

DIETARY INTAKES OF PRESCHOOL CHILDREN IN LA PAZ, EL SALVADOR, CENTRAL AMERICA

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SUMMARY

A dietary survey was conducted in a department of El Salvador as part of an assessment of the nutritional status of preschool children. Intake of calories, protein and retinol equivalents were estimated using a 24-hour recall technique. The average daily energy intake for children 1-4 years old was 866 Kcal representing 60% of the 1973 level recommended by the Institute of Nutrition of Central America and Panama (INCAP), for this age group, and 76% of the recommended level on a body-weight basis. Average protein intake per child per day in the same age group was 31.3 g, which represents 110% of the recommended level for the age group, and 136% of the recommended level on a body weight basis. The estimated retinol

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equivalent intake was 36% of the recommended allowance. In general, the results of the present study were similar to those obtained in the study carried out in El Salvador by INCAP during the period September-November, 1965.

INTRODUCTION

Dietary information concerning the intake of calories, protein and retinol of children in El Salvador is limited. The last major investigation of dietary patterns was carried out by the Institute of Nutrition of Central America and Panama (INCAP) as part of the Central American nutrition survey undertaken during the period 1965 to 1967 (1). The results of this study indicated that, as happens in other Central American countries, in El Salvador there was a low protein and energy intake associated with significant growth retardation in children. Dietary results for El Salvador revealed a particularly low retinol intake.

The present study represents the first investigation of dietary patterns of preschool children in El Salvador since the INCAP survey. It provides more current dietary information and renders results obtained with a larger sample of children. Although important differences in sampling exist, the study provides a basis for comparing current preschool dietary patterns with those defined in the INCAP study ten years earlier.

METHODS

The dietary studies were carried out in the Department of La Paz, El Salvador, in conjunction with anthropometric and demographic studies (1). Eighteen sample sites were selected for dietary investigation. At each of these sites dietary histories were obtained from 10 to 12 children 1-4 years of age who were randomly selected from those included in the anthropometric measurements.

A 24-hour dietary recall method was employed by a nutritionist, fluent in Spanish. Dietary interviews took place in the children's homes. The child's mother or the person responsible for food preparation was asked to recall the types and amounts of food eaten by the child in the previous 24 hours. If the child were ill, the mother was asked to describe the usual intake

pattern. Food models, various sized cups, and spoons of known volume served as visual aids, which were used to improve quantitative estimates. In the case of tortillas, where large weight variations were observed between households, a sample of the actual food item was weighed on a portable scale. At the close of the interview the investigator cross-checked the dietary information by reviewing the child's share of the food prepared for the entire family during the 24-hour period. All field methods were pretested in a comparable rural population outside of the study area.

The data collected during the survey were coded for computer analysis by the nutritionist (P.W.). The energy protein and retinol equivalent contents of commonly eaten foods were calculated by computer using the INCAP Food Composition Table for Central America and Panama (2). The nutrient contents of unusual food items were hand calculated and listed under "miscellaneous". Intake levels were compared with the recommended daily dietary allowances adapted for this region of the Americas (3).

RESULTS

Energy and protein intakes increased steadily with age in the La Paz sample (Table 1). Retinol intake was maximal among one-year-olds and variably lower thereafter. Expressed as per cent adequacy, calorie intake remained relatively stable at about 60^o/o. The per cent adequacy of protein intake generally increased after one year of age while retinol adequacy decreased.

Cereal products were the major source of calories for all ages as well as the major protein source beyond the one-year-old age group (Table 2). Milk products contributed substantially to the calorie and protein intakes of one-year-olds but made a lesser contribution in the older age groups. Sugar contributed most significantly to the calorie intake of the one-year-olds. Beans were an important source of both calories and protein, principally in older children. Milk products and eggs were the main sources of retinol for all age groups.

An average of 14.5^o/o of calorie intake was provided by protein (Table 3). The percentage tended to increase with age. Adjustment for a protein quality of 70^o/o and 60^o/o reduced the average NDpCal^o/o to 10.2^o/o and 8.7^o/o, respectively.

TABLE 1
 AVERAGE DAILY INTAKE BY AGE – LA PAZ, EL SALVADOR
 (1976)

Age (yr)	No.	Calories		Protein		Retinol equivalents	
		Kcal	% adequacy	g	% adequacy	µg	% adequacy
1	54	718	62	23.7	99	117	47
2	52	837	62	30.9	110	83	33
3	36	887	57	32.2	107	73	29
4	52	1,034	59	39.0	118	101	34
1-4	194	866	60	31.3	110	95	36

TABLE 2
PER CENT CONTRIBUTION OF FOOD GROUPS TO INTAKE BY AGE,
LA PAZ, EL SALVADOR (1976)

Food group	Intake (Per cent)											
	Calories age				Protein				Retinol equivalents			
	1	2	3	4	1	2	3	4	1	2	3	4
Milk products	23	11	8	9	39	18	15	18	61	55	53	54
Eggs	4	4	4	4	8	9	7	7	15	30	29	24
Meat, poultry, fish	2	3	3	5	5	8	7	10	—	—	—	—
Beans	4	12	4	12	9	21	24	20	—	—	—	—
Fruits & vegetables	1	1	1	1	1	1	—	1	3	6	6	8
Cereals	40	50	53	54	30	34	37	36	—	—	—	—
Fats and oils	1	1	1	1	—	—	—	—	—	—	—	—
Sugar	16	9	8	6	—	—	—	—	—	—	—	—
Miscellaneous	9	9	8	9	8	9	10	8	21	8	12	14

TABLE 3

NET DIETARY PROTEIN CALORIE PER CENT (NDpCal^o/o) BY AGE
ADJUSTED FOR RELATIVE PROTEIN QUALITY

Age (yr)	No. of children	NDpCal ^o /o		
		Relative protein quality		
		100 ^o /o	70 ^o /o	60 ^o /o
1	54	13.2	9.2	7.9
2	52	14.8	10.4	8.9
3	36	15.5	10.9	9.3
4	52	15.1	10.6	9.1
1-4	194	14.5	10.2	8.7

DISCUSSION

The overall daily energy intake for ages 1-4 of 866 Kcal in the present study was slightly lower than the 943 Kcal intake for ages 1-5 reported in the 1965 INCAP dietary survey for El Salvador (4). Protein intake in the present survey averaged 31.3 g per day, a percentage slightly higher than 29.2 g showed by the 1965 INCAP study. Daily retinol intake (μg retinol equivalents) was lower than the already low INCAP result of 122 μg . However, the INCAP survey included 30 different sites selected to represent all regions of the country, whereas the study reported herein sampled only a single geographic area. Because of this major sampling difference, and the differences in the age distribution of the study children, it is not possible to evaluate whether the differences in dietary results between the two surveys represent a real change in dietary patterns, or not.

A recent dietary study in Honduras (5) provides an additional basis for comparison with the La Paz results. The average energy intake for 87 children 1-5 years of age in all socioeconomic groups combined, was very similar at 852 Kcal per day. Protein intake was somewhat lower at 26.1 g per day. Overall retinol intake was higher at 125 μg .

The low retinol intake estimates corresponded to low serum vitamin A levels as measured in the 1965 INCAP survey. Over

40% of the El Salvador children 0-4 years of age had serum levels below 20 µg per 100 ml, that is, the highest deficiency level of the Central American countries (6). Field studies have failed to document widespread clinically apparent vitamin A eye disease (7), but ample evidence exists indicating general low intakes and possible subclinical deficiency. As such, vitamin A deficiency is a continuing concern in El Salvador.

Data on the per cent contribution of food groups to calorie intake are not available for the INCAP study, so that comparisons could not be made. Comparative data are available for protein and retinol intake, and some differences are evident. In the La Paz study milk products and cereals made a lesser contribution to protein intake at all ages. The contribution of eggs, meat, poultry, fish and beans was higher. Milk products also contributed less and eggs relatively more to vitamin A intake. However, since overall retinol intake was somewhat lower, it appears that the relative increase in egg consumption did not compensate for the decreased milk products intake in providing vitamin A.

The calculated net dietary protein expressed as a per cent of the energy intake (NDpCal%) of 8.7%, compares with 7.3% calculated from the 1965 INCAP results for El Salvador (4), and with 7.4% calculated from the Honduras study (5). All figures are based on an estimated net protein utilization for the diet of 60%. These results suggest that the protein composition of the diet, if consumed in sufficient amounts, would be adequate to meet protein needs, since a protein-energy ratio of approximately 5% has been estimated to be adequate for most 2-3-year-olds if energy intake is adequate (8), based on the 1973 FAO/WHO estimates of protein and energy requirements (9). The study results indicate, however, that energy intakes are well below the estimated requirements, so that protein intake may also be inadequate. Furthermore, other researchers have challenged the adequacy of the recommended level of protein intake, and have also suggested that this level should be higher to allow more amply for the increased protein needs associated with infection and catch-up growth (10). For these reasons, although protein intake in relation to calories may be adequate, it is probable that the diet of these children would benefit from both increased energy and protein intake.

RESUMEN

INGESTA DIETETICA EN NIÑOS PREESCOLARES EN LA PAZ,
EL SALVADOR, AMERICA CENTRAL

Se llevó a cabo un estudio en un departamento de El Salvador como parte de una encuesta cuyo objetivo era determinar el estado nutricional de niños preescolares. Se estimó la ingesta de calorías, proteína y equivalentes de retinol por el método de recordatorio de 24 horas. El promedio de ingesta diaria de energía de los niños de 1 a 4 años de edad fue de 866 Kcal, lo que representa 60% del nivel recomendado por el Instituto de Nutrición de Centro América y Panamá (INCAP) en 1973 para este grupo etario, y 76% del nivel recomendado en base al peso corporal. La ingesta promedio de proteína en el mismo grupo etario fue de 31.3 g, lo que representa 110% del nivel recomendado para este grupo etario, y 136% del nivel recomendado en base al peso corporal. La ingesta estimada de equivalentes de retinol fue 36% del nivel recomendado. Por lo general, los resultados del estudio fueron similares a los obtenidos en el estudio que realizó el INCAP a nivel nacional en El Salvador, en el período comprendido de septiembre a noviembre de 1965.

BIBLIOGRAFIA

1. Trowbridge, F. L. & H. S. Stetler. Nutrition status surveillance in El Salvador. Bull. WHO. In press.
2. Flores, M., M. T. Menchú & M. Y. Lara. Valor Nutritivo de los Alimentos para Centro América y Panamá. Guatemala, Instituto de Nutrición de Centro América y Panamá, mayo de 1971, 18 p.
3. Recomendaciones Dietéticas Diarias para Centro América y Panamá. Trabajo elaborado por M. T. Menchú, G. Arroyave y M. Flores, con asesoría de un grupo de profesionales del INCAP. Guatemala, C. A., Unidad de Ayudas Audiovisuales, diciembre de 1973, 33. p.
4. Flores, M., M. T. Menchú, M. Y. Lara & M. Béhar. Dieta del pre-escolar en el área rural de El Salvador. Arch. Latinoamer. Nutr., 22: 205-225, 1972.
5. Flores, M. Perfiles dietéticos según el nivel socioeconómico en Honduras. Arch. Latinoamer. Nutr., 26: 401-423, 1976.
6. Nutritional Evaluation of the Population of Central America and Panama. Regional Summary. Institute of Nutrition of Central America and Panama (INCAP) and Nutrition Program, Center for Disease Control (formerly Interdepartmental Committee on Nutrition for

- National Development). Washington, D. C., U. S. Department of Health, Education and Welfare, 1972, p. 306.
7. Sommer, A. A preliminary report of vitamin A prophylaxis assessment program in El Salvador. In: **Vitamin A Deficiency and Blindness Prevention**. New York, N. Y., American Foundation for Overseas Blind, 1974, p. 18.
 8. Payne, R. P. Safe protein-calorie ratios in diets. The relative importance of protein and energy intake as causal factors in malnutrition. **Am. J. Clin. Nutr.**, **28**: 281-286, 1975.
 9. **Energy and Protein Requirements**. Report of a Joint FAO/WHO *ad hoc* Expert Committee, Rome, 22 March - 2 April, 1971. Rome, Food and Agriculture Organization of the United Nations, 1973, 20 p. (FAO Nutrition Meetings Report Series No. 52; WHO Technical Report Series No. 522).
 10. Scrimshaw, N. S. An analysis of past and present recommended dietary allowances for protein in health and disease. **New Engl. J. Med.**, **294**: 198-203, 1976.