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ORIGINAL PAPER

Food Insecurity and the Double Burden of Malnutrition of Indigenous Refugee Épera Siapidara

María Pilar Villena-Esponera[1,2] · Rafael Moreno-Rojas[1] · Guillermo Molina-Recio[3]

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Abstract
The goal of this paper is to assess food and nutritional security status of an indigenous population who migrated from Colombia to Ecuador. We collected data about the perception of food insecurity, anthropometric and food intake (n = 104). An analysis multivariate (Generalized Linear Model) we used to know the adequacy to the Dietary Reference Intake (DRI). All the households were food insecure, stunting affected 45.1% of children and adolescents and the 60% were overweight or obese women. Significant differences were observed by gender for energy, lipid, carbohydrate, fiber, and iron ($p < 0.001$). No age group meets the DRI for fiber, calcium and potassium (except in children 24–59 months) and iron. There was a deficiency in vitamins A, D, folic acid and thiamine. The Epera Siapidara people in Ecuador experience acute food insecurity and a double burden of malnutrition, which may seriously affect their health and general progress.

Keywords Food insecurity · Double burden of malnutrition · Indigenous people · Refugee · Ecuador

Background

Despite being a region with a surplus of food, the main cause of hunger and malnutrition in Latin America is the lack of access to it for the most vulnerable social groups [1]. The World Summit on Food Security (1996) declared that "food security exists when all people, at all times, have physical, social and economic access to sufficient, safe and nutritious food to meet their dietary needs and food preferences for an active and healthy life" [2].

✉ María Pilar Villena-Esponera
pilar.villena@hotmail.com

Rafael Moreno-Rojas
Rafael.moreno@uco.es

Guillermo Molina-Recio
en1moreg@uco.es

[1] Department of Food Science and Technology, University of Córdoba, Agrifood Campus of Excellence International CeiA3, Córdoba, Spain

[2] Food Safety and Quality Research Group, Pontificial Catholic University of Ecuador in Esmeraldas (PUCESE), Esmeraldas, Ecuador

[3] Department of Nursing, School of Medicine and Nursing, University of Córdoba, Córdoba, Spain

In Ecuador, the indigenous population is one of the most vulnerable groups to suffer from food insecurity, and among these are the Épera Siapidara an ethnic group from the Colombian department of Chocó, who migrated, among other reasons, due to situations of violence in their territory [3]. Currently, the Épera Siapidara population resident in Ecuador is composed of 546 individuals [4], 20% of which is considered by the UNHCR as being refugees [5], and they are mainly concentrated in the community of *Santa Rosa de los Épera* [3].

These migratory movements, combined with the limitation of their territory, are causing changes in this ethnic group's traditional food system, worsening their nutritional status, increasing food insecurity and hindering the development of their people. Traditionally, the Épera people could relocate their agricultural plots when faced with environmental pressure, which allowed the land to recover its fertility and guaranteed the presence of wildlife [6]. In the present situation, however, the scarcity of land for food production compels many males to go to work on nearby farms or for the timber industry, and forces young people to migrate to urban areas in search of casual work [3]. Due to the scant economic resources available, this situation leads to neglect of traditional food production habits, and an increased consumption of exogenous products, which are generally of a poorer nutritional value. The conditions of poverty of the

indigenous population do not permit families to dispose of the necessary economic resources to fill a basic basket of food, that was established at 644.74 USD monthly in November 2014 [7]. All the factors associated with poverty, such as giving up the habits of daily agricultural work, being less physically active and acquiring less healthy eating habits with repetitive diets poor in nutrients, could all lead to the development of chronic-degenerative diseases such as hypertension and type 2 diabetes mellitus, which were among the main causes of mortality in 2014 in Ecuador [8].

The use of food security scales is recognized as a suitable tool for identifying and monitoring the level of food security in vulnerable households [9, 10]. However, it is important to supplement this information by analyzing the nutritional status of the members of the household [11].

According to the latest national figures published in the National Health and Nutrition Survey in Ecuador (ENSANUT-ECU) [12], the country's indigenous population is the ethnic group with the highest prevalence of stunting (42.3%) and anemia in children 0–59 months (40.5%). As regards nutritional requirements, it is the population group with the greatest deficit in the daily consumption of protein (10% of the Dietary Reference Intake-DRI) and the highest surplus in the consumption of carbohydrates (146% of the DRI). The results of this survey also show the double nutritional burden facing this group, both in households and at an individual level.

For this reason, the objective of this study is to assess food and nutritional security status in the indigenous Épera Siapidara population in Ecuador.

Methods

Study Design

In the third quarter of 2014, a food and nutritional insecurity study was carried out on the population of indigenous Épera Siapidara, located in the community of *Santa Rosa de los Épera*, (Esmeraldas, Ecuador). Due to the lack of census information, the first step was to collect sociodemographic data. These data gave us information on the number of individuals, gender and age of the whole population of *Santa Rosa de los Épera*, which was necessary for comparing their demographic structure with the national population pyramid [13] and set the sample size. Information was also collected on family income, land availability and access to public services.

We conducted stratified random sampling by age and gender without replacement, with an expected frequency of chronic malnutrition of 12%, the declared objective of reducing malnutrition for 2015 in Ecuador, and a 95% confidence level. For the population of 254 persons counted (in 36 households registered), the representative sample obtained was of 100 people.

Food and Nutritional Security

To collect the data from each of the families, a series of surveys was used:

- Data were collected on the quantity and quality of food available, the omission of family meals, and the feeling of hunger in the home, using the Latin American and Caribbean Food Security Scale (ELCSA) [9]. Of the 15 items in this survey, the first 8 referred to different situations that lead to food insecurity in households with adults, and the rest consisted of questions regarding conditions that affect children of 0–17 years. A raw score is constructed by assigning a weight of "1" to each question with an affirmative answer ("yes"). Total raw scores range from 0 to 8 (for households without children) or 0 to 15 (for households with children). Households are classified according to the following categorization: For households with minors: 'household food secure' (score = 0), mild household food insecurity (score = 1–5), 'moderate household food insecurity' (score = 6–10), 'severe household food insecurity' (score = 11–15). For households without minors: 'household food secure' (score = 0), 'mild household food insecurity' (score = 1–3), 'moderate household food insecurity' (score = 4–6), 'severe household food insecurity' (score = 7–8).
- Data on food consumption were obtained by implementing a Food Consumption Frequency Questionnaire (FCFQ), adapted and validated for the Épera population [14]. Specially trained interviewers conducted the FCFQ with the person responsible for feeding the family, and measured the portions consumed by each family member using a photographic food atlas [15], containers or measuring instruments from the home. Nutriplato 2.0 software [16], developed by the University of Cordoba, was used to estimate their energy and daily intake of nutrients. The results were then compared with the Dietary Reference Intake (DRI) and were expressed as % intake level with respect to DRI for each nutrient, published by the FESNAD in 2010 [17], a collection of the best- documented and most widely used DRI values from other nutritional studies in the country [18].

Anthropometry

The anthropometric data, including weight, height and waist circumference (WC), were collected following the protocols proposed by the World Health Organization (WHO) [19] using suitably calibrated equipment. As the instruments necessary for correctly obtaining the anthropometric

measurements from 0 to 2 years was not available, this age range was not included in the study. The nutritional indexes derived from the weight and height used were height/age, weight/height and weight/age or body mass index (BMI)/age. In children, the Z-scores of weight-for-age (W/A), height-for-age (H/A), weight-for-height (W/H) or body mass index-for-age (BMI/A) were established with the software WHO Anthro v 3.2.2 [20] for children of between 24 and 60 months, and the WHO growth reference tables for those over 5 years [19].

The nutritional status in children was classified as: underweight (Z W/A < − 2SD) wasting (Z W/H or Z BMI/A < − 2SD), overweight (Z W/H or Z BMI/A > + 1 SD), obesity (Z W/H or Z BMI/A > + 2 SD). Normality for these indicators was considered at Z-scores of between − 1.99 SD and + 0.99 SD. The prevalence of stunted growth (defined by the WHO as height-for-age below − 2SD) and that of severe stunted growth (height-for-age below − 3SD) was calculated. Four categories of nutritional diagnosis were established for adults on the BMI: (1) underweight (BMI < 18.49), (2) normal weight (18.50 < IBM < 24.9), (3) overweight (IMB > 24.9) and (4) obese (IMB > 29.9).

Given the wide variety in the anthropometric data among the different population groups, and the importance of evaluating the nutritional status of children due to their possible state of malnutrition, it was decided to divide the present data into two categories: Child and adolescent population (2 < year < 18) and adults (≥ 18 years).

Risk of Cardiovascular Disease

Due to the limited access to health services of people living in the community of *Santa Rosa de los Épera*, and given the link existing between nutritional status and cardiovascular diseases [8, 12], time was dedicated in this study to evaluating this risk, in an attempt to identify risk factors such as blood pressure (BP) and obesity.

Blood pressure of participants > 12 years was measured following procedure recommended by the International Society of Hypertension and the European Society of Hypertension /European Society of Cardiology [21], whose recommended classification is: (1) < 120/80 mm Hg (optimal); (2) 120–129/80–84 mm Hg (normal); (3) 130–138/85–89 mm Hg (High normal); (4) 140–159/90–99 mm Hg (Grade 1 hypertension); (5) 160–179/100–109 mm Hg (Grade 2 hypertension); (6) ≥ 180/≥110 (Grade 3 hypertension); and (7) ≥ 140/<90 mm Hg (Isolated systolic hypertension).

Obesity was estimated using the BMI, with a cutoff set at ≥ 25 for overweight and ≥ 30 for obesity, respectively, and abdominal obesity was measured by the waist circumference, as recommended by the International Diabetes Federation for this population (women > 80 cm and men > 90) [22].

Statistical Analysis

We used Open Epi software to calculate the sample size, and the SPSS program (version 15.0 for Windows) to perform the statistical study of the data collected. The survey results were analyzed using descriptive statistical techniques (frequencies for the qualitative variables and measures of central tendency for the quantitative ones). For the statistical study of the % DRI, the multivariate General Linear Model (GLM) was used, employing all the food components studied as variables, and gender, age, BMI value, BP and waist measurements as classification factors. GLM allow determine whether the means of two or more groups differ for each factor. In those cases where the classification factor was in more than two classification groups and the GLM showed significant differences ($p < 0.05$), Tukey's test was performed ($p < 0.05$), that allowed us to compare items in pairs between groups and identify those homogeneous subsets that showed no statistically significant differences.

Ethical Criteria

The study was reviewed and approved by the ethics review committee of the Human Nutrition Unit at the University of Córdoba (Spain). Also, two types of consent were requested, one from the whole community, for which we took a vote from those attending the 2014 General Assembly to permit the president of the Épera Siapidara people to sign a document. The other was taken on a family basis, where the person in charge of the home was informed about the study (in Spanish or epérã pedée) and gave his/her agreement in writing.

Results

Socio-Economic Characteristics

The community *Santa Rosa de los Épera* has a total of 254 inhabitants, men comprised 56.2% of the population and women 43.8%. The families are distributed in 36 houses, with an average of 7.13 (2–15) people per household. Twelve of them are female-headed single-parent households. The mean age is 19.58 ± 17.68 years; 50% of the population is under 15 and the population > 65 is 1.94%. No women aged between 40 and 49 years were registered during the census. This demographic structure, when compared to the Ecuadorian population pyramid, has a lower percentage of non-dependent population (48.06% versus 62.20%).

Fifty percent of the people > 14 years do not currently have any paid employment, 38% are self-employed (mainly in agriculture) and the rest work as day laborers on agricultural estates or for public institutions. At a global level, an

individual is considered to be in poverty or extreme poverty when her/his income is under $2 or $1 per day, respectively. In the case of *Santa Rosa de los Épera*, 56% of the inhabitants are in poverty and 40% in extreme poverty. 86% of families have access to land for food production and 67% of the households stated that the food that they consume is obtained mainly through direct purchase.

The community is supplied with electricity, but 75% of the households do not have toilets, and the same proportion of households do not have refrigerators to conserve food. As there is no potable water system, 72% of all the water consumed by the families is drawn directly from the Cayapas River.

Food and Nutritional Security

Out of the 36 homes that make up the community of *Santa Rosa de los Épera*, 32 answered the ELCSA survey. In all the households, the heads of the family stated that, during the last 3 months, they had been worried that their food supply would run out. 100% of households in *Santa Rosa de los Épera* were food insecure (8% mildly, 11% moderately and 81% severely). No significant differences were observed per the sex of the household head.

Child and Adolescent Population (n = 51)

The mean age of the participants of between 2 and 18 years was 8 years ± 4 years. In relation to weight/age, 84.3% were found to be within normal ranges (− 1.99 SD < z-score < 1.99 SD) and the remaining 15.7% were underweight (Z < − 2 SD). All the weight/height values in children over 2 years and under 5, or BMI/age (over 5 years and under 18), were in the normal range (− 1.99 SD < z score < 1.99 SD). Among the children, the prevalence of stunted growth was 35.3% (− 2 SD < z score < − 3SD) and that of severe stunting was 9.8% (z score < − 3SD), with no statistically significant differences per sex ($p > 0.05$).

Adult Population (n = 53)

The average height for adult Épera is 158.75 cm for men and 146.20 cm for women. The mean weight in men is 60.43 kg, while in women it is 55.49 kg ($p < 0.01$). The women's BMI is significantly higher than the men's (25.84 vs. 23.96) ($p < 0.01$). Waist perimeter was higher in women (mean 81.89 ± 11.85) than in men (mean 78.64 ± 8.40) ($p < 0.05$). We found significant differences ($p < 0.05$) in the nutritional diagnosis between men and women: for instance, the women presented higher rates of overweight/obesity (60% in women compared with 26% in men). As for blood pressure, the diagnoses reveal that 74% of the subjects were categorized as optimal, 20% normal or high normal and 6% had high blood pressure and there were no cases of people receiving treatment. No significant differences were found between the sexes.

Pattern of Food Consumption

The factors associated with classification by blood pressure and waist measurement was not associated with the intake of any nutrients except iron, whose % DRI were higher for people classified at a higher risk of cardiovascular disease in both factors (Table 1). Gender was associated with intake of energy, lipid, carbohydrate, fiber, and iron ($p < 0.001$). In all cases, except for iron, the % DRI was higher in women than in men. Finally, the largest number of statistically significant differences in nutrients were age and BMI classification, whose association is described in more detail below.

With respect to the age classification, in Fig. 1 it is observed that for the under 20 age groups, the energy DRI were not fulfilled. Most age groups reach or exceed the DRI both in protein and in carbohydrates, and a tendency to augment their carbohydrate intake and reduce that of protein was shown as the individuals grew older. The lipid intake exceeds the DRI in the 40–60 and over 60 years age groups.

After the application post hoc Tukey for age ranges, groups of significant %DRI ($p < 0.05$) for energy, proteins and carbohydrates were formed. In the case of energy %DRI,

Table 1 Comparison mean differences between groups per factors with multivariate general linear model (GLM)

Variables	Factors				
	Sex	Age	BMI classification	BP classification	WC classification
Energy	***	***	***	n.s	n.s
Protein	n.s	***	***	n.s	n.s
Lipid	***	***	**	n.s	n.s
Carbohydrate	***	***	***	n.s	n.s
Fibre	***	***	*	n.s	n.s
Ca	n.s	n.s	n.s	n.s	n.s
Na	n.s	***	***	n.s	n.s
K	n.s	***	***	n.s	n.s
Fe	***	n.s	n.s	*	**
Vitamin A	n.s	**	***	n.s	n.s
Vitamin D	n.s	***	***	n.s	n.s
Ascorbic acid	n.s	n.s	n.s	n.s	n.s
Folic acid	n.s	***	**	n.s	n.s
Vitamin B_{12}	n.s	***	**	n.s	n.s
Thiamin	n.s	***	***	n.s	n.s
Vitamin B_6	*	***	n.s	n.s	n.s

BMI body mass index, *BP* blood pressure, *WC* waist circumference
n.s. $p > 0.05$; *$p < 0.05$; **$p < 0.01$; *** $p < 0.001$

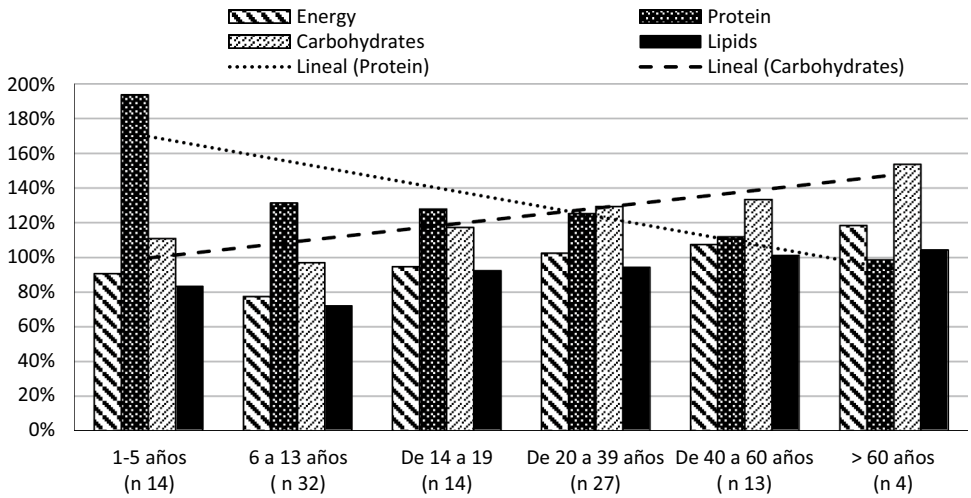

Fig. 1 Dietary reference intake (DRI), expressed in percentage, from energy and macronutrients for age groups. Indigenous population Épera Siapidara, Ecuador ($n = 104$)

the results give a homogeneous group for the ranges of age of over 5 years and under 13. The children with ages of under 13 form a homogeneous group of %DRI for carbohydrates, and groups of over 13 and under 60 form a homogenous group of %DRI for proteins.

Lipid consumption was low or sufficient in children and men, but in women of 14–19 and 50–70 years, we found that there was an intake above the DRI (Fig. 2). As regards fiber consumption, no group met the DRI recommendations.

Regarding the consumption of minerals and vitamins (Table 2), calcium intake was very poor, all the groups being below half the recommended levels, with a general average of 34%. This was also true of potassium, for which, except in children 24–59 months, the DRIs were not met, or for iron intake, for which we found significant differences between the sexes ($p < 0.001$). In contrast, sodium intake was high in all groups (mean 302%), mainly > 13 years, but, above all, in the group of men > 50 years.

There was a deficiency in vitamins A, D, B9 (folic acid) and B1 (thiamine), with global intakes of 30%, 38%, 58% and 66%, respectively. Although the general average consumption of vitamin C (ascorbic acid) and B12 exceeded the FESNAD recommendations, we found deficiencies in the case of adults over 60.

BMI is the other classification factor that produced a large number of statistically significant differences in the %DRI of the different nutrients. After post hoc application of Tukey, three homogeneous groups were established for energy, lipids, carbohydrates and fiber (Table 3). The first group was set up for the lower %DRI and individuals with a low weight or underweight. The second group corresponds to the higher %DRI, in which the individuals with obesity are included. The other two classifications per BMI (normal weight and overweight) form a homogeneous group in which intermediate values of %DRI are found, except for the case of %DRI of energy, in which overweight individuals are included in a group together with obese ones. With respect to the %DRI of proteins, the post hoc Tukey test indicated a single homogeneous group for all the classifications made according to the BMI/age.

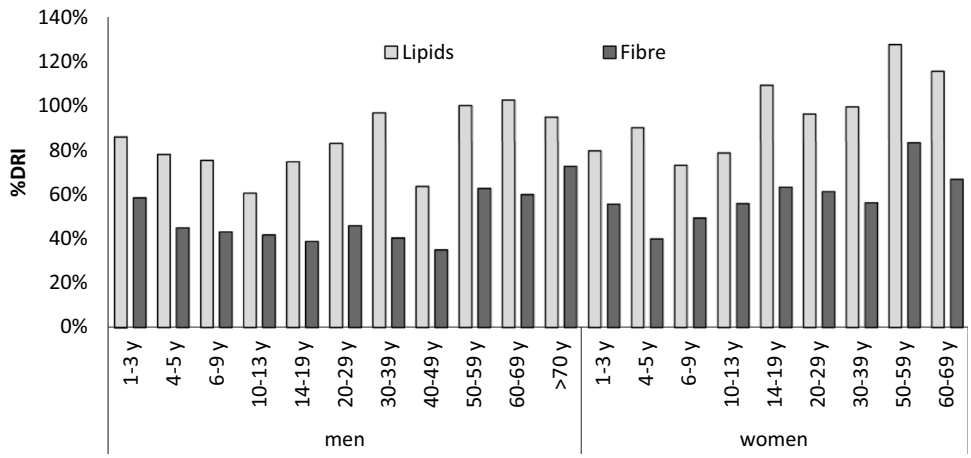

Fig. 2 Dietary reference intake (DRI), expressed in percentage, from lipids and fiber for age and sex groups. Indigenous population Épera Siapidara, Ecuador ($n = 104$)

Table 2 DRIs, expressed in percentage, from macro and micronutrients for age and sex groups

Nutrients (%DRI)	Population by age and sex groups																
	2–3	4–5	6–9	10–13		14–19		20–29		30–39		40–49	50–59		60–69		> 70
				M	W	M	W	M	W	M	W	M	M	W	M	W	M
(n)	9	5	19	8	5	7	7	7	9	2	9	5	1	7	2	1	1
Energy	96	81	79	67	89	78	111	91	108	96	107	69	119	133	117	127	113
Proteins	209	166	150	101	109	107	149	123	135	109	120	84	109	132	99	112	84
Lipids	83	83	75	61	79	75	110	83	97	97	100	64	101	128	103	116	95
Carbohydrates	120	95	96	89	113	97	138	115	138	118	134	87	155	164	150	162	152
Fiber	57	43	44	42	56	39	63	46	61	40	56	35	63	83	60	67	73
Ca	40	36	33	27	27	33	35	38	38	38	35	34	39	34	35	28	35
Na	178	171	209	178	229	303	319	361	304	344	303	256	439	367	425	319	431
K	137	111	62	46	51	53	55	54	52	60	52	48	58	56	42	55	39
Fe	77	89	79	68	52	76	57	96	47	112	47	82	94	62	80	63	85
Vitamin A	45	49	41	34	32	27	36	22	28	44	33	25	18	27	13	25	11
Vitamin D	18	33	35	33	36	55	55	60	43	38	46	42	42	43	27	33	12
Ascorbic acid	139	125	132	144	130	133	129	107	99	116	117	116	121	118	41	87	36
Folic acid	122	80	66	61	62	59	54	45	47	71	55	51	41	62	22	62	20
Vitamin B_{12}	318	197	185	161	159	139	127	127	103	264	154	98	115	124	78	69	63
Thiamin	110	78	78	71	78	59	73	48	58	63	70	55	52	71	48	70	39
Vitamin B_6	190	125	134	117	145	119	137	111	128	127	144	100	123	150	108	138	93

Indigenous population Épera Siapidara, Ecuador ($n = 104$)

Table 3 Percentage of DRI for macronutrients according to BMI/age classification

BMI classification	n	%DRI, mean (SD)*				
		Energy	Protein	Total fat	Carbohydrate	Fibre
Underweight	43	82.1 (20.0)[a]	154.1 (52.0) [a]	77.2 (20.7)[a]	101.6 (25.5)[a]	47.6 (13.6)[a]
Normal weight	36	97.8 (27.3)[b]	116.8 (32.6) [a]	90.6 (25.3)[b]	123.1 (35.3)[b]	53.6 (19.5)[b]
Overweight	20	105.8 (17.9)[c]	123.2 (21.6) [a]	96.6 (19.9)[b]	130.0 (22.1)[b]	57.1 (15.4)[b]
Obese	5	108.0 (29.1)[c]	128.0 (29.3) [a]	105.8 (28.8)[c]	134.2 (36.6)[c]	65.1 (18.6)[c]

Groups produced by HDS Tukey. Indigenous population Épera Siapidara, Ecuador ($n = 104$)

*Letters (a, b, c, d) in the same column represent homogeneous groups reported by DHS Tukey test ($p \leq 0.05$)

DRI dietary reference intake, *SD* standard deviation

Discussion

Given that the basic food basket in Ecuador was 645 USD/month and that 89% of households get by on under 170 USD/month (50% of the standard basic salary in Ecuador in 2014), the economic situation of the Épera families is highly worrying. Lack of productive land and scant economic resources limit food availability and access, thus leading to a high rate of severe food insecurity in households. In the Épera community 33% of households are female-headed, and although this study has not shown a statistically significant correlation between food insecurity and this variable, it is a situation which can further compromise family food security. This was illustrated in the study carried out by the United Nations World Food Program in Colombia with displaced families [23], where those headed by women were more vulnerable to food insecurity problems due to lack of economic resources, since, in general, they did not have a fixed job or, if they did, their wages were usually lower.

Just as in other nutritional studies conducted at a national level in Latin America or specifically with indigenous populations, we found a double burden of malnutrition [24, 25]. In the community, overweight or obese mothers coexist with children with stunting, and these results coincide with those obtained by Freire et al. [25] at a national level, where it was shown that the risk of this situation was double in

households with indigenous children compared with other ethnic groups. Stunting affected an estimated 45.1% of children and adolescents, which is above the national average for children aged 5–11 years (15.0–19.1%), although it is within the range of the national average for the indigenous population (36.5–48.8%) [12]. These findings are also consistent with nutritional studies of indigenous children in South America, which found a high prevalence of stunting, as in the case of the Naporunas in Ecuador (22.8%) [26], the Aguaruna people in Peru (33.4%) [27] or the Embera of Colombia (65.9%) [28]. As no children were identified with wasting (low weight-for-height), the prevalence of 16% low weight-for-age reflects the high prevalence of stunting (low height-for-age). This stunting and low weight situation has its origins in the common conditions of poverty and vulnerability which they face, and whose effects lead to a greater likelihood of poor academic performance at school compared with those who do not suffer from them [29].

In contrast to this high prevalence of stunting and underweight is the greater prevalence of overweight and obesity in adult women, which coincides with the higher risk of cardiovascular disease for this group. The nutritional status data that we report follows a similar pattern to that of other Amazonian groups and indigenous Ecuadorians, characterized by high rates of stunting [30], which are reflected later on in adulthood, when the average stature of the Épera Siapidara (158.7 cm for men and 146.2 cm in women) matches other results produced in research carried out on indigenous people [31] and falls short of the national average by 6.5 cm and 6.2 cm, respectively [12].

The protein consumption in the community of *Santa Rosa de los Épera* is over 100% DRI for most age groups. However, the ENSANUT-ECU survey, indicates that the main source of dietary protein in Ecuador is of vegetable origin (rice), which may lead to a lower bioavailability of minerals such as iron and calcium [12, 32]. It is also interesting to note the low fiber intake, since this could lead to a greater predisposition for other chronic conditions, such us Diabetes Type II or cardiovascular disease [8, 12].

In addition, it should be stressed that these "transitional" diets are typically dense in energy but poor in micronutrients. We therefore have a situation in which micronutrient malnutrition and overweight/obesity exist side by side, especially in the adult women group. Excess lipid intake in women aged 14–19 years and 50–70 years could be due to the fact that these are the age ranges in which the women tend to stay at home and have easier access to exogenous foods.

Although iron deficiency is common in all the Épera population ranges (except in males aged 30–39 years), and despite the fact that it has been observed at a national level that indigenous populations are more likely to have this deficiency than other ethnic groups, the prevalence of insufficient iron intake is higher in women, whether they are overweight or not. Lack of iron in the body is one of the main causes of anemia [12] and a key factor to take into account as it affects women of childbearing age, which significantly increases the risk of death during or after childbirth, as well as of giving birth to children with a low birth weight [32].

At a national level, 89.4% of the population shows an inadequate intake of vitamin A, with a higher prevalence in the indigenous population [12]. Our study agrees with this finding, which is further aggravated by the high prevalence of a low intake of vitamin D, folic acid and thiamine. Although vitamin B12 deficiency is common in the elderly, the situation may be worsened by the lower dietary protein intake with age.

We consider it to be vital to supplement this information with more comprehensive studies, including biochemical and/or densiometric analyses, as well as other tests focused on studying the bioavailability of nutrients ingested from foods commonly consumed in this culture.

However, this work has allowed us to set a baseline to design and evaluate research interventions, programs or double-action policies [33], which are specifically directed at reducing the different forms of malnutrition of this indigenous population of Ecuador, where the double burden of malnutrition and grave nutritional deficiencies in food-insecure households can produce a severe impact on disease and mortality rates, as well as on academic and productive performance, which negatively impacts the future development of this community [3, 12, 24, 29, 33].

Conclusion

The findings we have presented show that the Épera Siapidara people in Ecuador have severe food insecurity, that affects both their nutritional status and their health. A double nutritional burden exists, with the presence of overweight or obese women, whose children suffer from malnutrition. This situation has come about as a result of a transition in food consumption and nutrition habits, possibly caused by their displacement and the limits imposed on the territories where they live.

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Compliance with Ethical Standards

Ethical Approval Two types of consent were requested, one from the whole community, for which we asked those attending the 2014 Gen-

eral Assembly to vote and the president of the Epera Siapidara people to sign a document. The other was on a family basis, where the adults and the person in charge of the home read the informed consent sheet in Castilian or translated to *epérã pedée*, as necessary, and signed to give their agreement in writing.

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