

## Sexual Maturation in Schoolpupils in The Town of Smolyan in 1980s, in their Mothers and its Sociofamilial Differentiation

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In 1986 in the district center Smolyan a transversal study of sexual maturation in 192 girls and 169 boys aged 9 to 17 and a retrospective study of age at menarche in 220 their mothers were carried out on the background of their sociofamilial conditions. A relatively late sexual maturation is found. Sexual maturation terms are close to these in small towns and villages, not to these in the big cities. This phenomenon is due to the specific sociofamilial structure and the ruralization in the way of life. The withingroup analysis shows significant social differentiation in pubertal terms both in children and in their mothers. Fathers social status seems to be more important than mothers one in this differentiation. Schwidetzky-Pavilonis' sexual maturation index is found to be a good measure of the influence of the environment on the maturation in boys (as the age at menarche in girls is).

*Key words:* puberty, age at menarche, adolescence in boys, sexual maturation index, sociofamilial differentiation

### Introduction

The majority of the investigations on sexual maturation in Bulgaria are carried out in the cities (predominantly Sofia) and other highly urbanized areas [4]. The aim of this study is to throw some light on this process in a less urbanized environment.

The town of Smolyan is located in the Rhodope mountains in South Bulgaria on an altitude of about 900-1000 metres. It was formed in 1958 by consolidation of two small towns (Smolyan, Ustovo), two big villages (Upper and Lower Raykovo) and a few smaller ones. Even today it is not a compact built area, but a 16 kilometres long series of settlements. Before 1975 its population increased quickly because of high rural-urban migration. Then the migration balance became negative. About one third of the population is Bulgarian-speaking, but connected with the Islam (mostly by family tradition), with a relatively conservative way of life. Because of all the above mentioned reasons in 1980s Smolyan was a district center, but the way of life of its 30 000 inhabitants was similar to that in the small towns and villages (the phenomenon of "ruralization").

## Material and Methods

In the autumn of 1986 a transversal study of sexual maturation with an investigation on sociofamilial conditions was carried out in 192 schoolgirls and 169 schoolboys, aged 9 to 17 years at last birthday, in the town of Smolyan. In 220 women, their mothers, data of age at menarche and of sociofamilial origin have been collected.

The following signs of sexual maturation are traced: axillary and pubertal hair and breast development in both sexes, beard hair in boys and menarche in girls. The secondary sexual signs are evaluated by a scale from 0 to 3 points, excluding pubic hair and breast development in boys — from 0 to 4 and from 0 to 2 respectively [9]. If needed, intermediate marks are used. For evaluation of the stage of puberty development the total index of sexual maturation after Schwidetzky and Pavilonis is used. This index is a generalisation of the particular sexual maturation signs and varies from 0 to 12. On the basis of it the following stages of sexual maturation are distinguished: 0 — juvenile stage; 0.5 — first puberty signs or juvenile-2 in girls, prepuberty in boys; 1.0 — prepuberty in girls; 2.0 (1.5) — early puberty or phasis cetera in girls (boys); 6.5 (5.0) — late puberty or phasis lenta in girls (boys); 10.5 — postpuberty in both sexes; 12.0 — adult stage [1].

Median age at menarche and other stages of puberty is evaluated by probit analysis. In the subsamples with different sociofamilial conditions three-year moving sums and average ages are used to estimate the proportion of adolescents of the traced stage of puberty by age (the basic data for probit analysis).

## Results and Discussion

The sexual maturation of the investigated boys and girls is relatively late [Table 1]. The median age at menarche is  $13.44 \pm 0.17$  years against  $12.84 \pm 0.11$  in Sofia ones in the same time [6] — a delay of 0.6 years. When calculated excluding breast development (as in Sofia adolescents) the sexual maturation index 5.0 (the peak moment in the puberty in the boys) appears at  $15.0 \pm 0.2$  years against  $14.3 \pm 0.1$  in Sofia ones [6], i.e. also by 0.7 years later. Thus the sexual maturation index in boys demonstrate its value as an indicator of the differentiation of the sexual maturation terms.

The explanation of the relatively late maturation in Smolyan adolescents against Sofia ones is found to be in their different sociofamilial characteristics: lower parental education, more manual workers among the parents, higher number of children in the family etc. (Table 2). These characteristics are usually connected with a later sexual maturation [2].

Since most of the investigations on sexual maturation in Bulgaria are carried out in urbanized areas, the reported ages at menarche (from late 1960s to 1980s) are close to these found in Sofia. Only in the small mountain town of Kostenets and in the rural population in the district of Haskovo the ages at menarche (13.4 and 13.8 years respectively) are similar to this found in Smolyan [7, 8]. Retrospective studies in Rhodopian local rural samples show even higher mean age at menarche — about 13.8 years in traditionally Christians and 14.6 in traditionally Muslims in 1960s and 1970s [4]. The figures obtained in retrospective study in Sofia university students are also close to Smolyan one — 13.6 in the students from small towns and 13.3 in these ones from medium towns (mostly district centers) in the late 1970s [10].

The withingroup analysis shows that the dwelling conditions show the stronger connection with the sexual maturation in the Smolyan boys and girls (Table 3). In

Table 1. Age at some stages of sexual maturation in Smolyan adolescents (years)

Sign	Girls				Boys			
	Stage	Mean	<i>m</i>	<i>s</i>	Stage	Mean	<i>m</i>	<i>s</i>
Menarche		13.44	0.17	1.21				
Breast	Ma 0.5	10.14	0.38	1.45	C 0.5	12.72	0.28	2.43
	Ma 1.5	12.68	0.20	1.35	C 1.0	13.57	0.20	1.68
	Ma 2.5	13.82	0.19	1.37	C 1.5	14.66	0.17	1.21
	Ma 3.0	15.31	0.20	1.65	C 2.0	14.99	0.17	1.08
Pubic hair	P 0.5	11.31	0.23	1.32	P 0.5	12.44	0.20	1.58
	P 1.5	12.46	0.14	0.91	P 1.5	13.45	0.16	1.30
	P 2.5	13.03	0.19	1.37	P 2.5	14.78	0.17	1.23
	P 3.0	13.72	0.22	1.67	P 3.5	16.24	0.37	1.65
Axillary hair	Ax 0.5	11.71	0.22	1.42	P 4.0	(17.6)	(1.7)	(2.6)
	Ax 1.5	13.56	0.18	1.27	Ax 0.5	13.95	0.20	1.78
	Ax 2.5	14.12	0.16	1.11	Ax 1.5	15.10	0.21	1.40
	Ax 3.0	14.69	0.17	1.40	Ax 2.5	16.82	0.51	1.91
Beard					Ax 3.0	(17.3)	(0.8)	(1.3)
					Ba 0.5	14.27	0.32	2.43
					Ba 1.5	16.27	0.36	1.53
					Ba 2.5	(17.6)	(0.8)	(1.8)
Juvenile 2	SMI 0.5	10.09	0.37	1.43	Ba 3.0	(19.0)	(3.8)	(2.4)
Prepuberty	SMI 1.0	11.26	0.24	1.31				
Phasis cetera	SMI 2.0	11.86	0.20	1.04	SMI 0.5	11.93	0.47	1.82
Phasis lenta	SMI 6.5	13.09	0.16	1.08	SMI 1.5	12.78	0.21	1.75
Postpuberty	SMI 10.5	14.44	0.16	1.18	SMI 5.0	14.61	0.17	1.17
Adult	SMI 12.0	15.72	0.19	1.45	SMI 10.5	16.67	0.37	1.28

(17.) uncertain values because exceeding the limits of the period under study

Sofia the most important role plays the income per capita [6]. The explanation can be that only regular money incomes were reported in the investigations. However, in Smolyan (as in the villages and the small towns) the small private farming played an important role in family economy in this period. Thus the dwelling conditions reflect better the social status of a family in Smolyan (in the big cities housing was centralized and relatively more independent from the family well-being).

The mean age at menarche in pupils' mothers is  $14.24 \pm 0.09$  years against  $13.32 \pm 0.07$  years in Sofia schoolchildren mothers of the same generation [5]. It reflects the situation around 1960 (1950s and 1960s were the period of adolescence in these women). There are strong sociofamilial differences in their age at menarche. The most important of them are the differences by the education of the father and by the number of sibs (Table 4). In the adolescents father's education and occupation are also more important than mother's ones. The first present statistically significant relations with 7 markers of sexual maturation, the second — only with one (mother's education with age at menarche). Differences by education of father and by number of sibs were also the higher ones in Sofia university students menarcheal age, which reflects the situation in late 1970s [10] and in Sofia adolescents in mid 1980s [6]. The investigations about 15 years later in Smolyan adolescents also demonstrate, that father's education influences stronger the growth than mothers, despite the well pronounced acceleration of the sexual maturation in the period 1960-2000 — age at menarche decreased from 14.2 to 12.8 years [3].

**Table 2.** Comparison between the families of Smolyan and Sofia adolescents

Sociofamily conditions:	Smolyan			Sofia			
	<i>N</i>	<i>M</i>	<i>m</i>	<i>N</i>	<i>M</i>	<i>m</i>	<i>p</i> ≤
Children in the family	361	2.04	0.03	902	1.87	0.03	0.001
Father's education, years	271	11.8	0.2	540	13.8	0.1	0.001
Mother's education, years	264	11.9	0.2	544	13.6	0.1	0.001
Monthly income per capita, levs	263	118.3	2.4	511	126.3	2.0	0.02
Dwelling surface per capita, sq.m.	233	21.6	0.5	492	19.2	0.4	0.001
Inhabitants per room	254	1.59	0.05	502	2.00	0.05	0.001
	<i>n</i>	%		<i>n</i>	%		<i>p</i> ≤
Father's occupation:							
manual work	185	56.1		174	31.4		
nonmanual work	145	43.9		381	68.6		0.001
Mother's occupation:							
manual work	95	34.5		81	14.8		
nonmanual work	179	65.1		461	84.3		0.001
Muslim confessional tradition	143	39.6		3	0.3		0.001

**Table 3.** Sexual maturation and dwelling conditions

Dwelling conditions	Age (years) at:					
	SMI 5.0 in boys			menarche in girls		
	<i>N</i>	<i>M</i>	<i>m</i>	<i>N</i>	<i>M</i>	<i>m</i>
Dwelling surface per capita, sq.m.						
less than 21	59	14.95	0.19	59	13.88	0.15
over 22	54	14.02	0.15	51	13.07	0.17
Inhabitants per room:						
less than 1.6	75	14.26	0.13	79	13.47	0.12
over 1.67	53	14.96	0.23	47	14.14	0.26

**Table 4.** Age at menarche in Smolyan women by number of sibs and parental education

Family characteristics	<i>n</i>	Age at menarche (years)			
		<i>M</i>	<i>m</i>	<i>s</i>	
Number of sibs					
0-1	121	13.90	0.12	1.36	
2-3	72	14.50	0.14	1.21	
4-8	26	15.08	0.23	1.20	
Father's education, years					
0-4	48	14.70	0.23	1.58	
8	124	14.30	0.11	1.27	
10+	43	13.61	0.16	1.09	
Mother's education, years					
0-4	56	14.74	0.18	1.36	
8	138	14.13	0.11	1.32	
10+	25	13.71	0.25	1.25	

## Conclusions

1) A relatively late sexual maturation is found in Smolyan, due to the specific sociofamilial structure and the ruralization in the way of life.

2) Even in these relatively small samples statistically significant differences in pubertal terms in different sociofamilial environment can be traced.

3) The sexual maturation index is nearly such a good indicator of the influence of the sociofamilial environment on the sexual maturation in boys, as the menarche in girls.

4) Father's social status seems to be more important factor in the differentiation of sexual maturation terms as in Smolyan and in Sofia, i.e. Bulgarian society is still "patriarchal".

## References

1. Cieslik, J., M. Drozdowska, A. Malinowski. Norma rozwojowa — teoretyczne i praktyczne aspekty oceny rozwoju biologicznego człowieka. — In: *Antropologia fizyczna* (Editors: A. Malinowski, J. Strzalko). Warszawa-Poznan, PWN, 1986, 511-536.
2. Laska-Mierzejewska, T., E. Luczak. Biologiczne mierniki sytuacji społeczno-ekonomicznej ludności wiejskiej w Polsce w latach 1967, 1977, 1987. Wrocław, Zakład Antropologii PAN, 1993, 1-127.
3. Mladenova, S., M. Nikolova. Intragroup differences in morphological characteristics in children and adolescents from Smolyan region based on social and economic factors. — *Anthropology*, 4, 2003 (in print).
4. Stoev, R. Sexual maturation in girls from Bulgaria (a review). — In: *Growth and Ontogenetic Development in Man IV*, Prague, Dept. of Anthropology, Charles Univ., 1994, 197-200.
5. Stoev, R. Age at menarche in women in Sofia. — *Papers of Anthropology*, VI, 1995, 218-220.
6. Stoev, R., T. Kazakova, L. Zhelkova, L. Tsacheva. Sexual maturation and sociofamilial conditions in school boys and girls in Sofia. — *Anthrop. Kozl.*, 32, 1989/90, 131-135.
7. Бъчварова, М., Й. Великова. Менархе при момичетата от Костенец. — *Научн. Труд., Пловд. Унив.*, 22, 1984, № 1, Биол., 287-296.
8. Дамянова, Цв. Показатели за нормален пубертет при момичета. Дисерт. труд (София), 1-238.
9. Миклашевская, Н. Н. Биологический возраст. — В: *Морфология человека*. Москва, МГУ, 1983, 20-25.
10. Стоев, Р., Цв. Казакова, Л. Желкова, Л. Цачева. Възраст при менархе и някои специфични за човека екологични фактори при студентки в град София. — В: *Приносът на младите научни работници при решаването на екологичните проблеми*. Враца, СНРБ — клон Враца, 1988, 151-156.