

Anthropometric evaluation of children in Creole and indigenous communities of Maniapure, Venezuela: preliminary study.

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ABSTRACT

Objective: To determine the prevalence of nutritional and growth diagnoses by anthropometric methods in the population under 18 years of age (Creoles, E'ñepá and Jivi indigenous) in the Maniapure region, Cedeño municipality, Bolívar state, Venezuela in August 2018. **Methods:** Observational, descriptive, and cross-sectional study, with non-probabilistic sampling for the convenience of patients who attended a free medical consultation, in the Cerro Pelón, El Palote, Tortuga, Corozal, Quebrada Seca, and Arepítal communities. Weight, height, head, and left arm circumference were determined. Data were recorded in Microsoft Excel® 2013 and analyzed with Epi Info™ 7.2.2.6 using descriptive statistics. **Results:** High prevalence of general malnutrition (47.25%) and short stature (36.26%) was evident. The native people had a more significant number of malnutrition diagnoses (51.46%) than criollos (41.77%), as well as short stature (50.43% and 14.89%, respectively). **Conclusion:** Malnutrition and low pondo-state development were identified for the first time as health problems in Maniapure, especially in the indigenous population. Possible risk factors for developing malnutrition were exposed, and new studies should be realized in the area.

Keywords: Malnutrition, Nutrition Assessment, Venezuela.

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INTRODUCTION

Sundry factors socioeconomic has conditioned the appearance of the so-called "humanitarian crisis" in Venezuela. They are characterized by various indicators such as maternal and child mortality, the re-emergence of diseases preventable by vaccination, and decreased safety food, which have conditioned the evident detriment of the population's health status, even in the absence of official figures for several years (1,2). Deficit malnutrition and short stature in pediatric patients are direct and logical consequences of this problem, being the goal of numerous safety programs feeds in the region (3).

Indigenous ethnic groups and Creole communities characterize the Maniapure region (Cedeño municipality, Bolívar state) with similar geographical environments but with different social behaviors (4). Limits of the area are determined by the area of influence of the local outpatient center "La Milagrosa," existing close relationship with the Orinoco, Cuchivero, and Suapure rivers (5).

The lack of epidemiological information regarding the problem in the rural population of the country is alarming. Therefore it is necessary to determine malnutrition and weight deficit in children and adolescents in these localities. In the

context of the different days of the Multidisciplinary University Camp for Research and Service (CUMIS) of the Scientific Society of Medical Students from the Central University of Venezuela (SOCIEM-UCV), the present study was carried out to identify the prevalence of nutritional and growth diagnoses in the region using different anthropometric measures.

MATERIALS AND METHODS

Study design, place, population, and sample. An observational, descriptive, and cross-sectional study in the region of Maniapure, Cedeño municipality, Bolívar state, Venezuela, between August 28 and 30, 2018. It is about a region with marked river limits (5) and a striking cultural mix with Creole communities and indigenous peoples (predominantly the E'ñepá ethnic group, despite there is a Jivi minority), specifically, three Creole communities (Cerro Pelón, El Palote, and Tortuga), two E'ñepá (Corozal and Quebrada Seca) and a Jivi (Arepítal). They are considered population the totality of patients under 18 years old who lived in the different communities evaluated at the time of the study, performing a non-probability sampling procedure for convenience, and selecting all those patients who have voluntarily attended the CUMIS medical care area SOCIEM-UCV.

Inclusion criteria included being younger than 18 years old, residing in the Maniapure region for the evaluation's time, and consent of the representative or child's assent. All patients with a diagnosis of acute respiratory infection or syndrome were excluded. Acute diarrhea, as a control measure for information.

Materials and procedures. The patients voluntarily attended the evaluation area in the context of the different free health days offered by CUMIS in each locality. After being identified (in triage) as eligible to participate in the study, the inclusion and exclusion criteria were considered. They were in the anthropometric evaluation area, assisted by the authors of this work. In this area, measurements were carried out, weight and height, following the recommendations made by the World Health Organization Training Course on Child Growth Assessment (WHO) (6). A digital scale was used (Ohaus® 3000), while the size was determined with a measuring tape calibrated in cm, placed at right angles to the floor relative to a vertical surface. Again, measurement of circumferences was made with the use of a flexible tape measure according to WHO recommendations (6).

Definition of the variables. Considered were biological characteristics (sex and age group), measurements anthropometric (weight, height, left arm circumference, and head circumference), and diagnoses (nutritional and growth).

The following age groups were defined: newborn (from birth to 28 days), young infant (from 29 days to 12 months minus 1 day), infant older (from 12 months to 24 months minus one day), preschool (from 2 years to 6 years minus one day), school (from 6 years to 12 years minus 1 day) and adolescent (from 12 years to 18 years minus one day).

As for the Kanawati McLaren index (IKM), this was used in boys and girls between 3 months and 5 years of age, obtaining a value product of the CBI division by the head circumference (HC). Depending on the result, various diagnoses were made: normal nutrition (> 0.31), mild malnutrition (<0.31 to > 0.29), moderate (<0.28 to > 0.25) and severe (<0.25) malnutrition. If there were cases in which the diagnoses given by the IKM were different from those shown in Table 1, the most serious diagnosis was chosen.

Table 1. Nutritional diagnostic and growth cut points..

NUTRITIONAL DIAGNOSTIC AND GROWTH CUT POINTS.	
<i>Nutritional diagnosis</i>	
Obesity	$>P97^*$
Overweight	$P90 \text{ a } \leq P97$
Normal nutrition	$P10 \text{ a } \leq P90$
Malnutrition subclinical	$CBI/E^{**} \leq P10$ CBI / E $^{**} \leq P10$ with indicators of WHO / INN † normal
Malnutrition critical zone	$P3 \text{ a } \leq P10$
Malnutrition mild	$-3DE^\ddagger \text{ a } \leq P3$ IKM $^\S \geq 0,29$ y $< 0,31$
Malnutrition moderate	$-4DE \text{ a } \leq -3DE$ IKM $^\S 0,25$ y $\leq 0,28$
Severe malnutrition	$\leq -4DE$ IKM $\leq 0,25$
<i>Growth diagnosis</i>	
Tall size	$>P97$
Tall normal size	$P90 \text{ a } \leq P97$
Normal size	$P10 \text{ a } \leq P90$
Low normal size	$P3 \text{ a } \leq P10$
Low size	$\leq P3$

Nutritional diagnostic and growth cut points. Nutritional diagnosis Obesity Overweight Normal Nutrition Malnutrition Subclinical Malnutrition critical zone Malnutrition mild Malnutrition moderate Severe malnutrition $> P97^ P90 \text{ to } \leq P97 P10 \text{ to } \leq P90 CBI / E^{**} \leq P10$ with indicators of WHO / INN † normal $P3 \text{ to } \leq P10 - 3DE^\ddagger \text{ a } \leq P3$ IKM $^\S \geq 0.29$ and $P97 P90 \text{ to } \leq P97 P10 \text{ to } \leq P90 P3 \text{ to } \leq P10 \leq P3$*

** P: Percentile. ** CBI / E: Left Arm Circumference / Age. † WHO/INN: World Health Organization / National Institute of Nutrition. ‡ SD: Standard Deviation. § IKM: Kanawati-McLaren index.*

Ethical aspects. The Bioethics Committee approved the School of Medicine "Dr. José María Vargas" from the Central University of Venezuela. The participants and their representatives read and signed the corresponding informed consent, after having posed to the researcher the doubts regarding their participation in the project, which was carried out under the four principles of bioethics: beneficence, non-maleficence, justice, and autonomy.

Analysis of data. The data were recorded in an instrument created in Microsoft Excel® 2013 software, later exported to Epi Info™ version 7.2.2.6 for statistical treatment. It was done using descriptive statistics, expressing the quantitative variables with central tendency measures (mean) and the qualitative variables as measures of frequency.

RESULTS

In the set of sessions, a total of 231 pediatric patients were evaluated, of which 49 were excluded from the study (see figure 1), obtaining a definitive sample of 182 patients. 11 43.41% were Creoles and 56.59% indigenous (71.84% E'ñepá and 28.16% Jivi). Of the total, 90 (49.45%) were female, and 92 (50.55%) male. Regarding the age groups, in descending order of frequency, they were preschool with 71 (39.01%), schoolchild with 51 (28.02%), adolescent with 29 (15.94%), younger infant with 17 (9, 34%), and older infant with 14 (7.69%).

The most participatory communities, in decreasing order, were Corozal with 42 (23.08%), El Palote with 39 (21.43%), Quebrada Seca with 32 (17.58%), Arepital with 29 (15.93%), Cerro Pelón with 26 (14.29%) and Tortuga with 14 (7.69%). Due to the nature of the health intervention and its objectives, a random sampling was not carried out to select this study's participants. However, the flow of patients in each community reached very high levels of participation. Although the results cannot be extrapolated to the entire Maniapure region (which has other communities with different characteristics), the sample obtained to obtain data from the six communities evaluated was considered representative (as was the proportion according to the age of the group).

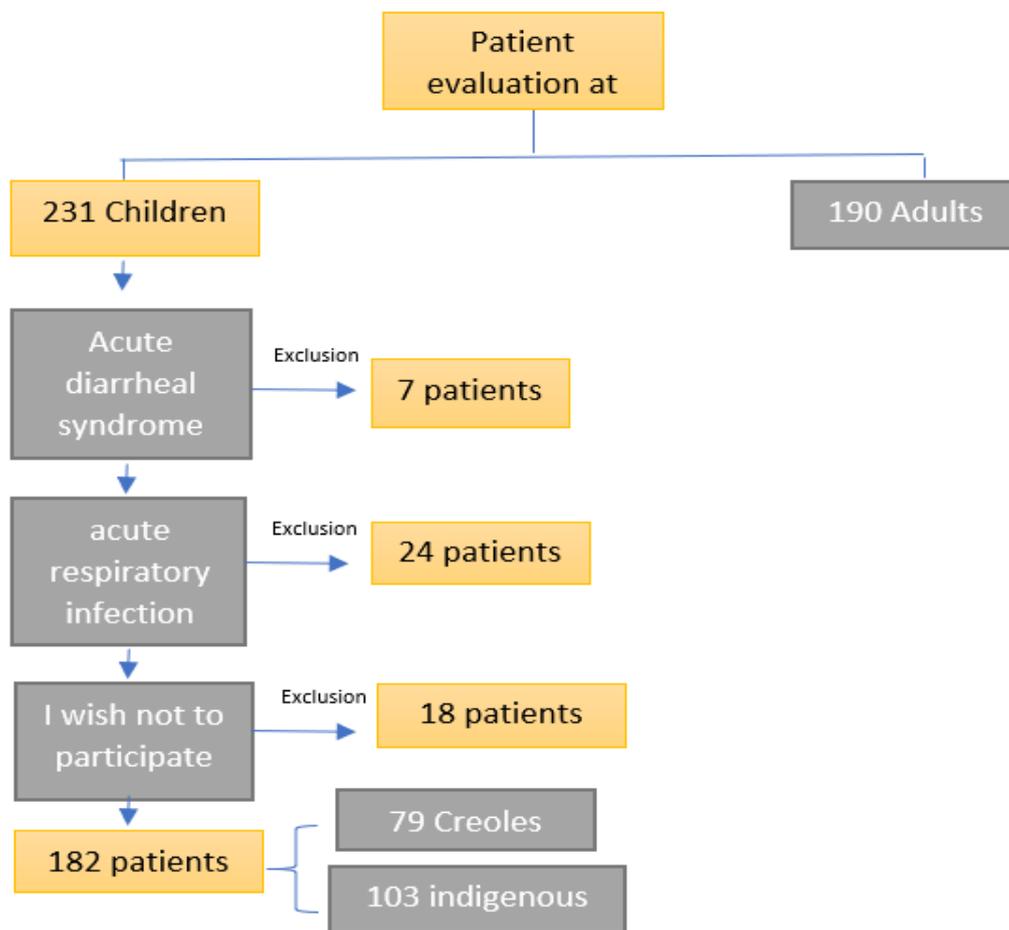


Figure 1. Flow diagram of the sample selection process.

When analyzing the Creole and indigenous sample as a whole, the majority did not have alterations from the nutritional point of view (42.86%). In comparison, 47.25% and 9.89% had malnutrition due to deficit and excess, respectively. Malnutrition cases in the entire sample were classified according to severity, as shown in Figure 2.

Los diagnósticos nutricionales y de crecimiento, estratificados según origen indígena o criollo, pueden observarse en las tablas 2 y 3, respectivamente.

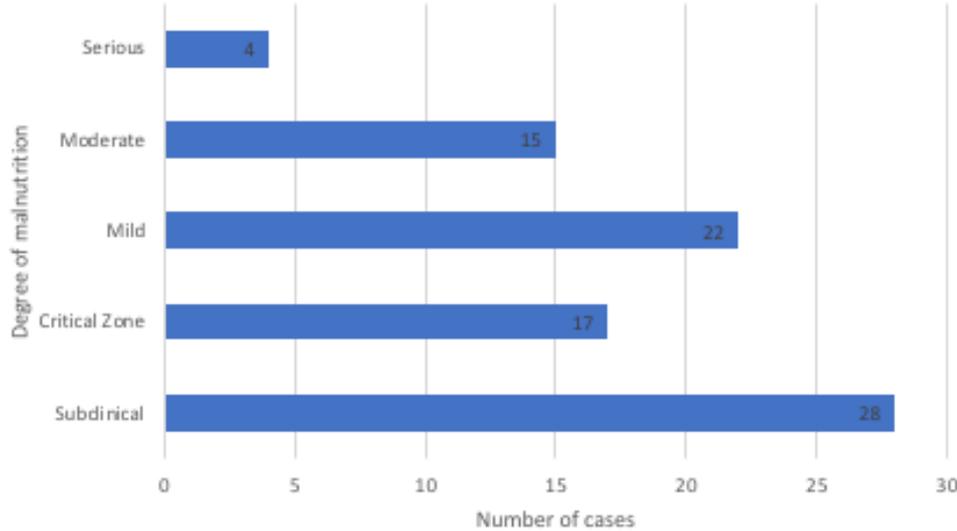


Figure 2. Distribution of malnutrition cases according to grade in the entire sample.

Table 2. Nutritional diagnoses distributed according to the origin of the patients.

Diagnosis	Creoles	Indigenous	Total
Obesity	4 (5,06%)	4 (3,88%)	8 (4,39%)
Overweight	4 (5,06%)	6 (5,83%)	10 (5,49%)
Normal nutrition	38 (48,01%)	40 (38,83%)	78 (42,86%)
Subclinical malnutrition	10 (12,67%)	18 (17,48%)	28 (15,39%)
Subclinical malnutrition	7 (8,86%)	10 (9,71%)	17 (9,35%)
Mild malnutrition	9 (11,39%)	13 (12,62%)	22 (12,09%)
Moderate malnutrition	4 (5,06%)	11 (10,68%)	15 (8,24%)
Severe malnutrition	3 (3,08%)	1 (0,97%)	4 (2,19%)
Total	79 (100%)	103 (100%)	182 (100%)

Table 3. Growth diagnoses distributed according to the origin of the patients.

Diagnosis	Creoles	Indigenous	Total
Tall size	1 (1,27%)	0 (0%)	1 (0,55%)
Tall normal size	2 (2,53%)	2 (1,94%)	4 (2,20%)
Normal size	51 (64,56%)	19 (18,45%)	70 (38,46%)
Low normal size	11 (13,92%)	30 (29,12%)	41 (22,53%)
Low size	14 (17,72%)	52 (50,49%)	66 (36,26%)
Total	79 (100%)	103 (100%)	182 (100%)

between 2016 and 2018 (which represents a considerable increase compared with prevalence of 6,4% in 2012-2014) (12). Malnutrition (for excess or deficit) is the result of an imbalance between diverse organic and environmental factors (13), where factors tightly related to human nature (lifestyle typical of a culture) and some disease with high prevalence influences directly in their occurrence (14).

Suppose both samples are analyzed together (like it's exposed in shape 2). In that case, the large number of subtleties diagnoses (including mild malnutrition cases, in critical zone and subclinical) reinforces the necessity and importance of early identification and timely treatment in nutrition matters. The long-term consequences include decreased immune response against infections (15), a decrease of nervous system development, and some cognitive abilities.

DISCUSSION

This study identified high percentages of malnutrition and short stature in kids and teenagers of evaluated communities, with a slight dominance of indigenous (E'ñepá y Jivi) respecting of criollos. This situation is logical considering the unfavorable socioeconomic conditions of the indigenous group. (poverty, overcrowding, low instruction level, food restriction, geographic and social isolation), being that one of the first reports of malnutrition in this population.

According to the Organization of United Nations for Food and Agriculture (FAO), sub feeding in Venezuela was 21,2%

This study's results reveal the considerable susceptibility that indigenous communities respect of criollos to deficit malnutrition and alteration of growth. This vulnerability is generally associated with lack of inclusion in government plans (despite manifested interest for national authorities respect of villages indigenous) and demanding access to certain aliments because of geographic and social isolation (16). Poverty, diverse social aspects, and acculturation are essential factors to keep in mind.

In previous studies that analyze the situation in other ethnicities indigenous at the national level. (7,17). Related with ethnicity Wayúú, a work evaluated one hundred children between 6 and 9 years from both genres, evidencing that 68 % of scholars were found in normal conditions according to anthropometric indicators (P/T, T/E, P/E). According to growth diagnoses, 24% had short stature, an important percentage of scholars (17). In our work, the proportion of nutrition and normal growth diagnoses for indigenous communities is lower (38,8% and 18,45%, respectively).

According to the study of nutritional evaluation of childhood population Warao in Delta Amacuro, 107 pediatric patients between the first day of birth and 16 years were evaluated. The results found that 55% got the diagnosis of normal nutrition, 15% subclinical malnutrition, and 12% mild malnutrition (7). In Warao's population, the results were similar to this work's indigenous population, which were 45% with normal nutrition, 18% with subclinical malnutrition, and 13% mild malnutrition. However, Warao's stature is primarily average (63%), corresponding to short stature. This data differs widely from the present work because the majority had a growth deficit.

The acculturation or transculturation of indigenous people's transculturation, as an inevitable consequence of globalization, is a potential factor related to the genesis of malnutrition and short stature in the evaluated sample. Exists also reject fluvial activity (even though they live in delimited zones by rivers), so obtaining fishing products as a food fountain is not very significant (18). Though it is not identified until now, protein caloric malnutrition derived from apparent lack of meat and fish will be a causal factor of observed malnutrition, being one the starting point for future studies in that area.

It has been reported in other ethnicities (like recently reported in Añu), including industrial food because of geographic closeness with Criolla populations, an evidenced situation in different communities evaluated in Maniapure (16).

Although the present study did not plant this objective, it was evidenced by commercial activity related to the acquisition of processed food by part of the indigenous population, especially E'ñepá, thanks to the sale or interchange of craft.

The intestinal parasitosis was able to identify during the different journeys of CUMIS as one of the principal diagnostic impressions in general consults. (19,20). In the same study's period like this work represented 10,46% of the total (including both kids and adults), despite not having complementary diagnosis methods for determination of causal agent (21). About protein-caloric malnutrition, it has been determined that more related parasitic infections are those produced by helminths (*Ascaris lumbricoides*, *Trichuris trichiura*) and some protozoa (*Giardia lamblia*), as they can accelerate the intestinal transit and upset nitrogen balance because of excessive loss of this element in feces, which produces malabsorption and intolerance to sugar and vitamins (15).

In Latin America, these infections are more frequent in rural communities, probably due to the housing situation, characterized by the deficit of basic services. These infections make the population more vulnerable to contract infection diseases, creating a vicious circle of malnutrition-parasitosis.

That is why intestinal parasites' presence and persistence are directly related to socioeconomic conditions (23-26). It is considered a cycle, since nutritional deficient could, at the same time, influence the state of parasite infection modulating the immune response involved in humoral mechanism de defense against helminth (production of IgA and IgE) (15). Also, it is well known that parasites produce appetite loss, metabolism increase, intestinal malabsorption, and mucosal injuries, leading to generating protein-caloric malnutrition and learning problems (24).

Notice that the cutoff or reference points used in this and other studies to determine nutritional diagnoses are made with a combination of national and international standards (7,17). However, the most reliable approximation to reality must be made considering every ethnicity's typical growth patterns, which are inexistent to Venezuelan indigenous. This aspect, for example, allows explaining the high prevalence of short stature in the indigenous population (50,49%) according to Criolla (17,72%), which probably reveals that indigenous patients were naturally with short stature than criollos, for genetics and environmental reasons, beyond a base pathology.

Although the obtained data in this study allows to do a descriptive analysis and evaluate the general panorama of infantile malnutrition in Maniapure, it is necessary to make new investigations to identify the statistical factors related to the problem. According to this, a work made in the context of different journeys of regional CUMIS in Peru managed to reporter a series of risk factors inherent with the mother (occupation, level instruction, housing conditions, and the number of children in the familiar core) together with many figures of malnutrition, even though it was not found statistical relation significative between variables (13).

This kind of Works that look identifies knowledge, practices, and attitudes related to infantile malnutrition is also a way of register risk factors in the zone, so it has recommended his development considering as a base the results of this work. The statistical limitations of our work should be considered, the absence of hypothesis contrast, because it is an exploratory study with descriptive purpose, so the results can't be extrapolated to all Maniapure regions until a new study with a probabilistic sample should be done. At the same time, this selection bias must be considered when analyzing work.

The present study allows identifying for the first time the general characteristics of malnutrition in evaluated communities, revealing that, in a similar way like international reports (27), malnutrition and short stature are highly prevalent, a fact that is probably related to lack of food security, socioeconomic conditions, and previous diseases. It is suggested that provided information by this preliminary study allows establishing bases for new transversal and longitudinal investigations (including remaining communities of Maniapure, increasing the sample, and including an aleatory sampling), to determine risk factors for malnutrition development in the infantile population, and also consider the results of this work for the realization of new interventions in health matter.

In conclusion, it was possible to perform the evaluated sample's nutritional and growth diagnosis, obtaining valuable information that could be used as a base for other studies.

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