



MALINEA project:

« Malnutrition and infections among children in Africa »

▶ Project duration

3 years from September 2014

▶ Intervention area

The multi-sites study is taking place in Senegal, Niger, Madagascar, and CAR.

▶ Project objective

The project's main objective is to assess the interactions between malnutrition and modifications of the gut microbiota in order to propose new strategies of treatment for malnourished children taking into account the microbiological variant of the problem.

▶ Consortium

- Lead: Pasteur Institute network
- Partners: ACF-France and ACF-Spain, GRET
- Local partners: universities, hospitals, research centers in the South

▶ Budget: 1,3 million €



▶ CONTEXT

Global programs support the treatment of severe acute malnutrition (SAM) because life is threatened. This life-threatening condition has most often a development on a chronic background, which first evolved in moderate acute malnutrition (MAM). This nutritional deficiency impacts all biological systems of the child. The immune system seems to be altered and even cognitive development seems disturbed, resulting in poor school attendance and persistent disorder into adulthood. A disorder of the intestinal flora, regardless of diarrhea, is now involved in intestinal villous atrophy and it induces under-nutrition due to chronic inflammation. The analysis of all the microorganisms in the digestive tract becomes an important issue for the understanding of under-nutrition.

▶ OBJECTIVE

The MALINEA project is divided into three main parts:

Part 1: Evaluation the association between disturbances of the digestive microflora and malnutrition. This component aims to study differences between malnourished and non-malnourished children in the distal intestinal microbiota and in frequency of pathogens. Analyses will be stratified by country, age and sex of the children, and presence of diarrhea. Stool collections will be analyzed by a metagenomic approach and PCR detection of pathogens.

Part 2: Improvement of the management of moderate acute malnutrition (MAM) by acting on this microbial component. This part is a multicenter randomized clinical trial comparing the effectiveness (recovery at 3 months) of 3 refeeding protocols: 1/ CSB ++ standard treatment (Fortified Corn-Soy Blend) 2/ CSB ++ associated with antibiotic 3/ CSB ++ associated with prebiotic. Secondary objectives aim to compare the 3 groups on anthropometric measurements, clinical characteristics, adherence to interventions, tolerance to interventions, as well as scales and cognitive measures at 3, 6 and 12 months after study entry. 2,100 MAM children between 6 and 24 months will be included and followed up. The flour used will be produced locally by social enterprises established in the economic fabric of the country.

Part 3: Improvement of local capacity/knowledge on nutrition by promoting the transfer of know-how and partnerships between research institutes and fight against malnutrition programs. Achievements of the project will target authorities and health structures in each country, as well as the academic world. Data and protocols will be copublished with scientists from the different countries, involving doctoral students. Development of new themes in academic courses (Masters) in African universities will be promoted. Scholarships will allow students and young researchers to be involved in the project, and to be trained in the methods used. Beyond the establishment of scientific protocols, MALINEA project will be a permanent working group to continue to work on this topic "Nutrition and infections" to develop new projects and meet other operational issues. This first project is the basis for a lasting partnership between the International Network of Pasteur Institutes and the two NGO Action Against Hunger International and GRET on the theme "nutrition and infection".

► Beneficiaries

- Final beneficiaries are children with acute under-nutrition
- Direct beneficiaries are teams of health structures and researchers of south universities
- Indirect beneficiaries are national Health (nutrition) programs as well as international organizations that could use recommendations made through the project by the national authorities.

► Methodology

This is a multicenter randomized clinical trial comparing the effectiveness (recovery at 3 months) of 3 refeeding protocols:

- 600 children with CSB ++ standard treatment (Fortified Corn-Soy Blend)
- 600 children with CSB ++ and one **antibiotic** (azithromycine)
- 600 children with CSB ++ and one **prebiotic** (Inuline + Fructo Oligosaccharides)

► Project impact

Improved treatment management for malnourished children: Knowledge of the most common pathogens found in malnourished children and new proposed interventions will allow better management of MAM cases.

Skills transfer and training of students: This project will first be based on a Southern transfer of competence to the South. Micro-biological analyzes will be conducted by young researchers and students from the South. They will value their work in the form of scientific articles and thesis or master memories.

► Operational agency

- ◆ Action Contre la Faim - France

► Sponsor and donor:

- ◆ French Ministry of Foreign Affairs

► Scientific partners

- ◆ Pasteur Institute
- ◆ GRET University

► For more details...

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