RELATIONSHIPS BETWEEN THE DIFFERENT FACTORS AND THE AGE AT MENARCHE IN HUNGARY

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Abstract: The author studied the age at menarche and its relationship with socio-economic factors in 29 915 10—18.5 year-old girls in Hungary, based on a data collection with status quo method. He analysed the deviation of menarche-median in detail according to 19 different factors (for example: birth-order of girls, number of siblings, size of the girl's domicile, education level and occupation of the parents, etc.).

This is a large sample in which in one population we could simultaneously investigate the relationship between 19 factors and the change of the menarche-median.

Key words: Menarche-median, Hungarian girls, Socio-economic factors.

Introduction

Based on reviewing the international literary data it could be said that studies have been carried out on the time of the first menstruation of girls (i.e. menarche) in connection with the factors influencing it in many countries, from several viewpoints. The literature on the topic is extremely large (Farkas 1986). Most of the experiments, however, only focused on the determination of the median in the studies aiming to determine the age at menarche. It also became evident on the basis of the observations that age at menarche could be related to several factors (Farkas 1980, Grimm 1966). These influencing factors could be divided into three groups:

I. Endogeneous factors or typical biological effects, such as the (1) somatometrical and somatoscopical characters. These are: race and genetic determination, somatic measurements, secondary sexual characters, colour of eyes and hair of the person in question, skeleton-age and their connection with the maturity. (2) physiological characters, for example the similarity of the age at menarche between mother and her daughter, absolute menarche-age (the difference between the time of birth and menarche), vitalcapacity.

II. Endogenuous and exogenuous (biological and social) effects at the same time. These are on the one hand (1) natural factors, such as the meteorological (climatical) effects, height above sea level of domicile, radiation effect and on the other hand. (2) social factors, such as the ethnical and national status of girls, education level and occupation of the parents, number of living or dead brothers and sisters, number of members in a family, living space for one person, nutrition, quality of food, in what type of schools the girls study, school achievement of girls, effect of sport, size of domicile, seasonal changes in menarche, coincidency between the month of birth and month of menarche.

Sample and Methods

From these factors we studied 19 in Hungary between 1981 and 1984 in 10—18.5 year-old girls (Farkas et al. 1983b).

The data were collected with status quo and anonymous questionnaire method.

One part of the questions was filled out during the course of examination and the other part of the questions was requested to be filled out by the parents in such a way

that the pupil took the questionnaire home and asked her parents to answer these questions.

Taking a unified classification system as a basis, the occupation of the parents was divided into 9 categories.

On the basis of the parents' school education we differentiated 5 groups.

We collected 34 different types of information, which makes it possible to evaluate them independently as well as combined with one another.

The girls are divided into half-year age groups in all the information and this is also performed with the help of a computer using the decimal life-table.

The data were evaluated by a R–55 type computer using the Osiris program package. The medians were calculated by probit analysis.

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Results

The most important results of our research are the following (Farkas 1982, 1983, 1984, 1985, 1986, in the press. Farkas et al. 1983a, 1983b, 1985, Farkas–Szekeres 1982, 1982a, 1982–83, Fazekas et al. 1982, 1983):

The number of the investigated girls is 29915.

We calculated for the total sample 12.79 years menarche-median an 12.544 years as arithmetic mean of the absolute age of menarche.

The medians for the secondary sexual characters are the following: in the case of the breast 12.44, at the axillary hair and pubic hair 12.60 years (Table 1).

Table 1. The medians of secondary sexual characters

Character	n	M_e
Breast	16436	12.44
Axillary hair	16440	12.60
Pubic hair	16431	12.60

In the town of Szeged (Southern-Hungary) we could observe the changes of the menarche-median between 1958 and 1982 (Table 2). The decrease of the median (from 13.20 to 12.68 year) during 24 years is 0.52 year (Farkas 1986, Farkas in the press).

Table 2. The change of menarche-median in Szeged (Southern-Hungary) between 1958 and 1982

Time of the survey	n	M_e
1958/1959	1182	13.20
1961	1473	13.03
1966/1967	1136	12.75
1981/1982	1099	12.72

According to the year of birth of the girls we have also found differences in the menarche-median between 1966 and 1973. In this case we could observe the manifestation of the deceleration, too.

According to the crow-flight distance of the parents' birth-places we have not found important differences in the menarche-median of their daughters (Table 3, factor 1).

Table 3. Change of menarche-median in the case of various
socio-economic factors

Studied factors		Total cases	M_e	95 p.c. conf. interval.
1	2	3	4	5
1. Crow-flight	0 km	10846	12.56	11.00 – 14.12
distance of	1 – 25 km	6355	12.68	10.85 – 14.50
birth-places	1 – 50 km	9362	12.66	11.24 – 14.07
of the parents	26 – 100 km	5504	12.66	10.85 – 14.47
	101 – 200 km	3139	12.70	10.44 – 14.95
	201 – 400 km	1386	12.65	10.33 – 14.98
2. Size of	200 000 – 100 000	4623	12.69	12.29 – 13.09
domicile	100 000 – 50 000	4244	12.73	12.50 – 12.96
(inhabitants)	50 000 – 10 000	6294	12.81	12.54 – 13.08
	10 000 – 5 000	2909	12.92	12.65 – 13.20
	lass than 5 000	5885	12.83	12.40 – 13.25
3. The order	1	13088	12.74	12.42 – 13.05
of birth	2	8330	12.83	12.73 – 12.92
	3	1552	12.88	12.42 – 13.35
	4	472	12.85	10.29 – 15.40
	5	112	12.85	12.52 – 13.17
4. Number of	0	12011	12.75	12.37 – 13.13
living	1	10084	12.80	12.59 – 13.01
brother	2	1666	12.87	12.47 – 13.27
	3	340	12.99	12.21 – 13.77
5. Number of	0	12040	12.74	12.62 – 12.87
living	1	9650	12.80	12.36 – 13.23
sister	2	1603	12.88	11.54 – 14.23
	3	380	13.00	12.06 – 13.93
6. School	2.0 – 2.5	573	12.97	12.47 – 13.47
achievement	2.6 – 3.0	3491	12.89	12.57 – 13.20
	3.1 – 3.5	2417	12.81	12.59 – 13.02
	3.6 – 4.0	6261	12.77	12.39 – 13.15
	4.1 – 4.5	4892	12.71	12.38 – 13.03
	4.6 – 5.0	5777	12.77	12.48 – 13.07
7. Occupation	Industrial worker	3157	12.80	12.67 – 12.93
of the mother	Agricultural worker	1373	12.88	12.57 – 13.19
	Other worker	7501	12.76	12.56 – 12.95
	Intellectual (with high education)	1497	12.67	12.06 – 13.27
	Intellectual (with secondary school ed.)	7113	12.75	12.52 – 12.97
	Pensioner	326	12.75	12.54 – 12.97
	Housewife	2734	12.93	12.60 – 13.26

Table 3. (continuing)

1	2	3	4	5
8. Occupation of the father	Industrial worker	7657	12.79	12.53 – 13.04
	Agricultural worker	2341	12.92	12.52 – 13.32
	Other worker	5855	12.80	12.47 – 13.14
	Intellectual (with high education)	2781	12.73	12.42 – 13.04
	Intellectual (with secondary school ed.)	3718	12.72	12.51 – 12.93
	Pensioner	648	12.67	11.89 – 13.45
	Father died	663	12.76	12.00 – 13.51
9. Education level of the mother	Has not finished the primary school	1635	12.88	12.37 – 13.38
	Finished the primary school	10309	12.83	12.54 – 13.12
	Finished the school of professional training	3076	12.73	12.54 – 12.91
	Finished the secondary school	7077	12.74	12.51 – 12.97
	Finished the university or academy	1281	12.69	12.06 – 13.32
10. Education level of the father	Has not finished the primary school	1845	12.93	12.43 – 13.44
	Finished the primary school	8112	12.80	12.63 – 12.98
	Finished the school of professional training	5445	12.77	12.58 – 12.96
	Finished the secondary school	5295	12.74	12.07 – 13.42
	Finished the university or academy	2888	12.71	12.32 – 13.10
11. Year of birth of the mother	1926 – 1930	231	12.71	11.97 – 13.45
	1931 – 1935	1284	12.79	12.15 – 13.42
	1936 – 1940	3726	12.77	12.06 – 13.48
	1941 – 1945	7629	12.78	12.64 – 12.93
	1946 – 1950	8370	12.80	12.69 – 12.90
	1951 – 1955	2010	12.66	11.83 – 13.49

The age at menarche of the girls living in larger settlements is lower than that of the girls living in a smaller domicile. The domiciles are grouped according to the number of inhabitant (Table 3, factor 2).

On the basis of the girls' birth order we have also found differences. In Table 3 (factor 3) we present the medians in the cases of first to fifth born girls. As it may be seen in the Table, the first born girls reach puberty earlier than the fourth-born girls.

We examined the age at menarche according to the number of living siblings, too. In Table 3 the medians concerning the living brothers (factor 4) and sisters (factor 5) from 0 to 3 can be seen. If a girl has no brother or sister, the reachs puberty earlier than those girls who have 1—3 brothers or sisters.

In a Hungarian school the best achievement is 5 points and the worst is 1. We divided the school achievements of the girls into six groups. The girls who have the worst school achievement reach puberty later than the girls with better school reports (Table 3, factor 6).

In Table 3 we present the medians of the girls, who are classified according to the occupation of their mothers. The daughters of intellectual mothers with a high education have the smallest menarche-median and the daughters of housewives, the highest. In general the daughters of intellectual mothers reach puberty earlier than the daughters of working mothers (Table 3, factor 7).

The groups of the occupation of the fathers from one to six are identical with the same groups of the occupation of mothers. In the last group we placed the daughters of not the housewives but the cases of those girls whose father had died (Table 3, factor 8). According to the occupation of the fathers we found the same results as the mothers' occupation.

The girls, whose mothers have a lower school education (for example they have not finished the primary school), reach puberty later than those girls whose mothers have higher education level (Table 3, factor 9).

We could also observe identical results with the education-level of the fathers (Table 3, factor 10).

We also divided the mothers into groups according to the years of birth. In doing so, we found that there is not a great difference between the mothers' years of birth and the age at menarche of the daughters (Table 3, factor 11).

Finally, seasonal fluctuation occurs at the time of the first menstruation. Most girls menstruated in January (13.1%), in July (10.5%), and in June (10.1%). The smallest relative frequency of menarche is in February (6.1%).

In the mothers' cases the greatest relative frequency is in January (13.1%), and in August (11.8%), the smallest we found in October (5.6%).

We established a 11.08% coincidency between the month of birth and month of menarche.

In Figure 1 we can see the connections between the median of menarche, the medians of secondary sexual characters and the arithmetic means of the somatic measurements.

With full knowledge of these facts we created a method to predict the time of the menarche for any girl. This enable us to apply the results to the practice of sexual education in primary schools.

As it appears to, this is the first large sample in which in one population we could simultaneously investigate the relationships between 19 factors and the change of the menarche-median.
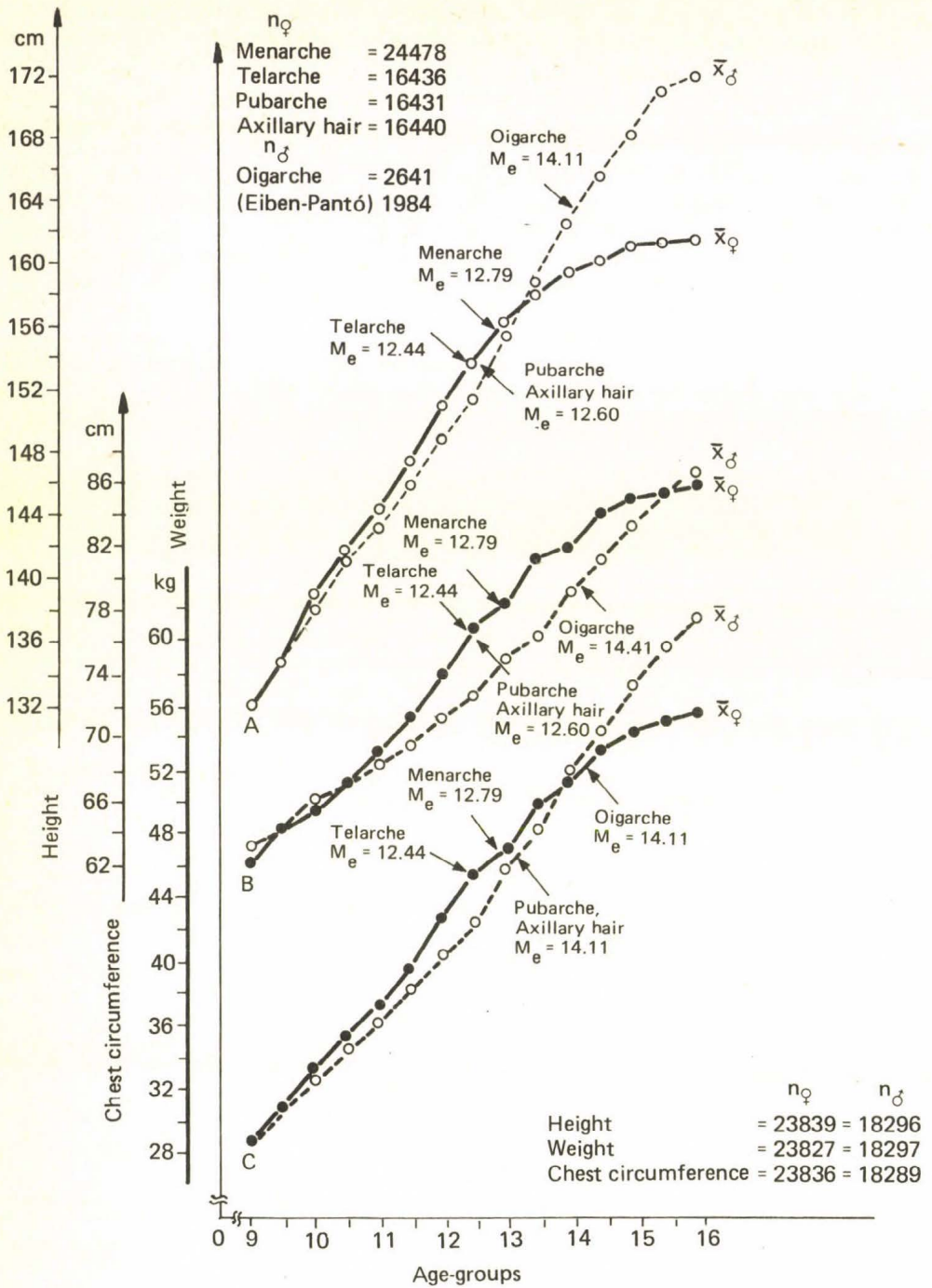
Fig. 1: The medians of menarche and secondary sexual characters and the arithmetic means of the somatic measurements

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