The Food Consumption *of* Juvenile Diabetics

Evaluation of Diets Used at Home and at Summer Camp

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IN A PREVIOUS report on nutritional studies of diabetic children attending summer camp[1] we mentioned the observation that the actual food consumption at home by many of these children was not always that which was represented by the figures furnished to us on the camper's application for admission to camp. The desire for more accurate information regarding this prompted us to undertake a careful analysis and calculation of the food consumption at home.

To carry out such studies it was of course necessary to interview each child and attempt to make the necessary calculations from the information thus furnished. This, we felt, would be the best way of learning just what the caloric intake actually was and how it compared with the diet prescription ordered by the referring physician. Information was also obtained regarding the insulin dosage and the level of diabetic control that was maintained while on these home diets as judged by the degree and persistance of glycosuria.

We were also interested in the problem involving those of our children who had not received at any time any definite instructions regarding their food intake; and, finally, we were particularly anxious to obtain information regarding that group of children who were on the so-called "free diet" regime.

Before considering these data, however, certain qualifying statements must be made. First, we were able to carry out this investigative work only with the older children (10–17 yrs.). Many of the younger group had to be excluded because it was difficult to confirm their reliability. Furthermore, it must be realized that there are differences inherent in the various methods of caloric calculation used, which may lead to variations of as much as 20 to 30 per cent in the total figures. Therefore, it is clear that the calculations of the home consumption diets are in reality only approximations.

These particular studies were possible in a total of 120 cases (62 girls and 58 boys) out of the entire group of 155 attending camp during the summer of 1951. The remainder of the group were excluded from the survey because their data were not considered to be sufficiently reliable to warrant inclusion.

OBSERVATIONS

Table I shows the relation between the prescribed and actual (as calculated) home diet of the 58 boys and 62 girls of our series. It can be seen that only about one-fifth of the boys and one-third of the girls followed their prescribed diet. A significant number apparently consumed a diet about one and one-half times the caloric intake prescribed by their physician. A high percentage (29.3 per cent of the boys and 33 per cent of the girls) followed no dietary restriction and are here classified as on a "free diet."

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TABLE I

Analysis of Calculated Home Diet Consumption Carried Out on 58 Boys and 62 Girls of Our Series

Type of diet	Boys		Girls	
	No.	%	No.	%
As prescribed	11	19	22	35
Less than prescribed diet	0	—	2	3
1½ times prescribed diet	22	38	14	23
2 times prescribed diet	7	12	1	1.5
2½ times prescribed diet	1	1.7	2	3
3 times prescribed diet	0	—	1	1.5
Free diet	17	29.3	20	33

It was of particular interest to analyze the food intake of children on a so-called "normal," "free," or "unrestricted" diet. The results of this survey in the 37 children on a free diet are presented in Table II. Of the total, about half (54 per cent) were found to have been taking the correct amount of food warranted by their particular age, weight, and physical activity. About one out of every four of these ingested two or more times the caloric intake indicated on clinical grounds. The distribution was somewhat different between boys and girls, in that, on the whole, the girls were less likely to eat amounts in excess of their actual requirements. (In all cases the normal values used in the calculations are those given for ideal body weight and are based on figures suggested by the Food and Nutrition Board of the Nutritional Research Council.)

It is significant that there were 35 boys and 15 girls who claimed to have taken more than 3000 calories while at home, whereas at camp, where they were presumably more active, not a single child was fed more than 2900 calories.

Of the 33 boys in this "over 3000 caloric group," 13 showed a gain, 14 lost, and six showed no change in weight. All of the 14 who lost weight were definitely overweight at the time of admission to camp.

Similarly, of the 15 girls in this group, three gained, ten lost, and two had no change in weight at the end of their camp stay. Practically all the girls in this category had been definitely overweight when they arrived at the camp.

Insulin Dosage

In most instances, the insulin dosage at the start of the camp period was reduced from that of the home dosage. As can be seen from representative data (Table III) on the 12-year-old group, in some cases the final insulin schedule was even lower, while in others higher, than the dosage at the beginning of the camping period. In very few cases in the entire group did we have to increase the insulin dose above the amount which had been prescribed for home administration

The reason for the generally lower insulin dosage at camp is probably the very poor control of the diabetes in a number of these children before coming to camp, a finding which we feel is valid although we cannot quantitate the degree of control. Since, in many instances, the children were eating a lower carbohydrate diet in camp, they could be better controlled on smaller amounts of insulin aided by increased physical activity.

TABLE II

Analysis of Cases on "Free" or "Uncontrolled" Diets

	Caloric calculation of actual food intake							
	Normal intake		1½ times normal		2 times normal		2½ times normal	
	No.	%	No.	%	No.	%	No.	%
Boys 58 total 17 "free"	8	47	3	17	4	24	2	12
Girls 62 total 20 "free"	12	60	5	25	3	15	—	—
Total on "free" diet: 37	20	54	8	22	7	19	2	5

TABLE III

Data on a Representative Group (12-Year-Old Children)

Case no.	Duration of diabetes, yrs.	Diet														Insulin dosage*			
		Home prescribed				Estimated actual consumption				Camp						Home	Camp		
										Beginning				Ending			Beginning		Ending
		C	P	F	Cal.	C	P	F	Cal.	C	P	F	Cal.	C	P	F	Cal.				
MALES																			
35	9	190	80	80	1800	289	136	164	3176	200	100	100	2100	300	120	110	2670	N.60			N.52
36	5	200	150	90	2210	258	126	147	2859	200	100	100	2100	200	100	100	2100	N.30			N.30
37	4		"Unrestricted"			474	174	252	4860	325	120	120	2860	325	120	120	2860	R.25,	P.15,	M.	R.18, P.10, M.		P.38
38	3	200	90	80	1880	219	121	150	2710	200	100	100	2100	200	100	100	2100	N.66			N.48		N.50
39	6		"Free"			169	95	104	1992	300	120	110	2670	250	110	110	2400	N.40			N.28		N.40
40	11	140	90	90	1730	225	123	181	3021	200	100	100	2100	200	100	100	2100	R.24,	P.16,	M.	R.18, P.12, M.		P.34
41	1/2	350	100	130	2970	365	140	181	3649	325	120	120	2860	325	120	120	2860	R.15,	P.15,	M	R.11, P.11, M.		P.25
FEMALES																			
108	3/4	150	100	80	1720	211	100	100	2144	160	95	90	1800	160	95	90	1800	P.32			P.22		P.16
109	2		"Normal"			291	97	100	2452	250	110	110	2400	250	110	110	2400	N.25			N.18		N.12
110	1 1/2	250	95	68	1992	302	110	118	2710	200	100	100	2100	200	100	100	2100	N.40			N.28		P.34
111	5	180	90	100	1980	250	102	115	2443	200	100	100	2100	200	100	100	2100	R.26,	P.13,	M.	R.18, P.8, M.		R.22, P.12, M.
112	8		"Free"			345	128	128	3044	250	110	110	2400	250	110	110	2400	R.24,	P.12,	M.	R.18, P.8, M.		R.22, P.12, M.
113	3		"Regular"			336	120	136	3048	200	100	100	2100	200	100	100	2100	R.55,	P.35,	M.	R.40, P.25, M.		R.35, P.45, M.
114	3	200	90	70	1790	244	104	125	2517	200	100	100	2100	200	100	100	2100	N.42			N.30		N.56

* P = PZI; N = NPH; R = Regular; M = Mixtures.

Discussion

There were several significant facts which were learned as a result of our analysis of the comparison of the prescribed home diets with the calculated actual daily home food consumption and the final camp diets. Examination of our data reveals that most of the home diet prescriptions actually did not deviate very much from the final camp diet. However, the calculated average daily home food consumption showed an entirely different picture, as shown in the analysis contained in Table III. It was found that most of the children were consuming carbohydrate intakes much in excess of their diet prescriptions. They were eating not only extra bread, fruit, and milk, but also some of the more concentrated carbohydrates such as ice cream, sweetened desserts, cakes, cookies, and candies. This was a more common practice among the 14- to 17-year age groups than among the younger age groups. Data from the remaining groups for which records are available show that there was much less deviation in the carbohydrate intakes than among the older group. Furthermore, many of the home diet prescriptions were actually found to be insufficient in total calories, and so some of the children appear to have compensated for this deficit by intakes in excess of their diet prescriptions.

We found that most of the children (and evidently this was also true of their parents) had not received adequate diet instructions either from their physicians or from dietitians in the various hospitals or clinics. They had little knowledge of the relative carbohydrate values of food and other exchange values. Several of the girls, for example, honestly felt that they were sticking quite closely to a prescribed diet, but actually, according to our estimations, were off as much as 1000 to 3000 calories a day.

In trying to obtain home diet histories from these diabetic children, it was expected that since they were on restricted diets, food would have great significance for them. They would be expected to be more or less conscious of what they did eat each day, and when they were breaking their diets. It was found that,

in general, children on restricted diets were conscious of the food they ate and followed a rather consistent pattern in their meals. However, these children often ate concentrated sweets as extras without realizing that by so doing they were completely overcoming the efforts to control their caloric intake. The impression gained, however, was that though some of these children were not following their prescribed diets, they were consistently eating the same kind of diet every day. They were being controlled on this diet which, in reality, was higher than their physicians realized.

We had no difficulty whatsoever in bringing the children of this group in line so that they were receiving the diets indicated for their age, weight, and height standards. They appeared to be just as well pleased with this routine as with their "free diet" and we did not hear of any difficulty arising because of the change.

As a result of this analysis we now have some idea of the proportion of juvenile diabetics coming from the New York area that are being treated on "free diets," and also what such "free diets" have actually turned out to be when subjected to careful study and evaluation. Results of studies similar to those presented above may be different for other parts of the country, and we feel that an analysis should be undertaken in different areas for a comparative study.

Summary

An analysis and estimation of diets consumed at home prior to coming to a summer camp for diabetic children was attempted on 62 girls and 58 boys out of a total camp population of 81 girls and 74 boys.

Most of the children were found to be consuming carbohydrate (and calories) greatly in excess of their diet prescriptions. In many instances, however, the prescribed home diets were considered to be actually insufficient in total calories to meet the energy needs of active and rapidly growing children. Most of the children and their parents had not received adequate diet instructions from either their physicians or from dietitians in hospitals and clinics. They had little knowledge of the relative carbohydrate values of foods or of exchange values.

An analysis is presented of all children who were on "free diets" prior to coming to camp, to study the actual deviation of these from the so-called average food requirements as established by accepted standards. About half of a group of 37 children on a "free diet" consumed a diet considered "normal" and adequate for their needs. The others ingested increasing amounts of food in excess.

Data are presented showing the prescribed home diet, the actual home diet, as obtained by questioning, the final camp diets, and the corresponding insulin dosages in a representative group of campers.

REFERENCES

1. Jacobi, H. G.: Nutritional standards, organization, and management of summer camps for diabetic children. J. Clin. Nutrition 1: 384, 1953.
2. Jacobi, H. G.: Nutritional studies of juvenile diabetics attending summer camp. J. Clin. Nutrition 2: 22, 1954.

Resumen

El consumo alimenticio de diabéticos jóvenes. Apreciación de las dietas empleadas en casa y en un campo de verano

Un análisis de las dietas consumidas en casa antes de llegar a un campo de verano para niños diabéticos fué intentado en 62 muchachas y 58 muchachos de un total de 81 muchachas y 74 muchachas asistiendo al campo.

Se descubrió que la mayor parte de los niños consumían cantidades de hidratos de carbono (y calorías) muy en exceso de las indicadas en sus recetas dietéticas. En muchos casos, sin embargo, las dietas caseras impuestas fueron juzgadas como realmente insuficientes en calorías totales para cumplir las necesidades enérgicas de niños activos en el período de rápido crecimiento. En la mayoría de los casos, ni los niños ni sus padres habían recibido instrucciones dietéticas adecuadas, sea de sus médicos sea de los servicios dietéticos de los hospitales y clínicas.

Se presenta un análisis de todos los niños consumiendo dietas "libres" antes de llegar al campo, con objeto de estudiar la verdadera desviación de dichas dietas de los llamados requerimientos alimenticios medianos establecidos según los *standards* aceptados. Alrededor de la mitad de un grupo de 37 niños siguiendo una dieta "libre" consumía una dieta considerada como "normal" y adecuada a sus necesidades. Los demás ingerían cantidades cada vez mayores de alimentos en exceso.

Se presentan datos sobre la dieta casera impuesta por el médico, la dieta casera efectivamente consumida (datos obtenidos por interrogación), las dietas últimamente establecidas en el campo, y las dosis correspondientes de insulina en un grupo representativo de niños.