

Longitudinal examinations in the course of dietotherapy of mentally retarded obese in-patients

**M. Antal, G. Zajkás, B. Rajháthy, K. Nagy, É. Szántó, M. Thur,
E. Dworschák, A. Gergely, M. Bedő, and G. Bíró**

National Institute of Food Hygiene and Nutrition, Budapest (Hungary)

Summary: Mentally retarded obese in-patients were fed by low-energy diet (4.2–4.6 MJ) for 9 months. During this period, an average of 13 ± 4.5 kg loss of body mass occurred in men and 16 ± 2.7 kg in women.

Anthropometric measurements were performed before starting the dietotherapy and in the ninth month. Changes of body fat could be followed well when calculated according to BMI. Less reliable results were obtained with skinfold thickness measurements, presumably due to body deformities.

Results of clinical laboratory tests, which were carried out before starting the dietotherapy and in the fourth and seventh months, suggested that a low-energy-containing diet with balanced nutrient content and adequate protein intake did not impair protein metabolism, favourably affected serum triglyceride and cholesterol levels, but resulted in an unfavourable decrease in the HDL-cholesterol content.

Zusammenfassung: Geistig behinderte, übergewichtige Patienten, die in einem geschlossenen Kollektiv lebten, verwendeten neun Monate lang eine kalorienreduzierte Kost (4,2–4,6 MJ). Während der Untersuchungsperiode war eine Körpergewichtsverminderung von $13 \pm 5,5$ kg bei den Männern und $16 \pm 2,6$ kg bei den Frauen zu beobachten.

Vor der Diättherapie und im neunten Monat wurden anthropometrische Untersuchungen durchgeführt. Wir konnten feststellen, daß der prozentuale Anteil des Körperfetts, nach BMI berechnet, deutlich abnahm. Anhand der Hautfaltungsmessungen dagegen zeigte sich diese Verminderung weniger deutlich. Das ist wahrscheinlich auch auf die Schwierigkeiten zurückzuführen, die während der Messungen infolge körperlicher Mißbildungen auftraten.

Die klinischen Laboruntersuchungen, die vor Beginn der diätetischen Behandlung sowie im vierten und siebten Monat durchgeführt wurden, weisen darauf hin, daß eine kalorienarme Kost mit ausgeglichenem Nährstoff- bzw. Eiweißgehalt dem Eiweißstoffwechsel nicht schadet und den Triglycerid- und Cholesterinspiegel im Serum günstig beeinflußt, andererseits aber eine ungewünschte Cholesterinverminderung in der HDL-Fraktion verursacht.

Key words: mental retardation; obesity; body size; serum lipids; low-energy diet

Schlüsselwörter: geistige Behinderung, Übergewicht, Serumlipide, kalorienarme Diät

Introduction

The majority of mentally retarded adolescents are shorter and of less body mass than their mentally healthy contemporaries but their body

composition, namely the protein and fat reserves, are about the same as those of the normal population (1). Examinations of the nutritional status of mentally retarded adults are extremely sparse. Litchford and Wakefield (2) found about 22% of 80 seriously retarded adults to be obese. In mentally intact persons with obesity simplex, considerable loss of body mass can be achieved by properly chosen dietary regimens. The present study was designed to examine whether a loss of body mass could be induced by dietotherapy in mentally retarded obese persons.

Materials and Methods

From among 92 mentally retarded in-patients, obese persons were selected on the basis of body height and body mass measurements and of the determination of the fat content of the body. Body fat percent was determined based on BMI [body mass (kg): body height² (m)] and according to the thickness of four skinfolds (biceps, triceps, subscapular, suprailiacal) measured by Lange calipers (3–5).

The obese in-patients received their meals in a separate dining room 1 month before the start of dietotherapy, so as not to be disturbed either by environmental factors or by the other people. Before starting dietotherapy, daily energy and nutrient intakes were calculated by weighing the served meals and the plate waste, then the supplemented meals.

A 30-day rotating menu with 4.2–4.6 MJ energy content was administered in the course of the dietotherapy. The quantity of food actually consumed was measured by weighing once a week. Dietotherapy lasted for 9 months.

Clinical laboratory tests were performed on the sera of three men and seven women, before starting dietotherapy, and in the fourth and seventh months, during the therapy. Blood sampling was done after 12-h fasting.

Total protein content of the serum was determined by the Galenopharm Protitest, albumin by Bromcresol green reagent (6). Triglyceride was determined by Gödecke Enz Glycin-GPO test and cholesterol by Gödecke Enza Chol-F test. High density lipoprotein cholesterol was measured after double precipitation with phosphotungstic acid and magnesium chloride (7, 8).

Table 1. Energy and nutrient intake.

	before	during
	dietotherapy	
Energy (MJ)	9.24	4.58
Protein (g)	76	67
Energy %	14	24
Animal origin (g)	38	45
Fat (g)	80	36
Energy %	33	30
Saturated fatty acids (g)	27	11
Monounsaturated fatty acids (g)	30	11
Polyunsaturated fatty acids (g)	10	4
Cholesterol (mg)	376	258
P/S	0.37	0.35
Carbohydrate (g)	294	125
Energy %	53	46
Sugar (g)	94	24
Dietary fibre (g)	7	22

Table 2. Body mass values of obese patients.

Patient	Age (years)	Psychopatho- logical diagnosis	Body height cm	Body mass (kg)			Body fat (%)				
				Initial	4th month	7th month	9th month	Loss	Initial*	9th month	Initial**
Males											
M.F.	60	imbecile	166	89.5	76.5	73.0	71.0	18.5	14.5	31.4	22.3
L.T.	24	imbecile	158	70.0	65.0	60.0	61.5	8.5	24.0	25.1	20.5
B.I.	52		147	100.0	90.0	90.0	90.0	10.0	24.0	49.5	43.3
B.P.	52	idiot	166	88.0	80.5	79.5	77.0	11.0	21.8	30.3	25.0
B.Z.	32	debilitate	174	88.0	80.0	73.0	71.0	17.0	29.0	29.1	21.0
	44	idiot	162	87.1	78.4	75.1	74.1	13.0	22.7	33.1	26.4
\bar{x}			± 10	± 10.8	± 9.0	± 10.9	± 10.5	± 4.5	± 5.3	± 9.5	± 9.6
SD	± 15										
Females											
Sz.V.	36	idiot	141	70.5	63.0	58.0	53.0	17.5	33.0	45.1	33.1
B.Gy.	34	imbecile	156	83.0	70.5	66.5	66.0	17.0	34.0	43.3	37.3
R.M.	47	debilitate	160	80.0	71.0	66.0	63.0	17.0	30.0	39.4	30.2
S.R.	38	debilitate	146	71.0	62.5	60.0	60.0	11.0	32.0	42.2	35.1
S.M.	45	imbecile	156	86.0	76.0	71.0	69.5	16.5	31.0	45.5	35.7
T.M.	25	imbecile	157	93.0	80.0	76.0	73.0	20.0	37.0	48.3	37.1
B.Cs.	22	idiot	158	95.0	87.0	82.5	77.0	18.0	34.5	48.7	38.7
B.E.	23	idiot	—	87.0	80.0	77.5	75.0	12.0	37.5	—	—
T.J.	66	oligophren	155	73.5	66.0	59.0	58.5	15.0	32.0	38.5	29.9
L.M.	45	oligophren	162	103.5	95.0	89.0	87.5	16.0	35.0	50.6	42.2
	38		155	84.2	75.1	70.5	68.2	16.0	33.6	44.5	32.3
\bar{x}			± 7	± 10.9	± 10.6	± 10.5	± 10.2	± 2.7	± 2.5	± 4.2	± 10.9
SD	± 13										

* Skin fold measurement; ** BMI

In the seventh month, N-balance studies were performed with some collaborative people, based on protein intake and urinary excretion of nitrogen.

Results and Discussion

We found five obese men and ten obese women among the 92 mentally retarded in-patients. None of them had hypertension, i.e. their blood pressure values did not exceed 140/90 mm Hg. In the course of regular medical check-ups, no pathological changes were observed.

The energy intake of the obese persons before dietotherapy was near to the lower limit of the Hungarian Recommended Dietary Intake for adults with light physical work (Table 1). The patients' physical activity was slight: this fact may contribute in the development of their obesity. It is generally accepted that the considerably reduced resting metabolism of the obese (9), the life-style and social-cultural facilities (10) and genetic factors also play an important role in the development of obesity.

The relatively high fat, cholesterol and sugar contents and the low dietary fibre content of the diet consumed before the nutritional intervention were apparent. On planning the diet, besides the reduction of energy intake, efforts were made to correct these faults too.

Data for retarded obese persons, including mental status, are given in Table 2. The classification of the in-patients was as follows: debilitates, imbeciles, oligophrens and idiots, according to intelligence levels. Person B. P. was an adult postmeningitic, in-patient R. M. an infantile postmeningitic and patient Sz. V. suffered from Down's syndrome. The mental retardation of the rest of the in-patients was the consequence of premature delivery, perinatal injuries.

The average body height, both in men and women (162 ± 10 cm, 155 ± 5 cm, respectively) was considerably lower than the reference values (172 and 162 cm) recommended by the Expert Committee of the WHO (11). The body height of patient B. E. could not be measured because of very strong

Table 3. Serum total protein and albumin levels and nitrogen-balance (N-balance).

	Total protein (g/l)			Albumin (g/l)			N-balance (g/day) 7th month
	Initial	4th month	7th month	Initial	4th month	7th month	
Males							
M.F.	64	64	70	41	41	40	—
L.T.	64	70	75	43	49	58	-2.0
B.J.	57	69	62	33	42	36	—
Females							
Sz.V.	57	69	70	33	35	36	—
B.Gy.	63	74	74	38	43	37	-0.18
R.M.	65	70	69	41	44	36	—
S.R.	71	71	73	41	42	42	+1.14
S.M.	60	69	69	40	45	43	-0.03
T.M.	60	75	71	39	46	45	+0.17
B.Cs.	65	68	71	39	45	41	—

contractures. During the 9 months of dietotherapy, men lost an average of 13 kg and women of 16 kg body mass. The weight loss was most pronounced in the first period. Body fat quantity, calculated on the basis of BMI, was better indication of significant obesity and the changes of body mass in response to dietotherapy. Formerly, Scherf et al. (12) called attention to the fact that after a rapid and pronounced loss of body mass, the percent of body fat, calculated by skinfold thickness measurements, considerably exceeds the actual values. Further difficulties arose in the course of measuring, due to muscular atrophy, contractures – in some cases, to considerable limitation. Thus, skinfold measurements in regions suggested by the Jackson-Pollock (13, 14) anthropometric method – which correlates better with the hydrostatic measurements – could not be carried out.

A so-called conservative diet was used for dietary treatment avoiding carbohydrate derivatives, but containing a well-balanced proportion of nutrients (Table 1). According to Rosen et al. (15), neither appetite nor mood differ considerably in obese persons, consuming 800 or 1,000 kcal diets, supplemented by 50 g carbohydrate. In our study, the 1,000 kcal diet contained 125 g carbohydrate. During dietotherapy, the in-patients complained occasionally about sensations of dizziness. Parallel with the complaints, acetonuria could not be detected.

The realisation of dietotherapy in mentally retarded persons is impossible with traditional psychotherapy (16, 17). In the present study, this was replaced by careful nursing and medical-pedagogic attention. The in-patients responded in different ways to dietotherapy: debilitates were occasionally aggressive, one male in-patient tried a hunger strike, imbecile women responded to the diet practically with no problems and were pleased with the compliments received about their better appearance due to weight loss. Oligophrens and idiots submitted quietly to the situation; they sometimes tried to get extra food but after some unsuccessful attempts, gave up.

In the seventh month of dietotherapy, we were twice able to perform N-balance studies in five in-patients. Three in-patients presented slightly negative N-balances, consuming the low energy and acceptable protein-containing diet. Results appear to suggest that protein of good quality intake and adequate quantity with low energy intake, does not cause severe impairment of the protein metabolism for a long time. Two idiots' serum total protein and albumin levels were somewhat lower before starting dietotherapy; however, both of them were in the normal range during the examination period (Table 3).

Initial serum triglyceride levels exceeded the upper normal limit (1.71 mmol/l) in seven cases and was in one case about the upper limit. From among these cases, triglyceride levels decreased considerably in the fourth month in five patients, due to dietotherapy. In the seventh month, as compared to these values, slight increases were observed. Female in-patient Sz. V. did not respond at all to the treatment; in person S. M., after transient decrease, triglyceride level increased again, these in spite of the fact that both persons showed significant losses in body mass. When consuming the traditional diet, serum cholesterol level of person S. M. was higher than normal (6.5 mmol/l). Due to 4 months' dietotherapy, total

cholesterol level decreased in eight patients and slightly increased – within the physiological level – in two. Later on, the dietotherapy did not result in further significant decreases. HDL-cholesterol levels in persons L.T., Sz.V., and B.Gy. were under 0.8 mmol/l. By the seventh month, HDL-cholesterol levels of a further five in-patients fell below this value (Table 4).

Weinsier et al. (18, 19) reported that with similar energy and nutrient intakes, decreased serum triglyceride values occurred only when these were higher than normal before dietotherapy was started. They did not observe changes in HDL-cholesterol levels; however, serum cholesterol levels decreased slightly (18) or remained unaltered (19). According to the results of the "Zutphen Study", 1 kg loss of body mass was accompanied by 2 mg/dl (0.05 mmol/l) decrease of total cholesterol level (20). In their study, serum cholesterol levels decreased slightly but significantly. We did not observe such degrees of decrease in any patient. It is well known (21) that serum cholesterol level is decisively influenced – considering the exogenous factors – by the P/S ratio of the diet and by its cholesterol content. In the dietary period our patients consumed considerably less fat and relatively less cholesterol than before, but P/S ratio could not be changed substantially compared with their former diet.

Besides the loss of body mass in consequence of decreased energy intake, Jeffery et al. (23) noticed an increase in mass. In one of our earlier studies (24), low energy diet with adequate nutrient density together with increased physical activity, resulted in significant decrease of the serum total cholesterol and an increase of HDL-cholesterol level. In our present study, during the dietotherapy of mentally retarded patients, regular physical activity could not be prescribed.

According to our findings, with adequate diet and good nursing, dietotherapy may be realized even in mentally retarded in-patients. The present study also serves as a model, proving good results of dietotherapy alone in the treatment of obesity simplex.

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Authors' address:

Dr. M. Antal, National Institute of Food Hygiene and Nutrition, Gyáli út 3A, H-1097 Budapest, Hungary