

THE GENETIC AND SOMATOPSYCHIC EXAMINATION OF TWINS BORN IN BUDAPEST IN THE YEAR 1970

J. SARKANY, J. AGOSTON, G. GORACZ, M. TOMKA

With the introduction of obligatory registration of twins in Budapest on 1 January 1970, our team started the genetic and somatopsychic examination of twins. The program is being carried out in collaboration with the institutions of the Child Health Care Organization of Budapest and the National Institute of Public Health.

Since 1 January 1970, the placentae of twins born in Budapest are submitted to pathologic and histologic examination, and the twins living in Budapest are examined systematically by our clinical group at the age of six months, and one, two, and three years.

In addition to studying the social environment, examinations are carried out with regard to pediatrics, anthropometric measurements, photographic documentation, dental examination, dermatoglyphics, cardiology, and neuropsychiatry. In order to define the genotype of the twins we used haptoglobins and blood groups.

The examination of twins on a population level has a great importance nowadays, being the best subject of those epidemiological examinations and model experiments in which the interrelation of genetic and environmental effects can be studied.

According to the preliminary works set up in 1969 and to a decree of the Budapest City Council Executive Committee, all multiple deliveries have to be reported by telephone, within a few hours after birth, to our hospital. On the basis of this information we take the placentae from the delivery rooms and submit them to pathological and histopathological examinations in order to specify the twin type.

The registration including all multiple deliveries and the examination of the placentae constitute the basis of the examination of the twin population and the tracing of family descent in Budapest. We have only simple information about rural inhabitants born in the capital, but medical examinations cover only those who live in Budapest, since the former cannot be initiated into continuous medical follow up.

Selection-free examinations and longitudinal follow up are ensured by the cooperation with the Child Health Care Organization. Though parents cannot be obliged to be present at these controls, they appear with pleasure in more than 80% of the cases following our inviting letter. In cases of special prevention, if parents cannot be present at the examination, the data sheets are supplied by district nurses, and the data concerning history, state, and anthropometrical measurements, by pediatricians.

The genetic and somatopsychic examination of twins was started by our team in 1970.

The Aim of Our Observations

1. Genetic studies

- a. To attempt the verification of dizygosity in cases of like-sexed pairs and monochoorial placentae, i.e., after the examination of sex and placenta in cases of twins of uncertain origin by the examination of blood and serum-protein groups.
- b. To examine the possible changes of certain factors of inheritance, as well as the stable characteristics of inheritable qualities, or the possible changes under the influence of environmental effects.
- c. To make clear the role attributable to genetic factors in the phenotype, and the modifying factors of the environment.
- d. Systematic follow-up examinations make it possible to secure the simultaneous, parallel study of twins, illustrated by photos, and — in equivocal cases — this method may help to specify the twin type.
- e. To prevent certain illnesses and set up early diagnosis on the basis of genetic examinations.
- f. To clear up phenocopies.

2. Besides the possible genetic information and problems of tissue and organ transplantation, our research has some practical importance too.

- a. The risks of pregnancy rise with the number of simultaneously born fetuses for both the pregnant and the fetus. In our material, pregnancy was accompanied by the symptoms of toxicosis in 14.2% of the cases, so that the endangerment of twin fetuses may have been increased already before delivery.
- b. The distribution of the newborn population by birth weight and gestational time is extremely unfavourable in multiple deliveries, since the uterus is capable to bear only one fetus. The number of low-birth-weight infants is about 70%, in contrast to the 10.8% of single deliveries.
- c. The mortality, as well as the injury of newborns effecting their later development as well, resulting from the multiple pregnancy, is especially significant to the second child. (Twin I perinatal mortality is 70%, twin II perinatal mortality is 106.0%).
- d. Special attention is to be paid to the twins' feeding, antirachitic and antianemic prevention.

We wish to improve the protection of twins' life and health, amend the condition of their nursing. So, they are called in with their parents twice in the first year (at 6 and 12 months) and later once every year.

The process of our examinations is summarized in Table 1.

The survey of data includes the following items: (1) data of register; (2) family history (including parents, brothers, sisters and their children); (3) pregnancy preceding twin birth; (4) process of pregnancy and twin delivery; (5) neonatal state of twins and period preceding examination.

At the age of 6 months, 1 year, and 2 years, in addition to the surveying: (1) pediatric examination; (2) anthropometric measurements; (3) hematologic examination (Ilona Zi-

Table 1. *The Model of Twin Registration and Medical Examination of Budapest*

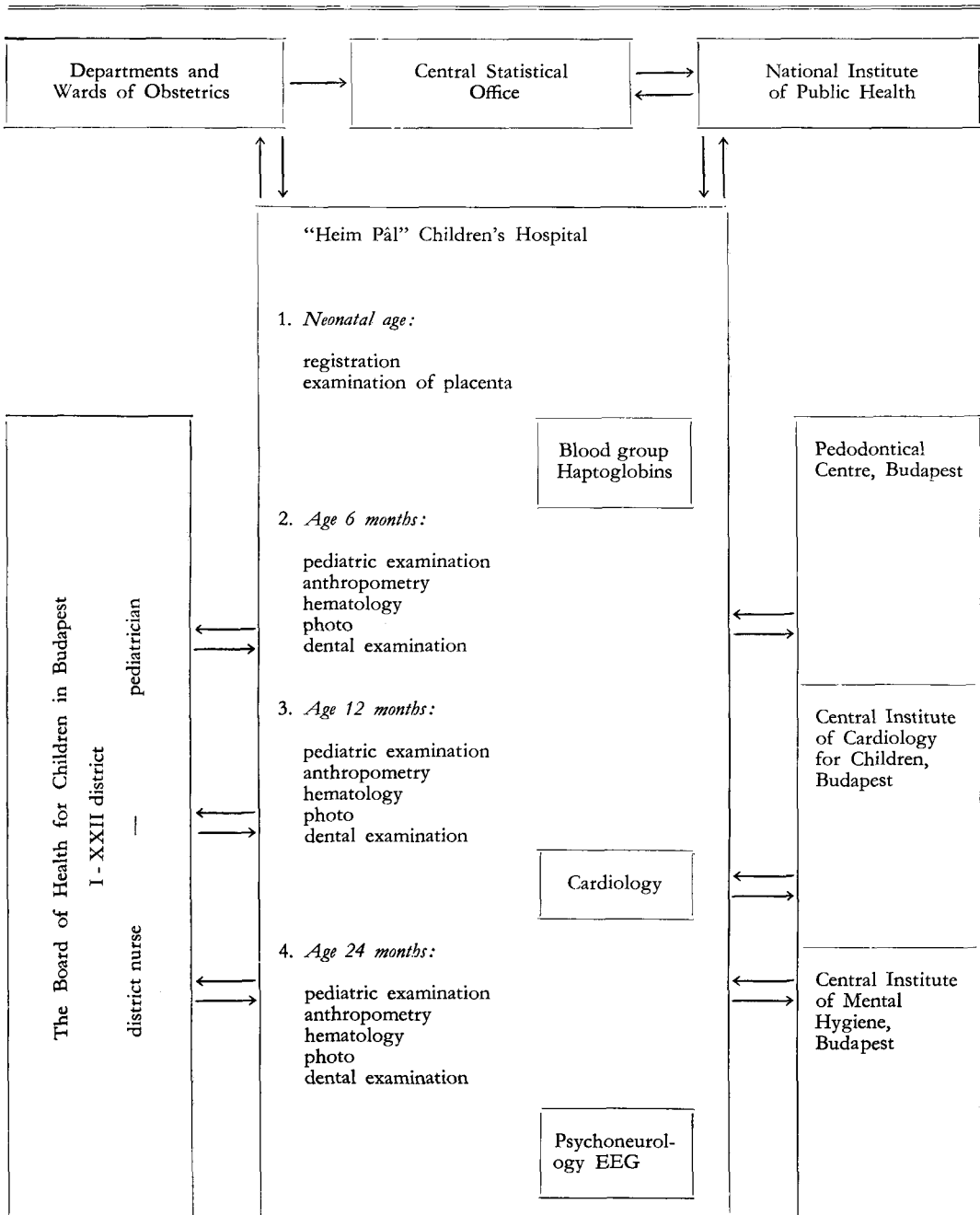
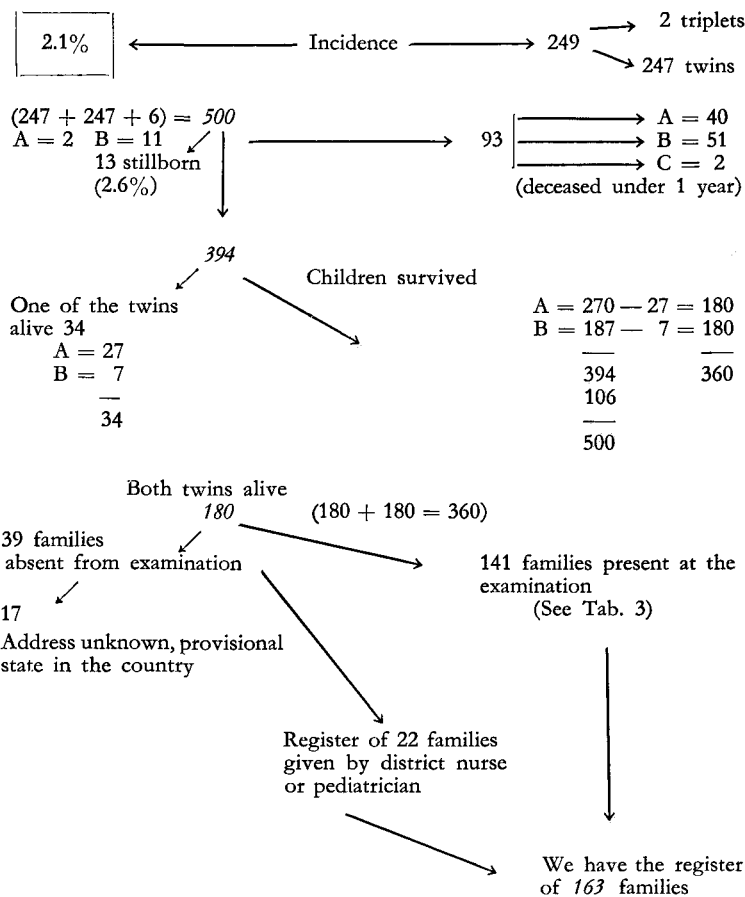


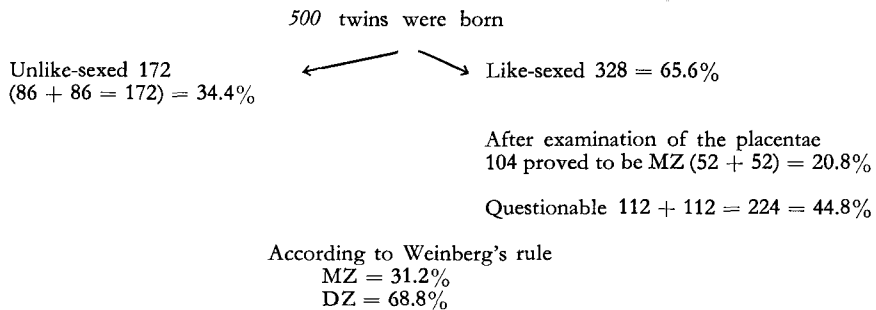
Table 2. Incidence, Mortality, and Participation in the Systematic Medical Care of Twins Born in 1970



monyi, M.D.); (4) dental examination (Zoltán Kovács, M.D.); (5) photographic documentation; (6) sampling of blood from fingertip for ABO and Rh blood-grouping. At the age of 1 year, in addition to these examinations, there is a cardiological test as well (György Bodrogi, M.D.). Sampling of blood from fingertip for haptoglobin typing. Haptoglobin type specification by arcyamid-gel electrophoresis (Pál Baranyai, M.D.). At the age of 2 years, and in selected cases, EEG and psychoneurological examination (Györgyi Brunecker, M.D.). Sampling of blood from vein for detailed blood-grouping from both the parents and the twins. The examinations are carried out by the detection of A_1 , A_2 , B, O, A_1B , A_2B , C^w , D, C, E, c, e, M, N, Kell, Cellano, Fy^a , S, s, P red blood cell antigens (Teréz Szabados, M.D.). A considerable amount of serum is needed for these tests; so, before the age of 2 or 3 years, they are carried out only in

Table 3. *Zygoty Determination*

There were 247 double and 2 triplet deliveries in Budapest in 1970



141 families apt for follow-up examination

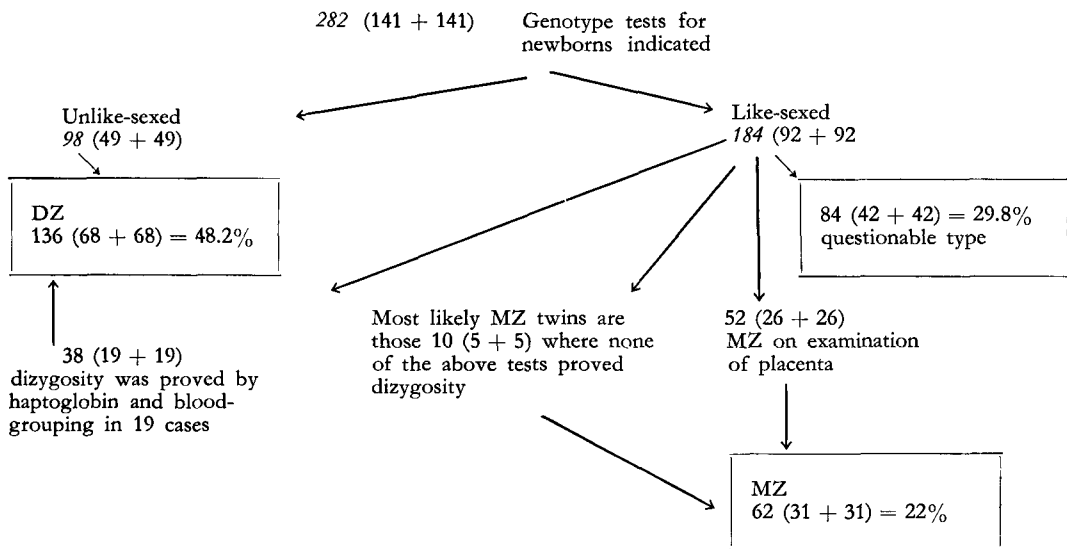


Table 4. *Birth Weight and Order of Twins Born in Budapest in 1970*

Birth weight (g)	Multiple births by birth order									Single- tons %
	I			II			III	I + II + III		
	M	F	M+F	M	F	M+F	F	N	%	
< 1000	6	10	16	6	11	17	1	34	7.0	1.1
1000-1499	8	12	20	13	8	21	—	41	8.4	1.5
1500-1999	28	28	56	25	24	49	1	106	21.8	2.6
2000-2499	37	49	86	36	35	71	—	157	32.2	6.6
Total prematures	79	99	178	80	78	158	2	338	69.4	11.8
2500-2999	29	25	54	32	33	65	—	119	24.4	22.1
3000-3499	11	3	14	8	6	14	—	28	5.8	37.9
3500-3999	1	—	1	—	1	1	—	2	0.4	22.5
Total matures	41	28	69	40	40	80	—	149	30.6	88.1
Grand total	120	127	247	120	118	238	2	487	100.0	99.9

Table 5. *Birth Weight and Mortality of Children Born in Budapest in 1970*

Birth weight (g)	Multiple births				Single births			
	Total births	Mortality		Death under 1 year by birth weight per 1000 live births	Total births	Mortality		Death under 1 year by birth weight per 1000 live births
		N	%			N	%	
< 1000	34	34	100.0	70.0	220	214	97.3	8.8
1000-1499	41	24	58.5	49.3	319	212	66.5	8.8
1500-1999	106	28	26.4	57.5	529	137	25.9	5.6
2000-2499	157	5	3.2	10.2	1,447	86	5.9	3.5
Total prematures	338	91	26.9	187.0	2,515	649	25.8	27.0
2500-2999	119	2	1.7	4.1	5,199	76	1.5	3.1
≥ 3000	30	—	—	—	15,844	99	0.6	4.2
Unknown	—	—	—	—	2	87	—	3.5
Grand total	487	93	19.1	191.1	23,560	911	3.9	37.8

Table 6. *Birth Weight and Gestational Age of the Deceased Twin Infants*

Birth weight (g)	Gestational age (weeks)								Total
	26	28	30	32	34	36	38	40	
< 1000	12	12	10						34
1000-1499		12	8	4					24
1500-1999			20	5	3				28
2000-2499				1		2	2		5
Total pretermatures	12	24	38	10	3	2	2		91
≥ 2500			1 ^a				1		2
Grand total									93

^a Hydrocephalus

Table 7. *Perinatal Mortality in Children of Multiple Deliveries*

	Birth rank			Total	
	I	II	III	Total	
				N	%
Stillbirths	2	11	—	13	26.0
Intrapartum anoxia and birth trauma	13	18	—	31	62.0
Prematurity	16	16	1	33	66.0
Massive pulmonary hemorrhage	1	5	—	6	12.0
Pulmonary infection	1	2	—	3	6.0
Congenital malformation	2	1	—	3	6.0
Total	33	42	—	76	152.0
Grand total	35	53	1	89	178.0

case of good attitude and cooperation of the parents. (We have so far completed these examinations in 12 families.)

Dermatoglyphic examinations at the age of 6 months have been carried out in 126 children and their parents (Magda Osztovcics, M.D.). The prints of children, however, were not valuable in more than half of the cases. We want to complete and estimate these examinations continuously between the age of 2 and 3 years.

Other data of twins, i. e.: incidence of multiple deliveries, type of twins, sex, weight at birth, mortality, etc., are shown in the Tables.

Here, we may hardly deal with the whole of our studies and results, but our items are at the disposal of those who are interested in the subject.