PKU management in Latin America: Where we are?

Soraia Poloni1, Bruna Bento dos Santos1,2, Ana Chiesa3, Norma Specola4, Marcela Pereyra5, Manuel Saborio-Rocafort6, Maria Florencia Salazar Silva7, Maria Jesus Leal-Witt8, Gabriela Castro8, Felipe Peñaloza7, Sunling Palma Wong9, Ramsés Badilla Porras10, Lourdes Ortiz Paranza11, Marta Sanabria12, Marcela Vela Amieva13, Marco Morales14, Amanda Rocio Caro Narango15, Antonieta Mahfoud16, Ana Rosa Colmenares17, Aida Lemes18, Jose Sotillo19, Ceila Perez20, Larita Martinez21, Georgina Zayas Torriente22, Lilia Farret Refosco23,24, Ida Vanessa Schwartz25 and Veronica Cornejo26,27

1 Hospital de Clínicas de Porto Alegre
2 Graduate Program in Genetics and Molecular Biology, Universidade Federal do Rio Grande do Sul
3 Centro de Investigaciones Endocrinologicas DR Cesar Bergadá. CEDIE-CONICET
4 Unidad de Metabolismo, Hospital de Niños de La Plata
5 Servicio de Crecimiento y Desarrollo del Hospital Pediátrico Dr. H. Notti
6 Hospital Nacional de Niños, “Dr. Carlos Sáenz Herrera”, Caja Costarricense de Seguro Social & Sistema de Estudios de Posgrado, Universidad de Costa Rica
7 Instituto de Nutrición y Tecnología de los Alimentos (INTA)Universidad de Chile, Chile
8 Instituto de Nutrición y Tecnología de los Alimentos (INTA)Universidad de Chile
9 Programa Nacional de Tamizaje. Hospital Nacional de Niños, San José
10 FCCMG Servicio de Genética Médica y Metabolismo - Hospital Nacional de Niños, San José
11 Ministerio de Salud Pública y Bienestar Social, Asunción
12 Universidad Nacional de Asunción
13 Laboratorio de Errores Innatos del Metabolismo y Tamiz - Instituto Nacional de Pediatría
14 Hospital Rebagliati, Lima
15 Instituto de Errores Innatos del Metabolismo y Tamiz - Pontificia Universidad Javeriana, Bogota
16 Instituto de Estudios Avanzados, Caracas
17 Hospital Clínica Caracas - Materno Infantil de Caricuao, Caracas
18 Instituto de la Seguridad Social, Montevideo
19 Hospital de especialidades Pediátricas Omar Torrijos Herrera, Ciudad de Panamá
20 Robert Reid Cabral Children’s Hospital, Santo Domingo
21 Centro Nacional de Genética Médica, La Habana
22 Centro de Nutrición e Higiene de los Alimentos del Instituto Nacional de Higiene, Epidemiología y Microbiología (INHEM), La Habana
23 Medical Genetics Service – Hospital de Clínicas de Porto Alegre
24 Nutrition and Diet Service
25 Institute of Nutrition and Food Technology INTA University of Chile
26 Laboratory of Genetics and Metabolic Disease LABGEM, INTA U of Chile

Acknowledgments: The authors thank Dévora Random, Laura Fernández and Mariana Castro for their assistance with data collection. The authors also thank all Latin American PKU patients and their families. This research was funded by FIPe-HCPA, Coordenação de Aperfeiçoamento de Pessoal de Nível Superior – Brasil (CAPES) and Fundação de Amparo à Pesquisa do Estado do Rio Grande do Sul (FAPERGS).
The aim of this study was to describe the current practices on diagnosis and dietary management of phenylketonuria (PKU) in Latin America, as well as the main obstacles to treatment.

**METHODS:** An online survey containing 44 questions was developed by a team of experts, targeted for health care professionals following PKU patients. After the first Portuguese and Spanish versions of the questionnaire were finished, a pilot study was performed with 6 PKU experts (3 Portuguese and 3 Spanish speakers) and then, the final version was sent to 14 countries where IEM practitioners were found.
RESULTS

- 22 centers in 13 countries were included: Brazil (n = 5), Argentina (n = 4), Colombia (n = 2), Venezuela (n = 2), Costa Rica (n = 1), Chile (n = 1), Mexico (n = 1), Paraguay (n = 1), Peru (n = 1), Dominican Republic (n = 1), Panama (n = 1), Uruguay (n = 1), and Cuba (n = 1).
- Most countries (12/13) screened newborns for PKU.
- Frequency of blood monitoring (Figure 1), Phenylalanine (Phe) targets (Figure 2) and protein prescriptions (Figure 3) throughout life were very heterogeneous among centers.
- Most countries had only unflavored powdered amino acid substitutes (10/13) and did not have low-protein foods (8/13).
- Only 3/13 countries had regional databases of the Phe content of foods, and 4/22 centers had nutrient analysis software.
- Perceived obstacles to treatment were: low purchasing power (62%), limited/insufficient availability of low-protein foods (60%), poor adherence, and lack of technical resources to manage the diet (50% each).
- Alternative treatments, such as BH4, LNAA and GMP were rarely available and in 6/13 countries none of them were available.

Figure 1. Frequencies of blood phenylalanine (Phe, 1a) and tyrosine (Tyr, 1b) monitoring for each age group as adopted by the Latin American centers included in the study (n = 22). *Numbers within columns represent relative percentages.

Figure 2. Target Phe levels during treatment in different age groups, as adopted by the studied centers (n = 22). Phe: phenylalanine.

Figure 3. Total protein (natural + protein substitute) prescriptions, in different age groups, in the studied centers (n = 22)

In conclusion, we observed a heterogeneous scenario in the dietary management of PKU, and most countries experienced a lack of dietary resources for both patients and health professionals. Our results show a very distinct reality of PKU management when compared to developed countries, raising the need for local guidelines.