

ON SOCIAL AND NATURAL FACTORS EXERTING INFLUENCE ON MATURATION OF GIRLS

by G. FARKAS

Department of Anthropology, József Attila University, Szeged, Hungary

Abstract: Analysing the menarche data of about, 50,000 Hungarian girls showed that maturation is a function composed partly of biological and partly of sociological factors. The observations concerned, however, in the first place, changes in the median but the factors influencing it were not thoroughly examined. To draw clear-out conclusions is rather difficult as the observations were made by different authors, between 1958 and 1978 and so the results are loaded with the possible influence of acceleration, too. A representative investigation would necessarily over the whole country and take into consideration all the possible factors.

Key words: Menarche, social factors, natural factors.

Introduction

One of the most reliable indicators of the maturing of girls is the appearance of the first menses that is menarche. The importance of this criterion is indicated also by the fact that in the relevant literature, especially more recently an increasing number of papers has been published dealing with this problem. There is practically no country where researchers investigating children's growth have not touched the maturing of girls.

The investigations in Hungary were initiated by Prof. SEMMELWEIS, in 1860, who was among the first to establish the age at the first menses (DARÁNYI 1941). However, from this time on up to the end of the Second World War there are only three papers to be found in the Hungarian anthropological literature mentioning this phenomenon. Since 1948, but in particular since 1958, several publications have dealt with this question. As the relevant Hungarian literature has been reviewed recently (EIBEN 1968), we dispense with giving such details as number of cases, the year of sampling of data and the medians found.

In this communication, our present knowledge about the age of girls at the menarche will be summarized partly on the basis of these articles and partly on the bases of our own investigations.

Up-to-date data on first menstruation of about 50,000 girls, between 10 and 18 years, were collected by several authors. It must be added, however, that only parts of the country were involved in the sampling. On the Figure 1 one can see the places of the settlements from which our data had originated.

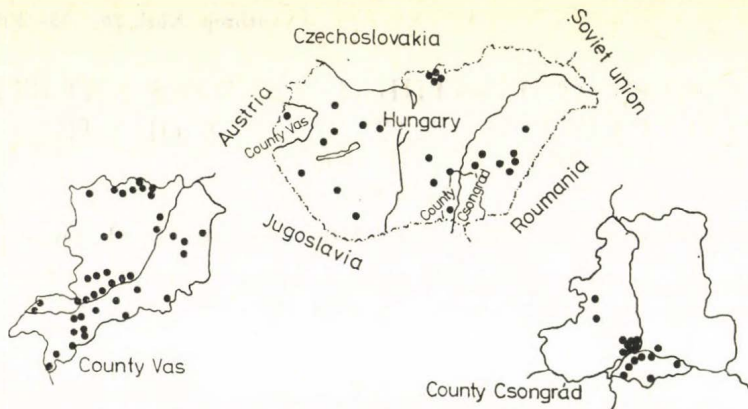


Fig. 1. The places of the settlements in Hungary from which the menarche data had collected

The collection of data took place almost entirely using the technique of status-quo. Probit analysis was employed by most of the authors to evaluate the results.

Results and Discussion

Acceleration

According to an evaluation made in 1963, the menarche-median was 13,23 years in Hungary (BOTTYÁN et al. 1963). This value, as compared to earlier values (SEMMELEWEIS; JANKOVICH 1941, VÉLI 1956) is lower, but the comparison is rendered difficult by the fact that the processing of the data was carried out using different techniques. Anyway, investigations made since that time prove that existence of acceleration also in this connection. This fact is supported by observations made in Szeged (South Hungary) in the years 1958—1959, 1961 and 1966—1967. According to these investigations the medians vary from 13.2 to 12.73 year in the course of 8 years, which corresponds to an annual decrease of 0.08—0.1 year in the last decade.

One reason, in the case of Hungarian girls, is the massive increase in the standard of living over the last few years.

Succession of birth and age at menarche

Changes in the age at menarche might have genetical reasons. EIBEN investigating 15,229 girls in Western Hungary found that within one family the value of the menarche-median increases according to their numerical position as siblings (EIBEN 1972). This value was 12.96 year for first-borns, 13.26 year for fifth-borns and 13.44 year for eighth-borns.

Anyway, it is our impression that the older a girls among her siblings the later she becomes adult. The median for third-borns corresponds to that of the average Hungarian value.

Family size and menarche-median

According to the above mentioned collection of data from West-Hungary made by EIBEN (1972) the median parallel increases with family size, that is the bigger the family the later the girls reach physiological maturity. In the case of a family consisting only of two members, 50 per cent of the girls become adult at the age of 12.99 year (a widow and one girl), the Hungarian average median is exhibited by families with six members (13.21 years), this value increases and even further, for instance, it is 13.5 years in families of 10 members.

Anyway the Hungarian data support the observations of others showing a positive correlation between family size and menarche median.

Occupation of parents and menarche-median

There is a further correlation between the occupation of parents and the menarche-median of their daughters. This was established by analyzing the observations made between 1958 and 1978 in a way that the parents were divided according to the following categories:

- a) manual or physical worker (industrial, agricultural, other),
- b) brain worker or intellectual (higher and secondary school education separately),
- c) homemaker (in the case of mothers),
- d) pensioned parents,
- e) dead parents.

It is apparent that the menarche-median varies according to the occupation of the parents (Table 1). A relationship seems to exist between the parent's education and the menarche median. In general, the daughters of manual workers reach maturity later than those of the brain workers.

Table 1

The menarche-median of girls according to the occupation of their parents

Parent's occupation	The menarche median (year) of girls according to the occupation of their father and/or mother	
Industrial manual worker	13.58	13.01
Agricultural manual worker	13.37	13.41
Other manual worker	13.16	13.29
Brain worker (university education)	12.92	12.81
Brain worker (secondary school ed.)	12.54	12.94
Pensioned	13.00	—
Dead parent	13.17	—
Homemaker	—	13.62

Settlement size and menarche

We compared the menarche-medians in settlements with a differing number of inhabitants (Table 2). It is clear that the smaller a settlement is the later the girls living there become adult.

Table 2

The menarche-median of girls according to the size of settlements

Number of inhabitants on the settlement	Menarche-median (year)
Over 200,000	12.86
Between 100,000 and 200,000	12.95
Between 50,000 and 100,000	13.02
Between 10,000 and 50,000	13.11
Between 500 and 10,000	13.28

Altitude above the sea level and menarche

In Hungary there are no appreciable differences in altitude above sea level in the different settlements. No direct investigations were carried out to establish whether there is a correlation between the two phenomena. However, subsequent analysis of the preexisting data showed that there is still a correlation of 95% probability between the menarche-median and the altitude above sea level of the settlement. From the Table 3 it is probable that with increasing altitudes the maturation of girls is delayed.

Table 3

The menarche-median of girls according to the altitude above the sea level of settlements

Average altitude above the sea level of the settlement (m)	Menarche-median (year)
239	13.35
119	13.06
104	12.87

Meteorological factors and menarche

The question, whether there is a correlation between meteorological data and the menarche-median, was investigated in the case of 16 settlements. We found the strongest correlation ($r = -0.76$) between the number of sunlight hours and the menarche-median. The probability was over 99 per cent. The correlation was negative: with an increasing number of sunlight hours the menarche-median decreased. Comparable correlations were demonstrated for the average temperature, for the average annual yearly precipitation (expressed in the percentage of the average annual cloudy days), and even for the lowest average precipitation. From these calculations the conclusion can be drawn that in smaller geographical areas the physiological processes leading to the maturation of girls respond to meteorological factors such as temperature and illumination.

Seasonal changes in menarche

Several data show that the first menses in 49% of the cases occurs in the winter season (November, December, January, February). Thus roughly 50 per cent of the girls experience their first menses in winter while the other 50 per cent are distributed over the remaining two-thirds of the year. However, the distribution is uneven also in this latter case as menarche these frequency is higher in August, than in the other months. Superimposed on these seasonal changes is the geographical effect. Taking all these factors together it can be stated that there is a seasonality in the menarche the winter and summer months being the most important determinants, while the spring and autumn months are only secondary in importance.

Coincidence between the month of birth and month of menarche

The above-mentioned observations made on West Hungary the coincidence is 11.46 per cent and the same is the case in other regions of the country.

These observations are in agreement with those made in other Central European countries and suggest that the coincidence of the month of birth and the menarche is a real, but at present not fully understood fact. Its practical importance is, however, great, especially in medical superintendency of schools.

Correlation between physical development and the menarche

Data on the relationship between the physical development and the menarche its acceleration have been published by VÉLI (1956). He compared data collected in 1947 and 1962 and from these a good correlation between the physical and physiological development of girls of different ages is evident, and clear that it is also an accelerating phenomenon (VÉLI 1968).

An increase is observable not only in average body height and body weight in each age group, but also in the frequency of menstruating girls.

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Author's address: Dr. FARKAS GYULA
Dept. Anthropology, József Attila University
Szeged, Egyetem u. 2.
H-6701 Hungary

