Eating better: Guatemala works to control the double burden of malnutrition

By Aabha Dixit

"Nuclear science and technology gave us the tools to understand and associate body composition with physiological changes, which can help to prevent disease later in life."

— Manuel Ramirez, Coordinator, Research Centre for the Prevention of Chronic Diseases, Institute of Nutrition of Central America and Panama (INCAP), Guatemala

With the help of nuclear techniques, scientists and health workers in Guatemala are now able to identify the causes and consequences of malnutrition in the country's children, enabling policymakers to devise strategies to combat obesity and stunting.

The country has one of the highest rates of chronic malnutrition in the world, and tackling it is a key priority for the government, said former Social Development Minister Lucy Lainfiesta.

"The Guatemalan Government's proposal for fighting chronic malnutrition will emphasize the window of opportunity found in the first 1000 days of life, through interventions that will ensure that mother and child have what they need to be well nourished," she said.

A field worker discusses the benefits of good nutrition at an urban primary school in Guatemala. (Photo: CIIPEC)

Projects using isotope technology to assess nutritional status are "beginning to make a positive and noticeable impact in our nutrition programmes," said Manuel Ramirez, Coordinator of the Research Centre for the Prevention of Chronic Diseases, from the Institute of Nutrition of Central America and Panama (INCAP). "Nuclear science and technology gave us the tools to understand and associate body composition with physiological changes that can lead to disease later in life."

Measuring children's total body water using isotopic tracers helps to determine their body composition, and the percentage of fat in their body, which in turn allows specialists to prescribe the right diet (see box).

The IAEA's support has helped Guatemala and other Member States to have the necessary information and data to design or improve their nutrition programmes. These include increasing the intake of vitamins and minerals through food fortification or micronutrient supplementation, complementing advocacy for healthy eating, and increased physical activity.

Fewer tortillas, more carrots

Lack of protein and micronutrients in diets, composed mainly of high carbohydrate foods, is a major reason for malnutrition in Guatemala, according to Ramirez. Health workers have noticed that in rural areas, children between six months and three years of age regularly eat corn tortilla softened with caffeinated drinks. This food is not beneficial for infants and young children, who should instead eat healthier locally produced food like eggs, avocado, bananas, soft cooked vegetables, beans, rice and oatmeal. Poor quality diets in infancy can lead to obesity later in life. With the help of nuclear techniques, scientists are able to track the amount of protein absorbed by the body and make diet recommendations accordingly, keeping in mind the availability of ingredients locally, explained Christine Slater, Acting Head of the Nutrition Section at the IAEA.

While obesity is the main health challenge among children in the cities, in rural areas, the indigenous population mostly suffers from the opposite problem. Nearly eight out of ten indigenous children are stunted, compared to just four out of ten non-indigenous children, Ramirez said. The latest research results have clarified that, contrary to popular belief, the short stature

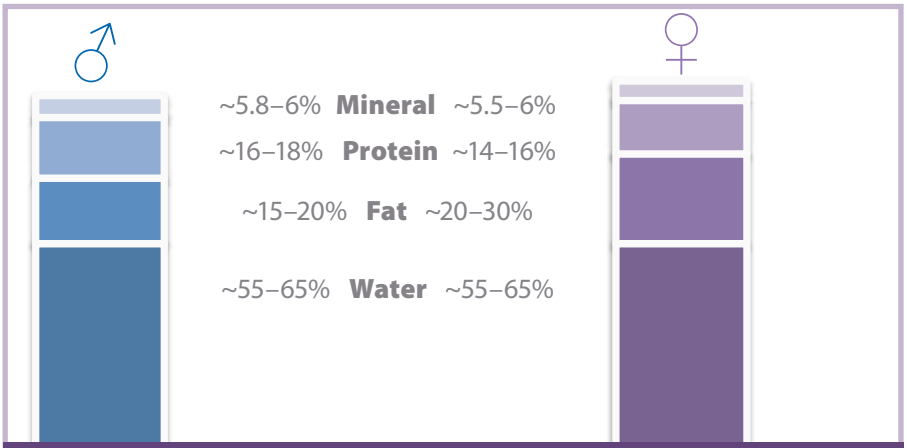
of indigenous Guatemalans is not due to genetics. It is caused by inappropriate feeding practices and poor diet in the early years of life, he said.

Stunting is a major contributor to poverty, Ramirez said. Stunted children face learning difficulties, which prevents them from earning well later on in life. There is an urgent need to ensure that diverse nutritious diets are available and accessible.

While all stunted children need adjustments to their diets, nuclear techniques can help determine how their diets should be changed, Slater said. "There is a growing realization that measuring the weight and height of children is not enough," Slater explained. "We need to understand body composition in order to determine healthy growth."

Children who are obese, stunted or both tend to lead less healthy lifestyles and suffer more health problems later in life, Ramirez said. "These children walk less, have lower oxygen consumption and poor blood circulation," he said.

With the information and data collected under IAEA projects, a task force endorsed by eight health ministers from Central America was established in June 2014 to develop a regional policy on the prevention and management of obesity in children and adolescences.



Water, protein, fat and mineral matters are the main components of the body and these can be altered with age, ethnicity and nutritional status.

Source: www.jawon.com

Evaluating food acceptability of healthy recipes for school age children.
(Photo: INCAP/CIIPEC)

THE SCIENCE

Using isotopes to measure body composition

Stable isotopes can be used to measure the amount of water and nutrients in the body and the amount of ingested nutrients the person's body absorbs. They can also be used to measure the rate of absorption, utilization or synthesis of proteins, fats or carbohydrates. Stable isotopes are non-radioactive, so there is no radiation hazard associated with their use.

Stable isotope labelled compounds are absorbed and behave in the body in the same way as their unlabelled counterparts, but because they have a different molecular mass, they are traceable. For example, to measure the percentage of water and fat in the body, a person is given a drink of special water, rich in deuterium, which is a stable isotope of hydrogen. Isotopes of an element have the same number of protons, but one or more extra neutrons, giving them a heavier molecular mass.

A few hours after a person drinks a small, carefully weighed amount of water with deuterium isotopes (D_2O), the deuterium is evenly spread through the body water. The body water can then be sampled in the form of saliva or urine, and the amount of deuterium measured. Because technicians know the amount of labelled water they gave the patient and subsequently measured the amount and proportion of labelled molecules in the body water, they can calculate how much water there is in the body.

From this they can calculate the amount of lean, or non-fat, tissue by knowing that water forms 73 per cent of the lean tissue weight. The difference between the body weight and the amount of lean tissue is the amount of fat. Depending on how the fat content differs from the norm, they can prescribe the relevant diet or advice concerning physical activity.