

Seasonality of menarche in Bulgaria

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Data of monthly distribution of menarche in 799 school and university students (9 samples) are analysed and compared to data from 10 other samples. Two basic types of menarcheal seasonality in Bulgaria can be distinguished: 1) spring-summer accumulation plus a small winter peak — in more urbanized populations; 2) two periods of accumulation, summer and winter — in less urbanized populations. The results support the concept that influence of social environmental factors on menarche is stronger than the influence of natural environment.

Key words: menarche, seasonality of menarche, influence of social factors on menarche, urbanization and menarche.

Seasonal oscillations of biologic functions in man constitute a basic problem in human ecology. Here belongs also the phenomenon of seasonality of the first menstruation — menarche [7].

There are some data about seasonality of menarche in some maturation studies in Bulgaria [1, 4, 5, 6, 8]. But there is not a study dedicated especially to this problem.

The aim of the present study is to trace the total picture of seasonality of menarche in Bulgaria and its peculiarities in the different groups of the population.

Data of investigations in schoolgirls in Sofia ($n = 241$) and Smolyan ($n = 110$) and of university students in Sofia ($n = 927$), collected in 1984-1987 have been used. Students responses account for menarcheal distribution of about 9 years before the investigation (late 1970s). For analysis χ^2 -test has been used.

The question about the month of menarche was answered by 235 schoolgirls in Sofia (97,5 %), 84 — in Smolyan (76,4 %) and by 480 university students (51,8 %). These proportions are good for analysis [7]. It shows that seasonal irregularity of menarche in the samples and the differences between them and other studies data are statistically significant (Table 1).

Even at first glance can be detected differences in seasonality of menarche between girls from the so-called Sofia-A (daughters mostly of employees and intellectuals with university education and high living standard) and of Sofia-B (parents of lower educational and cultural level and lower living standard). In the first ones well expressed accumulation of menarcheal cases in winter-spring (December—March) is recorded and the summer maximum is absent (Fig. 1). In Sofia-B the accumulation is in summer (July-September) and in winter only a small peak can be observed (in January). Such a kind of distribution (accumulation in the hot season and a small

winter peak) is dominating in the analyzed samples and was called "type 1". A distribution of summer and winter accumulation is more rare and has been called "type 2". Such a distribution has been found in the schoolgirls from Smolyan — a December-January and July-September accumulation. The distribution of menarche in schoolgirls from Sofia-A has not been found in other samples and has been called "type 3".

All distributions in urban students are of the type 1. The difference in comparison to Sofia-B schoolgirls is that the accumulation begins earlier, in April or May and ends in August-September. So we named this type "1a". By the end of spring or the beginning of summer a decrease of menarcheal cases compared to the preceding month can be observed in all distributions. When they drop below the theoretically

Table 1. Seasonality of menarche in the investigated girls (%)

Month	Theoretical level	Schoolgirls			Students (by residence)				
		Sofia-A	Sofia-B	Smolyan	Sofia (born in Sofia)	Sofia (migrants)	cities (over 25 000)	towns	villages
J	8,5	16,2	11,0	17,9	7,5	13,7	12,2	18,6	11,1
F	7,7	12,1	4,4	6,0	11,2	4,1	5,1	3,4	8,9
M	8,5	12,1	7,4	4,8	4,7	2,7	4,6	3,4	6,7
A	8,2	8,1	6,6	2,4	7,5	11,0	8,7	11,9	4,4
M	8,5	9,1	4,4	7,1	10,3	9,6	11,7	5,1	4,4
J	8,2	7,1	6,6	7,1	9,3	5,5	8,7	8,5	11,1
J	8,5	6,1	19,8	10,7	11,2	5,5	12,2	13,6	22,2
A	8,5	7,1	16,2	14,3	13,1	12,3	10,7	20,3	13,3
S	8,2	7,1	11,0	14,3	10,3	15,1	10,2	5,1	6,7
O	8,5	0,0	0,7	2,4	4,7	6,8	5,5	0,0	2,2
N	8,2	5,1	6,6	1,2	4,7	6,8	3,6	1,7	2,2
D	8,5	10,1	5,2	11,9	5,6	6,8	6,6	8,5	6,7
n		99	136	84	107	73	196	59	45
χ^2		21,97	50,24	31,80	13,03	14,86	24,09	33,62	18,43
$p \leq$		0,01	0,001	0,001	0,1	0,1	0,01	0,001	0,05
Type		3	1	2	1a	1b	1a	1b	2

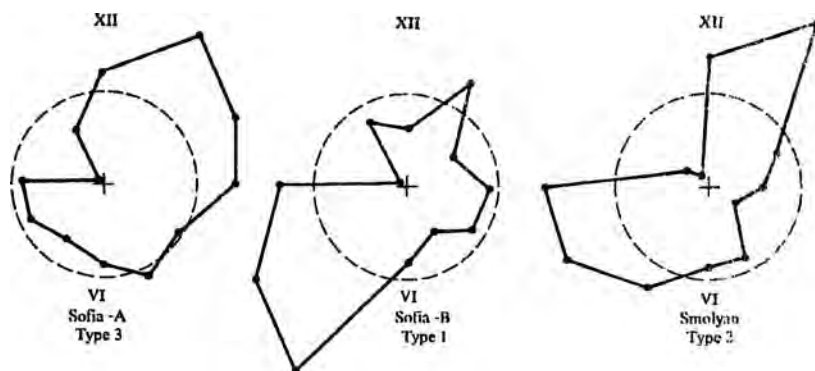


Fig. 1. Menarche in schoolgirls

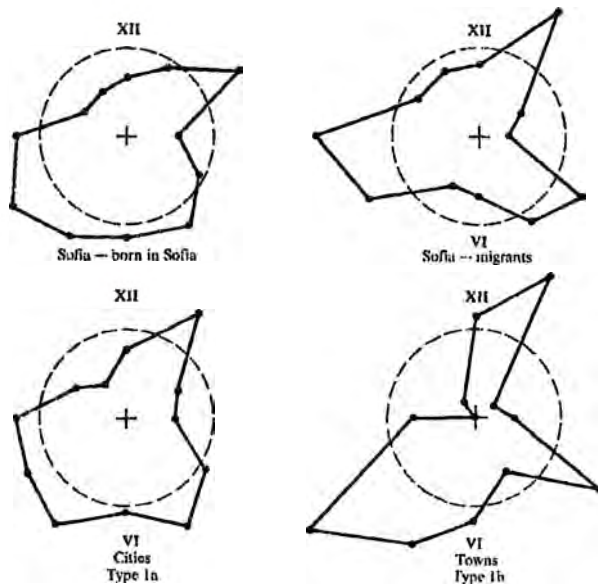


Fig. 2. Menarche in students in Sofia

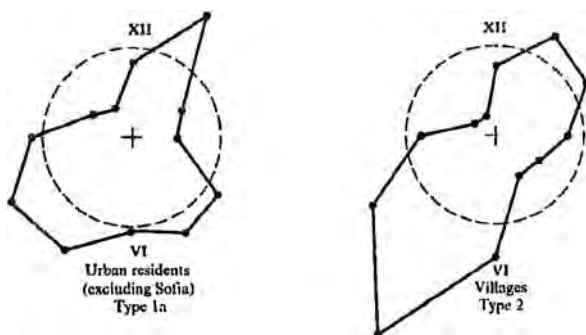


Fig. 3. Menarche in students outside Sofia

expected level the name "type 1b" has been introduced. It is typical of less urbanized samples (Fig. 2).

Village students present a distribution of type 2, with well expressed summer and winter accumulations (Fig. 3).

The review of former data reports that in Sofia the seasonality was of type 1 during the whole postwar period. In 1950s, however, it was of type 1b, as in the less urbanized samples later [1, 4, 6]. The towns of the district of Veliko Tarnovo and of Northeast Bulgaria in 1960s and 1970s show a seasonality of type 1b [2, 5]. The less urbanized populations in the same period (Haskovo, Haskovo villages, Blagoevgrad, Veliko Tarnovo villages) report distribution of type 2 or similar [4, 5, 8]. All this is in good concord with our study.

Closest to the dominating in our urban populations seasonality of type 1b is the one found in urban Georgian populations. An intermediate seasonality between type

1 and type 2 can be observed in Russian urban girls [7]. In Serbia, even in the city of Belgrade, the distribution is mostly of type 2 [3].

The specific type 3 in schoolgirls from Sofia-A (maturing most early of all analyzed samples) can be explained by the displacement of menarche to winter and spring in early maturing girls [7].

The results support the assumption about the role of the psychic factor in menarche [7]. The most common seasonality of type 1b can be explained by stresses and emotions in the beginning and the end of the holidays and classes. Autumn, the longest season without holidays, is always a period with minimum menarcheal frequency (in Bulgaria and abroad).

The results of this study show that in the urban population of Bulgaria since a long time the spring-summer accumulation of menarcheal cases plus a small winter peak is dominating (seasonality type 1). In the less urbanized populations two accumulation periods, summer and winter, can be observed (type 2). In early maturing girls of very good socio-familial conditions a winter-spring accumulation is found (type 3). The results support the conception for the prevalent role of social environment in the seasonality of menarche.

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