the group of families with 5 and more children, and in the group of girls with the highest level of fathers education. In 1977 the menarcheal age of girls from farmer group was 14.01 ± 0.21 and from nonfarmer group – 13.03 ± 0.12 ; in 1997 those ages were 13.52 and 13.39 respectively. The differences between compared groups changed, from 0.98 in 1977 to 0.13 of a year in 1997, as a result of socioeconomic situation in the decades 1977–1987 and 1987–1997.

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Introduction

Biological effects of socioeconomic diversification of Poland's rural population have been recorded by the author since 1967 at 10-year intervals. The research was conducted in 8 regions in Poland. The Krosno province is a region where a study of rural population split into strata was conducted. Results of first studies carried out in this province cover only two groups of rural families: the group of farmers and others. Only in subsequent regions covered by the study three groups were distinguished within rural population based on social and

occupational criteria:

1. farmers – people owning a farm which is their sole source of income,
2. farmer-workers – owners of farms, where one or both spouses have a job outside of their farm,
3. non-farmers – people who inhabit rural areas but do not own land.

Results of first studies conducted in 8 regions of Poland proved that the differences in living conditions in all distinguished groups of the rural population affect sexual maturation and body dimension of examined girls. These results [ŁASKA-MIERZEJEWSKA 1970, 1971] were republished in their entirety in the United States [HULSE 1975]. The fact was an additional inspiration to repeat the study in the next decades.

In subsequent studies the collection of data was increasingly more difficult. Finding a sufficient number of girls within the population of farmers posed problems. In the research conducted in the Krosno region in 1967 among 1334 girls the percentage of those coming from families owning a farm being their only source of income was 44%, their percentage dropped to 13% in 1977, and to only 7.6% in 1987. It should be emphasised that the research was repeated in the same communes (the smallest administrative division in Poland) and, where it was possible, in the same schools.

Departure from farming as the sole source of income was observed also in the remaining 7 provinces covered with the research. As early as in 1977 in two of the regions the percentage of families earning their income exclusively from farming was so low that in 1987 these provinces were excluded from the study and replaced with two new ones: the Leszno and Białystok provinces.

The above mentioned departure from farming in Poland is an understandable phenomenon. Situation of the families earning their income from farming was so bad that it had biological effects, such as delayed sexual maturation and smaller body dimension, on their children. In all 8 regions studied in 1967 and in 1977 the age of menarche for girls in the farmers group was the latest not only compared to the girls from cities or little towns but also in comparison with the girls from farmer-workers families and particularly compared to the girls from families not owning land. Girls from non-farming families were found to have the earliest menarche age as well as the highest stature in comparison to their peers from the

two other groups. [ŁASKA-MIERZEJEWSKA 1983, ŁASKA-MIERZEJEWSKA et al. 1982, ŁASKA-MIERZEJEWSKA, ŁUCZAK 1993]. Differences in the age at menarche among these groups remained significant even when the groups of girls coming from families with similar level of fathers' education and similar number of children were compared.

Only in the crisis decade between 1977 and 1987, when major shortages of food occurred, possession of a farm became an economic privilege. Inhabitants of rural areas who did not own farms were condemned to food rationing. This was immediately reflected in the biological indices of living conditions. In all eight regions a delay in the age of menarche by 0.06 to 0.46 of a year was noted in girls from non-farming families. Consolidated results for eight regions indicated a slight acceleration of menarcheal age only in the farming group of families [ŁASKA-MIERZEJEWSKA, ŁUCZAK 1993]. Delay of the age at menarche in the period between 1978–1988 was noted also in other regions of Poland by HULANICKA et al. [1990]. The greatest delay (by 0.25 of a year) was noted among girls from little towns. In three large cities the delay amounted to 0.12 of a year and only 0.06 of a year in rural areas. In 1987 the average age at menarche for girls from 8 regions of Poland was 13.51 years [ŁASKA-MIERZEJEWSKA, ŁUCZAK 1993] while the result obtained by HULANICKA et al. [1990] was 13.53 years; the delay in the age at menarche was identical in both studies and amounted to 0.06 of a year.

The present paper's objective is to provide answers to the following questions:

1. Did the arrest of the acceleration of

sexual maturation of girls from farming families and the delay of the age at menarche of girls from non-farming families recorded in the 1977–1987 decade change and how?

2. Did the differences in the age at menarche registered at that time in the girls from the three social-occupational groups of rural population change and how?

3. Are the gradients of the age at menarche, number of children in the family and the level of father's education registered in previous decades maintained?

Materials and method

At the turn of 1996/97, 1992 school girls aged from 10 to 18 years from 6 communes in the Krosno province were examined.

The study was conducted in four communes participating in the study also in previous decades (Dukla, Iwonicz, Rymanów and Wojaszówka) and in two new communes (Lesko and Olszanica). Addition of new communes resulted from the need to examine a sufficient number of girls from families earning their income exclusively from farms. Abandoning of farming as the sole source of the family's income takes place on a mass scale in Poland. In spite of the inclusion of additional communes into the study only 200 girls from farming families were examined, which constitutes 10% of the gathered material. This number turned out to be insufficient to calculate the probit mean of the age at menarche. As a result, the mean menarcheal age for the girls from farming families group was calculated with the use of Behrens Kärber formula [PERKAL

1963, ŁASKA-MIERZEJEWSKA 1968]. Generally, the age at menarche calculated by means of the above mentioned formula does not differ from the probit mean and the difference, if present, does not exceed 0.02 of a year.

In primary schools all girls from the fourth to the eighth grade were examined. In basic vocational schools, technical and grammar schools only girls living in rural areas underwent examination.

This report presents the age at menarche in particular socio-occupational groups (defined in the introduction), in groups of families distinguished according to the number of children (1–2 children, 3–4, 5– and more) and in groups distinguished according to the education level of the parents. Three of such education level groups were distinguished: primary education group, basic vocational education group and a composite group of parents with secondary school and academic education.

Results and discussion

Social structure of the population under study

In the period between 1977 and 1997, the social structure of the population under study underwent changes. The proportion of farmers and farmer-workers declined, while the percentage of the inhabitants of rural areas who do not own land increased.

Similarly, the educational structure of the parents changed. The percentage of fathers with primary education decreased from 58% in 1977 to 34% in 1987 and further to 18% in 1997. The percentage of fathers with basic vocational education doubled, from 28% in 1977 to 58% in 1997. The percentage of fathers with

secondary school and academic education increased from 14 do 23%. Between 1987 and 1997 also education structure of the mothers improved (this feature was not recorded in earlier studies).

The changes in the level of parents' education are to a large extent caused by the decrease in the percentage of farmers, being a group with the lowest level of education, and by the increase in the percentage of non-farmers, being a group with much higher education level.

High stability was observed in the structure of the number of children in the families of examined girls. Families with 3-4 children prevail, in subsequent studies such families constituted approximately 50% of the total number of families. Families with 1-2 children constituted 28-30% and families with 5 and more children-approximately 20% (Tab. 1).

Secular trends

The age at menarche of the total number of girls in the Krosno province undivided into subgroups lowered from 13.94 years in 1967 to 13.38 years in 1997. Thus, acceleration of sexual maturation in the course of 30 years amounted

to 0.58 of a year. The greatest acceleration (by 0.37 of a year) took place in the decade between 1967-1977. In the crisis decade between 1977 and 1987 the acceleration amounted to 0.08 of a year and in the decade between 1987 and 1997 the age at menarche lowered by further 0.11 of a year. (Tab. 1, Fig. 1).

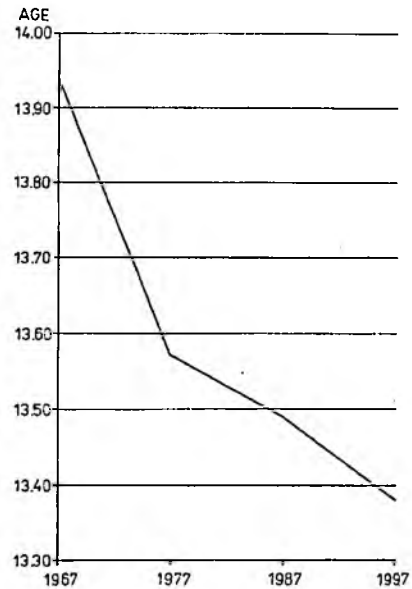


Fig. 1. Age at menarche of rural girls of the Krosno province in subsequent decades

Table 1. Age at menarche of rural girls of Krosno province in subsequent decades

Years of study	1967 N=1134				1977 N=1028				1987 N = 1255				1997 N= 1992			
Groups	%	M	S	S _w	%	M	S	S _w	%	M	S	S _w	%	M	S	S _w
Entire region	100	13.94	1.20	0.06	100	13.57	1.21	0.06	100	13.49	1.15	0.06	100	13.38	1.11	0.05
Source of income																
farmers	43.7	14.15	1.15	0.08	13.2	14.01	1.54	0.21	7.6	14.01	1.39	0.23	10.0	13.52	-	-
farmer-workers					61.4	13.53	1.11	0.07	54.3	13.62	1.30	0.10	49.9	13.34	1.09	0.07
non-farmers	56.3	13.84	1.30	0.08	25.2	13.03	1.10	0.12	38.3	13.31	0.96	0.08	40.1	13.39	1.18	0.08
Family size																
1-2 children					27.5	13.22	1.16	0.12	30.3	13.29	1.02	0.09	30.8	13.12	1.13	0.09
3-4 children					50.6	13.46	1.30	0.09	50.7	13.42	1.11	0.08	49.1	13.37	1.09	0.07
5 and more					21.7	13.75	0.88	0.10	19.0	14.00	1.45	0.16	20.1	13.82	1.11	0.11
Father's education																
primary					57.6	13.67	1.12	0.07	33.6	13.69	1.35	0.11	17.8	13.53	1.41	0.14
basic vocational					28.5	13.34	1.14	0.11	45.1	13.44	1.08	0.08	58.0	13.34	1.00	0.06
secondary school +academic					13.7	12.86	1.35	0.19	21.2	13.26	0.90	0.10	23.3	13.42	1.18	0.11
Mother's education																
primary									47.0	13.71	1.27	0.09	21.8	13.39	1.18	0.11
basic vocational									25.7	13.16	0.95	0.10	39.4	13.53	1.15	0.08
secondary school +academic									27.3	13.40	1.03	0.10	38.6	13.25	1.07	0.07

A considerable decrease of the acceleration of the age at menarche in the course of last 20 years cannot be explained with the exhaustion of the genetic potential, since the menarcheal age of rural girls still takes place much later than the age at menarche recorded in urban areas; these differences may be explained only with social and living conditions.

A small acceleration of sexual maturation within the last 20 years (by 0.19 of a year) ascertained for the total number of all examined girls of the Krosno region does not reflect the actual social and living situation within the rural population. Biological consequences of social and economic transformations in rural areas in Poland may be determined only on the basis of stratified assessment of particular social variables.

Socio-occupational groups

In the crisis decade between 1977 and 1987 the age at menarche of girls from the farmers group did not change. In farmer-workers group a delay of 0.09 of a year was recorded, while in non-farmers group the delay in sexual maturation amounted to as much as 0.28 of a year. (Tab. 1, Fig. 2).

One should remember that the inhabitants of rural areas who did not own land, similarly to the inhabitants of urban areas, had to live on food rations. The delay of the sexual maturation of girls from non-farmers group within rural population taking place in the 1977–1987 decade was recorded in all 8 regions covered by the study. In the region of Choszczno the delay recorded in this socio-occupational group amounted to as much as 0.33 of a year. This means that the girls from non-farmers group had the men-

arche at the latest age compared to the girls from other socio-occupational groups of this region. No such result had been obtained before in any other region and in any other study [ŁASKA-MIERZEJEWSKA, ŁUCZAK 1993].

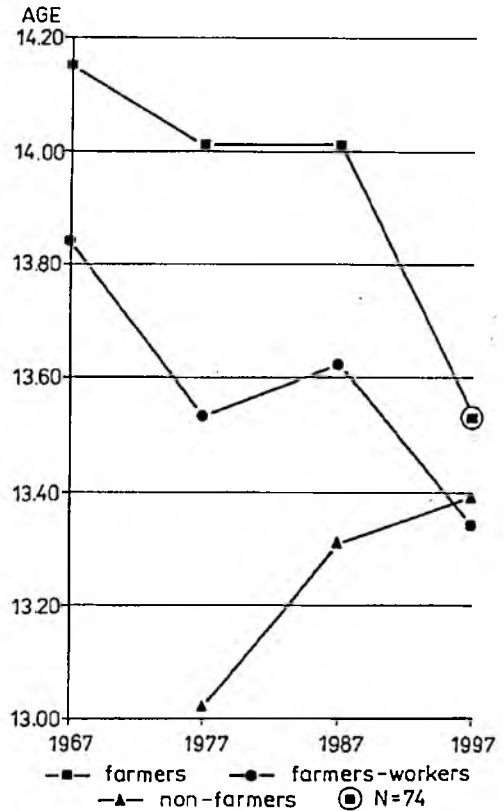


Fig. 2. Age at menarche and source of income

In the Krosno province, in the 1987–1997 decade the acceleration by 0.49 of a year of sexual maturation of girls within farmers group was recorded while in farmer-workers group – by 0.28 of a year. Within the non-farmers group the girls' age at menarche was further delayed by 0.08 of a year, that is by one month. In the discussed decade a very

significant change in living conditions of the rural areas population, of non-farmers group in particular, took place. The change was caused mainly by raising unemployment level. The liquidation of large state-owned farms and production co-operatives as well as the closure of numerous state-owned industrial plants lead to a huge shortage of jobs. In the last two decades possession of a farm became an economic privilege. In the 1977–1987 decade in the composite material from 8 studied regions only in girls from the farmers group a slight acceleration of sexual maturation was recorded. In both other groups a slight delay of the age at menarche was noted. As a result, the difference in the age of sexual maturation among socio-occupational groups in the rural areas of Poland narrowed down from 0.53 of a year in 1967, to 0.31 of a year in 1987 r. [ŁASKA-MIERZEJEWSKA, ŁUCZAK 1993, ŁASKA-MIERZEJEWSKA 1995].

In the Krosno province the difference between the latest maturation age among the girls from the group of farmers and the earliest maturation age in non-farmers group was 0.98 of a year in 1977 and 0.7 of a year in 1987. In 1997 the difference between these groups is 0.13 of a year.

The girls from the farmers group, in spite of a very big acceleration recorded in the last decade, still remains the group with the latest age of menarche. The two other groups of girls start menstruating at a very similar age, but the girls from the non-farmers group have their menarche 0.05 of a year later.

Family size

The relation between the number of children in the family and the age at

menarche proves clearly that the pace of sexual maturation is conditioned economically.

In the crisis decade between 1977 and 1987 a delay by 0.25 of a year in the maturation of girls from families with five and more children was recorded in the Krosno province. As mentioned above in the total material from 8 regions a slight acceleration of the age at menarche was recorded in that decade only in the farmers group, however in girls from large families within this group a delay was also noted.

In the 1987–1997 decade a slight acceleration of sexual maturation was recorded in all family size groups of girls inhabiting the Krosno province. In spite of that, girls from families with 5 children in 1997 have menarche 0.07 of a year later than 20 years ago. Thus, the acceleration in the last decade has not compensated for the delay in the crisis decade (Tab. 1, Fig. 3). The age at menarche of girls from these families is 13.82 years and is the latest among all categories distinguished from all three social variables. The difference between girls from extreme family sizes amounts to 0.70 of a year.

Education of the father and the mother

In the studies conducted in the years 1977 and 1987, clear gradients of the age at menarche in relation to the father's education were noted. In the recent studies the gradient was disturbed as a result of the delay in the age at menarche of rural girls from families with the highest status of the father's education. The delay of maturation in this group in the period between 1977 and 1987 amounted to 0.40 of a year. In the period between 1987 and 1997 the age at menarche was

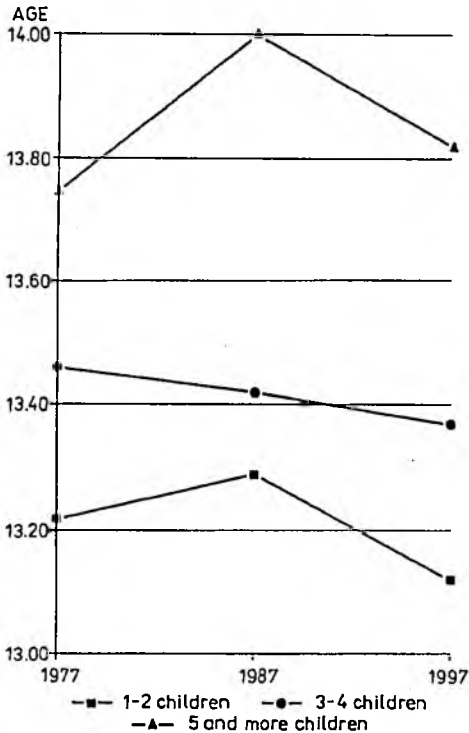


Fig. 3. Age at menarche and family size

further delayed by 0.16 of a year. The delay of the maturation of girls whose fathers' education was of the highest status is not specific to the Krosno province, since all data gathered in the course of studies in rural areas in 1987 indicate the greatest, in comparison with the data gathered in 1977, delay in maturation for the daughters of fathers with secondary school and academic education.

In numerous publications describing evident dependency of biological indices on the education status of the father or of both parents, better indices in the groups with the highest education status were explained with more efficient distribution of rather low income of these families and with a higher awareness with

regard to nutritional, health and body hygiene needs of a child [BIELICKI et al. 1981, CHARZEWSKI et al. 1991, WALISZKO et al. 1980]. Results of the present study prove, that the economic situation of rural intelligentsia is so bad that even the health awareness and care for a child are not enough to compensate for material deprivation. Moreover, the differences in the situation of people with secondary school and academic education living in rural and urban areas should be taken into consideration. These differences are related primarily to the availability of jobs.

In the group of families with primary fathers' education acceleration of the age at menarche by 0.16 of a year was noted in the 1987–1997 decade, while in the group with basic vocational education – by 0.1 of a year. This indicates the reversion to the age at menarche recorded in 1977 (Tab. 1, Fig. 4)

Education level of the mothers was assessed only in the years 1987 and 1997. The acceleration of sexual maturation was noted in girls whose mothers were educated at primary and secondary and academic level, by 0.32 and 0.15 of a year respectively. In the group of girls with basic vocational education of mothers a delay by 0.37 of a year was recorded. A large shortage of jobs for vocationally trained women, particularly in rural areas, may be one of likely reasons for this fact. (Fig. 5).

Range of the age at menarche

In this study the earliest first menstruation was recorded among 11-year-old girls. Among 158 school girls examined in this age group 4 (that is 2.5%) were menstruating. The oldest examined girl who has not started menstruating yet was 16 years old. The number of girls

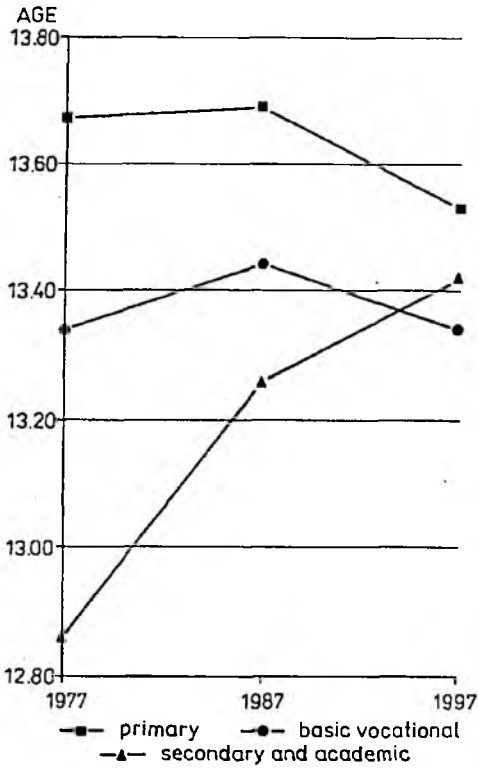


Fig. 4. Age at menarche and father's education

examined in this age group was 70. In the material from 8 regions compiled in 1987 concerning a group of 13 thousand girls 4 menstruating 10-year-old girls were recorded, which constituted 0.8% of the total number of examined schoolgirls. In the group of 16-year-olds there were 6.5% non-menstruating girls. The oldest non-menstruating girl was 18 years old. A very high number of girls covered by the study enabled to record extreme cases of the phenomenon under study.

In 1987 the age at menarche of the rural girls in the Krosno province (13.49) corresponded to the mean value obtained as a result of research carried out in 8 regions (13.51). The range of the age at menarche in the rural areas of Poland

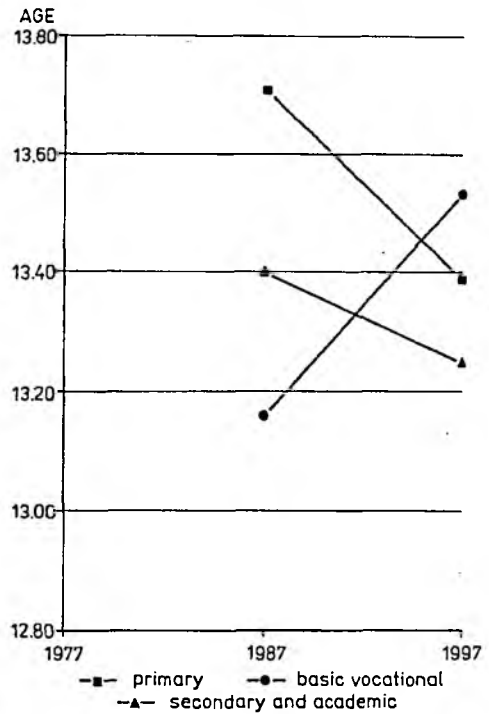


Fig. 5. Age at menarche and mother's education

was very wide. Girls inhabiting the Leszno province matured at the earliest age (13.18) the inhabitants of the Suwałki province – at the latest age (13.88). [ŁASKA-MIERZEJEWSKA, ŁUCZAK 1993]. In comparison with Warsaw girls, examined in 1986 [ŁASKA-MIERZEJEWSKA et al. 1989) the rural girls of the Krosno province examined in 1987 started menstruating 0.70 of a year later; compared to the girls living in three big cities [HULANICKA et al. 1990] their menarche was delayed by 0.54 of a year.

Conclusions

In the subsequent decades of 1977–1987 and 1987–1997 a slight acceleration of the age at menarche by 0.08 and

0.11 of a year respectively was recorded. However, these results do not reflect the actual socio-economic situation within rural community. In this period a delay in the age at menarche of the girls in the non-farmers group, in large families group and in group of girls with secondary school or academic fathers' education took place.

In the non-farmers group the delay in the age of menarche was 0.28 of a year in the 1977–1987 decade. In the last decade the delay increased by further 0.08 of a year. As a result of this in 1997 the non-farmers group ceased to be a group of the earliest sexual maturation. The delay in the sexual maturation of this group was recorded in all eight regions studied in 1987.

In 1967 the difference between farmers group characterised with the latest maturation and the earliest maturing non-farmers group was 0.98 of a year, while in 1997 these groups differ only with 0.13 of a year. Narrowing down of this difference resulted both from the acceleration of maturation in the farmers group in the last decade and from the delay in maturation in non-farming group in two subsequent decades.

In the 1977–1987 decade the age at menarche of girls from families with five and more children underwent a considerable lowering by 0.25 of a year. In spite of the acceleration of maturation by 0.18 of a year in the last decade their age of menarche in 1997 occurs later than 20 years ago. Also the difference between the extreme groups of family size have deepened from 0.53 of a year in 1977 to 0.70 of a year in this year.

A dramatic delay in the age at menarche was noted in the last two decades in the girls having fathers with secondary

school and academic education: in the former decade the delay amounted to 0.40 and in the latter one to 0.16 of a year. Girls within this group mature sexually 0.08 of a year later than daughters of fathers with basic vocational education. The delay in maturation by 0.3 of a year in the group of girls having fathers with secondary school and academic education was recorded in entire rural material in the 1977–1987 decade. The high status of secondary school and academic education of the mothers was maintained.

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Streszczenie

Na przełomie lat 1996/97, po raz czwarty, w odstępach 10-letnich, powtórzono badania dziewcząt wiejskich w województwie krośnieńskim. Zbadano 1992 uczennice w wieku od 9 do 18 roku życia pochodzące z rodzin utrzymujących się wyłącznie z rolnictwa, z rodzin chłopo-robotniczych oraz spośród mieszkańców wsi nie mających ziemi. Zarejestrowano też dzietność rodzin oraz wykształcenie każdego z rodziców.

W całym badanym rejonie wiek menarchy wynosił $13,97 \pm 1,20$ lat w 1967 r. i $13,38 \pm 1,11$ lat w 1997r. W ciągu trzydziestu lat przyspieszenie dojrzewania wyniosło 0,59 roku. Wynik ten nie odzwierciedla jednak prawdziwej sytuacji społeczno-bytowej wewnątrz społeczności wiejskiej, bowiem w okresie 1977–1997 miało miejsce opóźnienie wieku menarchy w grupie nierolniczej o 0,36 roku, w grupie rodzin wielodzietnych o 0,07 roku oraz w grupie dziewcząt, których ojcowie mają średnie i wyższe wykształcenie – o 0,56 roku.

W badaniach z 1977 roku zarejestrowano wyraźne gradienty wieku menarchy: najwcześniej dojrzewały dziewczęta z grupy nierolniczej, następnie z grupy chłopo-robotniczej i najpóźniej – z grupy rolniczej. Podobne gradienty odnotowano w grupach dzietności rodziny i wykształcenia ojca. Gradienty te uległy zmniejszeniu w 1987 r., ponieważ kryzys ekonomiczny mocniej dotknął wiejską ludność nierolniczą, w tym rodziny o najwyższym statusie wykształcenia. Sytuacja ekonomiczna tych rodzin uległa dalszemu pogorszeniu w dekadzie 1987–1997 w wyniku bezrobocia.