



Food consumption in Cuban children between 6-23 months of age in 2016-2017. A contribution to design dietary interventions in early childhood

*Santa Magaly Jiménez Acosta**; Isabel Martín González; Armando Rodríguez Suarez; Denise Silvera Tellez; Karen Alfonso Fague
 Nutrition Center of National Institute of Hygiene, Epidemiology and Microbiology. Infanta 1158. La Habana, Cuba

***Corresponding Author(s): Santa Magaly Jimenez Acosta**

Head Profesor, Nutrition Center of National Institute of Hygiene, Epidemiology and Microbiology, Infanta 1158, La Habana, Cuba
 Tel: 78795183; Mail: santa@inhem.sld.cu

Abstract

Introduction: The first two years of life are crucial to the establishment of food preferences. Appropriate feeding practices for infants and young children are among the most effective interventions to improve the health of children. The availability of timely and reliable data can be a way to help early detection of inadequate food consumption and its impact on health and to support decision makers in selecting more effective interventions.

Objectives: To estimate the consumption of food, the intake of energy and nutrients and the compliance of the recommended food portions in the dietary guidelines for Cuban children up to two years of age.

Materials and methods: A cross-sectional study was conducted in children aged 6 to 23 months. It's understood a random two-stage sampling. The sample was calculated in 2063 children. Socio-demographic information was obtained from children and his / her family environment. A food consumption survey was applied for a 24-hour recall and it was estimated the adequacy of the portions of food intake to those recommended in the dietary guidelines of children under 2 years.

Results: 24.4% of children between 6 to 11 months and 11.3% from 12 to 23 months are breastfed. The consumption of fresh vegetables showed a very low intake. The variety of the evaluated diet showed that 55.6% of the children had a satisfactory variety. The consumption of energy and nutrients according to sex in children, only showed statistically significant differences in relation to iron intake being higher in males.

There was a low compliance of consumption of the vegetable, fruit, fat and egg portions recommended in the dietary guidelines.

Conclusions: Knowledge of food consumption at an early age of life provides a window of opportunity for the development of interventions that help familiarize the child with a wide variety of healthy foods.

Received: Mar 16, 2020

Accepted: Apr 29, 2020

Published Online: May 05, 2020

Journal: Annals of Pediatrics

Publisher: MedDocs Publishers LLC

Online edition: <http://meddocsonline.org/>

Copyright: © Acosta SMJ (2020). *This Article is distributed under the terms of Creative Commons Attribution 4.0 International License*

Keywords: Food consumption in children under 2 years; Dietary guidelines; Complementary feeding

Cite this article: Acosta SMJ, Gonzalez IM, Suarez AR, Tellez DS, Fague KA. Food consumption in Cuban children between 6-23 months of age in 2016-2017. A contribution to design dietary interventions in early childhood. *Ann Pediatr.* 2020; 3(1): 1022.



Introduction

Appropriate feeding practices for infants and young children are among the most effective interventions to improve the health of children. It is well recognized that the period from birth to two years of age represents a window of opportunity to achieve adequate growth and development and to promote adequate eating habits from the earliest age.

Sufficient amounts of food for a child according to the nutritional recommendations for their age and sex should not only be assessed quantitatively, but that these foods should have adequate quality to promote health, if this principle is not met you run the risk of suffering from malnutrition due to excess or default.

In Cuba, quantitative surveys of food consumption in young children have not been carried out. The availability of timely and reliable data can be a way to help early detection of inadequate food consumption and its impact on health and to support decision makers in selecting more effective interventions [1].

The Food Guidelines can be defined as "the translation of nutritional objectives into practical advice for the population." They are the result of scientific and epidemiological evidence on priority health problems, nutritional goals, food availability, prices and cultural acceptability of foods, prepared in the form of messages that contribute to promoting health and reducing the risk of diseases linked to nutrition [2].

To educate the population about the most appropriate way to eat healthy, it is necessary to know first the real composition of their diet in terms of food consumed. In Cuba there are dietary guidelines for children under two years of age prepared in the form of messages that contribute to promoting health and reducing the risk of diseases linked to nutrition [3].

The objectives of the present work were: Estimate the consumption of food groups, the intake of energy and nutrients and the compliance of the recommended food portions in the dietary guidelines for Cuban children up to two years of age.

Materials and methods

Four provinces of the country were randomly selected, leaving one of the western region, one central and two of the eastern area distributed as follows: Havana, Sancti Spiritus, Las Tunas and Santiago de Cuba. A two-stage random sampling was performed. In the first stage the municipalities were selected

Provinces	Municipality
La Havana	Playa, Cerro, Guanabacoa, Habana Vieja y Boyeros.
Sancti Spiritus	Sancti Spiritus, Yaguajay, Cabaiguan y Trinidad.
Las Tunas	Las Tunas, Amancio Rodríguez, Manatí, Majibacoa
Santiago de Cuba	Cristo, Guamá, Mella, Palma Soriano y Santiago

Sample size was calculated taking into account that there were approximately 10 children of that age in each family doctor's office. A sample drop of approximately 3% and a DEFF (design effect) of 1.5 were considered. Finally, the sample was calculated in approximately 2063 children of which 560; 505; 495; and 503 corresponded to the provinces of Havana, Sancti Spiritus, Las Tunas and Santiago de Cuba respectively. The clinics were selected by simple random sampling of the health areas of the different municipalities for a total of 58, 70, 50 and 55 clinics respectively.

Approximately half of the children between 6-11 months and the other half between 12-23 months were chosen.

Through a structured questionnaire, socio-demographic information of the child and his family environment was obtained, as well as general data on feeding and supplementation with micronutrient pharmaceutical preparations.

A food consumption survey was applied per 24-hour recall. The field work was carried out during 2015-16, surveyors trained collected information on food consumption and food practices subrogated through the mother or caretaker of the child, as long as was responsible for the child's feeding. It was considered to include weekends and holidays were eliminated. In the 24-hour recall, the interviewer, based on the general instructions, collected detailed information on the type and quantity of food consumed during the day before the interview, specifying their intake schedule.

The person interviewed when reporting the quantities of food was supported with a photographic atlas of portions of food and utensils in homemade measures previously prepared and validated [4]. All the interviewers were trained and standardized for the collection of information.

Once the survey collection stage was completed and the same were reviewed, the provincial Nutrition Managers sent them to the Center for Nutrition and Food Hygiene, where the data was entered, codified and revised. For coding, a code manual made by the Institute of Nutrition and Food Hygiene was used.

The purpose of the new data review process was to detect and correct errors made by the interviewers and supervisors during the field work and was fundamentally based on detecting the identification of poorly written foods or foods whose description was not known and cleaning consumption of food excluding non-plausible consumption for age and sex. Subsequently, the information on food consumption was processed for nutrient evaluation using the Ceres + automated software developed by the Institute of Food Nutrition and Hygiene [5], which contains an updated version of the energy and nutrients recommendations of the Cuban population [6]. and in this way the percentage of adequacy of food intake to these recommendations could be known.

In order to obtain the number of portions of food consumed, were taken into account the food groups and portion sizes recommended in the dietary guidelines for Cuban children up to two years of age [3] and by means of the Automated Ceres + System [5] an algorithm was developed that allowed from foods (in raw form) to use conversion factors to obtain ready-to-eat foods, which is the way they are proposed in the aforementioned guidelines.

In order to know the variety of the diet, a qualitative global index was created that grouped the proportion of children according to the daily consumption of food of the different groups. It was considered "satisfactory variety" if it consumed between 7 and 8 food groups; "Partial variety" if consumption was between 5 to 6 food groups and "insufficient variety" if it consumed less than 5 food groups.

The evaluation of continued breastfeeding was carried out according to the criteria recommended by the World Health Organization and other international organizations [7].

The survey supervisors were 2 members of the research team who followed the guide prepared for this purpose in detail.

Respondents were asked for informed consent and the willingness to participate in the study and their objectives were explained. The agreements of the World Medical Association in the Declaration of Helsinki on medical principles for research with human beings were taken into account [8]. The possibility of not participating and leaving the study was directed if they wished, without affecting the medical care the child receives. At the end of the survey nutritional counseling was performed on mothers or caregivers with incorrect eating habits.

The means, standard deviations, 95% confidence intervals and proportions by age groups, sex and socio-demographic variables of the mothers, as well as the contribution of different foods to energy and nutrient intake were calculated by the SPSS statistical package version 13.0 and nutrients in this population group. Comparisons of energy and nutrient intake between sex and by province were made using the analysis of variance (ANOVA) of simple classification. For comparison between provinces, the Duncan multiple range test was also used. A significance level of $\alpha = 0.05$ was used in all cases

Results

The survey was applied to 2018 mothers of children between 6 and 23 months of age for 97.8% coverage of the total sample calculated. The distribution by provinces was as follows:

Provinces	N	%
Havana	546	27,0
Sancti spiritus	490	24,3
Las tunas	480	23,8
Santiago de Cuba	502	24,9
Total	2018	100,0

Of the sample studied, 51.4% (1036) belonged to the male sex and 48.6% (982) to the female. Of them, of either sex, 46.9% had not reached one year of age and 53.1% were between the ages of 1 to 2 years (23 months and 29 days).

General data on the feeding of girls and boys under two years of age.

The predominant schooling of the mother is the secondary or technical level with 53.3%, followed by the university with 29.6%, only 0.9% of the mothers had primary schooling.

The orientation of the foods that must be incorporated into the child's diet in addition to milk, falls mainly on the pediatrician with 70.0%, followed by the family doctor with 68 %, sometimes such guidance is offered by both professionals, to a lesser extent, the information is obtained from family members and from the version of the children's health card that includes this orientation.

The decision of what the child should eat or not, was 93.0% of the mother, shared sporadically with the father or other close relative. Similarly, 93.0% of mothers usually feed their child, and in the same percentage it is the mother who decides what food to offer the child.

The first food or preparation that was offered to the child in descending order was: tubers in 67%, meats with 37.8%, cereals with 9.2% and fruits with 6 , 7%.

96% of the mothers surveyed report having adequate time to prepare food for minors and only 4.0%, including mainly by working mothers, they reported that time was too short.

Continued breastfeeding

From the analyzed data it was found that 35.7% of children are breastfed IC. 33.6-37.8, of them, 24.4% are between 6 to 11 months and 11.3% from 12 to 23 months, they also consume other foods and even other types of milk.

It was found that mothers with secondary or technical level were the ones who contributed the highest percentage of breastfed children, for 18.3% CI 15.0-21.6.

Water consumption

The amount of water (refers to the consumption of water without sweeteners or carbonated gases and excludes water contained in food) ingested the day before the survey by children under two years, had a wide variation, with a predominance of consumption of 8 daily ounces for 24.2% of children.

Food portion consumption

In Table 1, comparison of the recommended portions in the dietary guidelines for Cuban boys and girls under two years of age with the actual consumption of food, show that the consumption of fresh fruits is low, predominantly mango, banana, and guava.

The consumption of fresh vegetables showed a very low intake, less than a quarter recommended portions of this food group according to the food guidelines, vegetables more consumed were pumpkin followed by tomato, beans and carrots,. The group of cereals and tubers showed a non-compliance of approximately 25% of that recommended, Only 11.2% of children consume fortified cereals. An excessive consumption of meats and sugars and a low consumption of eggs were observed.

The variety of diet showed that 55.6% of the children had a satisfactory variety while in almost half of the cases the variety was partial or insufficient Figure 1.

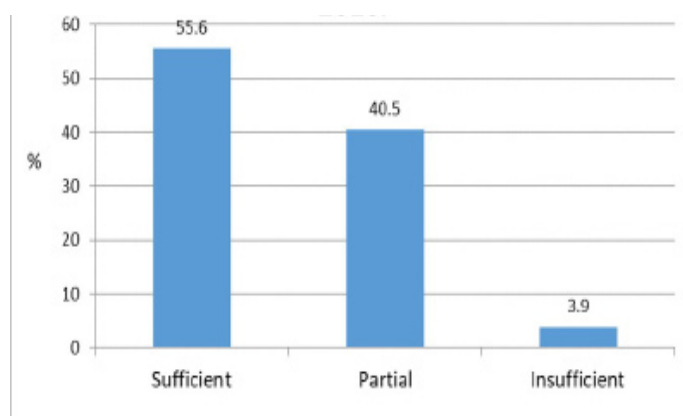


Figure 1: Variety of food consumption in children from 1 to 2 years of age. Cuba 2016.

Vitamin and mineral supplements such as: Polivit (B vitamins plus vitamin A) was reported as consumed by 13.0% of children; those of iron, mainly Forferr (ferrous fumarate and folic acid) were consumed by 24.0% and others including folic acid, vitamin C and multivitamins mainly, was declared by 15.3% of the mothers surveyed. The most ingested supplements are those of vitamin C with values ranging from 39.3% in Havana to 69.9% in Santiago de Cuba. The dose was not taken into account due to

inaccuracy in the answers given in this regard.

Nutritional value of the diet consumed by children under two years

The average energy and nutrient of the food eaten the day before the survey (24-hour recall), the percentage of satisfaction of the recommended dietary allowances and the confidence intervals, in children aged 6 to 11 months are shown in Table 2. The respondents of this age consumed an average of 1047 kcal (4380Kj), the total protein intake was 33.8 g, of them 26.9 g of animal origin, which represents 79.5% of the total. The average fat intake was 37.7 grams, 83% corresponding to those from animal sources. The percentage of adequacy of macronutrients was mainly excessive in protein consumption.

The average consumption of sugar was 43.7 grams per day, which represents 16.6% of the total energy consumed on the day.

The average intake of vitamins was high for vitamins A and C and low in the case of folates, iron showed low values while for sodium it was the opposite, reaching a very high level.

In children aged 12 to 23 months (Table 3) the energy consumption was 1170 kcal. (4895 Kj). For a 98.3% satisfaction of the nutritional recommendations. Protein consumption was 40.3 g, 72% being of animal origin, for fat, nutritional recommendations are met in only 83.8% and sugar consumption was 40.6 grams, which contributes 13.8% of daily energy.

The average adequacy percentages of thiamine and folic acid are deficient. Iron shows low intakes, meeting only 68.3% of the daily recommendation for that age. Sodium consumption as in the previous group shows very high consumption figures.

Energy and nutrient consumption by sex

The consumption of energy and nutrients according to sex in children aged 6 to 23 months is shown in Table 4. According to sex, overall males consumed on average 1122 Kcal and females 1104 Kcal, only statistically significant differences are observed in relation to iron intake being higher in males.

Comparison of energy and nutrient consumption by provinces

Table 5 shows the consumption of energy and nutrients in the provinces studied, it can be seen that the energy consumption is significantly lower in Havana and higher in Las Tunas, a similar behavior exists in relation to the consumption of proteins, fats and carbohydrates. Regarding sugar consumption, Las Tunas is the province with the highest consumption of this food, differing significantly from the other provinces.

The highest consumption of vitamin C, cobalamin, pyridoxine, thiamine and folates is provided by Sancti Spiritus, while that of vitamin A is higher in Santiago de Cuba.

The lowest iron consumption was carried out in Las Tunas and the highest in Santiago de Cuba with significant differences. In relation to sodium intake, it is in Las Tunas where the highest values are presented, followed by Sancti Spiritus and Santiago de Cuba.

Percent distribution of energy in the day

In children under one year of age, proteins provide 13.1% of energy while fats represent 31.8% and carbohydrates 55.1%. In the group of 1 to 2 years of age, the contribution to total energy

from proteins was 14.0%, that of fats was 29.5 %, and for carbohydrates 56.5% Figure 2.

The main foods that contribute to the daily energy intake are in decreasing order, breast milk, whole milk, fortified mango pure, white rice, chicken and boiled taro. among others.

The main food sources of protein of animal origin in decreasing order are: chicken, fortified whole milk, whole milk with , yogurt, breast milk and beef, those of vegetable origin are , rice and taro

Food frequency during the day

More than three quarters of children make 6 meals a day (including snacks and dinner before bedtime) Figure 3.

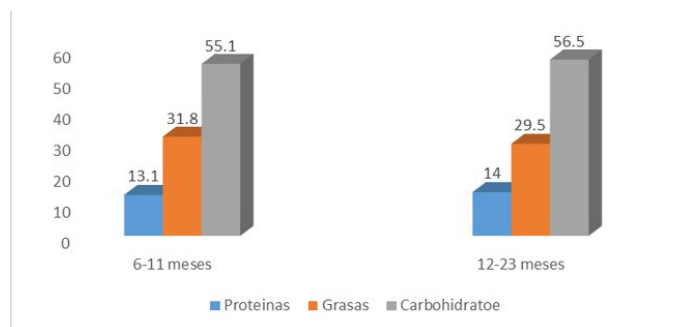


Figure 2: Macronutrients contribution to energy intake by age

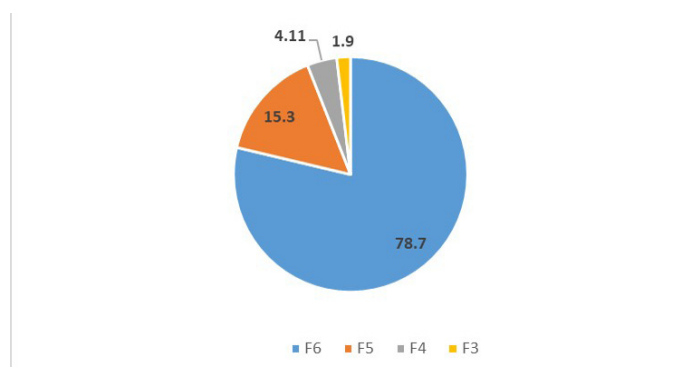


Figure 3: Food frequency (F) during the day

Table 1: Adequacy of compliance with the amounts of food portions for children 1 to 2 years of age. Cuba 2016

Food Group	Recommended portions in the day	Average portions consumed	% adequacy
Cereals and tubers	4,5	3.38	75.1
Vegetables	2	0,35	17.5
Fruits	2	1	50,0
Meat, Fish and chicken	1	1.54	154.0
Eggs	0,4	0,2	50
Beans	0,6	0,5	83,3
Dairy products	2	1.64	82
Fats	5	3.5	70,0
Sugar and swetener	5	7.3	146

Table 2: Mean nutrient intake in children between 6-11 months' age.

Nutrients	Mean consumption	CI al 95%	% adequacy	IC al 95%
Energía(Kcal)	1047.0	1026.4-1150.1	126.3	123.7-128.9
Proteína total (g)	33.8	33.0-34.6	162.9	159.2-166.7
Proteína animal (g)	26.9	26.2-27.6	-	-
Grasa total(g)	37.7	36.5-38.9	117.6	113.8-121.4
Grasa animal (g)	31.3	30.3-32.3	-	-
Carbohidratos (g)	149.5	145.9-153.1	131.2	128.0-134.4
Azúcar (g)	43.7	42.0-45.4	-	-
Vitamina A (µg)	855.0	822.9-887.0	213.7	205.7-221.7
Folatos(µg)	64.6	62.1-67.3	80.8	77.5-84.1
Tiamina (mg)	0.5	0.49-0.52	120.2	116.7-123.7
Piridoxina (mg)	0.87	0.85-0.89	145.8	142.1-149.5
Cobalamina (µg)	2.5	2.3-2.6	316.1	296.5-335.6
Vitamina C (mg)	118.2	111.0-125.4	394.2	370.1-418.3
Calcio (mg)	667.2	643.3-691.1	166	160.8-172.8
Hierro (mg)	8.6	8.2-8.9	77.9	75.0-80.8
Cinc (mg)	5.5	5.4-5.6	110.9	108.0-113.7
Sodio (mg)	573.9	550.8-596.9	286.9	275.4-298.5

Table 3: Mean nutrient intake in children between 12-23 months' age.

Nutrients	Mean Consumption	CI al 95%	% adequacy	CI al 95%
Energy(Kcal)	1170.0	1150.1-1189.9	98.3	96.6-99.9
Total protein(g)	40.3	39.6-41.1	112.0	109.9-114.1
Animal protein(g)	29.1	28.5-29.8	-	-
Total fats(g)	38.6	37.7-39.5	83.8	81.9-85.8
Animal fat(g)	28.8	28.1-29.6	-	-
Carbohydrates (g)	171.5	167.6-169.1	108.5	106.1-153.1
Sugar(g)	40.6	39.1-42.3	-	-
Vitamin A (µg)	712.5	685.9-739.3	178.1	171.5-184.8
Folates (µg)	84.1	81.5-86.8	56.1	54.3-57.8
Thiamin (mg)	0.6	0.58-0.61	75.6	72.1-79.1
Piridoxin (mg)	0.95	0.93-0.97	106.2	103.6-108.8
Cobalamin (µg)	2.9	2.84-3.08	269.3	258.2-280.5
Vitamin C (mg)	121.1	110.6-131.5	403.6	368.8-438.4
Calcium (mg)	726.2	703.7-748.6	145.2	140.7- 149.7
Iron (mg)	7.5	7.3-7.7	68.3	66.2-70.4
Cinc (mg)	6.1	5.9-6.2	101.8	99.7-104.0
Sodium (mg)	937.4	912.1-962.7	416.6	405.4-427.9

Table 4: Comparison of nutrient consumption by sex.

Nutrients	Mean \pm SD		CI 95%	
	Male	Female	Male	Female
Energy(Kcal)	1122 \pm 327	1104 \pm 339	1102.9-1142.3	1082.5-1125.6
Total protein(g)	37.5 \pm 12	37.2 \pm 13	36.7-38.2	36.8-37.9
Animal protein (g)	28.1 \pm 10.6	28.1 \pm 11	27.4-28.7	27.4-28.8
Total fats(g)	38.4 \pm 17.5	37.9 \pm 15.3	37.3-39.4	37.0-38.9
Animal fat (g)	29.8 \pm 13.6	30.1 \pm 13.8	29.1-30.6	29.2-30.9
Carbohydrates (g)	158.2 \pm 50.2	154.5 \pm 33.9	155.1-161.2	151.1-157.9
Sugar (g)	41.9 \pm 27.1	42.2 \pm 25.9	40.3-43.5	40.5-43.8
Vitamin A (μ g)	781.7 \pm 458	772.7 \pm 495	754.2-809.3	756.7-798.3
Folates (μ g)	76.5 \pm 43.8	73.7 \pm 43.5	74.0-79.2	70.9-76.5
Thiamin(mg)	0.6 \pm 0.2	0.6 \pm 0.2	0.55-0.58	0.53-0.57
Piridoxin (mg)	0.93 \pm 0.37	0.9 \pm 0.3	0.90-0.95	0.88-0.92
Cobalamin (μ g)	2.6 \pm 1.7	2.6 \pm 2.1	2.5-2.7	2.4-2.7
Vitamin C (mg)	110 \pm 101	117 \pm 137	101.3-116.3	108.3-125.8
Calcium (mg)	663.8 \pm 307.1	642.7 \pm 325.3	645.4-682.3	621.9-663.4
Iron (mg)	8.01 \pm 4.3	7.9 \pm 4.5	7.7-8.2	7.6-8.2
Cinc (mg)	5.9 \pm 2.1	5.7 \pm 2.3	5.7-6.0	5.6-5.9
Sodium(mg)	770 \pm 429	773.4 \pm 442.1	744-795	745.2-801.5

Table 5: Comparison mean energy and nutrient consumption by provinces

Nutrients	Provinces Mean \pm SD CI al 95%				
	Havana	Sancti Spiritus	Las Tunas	Santiago de Cuba	Signification
Energy(Kcal)	995 \pm 285 ^a 971.3-1019.5	1111 \pm 329.8 ^b 1081.-1140.2	1281 \pm 379.4 ^c 1247-1315.2	1085 \pm 266.8 ^b 1061-1108.1	0.000
Total protein (g)	33.3 \pm 10.9 ^a 32.4-34.2	38.5 \pm 13.5 ^b 37.3-39.7	40.3 \pm 13.7 ^c 39.1-41.5	37.7 \pm 11.1 ^b 36.7-38.7	0.000
animal protein (g)	25.9 \pm 9.2 ^a 24.2-25.7	29.0 \pm 11.9 ^c 27.5-29.6	30.6 \pm 11.6 ^b 29.5-31.6	28.8 \pm 9.9 ^b 27.9-29.6	0.000
Total fats(g)	31.8 \pm 12.4 ^a 30.7-32.8	37.5 \pm 15.9 ^b 36.1-38.9	47.2 \pm 20.1 ^c 45.3-48.9	37.2 \pm 11.1 ^b 36.1-38.3	0.000
Animal fat (g)	25.3 \pm 11.3 ^a 24.3-26.2	28.2 \pm 13.4 ^b 26.9-29.4	36.2 \pm 15.0 ^c 34.8-37.5	31.0 \pm 12.8 ^d 29.7-32.0	0.000
Carbohydrates (g)	143.8 \pm 48.9 ^a 139.7-147.9	156.3 \pm 50.3 ^b 151.8-160.7	176.8 \pm 59.0 ^c 171.5-182.1	150.8 \pm 44.9 ^b 146.9-154.7	0.000
Sugar (g)	41.9 \pm 27.9 ^a 39.6-44.3	35.6 \pm 23.5 ^b 33.5-37.6	51.4 \pm 29.6 ^c 48.7-54.0	39.6 \pm 22.2 ^a 37.6-41.6	0.000
Vitamin A (μ g)	650 \pm 402 ^a 616.1-683.9	715 \pm 441 ^b 675.9-754.2	856 \pm 445 ^c 816.4-896.4	900.9 \pm 560.1 ^c 851.8-950.1	0.000
Folates (μ g)	68.9 \pm 41.9 ^a 65.4-72.5	81.4 \pm 43.0 ^b 77.5-85.2	75.9 \pm 39.4 ^c 72.4-79.5	75.4 \pm 49.1 ^c 71.1-79.6	0.000
Thiamina (mg)	0.54 \pm 0.27 ^a 0.51-0.55	0.59 \pm 0.25 ^b 0.56-0.61	0.54 \pm 0.29 ^a 0.51-0.56	0.58 \pm 0.24 ^b 0.55-0.59	0.01
Riboflavin (mg)	0.89 \pm 0.41 ^a 0.85-0.92	1.11 \pm 0.51 ^b 1.07-1.16	1.13 \pm 0.48 ^b 1.09-1.17	1.12 \pm 0.41 ^b 1.08-1.15	0.000

Piridoxin (mg)	0.85±0.37 ^a 0.81-0.88	0.98±0.39 ^b 0.95-1.02	0.96±0.39 ^b 0.93-1.00	0.87±0.29 ^a 0.85-0.90	0.000
Cobalamin(µg)	2.3±1.92 ^a 2.1-2.5	2.8±1.74 ^b 2.6-2.9	2.7±2.2 ^b 2.5-2.8	2.6±1.9 ^b 2.5-2.9	0.000
Vitamin C (mg)	96.4±87.6 ^a 88.1-104.5	139.1±121.5 ^b 123.9-154.3	100.9±93.3 ^a 91.7-110.2	118.7±86.6 ^c 111.1-126.3	0.000
Calcium (mg)	533.2±267 ^a 510.6-555.7	698±352 ^b 667.5-730.1	725±336.3 ^c 695.3-755.7	672.1±267.5 ^b 648.6-695.5	0.000
Iron (mg)	7.6±4.08 ^a 7.2-7.9	7.9±4.6 ^a 7.5-8.3	6.7±4.1 ^b 6.4-7.2	9.6±4.5 ^c 9.2-10.0	0.000
Sodium (mg)	640.6±396.7 ^a 607.2-674.1	799.6±445.8 ^b 760.0-839.2	898.2±463.0 ^c 856.6-939.7	764.9±397.9 ^b 730.1-799.8	0.000

Discussion

The adequate feeding from the earliest age is acquiring more value every day. Eating habits are formed from the first years of life and are maintained throughout it [9]. What children learn in the first two years of life characterizes the rest of their life. This period is very sensitive for the development of healthy eating habits and interventions have a stronger impact on health during

Childhood and adolescence Hence the importance of paying due attention to food consumption at these ages. The early development of food taste and pleasure plays an important role for children and has a great influence on subsequent food preferences and selection [10-11].

The results obtained in the present study show that the pediatrician and the family doctor are key elements in the orientation on food and nutrition education as well as the mothers, since the decision of what the child is going to eat rests on them child, hence these are key actors in the formulation of the strategies that are to be carried out to promote breastfeeding and adequate complementary feeding.

In Cuba, mothers enjoy a year of paid leave after childbirth, this is in relation to the aforementioned opinion on the adequacy of the time available to prepare baby food. It is revealed that the father is little involved in the decision to feed the child Breastfeeding is a fundamental element of the feeding of children under two years, exclusively during the first six months and continued until two years of age. The findings of this study show that only about one third of children between 6 and 23 months are breastfed. Food security for infants and young children in developing countries is not possible without high rates of breastfeeding [12].

The percentages of continued breastfeeding at one year and two years of age in the 4 Cuban provinces under study are lower than those found by the Multiple Indicators Clusters Survey(MICS 2014) [13], in the present study 24, 4% of the mothers provided continued breastfeeding until the year of age and 11.3% until two years of age and in the MICS 2014 they did 39.1% and 24.1% of the mothers respectively, which denotes the need to continue promoting actions to improve this practice.

In a study conducted in Brazil [14], it was found that 32.9% of the children had breastfeeding at two years of age. Children with breastfeeding are less likely to be considered overweight or obese [15]. According to the results obtained, mothers with a higher level of education are the ones who most frequently

breastfeed their children. In Cuba the average educational level is 9 grades. The educational level of mothers has been positively associated with the practice of breastfeeding [16].

Recent findings suggest the importance of breastfeeding support for the achievement of Sustainable Development Goal 3 by 2030 for the relationship not only with maternal and child health but with noncommunicable diseases such as breast cancer, diabetes, overweight and obesity [17].

Regarding water consumption, mothers may underestimate the role of water in the feeding and nutrition of young children because, unlike other nutrients, water is spoken less frequently and sometimes it is not pay the attention it requires. Studies in Belgian children aged 4 - 6.5 years [18] also reported low water consumption. The water intake obtained in general is insufficient for a climate as warm as Cuba's.

When analyzing the consumption of portions of food according to what is recommended in the dietary guidelines for Cuban children up to two years of age (table1), very low consumption of vegetables, fruits and eggs is observed. However, meats and sugars and sweets far exceed the recommended portions. Complementary feeding represents a stage of great interest to familiarize the child with different flavors and a wide variety of foods [19]. The importance of fortified cereals in the favorable contribution to the intake of vitamins and minerals [20] has been demonstrated, in the case that analyzes the low availability of ready-to-eat fortified cereals and the low consumption may restrict the contribution of micronutrients.

Although dietary guidelines have been implemented throughout the National Health System since 2012, the established complementary feeding scheme has not yet been effectively complied with, with the percentage of mothers offering fruits and vegetables as their first food being very low.

The high percentage of energy and protein adequacy highlights the increased risk of overweight, obesity and kidney damage. Too much protein can cause kidney damage prematurely. In the young child, the mechanisms of tubular secretion and absorption work at a lower level than that observed in adults, and there is a physiological limitation, which is the poor ability to concentrate urine, mainly in the smallest. These arguments impose the need to maintain diets with adequate protein values to the recommendations of these ages [21].

The situation analyzed in relation to the consumption of food in children under two years of age draws a picture oriented to the tendency towards increased infant intakes of energy, sug-

ars, saturated fat and sodium element related to the nutritional transition [22].

Knowledge of food and nutrient intake and eating patterns at an early age of life has great implications for the prevention of noncommunicable diseases. It can be seen from the average nutrient intake and its level of adequacy, that folic acid and iron have low levels of consumption, not being so for most vitamins, and sodium is ingested excessively at these ages. In Brazil, Sangalli et al. [23] found that the consumption of healthy foods in children was below dietary recommendations with inadequate consumption of iron, folate, and other micronutrients. In this study, inadequacies were also found for the consumption of iron and folate. but unlike what was reported in Brazil, the consumption of vitamins A and C is high in Cuban children.

Although iron deficiency anemia is the main public health problem in Cuba due to lack of micronutrients [24], only 24% of mothers say that children take, FORFERR (iron supplement available and subsidized for these ages in the country). Iron deficiency anemia in early age is associated with poor cognitive and neurological function [25] and increases years lost due to disability in children and adolescents [26]. If we take into account the low percentage of adequacy of iron consumption obtained in the dietary survey, a greater indication and control of the consumption of iron supplement and foods that carry this mineral should be achieved.

Excess sodium is related to high blood pressure, and is a risk factor for cardiovascular diseases. Studies in animals and humans indicate that there is a positive dose-response relationship between dietary sodium intake and high blood pressure, both in children and adults [27-28] Children ingest milk in considerable quantities, and this is one of the foods high in this mineral, hence the need to continue educational measures to avoid adding salt to baby foods.

Although the consumption of trans fatty acids was not evaluated, it should be borne in mind that the average consumption of milk and milk products is one of the largest contributors in the ages of 1.5 to 3 years (47%) [29].

According to the global index proposed to assess the variety of the diet, approximately half of the children consume a satisfactory diet, and the other half have a partial or insufficient variety, although this estimate is only by means of a qualitative index, the need for promote in children a great diversity of foods with a high water content and low fat content and mainly containing fruits and vegetables [30]. Increasing dietary diversity is a specific recommendation for infants 6 months to 2 years of age [31].

Conclusion

The high percentage of energy adequacy at this stage of life is a predisposing factor to obesity. Similarly, low iron consumption favors nutritional anemia, both conditions can cause a double burden of malnutrition in a group of young children. Knowledge of food consumption at an early age of life provides a window of opportunity for the development of interventions that help familiarize the child with a wide variety of healthy foods.

Acknowledgements

The authors wish to express their appreciation to UNICEF for their technical and financial support for the study, to the nutrition coordinators of the Provincial and Municipal Centers of Hygiene and Epidemiology of the provinces participating in

the study, and to all mothers or caregivers of the children who kindly agreed to the interview to carry out the food consumption survey.

References

1. Stuart G, Haddad L, Mannar V, Menon P, Nisbett N and the Maternal and Child Nutrition Study Group. The politics of reducing malnutrition: building commitment and accelerating progress. 2013.
2. Leis Trabazo, R Tojo, Sierra R. Guías prácticas sobre nutrición y alimentación en el lactante. *An Esp Pediatr* 2001; 54: 145-159.
3. Jiménez S, Pineda S, Sánchez R, Rodríguez A, Domínguez Y. Guías alimentarias para niñas y niños cubanos hasta los dos años de edad. Documento técnico para los equipos de salud. La Habana. 2011.
4. Jiménez S, Martín I. Atlas fotográfico de porciones de alimentos y utensilios. Editorial IIIA. La Habana. 2015.
5. Rodríguez A, Mustelier H. Ceres+: Sistema automatizado para la evaluación del consumo de alimentos [Programa de ordenador]. ©: FAO, Roma; 2005.
6. Hernández M, Porrata C, Jiménez S, Rodríguez A, Carrillo O, et al. Recomendaciones nutricionales para la población cubana, 2008. Estudio multicéntrico. *Revista Cubana de Investigaciones Biomédicas*. 2009; 28: 2.
7. WHO, USAID, UNICEF, AED, FANTA, UC Davis: Indicators for assessing infant and young child feeding practices part 2: measurement. In Geneva: WHO. 2010
8. Declaración de Helsinki de la Asociación Médica Mundial. Principios éticos para las investigaciones médicas en seres humanos, 52ª Asamblea General, Edimburgo, Escocia, octubre 2000. Nota de clarificación del párrafo 30, agregada por la Asamblea General de la AMM, Tokio 2004.
9. Majer-Nôth A. Early development of food preferences and healthy eating habits in infants and Young children. *Nestlé Nutr Inst Workshop Ser*. 2019; 91: 11-20.
10. Maier-Nôth A, Schaal B, Leathwood P, Issanchou S. The influence of early food-related variety experience: a longitudinal study of vegetable acceptance from 5 months to 6 years in two population. *Plos One* 2016; 11: e0151356
11. Jones L, Moschonis G, Oliveira A, de Lauzon AB. The influence of early feeding practices on healthy diet variety score among pre-school children in four European birth cohorts. *Public Health Nutr* 2015; 18: 1774-1784
12. Salmon L. Food security for infants and Young children: an opportunity for breastfeeding policy? *International Breastfeeding Journal*. 2015; 10: 7.
13. Dirección Nacional de Registros Médicos y Estadísticas de Salud/ UNICEF. Encuesta de Indicadores Múltiples por Conglomerados 2014. La Habana. 2015.
14. de Moraes MB, Cardoso AL, Lazarini T, Mosquera EMB, Mallozi MC, Habits and attitudes of mothers of infants in relation to breastfeeding and artificial feeding in 11 Brazilian cities. *Rev Paul Pediatr*. 2017; 35: 39-45.
15. Horta B, Loret de Mola Ch, Victora C. Long-term consequences of breastfeeding on cholesterol, Obesity, systolic blood pressure and type 2 diabetes: A systematic review and meta-analysis. *Acta Paediatrica*. 2015; 104: 30-37
16. Sholeye O, Abosedo O, Salako A. Exclusive breastfeeding and its associated factors among mothers in Sagama, Southwest Nige-

- ria. *Journal of Health Science*. 2015; 5:
17. Victora C, Bahl R, Barros AJ, Franca G, Horton S, et al. Breastfeeding 1. Breastfeeding in the 21st century: Epidemiology, mechanism, and lifelong effect. *The Lancet*. 2016; 387: 475-90
 18. Huybrechts I, De Henauw S. Energy and nutrient intakes by preschool children in Flanders-Belgium. *Br J Nutr*. 2007; 98.
 19. Nicklaus S. The role of food experience during early childhood in food pleasure learning. *Appetite* 2016; 104: 3-9
 20. Fulgoni VL, Buckley RB. The contribution of fortified ready-to-eat cereal to vitamin and mineral intake in the US population, NHANES 2007-2010. *Nutrients*. 2015; 7: 3949-3958
 21. Sociedad Centroamericana de Gastroenterología, Hepatología y Nutrición Pediátrica/Asociaciones de Pediatría de Centro América. Primer Consenso Centroamericano. Alimentación en el primer año de vida. 2015.
 22. Lobstein T. Child and adolescent obesity: part of a bigger picture. *Lancet*. 2015; 385: 2510-2520.
 23. Sangalli CN, Rauber F, Vitolo MR. Low prevalence of inadequate intake in Young children in the south of Brazil: A new perspective. *British Journal of Nutrition* 2016; 116: 890-896
 24. Pita GM, Jiménez S, Basabe B, García RG, Macías C, Selva L, [et al]. Anemia in Children under five years old in Eastern Cuba. 2014; 16: 2005-2011.
 25. Balarajan Y, Ramakrishnan U, Ozaltin E, Shankar AH, Subramanian SV. Anaemia in low-income and middle-income countries. *Lancet*. 2011; 378.
 26. Kyu HH, Pinho C, Wagner JA, Brown JC, Bertozzi-Villa A, Charlson FJ, [et al]. Global and national burden of diseases and injuries among children and adolescents between 1990 and 2013: findings from the Global Burden of Disease 2013 study. *JAMA Pediatr*. 2016; 170.
 27. Tian N, Zhang Z, Loustalot F, Yang Q, Cogswell ME. Sodium and potassium intake among US infants and preschool children, 2003-2010. *Am J Clin Nutr*. 2013; 98: 1113-22.
 28. Dunford EK, Poti JM, Popkin B. Emerging disparities in dietary sodium intake from snacking in the US population. *Nutrients*. 2017; 9: 610.
 29. Public Health England/Food Standard Agency. National Diet and Nutrition survey. Results for years 1, 2, 3, and 4 (combined) of the Rolling Programme (2008/2009- 2011/2013). London. 2014
 30. Hebestreit A, Böhnhorst C, Palo V, Barba G, Eiben G, Veidebaum T et al. Dietary energy density in Young children across Europe. *International Journal of Obesity* 2014; 38: S124-S134.
 31. Steyn N, Nel J, Nantel G. Food variety and dietary diversity scores in children: Are they good indicators of dietary adequacy? *Public Health Nutr*. 2006; 9.