Country Story from Nicaragua

Food as Medicine: How a Hospital Kitchen Is Strengthening Pediatric Cancer Care in Nicaragua

The Health System Challenge

Malnutrition remains a critical but often overlooked challenge in the care of children with cancer in low- and middle-income countries. In pediatric oncology, undernutrition contributes to increased infections, higher treatment-related toxicity, interruptions in therapy, and poorer survival outcomes.[1-5] Evidence consistently shows that timely and adequate nutritional care improves tolerance to treatment, quality of life, and survival among children with cancer [3,4].

In Nicaragua, these challenges are compounded by limited access to specialized nutrition products and the high cost of commercial therapeutic foods and formulas [6,7]. As in many resource-limited settings, standard hospital meals are often insufficient to meet the increased energy and protein requirements of children undergoing cancer treatment [6]. Addressing malnutrition in this context requires innovative, sustainable, and locally adapted solutions that are integrated within the health system [6-8].

The Setting

The Hospital Infantil Manuel de Jesús Rivera “La Mascota”, located in Managua, is Nicaragua’s national pediatric referral hospital. Founded in 1982, it provides tertiary-level, highly specialized care to children from birth to 15 years of age and serves as a center for clinical care, teaching, and research.

Over time, the hospital has expanded its range of services, modernized its infrastructure and equipment, and strengthened its specialized workforce. A key component of this evolution has been the development of a well-organized Nutrition Department, historically led by nutrition professionals and supported by internal policies, manuals, and operational guidelines.

The Nutrition Department is organized into three integrated units:

1. Food Service
2. Pediatric Formula Unit
3. Clinical Nutrition

This structure enables close coordination between clinical nutrition care and food preparation, ensuring that nutrition prescriptions can be effectively implemented at the patient level.

The Innovation

At the core of the hospital’s Food as Medicine approach is a well-established hospital food service capable of preparing therapeutic diets and artisanal pediatric formulas using locally available, low-cost ingredients.

Clinical nutritionists work closely with trained food service technicians and kitchen staff, providing continuous training on the preparation, handling, and storage of hospital diets and pediatric formulas. This collaborative model allows individualized nutrition care plans to be translated into daily nutritional support for hospitalized children.

The hospital food service prepares a wide range of therapeutic diets, including soft, liquid, full-liquid, high-protein, high-calorie, low-sodium, low-carbohydrate, astringent, and high-fiber diets. All therapeutic diets are prepared according to nutrition prescriptions and are supervised to ensure quality and safety.

In addition, the hospital produces artisanal enteral formulas prescribed by clinical nutritionists.

These formulas are prepared using:

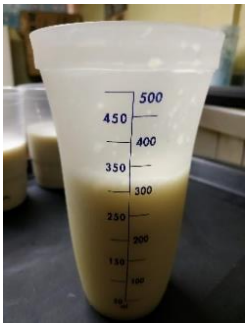
Milk (whole, lactose-free, soy, or hydrolyzed)
Protein sources such as chicken, beef, or egg
Vegetables including carrot or chayote
Carbohydrates such as plantain, squash, potato, taro, and sugar
Healthy fats, primarily extra virgin olive oil

Enteral recipe	
1000 mL of water	1. Wash the vegetables (potato, taro, chayote, plantain and carrot) and peel them. 2. Weigh the raw vegetables. 3. Place the vegetables and chicken in a saucepan to boil with 1000ml of water. 4. When they have boiled, place them in a blender along with the boiled water and process. 5. Add soy milk and olive oil and reprocess, until a single mixture is made. Strain the mixture
50 g of soy milk (NAN Nestle)	
100 g of raw potato	
60 g of raw Taro	
100gr raw carrot	
100 g of chayote	
55 g of ripe plantain	
70 g of raw chicken	
30 g of sugar	
25 mL of olive oil	
Nutrient information: Recipe yields: 1000 mL (33.8 oz.) Calories: 1000 kcal (4184 kJ) Carbohydrate: 138.7 g Protein: 27.2 g Fat: 35.4 g	

Process of preparing an enteral formula:

1. Weigh the foods
2. Peel and cook the foods
3. Blend and strain
4. Measure the volume
5. Sent to the formula room, where it is portioned according to the schedule and then delivered to the patient.






High-energy oral nutritional shakes are also prepared for children with increased nutritional needs. These are made with milk, egg, oats, fruit, oil, and sugar, and are delivered directly to hospital wards at the times prescribed by the nutritionist.

Impact on Pediatric Oncology Care

This integrated Food as Medicine model has had a particularly strong impact in the hematology-oncology unit, where children frequently experience feeding challenges related to cancer and its treatments, including chemotherapy, radiotherapy, and surgery.

Before 2018, the oncology unit did not have a full-time nutritionist, and access to nutrition care was limited. Nutritional assessments were often conducted only after children developed moderate or severe malnutrition or other serious complications.

In 2018, the International Initiative for Pediatrics and Nutrition (IIPAN), in collaboration with Hospital “La Mascota,” implemented a program aimed at strengthening nutritional care for children with cancer. As part of this initiative, a full-time clinical nutritionist was assigned to the oncology unit, ensuring that all children diagnosed with cancer had access to nutrition care from diagnosis through treatment, hospitalization, and outpatient follow-up.

The existing food service and formula infrastructure enabled the rapid expansion of nutritional interventions, allowing a greater number of children to receive timely, appropriate, and culturally acceptable nutritional support during hospitalization.

The Broader Impact

The experience at Hospital “La Mascota” demonstrates how a well-organized nutrition department, supported by trained personnel and integrated food service systems, can significantly strengthen pediatric cancer care in resource-limited settings.

By leveraging local foods, existing hospital infrastructure, and clinical nutrition expertise, this Food as Medicine model offers a sustainable, scalable, and cost-effective approach to addressing hospital malnutrition. The Nicaragua experience highlights the essential role of nutrition as a core component of comprehensive pediatric oncology care and provides valuable lessons for health systems seeking to integrate nutrition into routine hospital practice.

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