

## Age at Menarche in Sofia Girls /1984-2002/

*R. Stoev, Z. Mitova, L. Yordanova*

*Institute of Experimental Morphology, Pathology and Anthropology with Museum,  
Bulgarian Academy of Sciences, Sofia*

The purpose of this paper is to compare the results of two last cross-sectional studies of age at menarche in Sofia (1984-1987 and 2001-2002). The comparison shows that in the beginning of 21st century the mean age at menarche (calculated by probit analysis) in Sofia girls remains on the same level as in 1980s –  $12.9 \pm 0.1$  years. Its standard deviation is on the level of 1.3-1.4 years, typical for socially heterogeneous samples. A leveling of age at menarche in families with different number of children has been found, the causes of which need further study. The available data do not allow determining whether there was variation of the timing of puberty under the changes of social conditions between our researches and in the next decade.

*Key words:* age at menarche, socio-familial conditions, number of children in the family, acceleration, puberty.

### Introduction

The appearance of first menstruation (menarche) is used as a relatively easy for study and objective indicator of the degree of sexual maturation in girls. The age at menarche (AM) itself is very sensitive to the influence of the environment and is used for evaluation of the social conditions equally with the adult height. It is most accurately determined on the basis of the proportion of menstruating girls by age from cross-sectional studies (see a review in [7]).

The purpose of this paper is to compare the results of two last cross-sectional studies of AM in Sofia (1984-2002). They surround a period of great social changes and can serve as an indicator of how these changes affect the health and biological status of the young generation.

### Material and methods

In 1984-87 by R. Stoev and L. Yordanova in a cross-sectional study 462 girls aged 9 to 16 years at the last birthday were examined in Sofia and in 2001-2002 – 565 girls aged 9 to 15 by Z. Mitova and L. Yordanova [4, 7]. They were distributed in one year age groups. Mean AM was calculated by probit analysis [2].

Table 1. Investigated and menstruating girls by age

Age (yrs) at last birthday	1984-1987			2001-2002		
	Girls n	menstruating		Girls n	menstruating	
		n <sub>m</sub>	P, %		n <sub>m</sub>	P, %
9	34	0	0	81	0	0
10	66	2	3.0	75	3	4.0
11	65	6	9.2	85	10	11.8
12	58	23	39.7	83	26	31.3
13	86	72	83.7	81	54	66.7
14	49	45	91.8	86	74	86.0
15	63	62	98.4	74	73	98.6
16	41	40	97.6	nd	nd	nd
total	462	250	54.5	565	240	42.5

## Results and discussion

Of the girls investigated in 1984-1987 250 had menarche and of the surveyed in 2001-2002 – 240. The earliest cases of menstruating girls are in the 10 year age group and the latest single cases of girls without menses – in the age groups 15 and 16 years (Table 1, Figure 1). Subjected to probit analysis these data show that mean AM in 1980s was  $12.90 \pm 0.12$  (SD=1.39) and at the beginning of 20<sup>th</sup> century –  $12.92 \pm 0.09$  (SD=1.28).

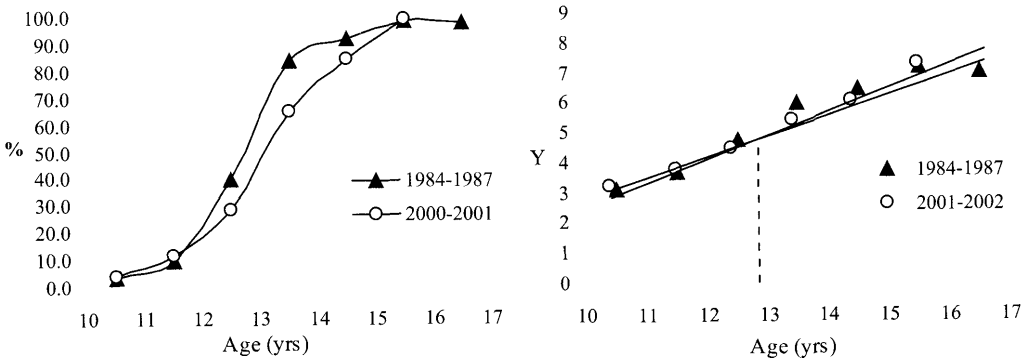


Fig. 1. Proportion of menstruating girls by age and its probit transformation Y.

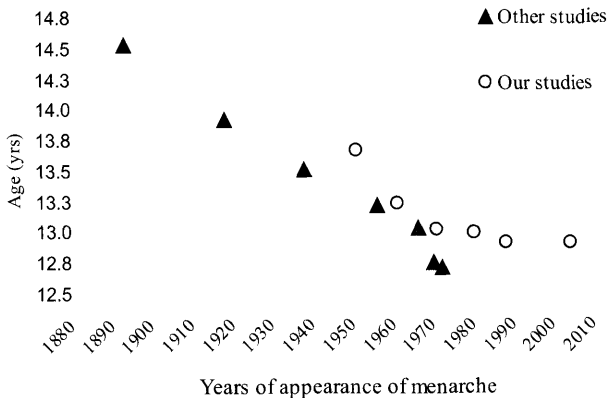


Fig. 2. Mean age at menarche in Sofia.

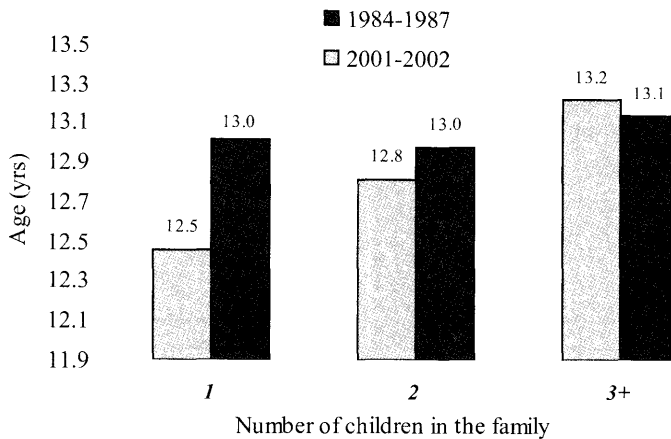


Fig. 3. Mean age at menarche by number of children in the family.

The mean AM is virtually the same, and the standard deviation is on the level typical for social heterogeneous samples [1].

The results of previous cross-sectional studies in which probit analysis can be made (even if it is not done in the original paper) show mean AM in Sofia of: 13.02 at 1963 [6] and of 12.74 at 1967 [3], statistically not different than these obtained by the authors. Retrospective studies in adult women and university students which also provide comparable, albeit less accurate results give mean AM in Sofia 13.00 around 1968 and 12.98 around 1977 [7] (Fig. 2).

All these results suggest a relatively stable average AM and therefore timing of puberty in Sofia from 1960s to 2002.

Meanwhile, in the smaller localities can be traced still a process of acceleration of the sexual maturation in the places for which comparable data exist (Haskovo – [3, 8]; Smolyan – [5, 7]).

Unfortunately, we do not have materials to see how the timing of sexual maturation changed in the extremely dynamic and socially difficult period of 1990s. On basis of studies in other countries AM during this period should have increased, reaching a maximum at the most difficult 1996-1997 and then declined, but our data are from before and after the crisis (see review in [7]).

The survey in 1984-1987 was accompanied by an extensive survey of socio-familial conditions, allowing tracing the relationship of the individual factors of the social environment with the terms of sexual maturation. Unfortunately, the survey in 2001-2002 was far less complete. Only the answers of the question about the number of the children in the family of the surveyed students can be used.

The results show that while in 1980s there is a strong correlation between the number of children in the family and AM, in the beginning of 21<sup>st</sup> century it disappears and the mean AM in families with one, two or three children differs within the statistical error (fig.3). Such a paradoxical lack of connection requires further research on the subject. Most likely it is related with the sharp decline of fertility in 1990s and the transition from two-children to one-child family model.

## Conclusion

In the beginning of 21<sup>st</sup> century the mean age at menarche (calculated by probit analysis) in Sofia girls remains on the same level as in 1980s –  $12.9 \pm 0.1$  years. Its standard deviation is on the level of 1.3-1.4 years, typical for socially heterogeneous samples.

A leveling of age at menarche in families with different number of children has been found, the causes of which need further study.

The available data do not allow determining whether there was variation of the timing of puberty under the changes of social conditions between our researches and in the next decade.

## References

1. W a n g e r m e z, J. L'age a la menarche. Variations dans l'espace et dans le temps. – Soc. d'anthrop. du Sud Ouest, Bull. trim., 16, 1981, 1, 51-63.
2. W e b e r, E. Grundriss der Biologischen Statistik. – Jena, Gustav Fischer Verlag, 1964, 1-582.
3. Д а м я н о в а, Цв. Показатели за нормален пубертет при момчетата. – Дис., София, 1974, 1-238.
4. М и т о в а, З. Антропологична характеристика на физическото развитие, телесния състав и телесната охраненост на 9-15 годишни деца и подрастващи от София. – Дис., София, 2009, 1-225.
5. М л а д е н о в а, С., Антропологична характеристика на растежа и развитието на деца и подрастващи от Смолянски регион в съвременните условия на живот. – Дис. Пловдив, 2003, 1- 193.
6. С е и з о в, Хр. Върху избързването на пубертетното развитие на учащите се в София в интервал от десет години. – Вър. физ. култ., 3, 1964, 180-183.
7. С т о е в, Р. Антропологична характеристика на подрастващи – физическо развитие и полове съзряване във връзка със семейно-битовите условия. – Дис., София, 2007, 1- 177.
8. Т и н е ш е в, Сл. Антропологична характеристика на деца и подрастващи. – Дис., Пловдив, 2009, 1-325.