



ELSEVIER

Contents lists available at ScienceDirect

## Economics and Human Biology

journal homepage: <http://www.elsevier.com/locate/ehb>

# The timing of sexual maturation among boys and girls in eastern Poland, 1980–2000: A rural–urban comparison

Helena Popławska<sup>\*</sup>, Adam Wilczewski, Agnieszka Dmitruk, Wojciech Hołub

University of Physical Education in Warsaw, Faculty of Physical Education and Sport in Białą Podlaska, Akademicka 2, Białą Podlaska 21-500, Poland

## ARTICLE INFO

## Article history:

Received 3 December 2009

Received in revised form 20 January 2011

Accepted 23 January 2011

Available online 26 February 2011

## Keywords:

Adolescence

Sexual maturation

Puberty

Poland

Economic transition

## ABSTRACT

The aim of this study was to determine secular changes in the sexual maturation of children and adolescents from Eastern regions of Poland between 1980 and 2000, with special attention paid to rural–urban differences. Our sample comprised 34,055 girls and 28,100 boys from 9 to 18 years of age. The age at which each gender reached each stage of sexual maturation was examined, along with menarcheal age in girls. An increase in the rate of sexual maturation was observed over the 20-year period of this study. Menarcheal age in girls decreased by 0.59 years. The length of sexual maturation decreased: from 6.58 years to 3.85 years in girls and from 5.84 years to 3.65 years in boys. A significantly faster rate of sexual maturation was observed between 1990 and 2000. Over the entire 20-year period, adolescents living in rural settings experienced a slower rate of sexual maturation than did their urban peers.

© 2011 Elsevier B.V. All rights reserved.

## 1. Introduction

Achieving sexual maturity is a dynamic process that occurs among humans in the second decade of life. Both genetic and environmental determinants lead to individual differences in the dynamics of sexual maturation, with changes and rates of change differing among individuals of the same age. Environmental factors implicated in the child's development include, among others, socio-economic living standards that have an indirect effect on nutritional patterns, life-style choices, etc. (Cole, 2003; Padez and Rocha, 2003; Were, 2007; Wronka and Pawlińska-Chmara, 2005; Villamor et al., 2009).

After the Second World War, systematic improvements in living standards were observed in Poland. These improvements had contributed indirectly to the higher rates of the physical development and sexual maturation of both genders. Between 1955 and 1978, a decrease in menarcheal age was observed in both urban and rural areas (Hulanicka and Waliszko, 1991). However, in the late 1970s and early

1980s, with declining economic conditions, scientists observed not merely inhibition in the sexual-maturation rate but an actual delay (Łaska-Mierzejewska and Olszewska, 2006) being most evident in small towns (Hulanicka and Waliszko, 1991). During later period, i.e. at the turn of 1980s and 1990s, the transformation of Polish economic system began with the introduction of free market economy (Zienkowski, 2000). This transformation was reflected in changes in living conditions and could indirectly affect population health and parameters of physical development (Chrzanowska et al., 2007; Hulanicka et al., 2007; Koziół et al., 2004; Lipowicz, 2007). However, in 1990s the age of first menstruation decreased compared to 1980s (Przewęda and Dobosz, 2003; Łaska-Mierzejewska and Olszewska, 2004).

Our study concentrates on Eastern Poland, because it is one of the least developed and hence poorest areas of the country. Girls and boys from this region are rarely included in systematic studies of rates of physical development.

## 2. Materials and methods

### 2.1. Sample selection

The sample was collected in a series of five investigations covering the years 1980, 1983, 1985, 1990, and 2000.

<sup>\*</sup> Corresponding author.

E-mail address: [helena\\_poplawska@poczta.onet.pl](mailto:helena_poplawska@poczta.onet.pl) (H. Popławska).

The study's subjects comprised 34,055 girls and 28,110 boys, from 9 to 18 years of age living in the Eastern provinces of Poland (Podlaskie, Lubelskie, and Podkarpackie). In 1980 the investigated schools were selected from a list provided by school superintendents at random but the list's proportions of particular types of schools were maintained. By these means 84 schools were sampled, constituting from 1.86% to 2.40% of the total number of schools and from 1.17% to 1.57% of the girls and from 1.07% to 1.24% of the boys in these three provinces. In subsequent years, investigations were conducted in the same locations, with the result that some of the children were surveyed several times.

The surveys began with the distribution of a questionnaire among the children's parents, requesting – if they consented to their children's participation – the date of birth and place of residence of the child in question. Thus the questionnaire permitted division of the participants into two groups, rural (villages) and urban (towns and cities).

## 2.2. Stages of sexual maturation

Evaluations of changes in sexual maturation were based on stages of secondary-sexual-trait development as defined by the five-point Tanner scale (1962) modified by Milicer (1973).<sup>1</sup> The study involved the evaluation of the development of girls' breasts and pubic hair and boys' genitals and pubic hair. According to Tanner, the first stage of development corresponds to the period of time when puberty has not yet appeared, the second stage corresponds to the onset of puberty, and the fifth stage to full maturity. Typically, menarche appears in girls between the third and fourth stages of the Tanner scale. Evaluation of the stages of sexual maturation was conducted by the authors of this paper, trained at the National Institute of Hygiene in Warsaw. Examinations were conducted in school consultation rooms or other facilities assuring intimacy and conformity with basic hygienic standards. This part of the study was approved by the Commission of Ethics at the Academy of Physical Education in Warsaw and also by the children participating in the study and their parents.

## 2.3. Age at menarche

The age at menarche was determined by means of a "yes – no" (status-quo) method, permitting the examiners to determine whether or not each of the girls had begun to menstruate, covering girls from the age when none of them

has begun menstruation until the age when all of them had already begun menstruating.

## 2.4. Statistical methods

Data concerning a participant's age at menarche and at the start of each stage in the sexual-maturation process were analyzed with Finney's probit method (1952), permitting us to calculate the mean age at menarche and the mean age of the appearance of consecutive stages of sexual maturation among girls and boys throughout the entire series of investigations (1980, 1983, 1985, 1990, and 2000). Mean age at menarche and at the start of each of the other stages of sexual maturation were compared by means of the Student's *t*-test for unequal variances between consecutive time series and between participants living in rural and urban settings. The differences were considered significant when  $p < 0.05$ . All calculations were carried out by means of the Statistica 7 package (StatSoft®, Poland).

## 3. Results

### 3.1. Girls

Between 1980 and 1985, an increase in average age of reaching the second stage of sexual maturity was observed in girls, but this parameter decreased in further study series (Fig. 1). At the end of the 20-year period, reaching this stage of sexual maturity took 0.71 year less than it had taken at the beginning (Table 1). Similarly, girls reach the third and fourth stages of sexual maturity earlier – by 1.15 and 0.93 years, respectively. Menarche appeared between the third and fourth stages hence two to three years after the appearance of the first signs of secondary-sexual-trait development. Over the course of the 20 years of this study, the menarcheal age declined by 0.59 on average, but in neither continuous nor systematic manner. Analyses of the age at which full sexual maturity was reached by girls demonstrated that the 1980s were characterized by a sharp decline in the age at which the fifth stage appeared, whereas the period from 1990 to 2000 was characterized by stabilization of the age at which that stage began (Fig. 1).

We observed that across the entire 20-year observation period there was an overall reduction in the time that girls needed to reach sexual maturity. In 1980, the age difference between girls at the onset of sexual maturation (second stage) and those at the final, fifth, stage was 6.58 years, as opposed to only 3.85 years in 2000.

As for the age at which girls reached the second stage, in 1980 no significant differences were observed between girls from rural and urban settings, whereas girls from urban settings reached menarche and the fifth stage earlier. In 2000, girls from urban settings reached not only the second and the fifth stages of sexual maturation but also menarche at a significantly younger age (Table 1).

### 3.2. Boys

Maturation pattern of the boys was characterized by a very distinct delay in the rate at which they reached the

<sup>1</sup> According to modifications introduced by Milicer, assigning subjects to a particular stage of sexual maturity can take place after the appearance of the first characteristics typical of a given stage, irrespective of whether the characteristics are linked with pubic-hair growth or the development of breasts or genitals. Thus, for instance, the appearance of breast buds or the enlargement of testicles and penis without the appearance of pubic hair, on the one hand, or the appearance of pubic hair but not of any breast or genital development, on the other, indicates the start of the second stage in the sexual maturation of a girl or a boy, respectively.

Download English Version:

<https://daneshyari.com/en/article/5057125>

Download Persian Version:

<https://daneshyari.com/article/5057125>

[Daneshyari.com](https://daneshyari.com)