Z. Ernährungswiss. **20**, 253–262 (1981)

ISSN 0044-264 X

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Survey of obesity in child communities

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(Received April 14, 1981)

Obesity is one of the commonest nutritional disorders, which, among others, has an unfavourable influence on life expectancy. In case of many overweight adults in the civilized countries the roots of obesity go back to childhood. In a strict sense obesity should be defined as an increase either in the quantity of fatty tissues or in the fat content of the whole body. It is difficult to determine the total fat content either directly or indirectly and it is also ethically disputable. In everyday practice the degree of obesity is expressed in the percentual rate of overweight by taking height and weight standard data collected from similar ethnical groups. Generally speaking, one is considered to be obese with a 20 % overweight as compared to the standard (1).

In the USA 25–45 % of the adult population and 2–14 % of the child population are obese (2). In the GDR in the district of Görlitz 5999 young persons were examined, 3103 boys and 2896 girls between 16 and 20 years of age. Obesity rate was 14.5 % with boys and 28.3 % with girls (3). In New Zealand 17 % of girls and 10 % of boys were obese out of 334 children of school age. The authors state that this value exceeds the similar rates obtained in England by 20 % (4). According to Turkish authors a survey of 1530 boys and 1465 girls of 9–17 years showed an obesity rate of 11.2 % in boys and 9.4 % in girls in Istanbul. Separating the children of well-to-do families, this rate was found to be 16.5 % in boys and 14.6 % in girls (5).

Development of common childhood obesity can be attributed to many etiological factors, but an excess intake of food consumed either in absolute or in relative quantity due to some environmental and hereditary factors is decisive.

Many children grow fat as a result of nutritional habits of the family, thus the parents of the affected children are in most of the cases obese as well. The role of the mother's personality, psychic factors, a lack of physical activity, improper nutritional rhythm and many other factors are worth mentioning. It is well known from literature data that diabetes has a wide incidence in the families of obese children (7).

The aim of our study has been to survey the percentual rate of obesity and its distribution according to age groups in a large child population. Furthermore, we wish to reveal the relationship between the incidence of diabetes in the child's family and obesity.

Materials and methods

Our survey was carried out in the district of Monor (county Pest, 110,000 inhabitants). Data of 12,751 children belonging to the child communities (nursery school, primary school, secondary school) with 16,000 children were processed.

In the child population between 3 and 18 years of age our task was to establish the average height and weight data. The height of the children was taken and the weight was measured by using measuring tapes and bathroom scales. The children were barefooted and without upper clothes. The measurement was carried out by teachers, nursery school mistresses and district's sanitary inspectors. Calculation of growth data was performed on the basis of Eiben's method (8). The decimal age of the children was determined by using the anthropology formula: in children over 6 years of age: the completed year ± 6 months. In children under 6 years of age: completed year ± 3 months. The data obtained were grouped according to age and sex.

Obesity was determined by the use of the IW/AH index (ideal body weight per actual height (9.10). This index gives comparison of the excess of body weight with the height of the child. If it is over 120 %, it has to be considered pathological. The percentual evaluation was two-fold. Between 120 and 129 %, children were declared to be obese, although they can be considered only overweight until skinfold thickness is examined. Obesity can be declared at an index over 129 %.

The correlation between occurrence of diabetes in the family and obesity in children was examined. Questionnaires were sent to the parents to reveal the details of diabetic cases – if any – in the family (parents, grandparents, siblings).

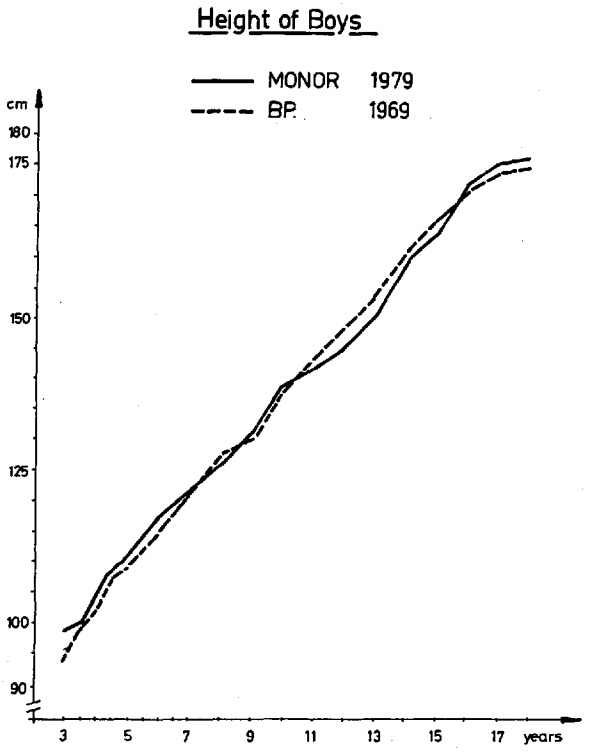

Fig. 1. Height of boys.

Results and discussion

Figures 1–4 represent the weight and height norms of children in the county compared with those obtained by Eiben. It can be seen that, despite the 10 years passed between the two measurements, our data for growth do not differ significantly from those of children in Budapest in 1969. Standard deviation determined on the basis of statistical analysis was in accordance with the SD values stated by Eiben. Statistical calculations were performed using the method described by Hegedüs-Eiben (11).

Table 1 gives the data obtained from nursery school children grouped according to age. The table also shows the number of children having a family background of diabetes and the number of obese children found among them. It is clear from the table that obesity appears with a 3.5–3.8 % incidence in the general population (there is no difference between sexes), while the rate of obese children in diabetic families is double of the general population's value.

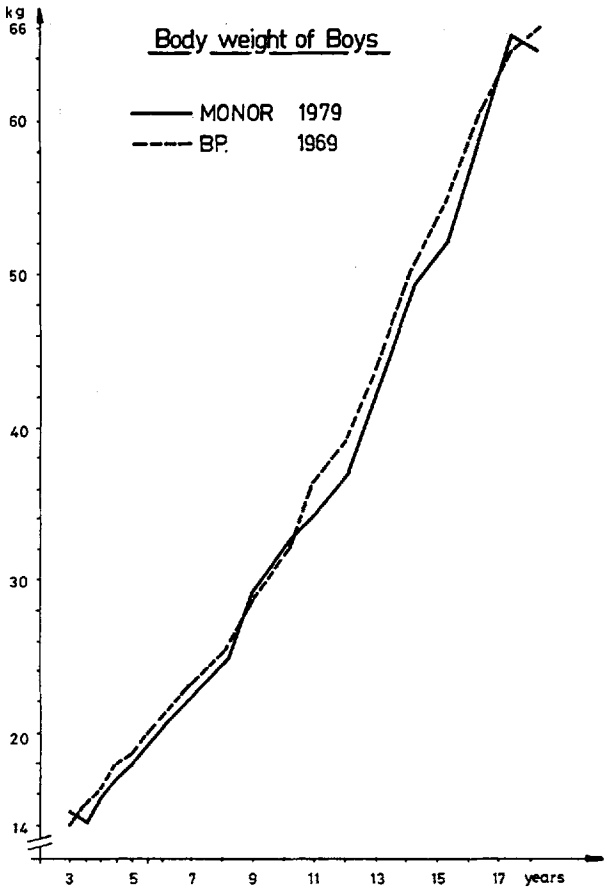

Fig. 2. Weight of boys.

Table 2 shows the primary school age group. Obesity rate was approximately 4 % at the age of 10 years among boys and 9 years among girls. The number of obese individuals is elevated in puberty; by 14 years of age, boys showed a 6 % and girls an 8 % incidence of obesity. In case of children with family background for diabetes, obesity rate coincides with the general population's value.

Table 3 contains the data of secondary school children. This age group consisted of a relatively smaller number of individuals. Percentual rate was not calculated in every age group. By the end of puberty in children between 15 and 18 years of age, obesity shows a declining tendency. At the same time, in this group obesity rate is the highest among children with diabetic relatives.

Table 4 is a summary of the data found. It must be emphasized that, while obesity rate of children in the general population is 5.53 %, diabetes in the family elevates the number of obese children to 8.4 %.

In the child population investigated, the highest obesity rate was found among children in puberty. 227 girls out of 2764 – 8.2 % – between 10 and 14 years produced an IW/AH index over 120 %. Obesity rate among girls of 12 years was extremely high – 10 % – and a similarly high value – 9 % – was found among girls of 15 years. There were 138 obese boys out of 2251, which equals to 6.1 %. In the group of secondary school pupils, considering the relatively small number of children, percentual rate was not calculated in every group. In the age group of 15-year-old obys, obesity

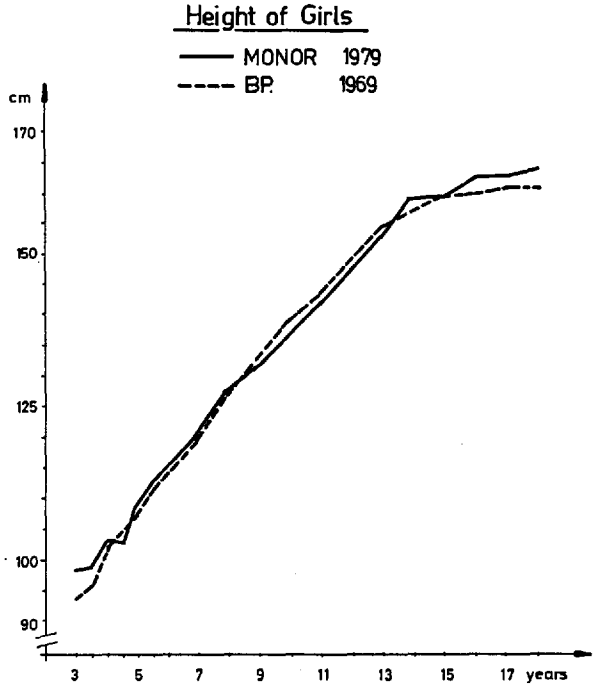

Fig. 3. Height of girls.

rate was 8.8 %. This value diminishes by the end of puberty. An overweight betwen 120 and 129 % – as we have already mentioned – can not necessarily be declared to be obesity. It may be attributed to a well-developed muscle system, therefore, the relation of fatty tissues of the body to the quantity of muscles has to be determined by the methods described by Pena in the doubtful cases (12). There are very few children who have to be excluded from this group – where we know the children by name – as regards their well-developed muscle system, consequently, considering them to be obese does not make much difference. In spite of this, measurements are being carried out.

According to Swiss authors (13), a similar survey was undertaken in Lausanne in 1973–74. 3.5 % of 1553 boys and 6.7 % of 1547 girls proved to be overweight. On the basis of IW/AH index at the age of 7 – 2.8 % of boys and 4.4 % of girls, at 10 – 3.7 % of boys and 6.5 % of girls, and at 15 – 4.7 % of boys and 9.5 % of girls were found to be obese. According to Canning's data (14), obesity rate amounts to 10–15 % among girls in puberty.

The highest obesity rate – 2.5 times higher than that of the population – was detected among children of 14–18 years with a family background of

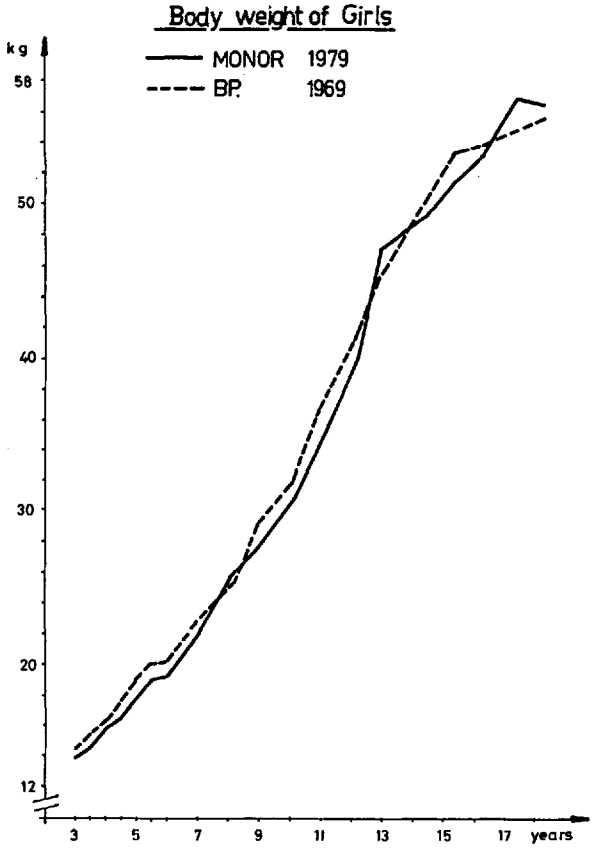

Fig. 4. Weight of girls.

Table 1. Nursery-school children.

Boys								Girls							
Years of age	Number of children	Obese						Years of age	Number of children	Obese					
		over 129 %	%	between 120 and 129 %	%	total	%			over 129 %	%	between 120 and 129 %	%	total	%
3.0	48	–	–	7	–	7	–	3.0	65	–	–	2	–	2	–
3.5	231	4	1.7	5	2.2	9	3.9	3.5	224	3	1.3	6	2.7	9	4.0
4.0	252	1	0.4	3	1.2	4	1.6	4.0	235	2	0.9	6	2.6	8	3.4
4.5	244	7	2.9	5	2.1	12	5.0	4.5	232	1	0.4	6	2.6	7	3.0
5.0	214	4	1.9	5	2.3	9	4.2	5.0	193	1	0.5	6	3.1	7	3.6
5.5	238	3	1.2	5	2.1	8	3.3	5.5	232	2	0.9	5	2.1	7	3.0
6.0	196	3	1.5	4	2.0	7	3.5	6.0	231	6	2.6	7	3.0	13	5.6
Σ	1423	22	1.6	27	1.9	49	3.5	Σ	1412	15	1.1	36	2.7	51	3.8

Diabetes occurred in families of 147 children. Out of these, obesity in 11 children 7.5 %.

Table 2. Primary-school children.

Boys								Girls							
Years of age	Number of children	Obese						Years of age	Number of children	Obese					
		over 129%	%	between 120 and 129%	%	total	%			over 129%	%	between 120 and 129%	%	total	%
7	583	9	1.5	18	3.1	27	4.6	7	545	14	2.6	11	2.0	25	4.6
8	588	11	1.9	17	2.9	28	4.8	8	479	10	2.1	8	1.7	18	3.8
9	674	13	1.9	7	1.0	20	2.9	9	558	4	0.7	13	2.3	17	3.0
10	625	18	2.9	10	1.6	28	4.5	Σ	1582	28	1.8	32	2.0	60	3.8
Σ	2470	51	2.1	52	2.1	103	4.2	10	580	38	6.6	17	2.9	55	9.5
11	632	21	3.3	16	2.5	37	5.8	11	585	28	4.8	21	3.6	49	8.4
12	483	17	3.5	14	2.9	31	6.4	12	562	29	5.1	28	4.9	57	10.0
13	623	21	3.4	17	2.7	38	6.1	13	504	21	4.2	12	2.4	33	6.6
14	514	15	2.9	17	3.3	32	6.2	14	533	14	2.6	19	3.6	33	6.2
Σ	2252	74	3.3	64	2.8	138	6.1	Σ	2764	130	4.7	97	3.5	227	8.2

Diabetes occurred in families of 555 children. Out of these, obesity in 41 children 7.4%.

Table 3. Secondary-school children.

Boys								Girls							
Years of age	Number of children	Obese						Years of age	Number of children	Obese					
		over 129 %	%	between 120 and 129 %	%	total	%			over 129 %	%	between 120 and 129 %	%	total	%
15	238	10	4.2	11	4.6	21	8.8	15	264	12	4.5	12	4.5	24	9
16	72	5		1		6		16	92	1		1		2	
17	76	3		1		4		17	72	–		4		4	
18	31	1		–		1		18	97	2		4		6	
Σ	417	19	4.6	13	3.1	32	7.7	Σ	525	15	2.9	21	4.0	36	6.9

Diabetes occurred in families of 82 children. Out of these, obesity in 14 children 17 %.

diabetes. Obesity rate of nursery school children with diabetic background is double of the general population's value. The number of obese children is relatively smaller in the children group of 7–14 years with diabetic relatives compared with the general population. This may be explained by the fact that in families where diabetes occurs obesity manifests itself earlier and shows no healing tendency. Obesity in puberty has a similar incidence in the diabetic families to that in the general population, however, in the latter case it has a transitory character.

Special care should be taken of children found obese in nursery school age. Obesity shows a persistent tendency, and prospective examinations suggest that 80 % of obese children become obese adults (15). Obese children of diabetic families should be nursed regardless of their age. Potential diabetic persons traced by an oral glucose-tolerance test must be given appropriate diabetic treatment.

On the basis of our results we recognized the urgent need for providing an opportunity for all the obese children traced by us to make regular physical exercises. Furthermore, parents should be involved in health protection work as regards their obese children (nutritional habits and life style). Professional nursing of obese children has already begun.

Table 4.

Number of population in the district Monor	110,000
Number of children attending child communities	16,000
Number of children participating in survey	12,751
Number of obese children	705
Percentual rate of obesity	5.53 %
Anamnestic data for diabetes in family	784
Parents, brother, sister 54	
Grandparents 730	
Obesity in children 66	
Percentual rate of obesity 8.4 %	

Summary

Authors conducted the weight-height measurements of 12,751 children in the district of Monor on the basis of the IW/AH index and found 705 obese children. Childhood obesity rate of the district was 5.53 %. The questionnaires sent to the affected children's families revealed diabetes in the families of 784 children, 66 of whom were obese, which is 8.4 % – much higher than the population's value.

The highest obesity rate was found in puberty, while in children with a family background for diabetes this value was found in 14–18 years of age.

The groups investigated are given special nursing. Authors express thanks to all the persons who contributed to carry out the measurements.

Zusammenfassung

Die Verfasser haben eine Reihenuntersuchung für die Aufklärung der Obesitätsfälle in der Kinderbevölkerung des Bezirks Monor (Komitat Pest) durchgeführt. Das Körpergewicht und die Körperlänge von 12751 Kindern (3–18 Jahre alt) wurden gemessen. Mit der IW/AH-(Idealgewicht/aktuelle Körperlänge-)Indexmethode wurden 705 (5,3 %) Kinder übergewichtig gefunden.

Mit Fragebogenmethode wurde geklärt, daß in den Familien von 784 Kindern Diabetes vorkommt. Unter diesen wurden 66 Obesitätsfälle unterschieden. Das Prozentverhältnis ist in dieser Gruppe mit 8,4 % viel höher als in der allgemeinen Population.

Die größte Zahl der Obesitätsfälle wurde im Pubertätsalter gefunden. Bei den Kindern mit einer Familiengeschichte für Diabetes war diese Zahl in dem Alter von 14 bis 18 Jahren am größten.

Die spezielle Untersuchung und ärztliche Beratung dieser Kinder ist im Gange.

Key words: obesity, JW/AH index method, diabetes, age-groups, survey

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