

BALLARD BRIEF

March 2023

Undernutrition Among Children in Guatemala

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Summary

Undernutrition in Guatemala is a serious issue that affects physical, mental, and social well-being. Children are most vulnerable to this dangerous condition, and in Guatemala, almost 50% of children experience inadequate growth and development due to a lack of appropriate nutrient intake.¹ Because of food insecurity and lack of nutrients, young children do not have adequate access to the nutrition that they need. Guatemala is located in an area that makes it prone to natural disasters, which also contributes to the high rates of undernutrition. Undernourished children also experience intense disadvantages because of their weakened immune systems and cognitive underdevelopment. Unfortunately, these problems persist in generational cycles, which are difficult to break. Many governmental and non-governmental organizations are seeking to address this issue, and providing mothers with education about best postnatal nutritional

practices—as well as better access to healthcare—has shown to be very effective as a current best practice.

Key Terms

DALY—Disability Adjusted Life Years refer to the healthy years of life that are lost because of premature death, disease, or disability.² One DALY is one year of good health lost.

Deficient—Not having enough. In terms of undernutrition, deficiency refers to not getting enough vitamins, minerals, calories, and other necessary nutrients.

Extreme poverty—The current measure of those in extreme poverty includes anyone living below \$2.15 per day.³

Food insecurity—Refers to the lack of regular access to enough safe and nutritious food for normal growth and development, which includes an active and healthy life. There are different levels of food insecurity: mild food insecurity—the uncertainty regarding the ability to obtain food; moderate food insecurity—compromising food

quality and variety or reducing quantity (including skipping meals); and severe food insecurity—going without food for a day or more.⁴

Macronutrients—Nutrients that provide energy or calories that allow for appropriate growth and development in the body.⁵

Malnutrition—Deficient, excessive, or imbalanced intake of energy and nutrients.⁶ Malnutrition can be divided into two categories: undernutrition and overnutrition.

Micronutrients—Vitamins and minerals that are vital to development. They also prevent disease and increase overall well-being. The six essential micronutrients are iron, vitamin A, vitamin D, iodine, folate, and zinc.⁷

Morbidity—Having a disease or a symptom of a disease. It can also refer to the amount of disease prevalent within a specific population.⁸

Postnatal—Refers to the period of time after childbirth.⁹

Stunting—A result of undernutrition that impairs growth and development

in children. Children who experience stunting are shorter in height for their age and may have other developmental problems, such as poor cognition and an increased risk of illness and health problems.¹⁰

Sustainable Development Goals—17 goals created by the United Nations in order to call the world to action by working towards global development. These goals include eliminating poverty, improving health and education, reducing inequalities, promoting gender equality, and eradicating hunger.¹¹

Undernutrition—Insufficient intake of energy and nutrients that are required in order to maintain good health and appropriate growth.¹²

Underweight—Having low weight-for-age. Children who are underweight can also be wasted and/or stunted.¹³

Wasting—Having low weight-for-height. Wasting is usually caused by severe weight loss and undernutrition.¹⁴ There is a wastage of muscle and fat tissue, leaving the person weak and thin.^{15, 16} Wasting can

also be referred to as acute malnutrition.¹⁷

Context

Q: What is undernutrition?

A: Although undernutrition and malnutrition are sometimes used interchangeably, they are not identical. While malnutrition refers to any lack or excess of nutrients and energy, undernutrition is a type of malnutrition that refers to the insufficient intake of energy and nutrients that are required to meet an individual's health needs.¹⁸ Undernutrition is measured in children by relationships between height, weight, and age and is measured using key indicators of stunting, wasting, and being underweight. Having low height-for-age is indicative of stunting, having low weight-for-height is known as wasting, and having low weight-for-age is categorized as being underweight. In order to be labeled under these categories, children must be within a certain range determined by the World Health Organization's growth standards.¹⁹ Globally, 8.9% of the

population is classified as undernourished.²⁰ In 2020, measurements showed that 22% of all children under the age of 5 were stunted, and an estimated 6.7% under the age of 5 were affected by wasting.^{21,}

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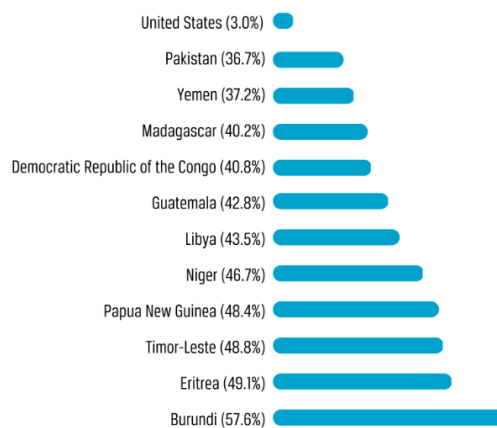
Q: Where is undernutrition a problem?

A: Undernutrition is a global problem. By region, the highest rates of undernutrition in the world are found in Sub-Saharan Africa and South Asia.²³ As of 2019, 20.3% of the population of Sub-Saharan Africa and 14.5% of the population of South Asia were undernourished. Latin America and the Caribbean had an undernutrition rate of 7.7%. Guatemala, however, had a rate of 16.8%.²⁴

In 2017, the rate of chronic child malnutrition in Guatemala was 49.3%.²⁵ The rates of chronic malnutrition in Guatemala have only decreased by 5.1% in the past 20 years, which is extremely low compared to most other Latin American countries.²⁶ Because undernutrition is technically a type of malnutrition, reports of malnutrition rates include undernutrition as well.²⁷ With 42.8% of children under 5 classified as stunted in 2020, Guatemala has the highest rate of stunting in Latin America and the 7th-highest rate in the world.²⁸ The only countries that reported higher rates of stunting were the countries of Burundi, Eritrea, Timor-Leste, Papua New Guinea, Niger, and Libya.²⁹ Guatemala has higher rates than the Democratic Republic of the Congo, Madagascar, Yemen, and Pakistan.³⁰ In measuring progress toward meeting the standards set by the Sustainable Development Goals (SDGs), which include eliminating problems caused by poverty and hunger, Guatemala ranks

121st out of 162 countries (1st being closest to meeting the SDGs).³¹

CHILDREN 5 AND UNDER AFFECTED BY STUNTING



Q: Who is most affected by undernutrition in Guatemala?

A: When it comes to nutritional deficiencies, children are especially vulnerable because they are in the early, critical stages of development.³² The first 1,000 days of life, from conception through the first 2 years, are critical to physical, cognitive, and neurological development.^{33, 34} Children are most at risk for undernutrition and its subsequent consequences during this early stage of life. Much of the brain's structure and

capacity is shaped before children reach the age of 3.³⁵ When it occurs, growth failure begins very early in utero.³⁶ If infants and children are not able to properly develop and grow, they can experience up to a 40% loss of structural brain development.³⁷ This brief will focus on undernutrition among children under 5 years of age because of their vulnerability to the consequences of undernutrition.

Children of indigenous and rural populations are disproportionately affected by undernutrition. Chronic malnutrition affects 58% of the indigenous population compared to 38% of the non-indigenous population in Guatemala,³⁸ with 40% of the Guatemalan population identifying as indigenous.³⁹ More than half of the population lives in rural areas,⁴⁰ where there can be limited access to aid, healthcare, and healthy food options.⁴¹ The largest populations of indigenous peoples live in the rural departments outside of Guatemala City, mostly to the north and west.⁴² In some areas that are highly populated by indigenous groups, the number of children who

experience stunting can reach up to 70%.⁴³

Q: What is the history of undernutrition in Guatemala?

A: Although overall stunting levels have slowly declined in the last few decades, Guatemala is still one of the countries with the highest rates of childhood undernutrition. From 1995 to 2015, the percentage of Guatemalan children who were wasted went from 3.8% to 0.8%, and the percentage of children who were underweight dropped from 21.7% to 12.4%.⁴⁴ In the same time period, stunting levels fell from 55.4% to 46.7%.⁴⁵ The current level of stunting among children under 5 is about 42.8%, but according to recent trends, stunting should continue to drop.⁴⁶

Recent efforts by Guatemalan leadership have focused on increasing health and reducing rates of undernutrition. Since 2012, Guatemala has implemented programs and policies designed to strengthen nutritious practices, especially during the first 1,000 days of life.⁴⁷ These

programs and efforts will be discussed in the Practices section later in this brief.

Q: What does a healthy, nutritious diet look like in Guatemala?

A: A healthy diet consists of a variety of nutrient-dense food. Nutrients include vitamins, minerals, carbohydrates, fats, and proteins.⁴⁸ It is recommended that children are exclusively breastfed during the first 6 months of life and then continuously breastfed until at least age 2. From 6 months on, breastfeeding should be complemented with nutrient-dense foods.⁴⁹ Recommendations local to Guatemala include tortillas, beans, egg yolk, chicken, vegetables, herbs, and fruit.⁵⁰

The FAO (Food and Agriculture Organization of the United Nations) nutrition guide for Guatemala recommends eating a piece of meat, chicken, liver, or fish at least twice a week.⁵¹ The guidelines state that seeds, nuts, beans, and sesame seeds

are good compliments to the diet and that eggs, cheese, milk, or incaparina (a mass-produced corn and soy hot cereal mix) should be eaten at least 3 times a week.⁵² Children under 5 should have a variety of foods, including meat, poultry, fish, or eggs.⁵³ The World Health Organization recommends a diet high in fruit, vegetables, legumes, nuts, and grains.⁵⁴ The Guatemalan national food guide also recommends eating beans and tortillas every day, with 2 tablespoons of beans per tortilla.⁵⁵ Diets should also be low in added sugar,⁵⁶ fats (especially saturated and trans fats), and salt.⁵⁷

Contributing Factors

Food Insecurity: Lack of Available Macronutrients

The lack of access to safe and nutritious food (known as food insecurity) causes children to suffer from undernutrition because they are unable to get enough macronutrients.

Macronutrients are basic nutrients that provide energy for the body. They need to be consumed in large quantities in order to sustain energy and growth.⁵⁸ Macronutrients include carbohydrates, fats, proteins, fiber, and water, all of which are essential for ensuring that Guatemalan children are able to maintain healthy levels of development.⁵⁹

In Guatemala, 16% of the population is reported to be living with severe food insecurity.⁶⁰ Unfortunately, stats specifically focused on food insecurity among children are not available. A study performed in rural Guatemala found that families with severe food insecurity had a less diverse diet and a reduced bean intake, which is one of the key sources of protein consumed in Guatemala.⁶¹ Protein is important for physical and mental health; inadequate protein intake can negatively affect brain functioning.⁶² Many children lack an adequate intake of vegetables, as well as meat and eggs for protein.⁶³ The depth of food deficit in Guatemala was 101.00 kilocalories (calories) per person in 2016, which was the highest

it had been in 10 years.⁶⁴ This number means that, on average, Guatemalans have a deficit of 101 calories per day.⁶⁵ When children do not receive an adequate number of calories, they decrease their energy intake and receive fewer nutrients, which leads to undernutrition. A sample study in Guatemala City evaluated the types of food that infants consumed in addition to breast milk from 6–12 months.⁶⁶ The main source of protein came from breast milk, but the other top sources of protein included maize tortillas, chicken, pasta, hot cereal, and formula. The main source of energy and carbohydrates also came from breast milk, but the other leading sources were maize tortillas, fortified sugar, banana, sweet rolls, and formula.⁶⁷ Each of these complementary foods had relatively low contributions to the overall diets of Guatemalan children, with each individual food making up only 2–7.9% of the total diet. The study shows that while food selection is diverse, there is a general lack of replacement formula and commercial baby foods.⁶⁸ Some of

the children's complementary food diets lack fruits, vegetables, and dairy, which are all recommended by experts as important things to implement in the diet.⁶⁹

In Guatemala, more than half of the population lives below the poverty line, with 23% living in extreme poverty.⁷⁰ When families are unable to afford food and appropriate macronutrients, the children in the household suffer because they are unable to eat the necessary nutrients that they need. The effects of this were recently seen during the COVID-19 pandemic, which led to widespread unemployment and, therefore, less income to provide food in homes and a decrease in available food for children.⁷¹ In the last year, the cost of food in Guatemala has increased by 13.3%, further preventing Guatemalan families from access to food.⁷² As compounding factors such as COVID-19 increase food insecurity in Guatemala, they simultaneously decrease nutrition in the country. Because it leads to an inadequate diet, food insecurity is one

of the leading contributing factors to child undernutrition.

Food Insecurity: Lack of Available Micronutrients

Undernourished children in Guatemala lack an adequate amount of micronutrients in their diet.

Micronutrients are vitamins and minerals that help to prevent disease and fortify the body's overall health.⁷³ The common Guatemalan diet is plant-based, high in phytates, and lower in animal-sourced products and nutrient-dense foods, especially those that contain iron and zinc.⁷⁴ Stunting is strongly related to iron and zinc deficiency.⁷⁵ Also, iron deficiency leads to a decrease in the production of red blood cells (RBC).⁷⁶ One study of children aged 6–59 months found that 33% of children had RBC folate deficiency.⁷⁷ RBC folate deficiency means that not enough red blood cells are being produced, which could lead to anemia.

In Guatemala, maize tortillas are the country's main staple; one study found that 41% of energy requirements for

young toddlers in Guatemala (aged 12–23 months) come from tortillas.⁷⁸

Although tortillas contain some micronutrients, such as zinc and iron, they do not have all of the micronutrients essential to a child’s dietary needs.⁷⁹ In the staple-adjusted nutritious diet estimated by health organizations, tortillas were not included.⁸⁰ Maize combines with other staple foods to supply more than 70% of energy needs.⁸¹ This amount means that in a typical Guatemalan diet, there is less room for the consumption of nutrient-dense foods without exceeding energy requirements.⁸² However, adjusting a heavy tortilla diet to one that is more balanced and full of necessary nutrients was estimated to increase household food costs by 3–43%, depending on the region.⁸³

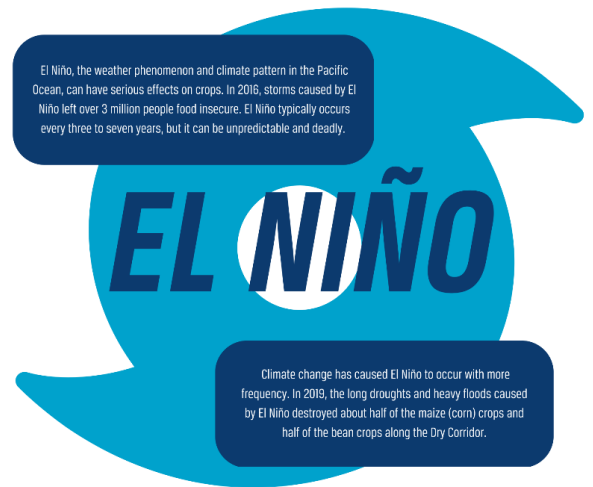


Poor socioeconomic conditions, such as income reduction and higher food prices, lead to lower micronutrient intake.⁸⁴ This is because micronutrient-dense foods are more expensive than staple foods like cereals (maize, wheat, oats, rice), starchy roots, and tubers.^{85, 86} In areas where inequality is greater, economic challenges disproportionately affect food security and nutrition as people are not able to afford healthier, nutrient-dense foods.⁸⁷

Food Shortages in the Agricultural Sector due to Climate Change and Natural Disasters

Natural disasters and other severe environmental challenges in Guatemala lead to higher rates of undernutrition because they negatively affect crops, leading to food shortages. Because of dry spells and their negative effect on agricultural yields, more than 2,000 Guatemalan children under the age of 5 died of malnutrition, according to a 2014 report.⁸⁸ The climate was listed as the main driver of the food crisis in

Guatemala in 2018.⁸⁹ Guatemala is listed as 1 of the 10 countries most vulnerable to natural disasters and other such environmental threats.⁹⁰ It is located in a part of the continent that is known as “Central America’s Dry Corridor,” which has suffered from serious droughts in the past few years. The Dry Corridor, consisting of parts of El Salvador, Guatemala, Honduras, Nicaragua, and parts of Panama and Costa Rica, is a dry tropical rainforest that is susceptible to both droughts and floods due to excessive rain.⁹¹ Although the region normally has a long dry season followed by periods of intense rainfall,⁹² the effects of these extremes are exacerbated by El Niño, the unpredictable climate pattern that warms the ocean temperatures and impacts ocean currents and weather.⁹³



Recent increases in Dry Corridor temperatures due to climate change have caused Guatemalan weather patterns to be more erratic and intense, making it difficult for some families to have a sufficient harvest and pushing them to seek food aid. The rainy season has a delayed start, and extreme droughts and floods are occurring with more frequency.⁹⁴ It is estimated that there will be continued increases in temperature (up to 3 degrees Celsius by 2050) along with intensified heat waves and decreased levels of monthly rainfall in the next 50 years.⁹⁵

Subsistence farmers and those in rural areas have been severely impacted by

the droughts, unable to feed their families as crops fail. In recent years, yields have decreased so much that some farmers have lost most or all of their crop production.⁹⁶ Of the 1.9 million basic grain producers in Central America, approximately half of them live in the Dry Corridor, and 31% of Guatemalans are employed in the agriculture sector.⁹⁷ Most families only have a small portion of cultivable area available to them, with an average of 0.6 hectares in some areas⁹⁸ and a median of 0.5 in the Western Highlands of Guatemala,⁹⁹ which does not produce sufficient output to feed a family for an entire year.¹⁰⁰ In a recent survey conducted among a sample of Guatemalan farmers, 53% reported that climate change is partially impacting the nutrition of their families: 38% thought that annual production was affected by climate change, and 35% considered production to be highly affected.¹⁰¹ As families are struggling to grow crops and have enough food and income to support their children, there are fewer

nutritious options for children, leading to higher rates of undernutrition.¹⁰²

Consequences

Cognitive, Emotional, and Intellectual

Underdevelopment

Undernutrition can lead to cognitive problems and underdevelopment of the brain because the lack of nutrients prevents necessary physical and neurological growth. Stunting stops children from reaching their full physical and cognitive potential or growth.¹⁰³ The period of development during pregnancy and infancy is critical not only for cognitive development but also for motor and socio-emotional skills.¹⁰⁴



One study found that children who received protein-energy supplements in the first 1,000 days of life had a decreased likelihood of developing mental distress in their later adulthood.¹⁰⁵ One study following Guatemalan children into their later years found that being exposed to nutritional supplements early on in life—within the first 1,000 days—increased psychological well-being. Conversely, cognitive underdevelopment from undernutrition was also shown to lead to mental health difficulties.¹⁰⁶ In 2019, the number of people in Guatemala with mental health disorders was over 2.1 million, which was about 12.6% of the population.¹⁰⁷ While it is not specified how many of these cases are related to undernutrition, the relationship between poor nutrition and mental health distress makes it possible to infer that a portion of these mental health disorders has connections to the consequences of undernutrition. Research shows that undernutrition can be associated with poorer performance on tests that involve

motor development and cognitive development.¹⁰⁸ Small size at growth and poor physical growth during the first 2 years of life have been associated with neurodevelopmental delays.¹⁰⁹ One Guatemalan study that measured the relationships between early childhood height and cognitive functioning found that height at age 3 predicted later performance on tests of literacy, general knowledge, and numeracy.¹¹⁰ Another study found that preschool-aged children (ages 3–7) who were malnourished had poor performance on tests that involved higher attentional tasks.¹¹¹ When children do not receive adequate nutrition, the prefrontal cortex is not properly developed.¹¹² Social skills, the ability to pay attention, and educational achievement are also affected. Undernutrition has also been linked to behavioral abnormalities.¹¹³ These external behavior issues also contribute to students having trouble focusing and succeeding in a classroom setting. Additionally, cognitive underdevelopment can make it harder for children to study and succeed in the

school system. Deficient cognitive development can lead to greater probabilities of children starting school at a later age, repeating grades, and dropping out of school.¹¹⁴ Guatemalan children who are stunted are more likely to miss school due to illness, making them fall further behind. They are also more likely to drop out of school when compared to well-nourished children.¹¹⁵

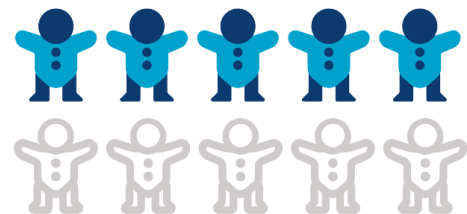
Risk of Disease and Complications

Children who are undernourished are more susceptible to dangerous diseases and illnesses due to undernutrition weakening their immune systems. In Guatemala, undernutrition is linked to about 45% of deaths among children under the age of 5.^{116, 117}

Undernutrition is characterized by the lack of specific nutrients that can lead to severe health complications. One of the first effects of undernutrition is the shutdown of the immune system.¹¹⁸ Iron and zinc are necessary for keeping the immune system strong; they help in fighting off infection.¹¹⁹ Many

Guatemalans receive a high amount of their zinc through corn, wheat, and other grains.¹²⁰ Research has shown that rising corn prices are directly related to lower zinc intake among poor households in rural areas.¹²¹ A study conducted among Mayan children under the age of 5 found that 79% of them were not consuming the recommended levels of zinc in their diet.¹²² Vitamin D also helps the immune system fight bacteria and viruses.¹²³ When a child lacks these nutrients, their immune system weakens. When a child's immune system is weakened, they are more vulnerable to diseases and infections, which may cause premature death.¹²⁴

MALNUTRITION CAUSES NEARLY 50% OF ALL CHILD DEATHS UNDER THE AGE OF 5



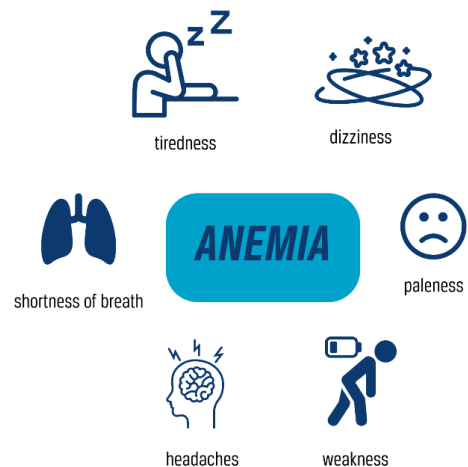
In 2019, 22.25% of the total disease burden in Guatemala was caused by communicable, maternal, neonatal, and nutritional diseases (CMNN diseases),

compared to 18.71% caused by injuries and 59.04% caused by non-communicable diseases.¹²⁵ Out of these CMNN diseases, 9.22% were directly caused by nutritional deficiencies. The majority of communicable diseases worldwide include diarrhea, infectious diseases, and neonatal disorders.¹²⁶ Even in cases where undernutrition does not directly cause CMNN diseases, children are more susceptible to CMNN diseases when they are undernourished. When looking at the disease burden by age, 55.13% of the total disease burden for children under 5 is caused by CMNN diseases.¹²⁷

Anemia

Anemia is a disease that is caused by an iron deficiency. The lack of iron reduces the number of red blood cells and negatively impacts the oxygen-carrying capacity of hemoglobin.¹²⁸ Children who do not have enough of this oxygen-rich blood may experience tiredness and feel weak.¹²⁹ Children might appear pale in color.¹³⁰ Other symptoms include dizziness, headaches, and shortness of breath.¹³¹

In Guatemala, iron deficiency is often associated with the lack of consumption of animal-source foods, which provide iron, zinc, and other micronutrients.¹³² When children are not getting enough iron, they are susceptible to higher rates of anemia.



One in four Guatemalan children under the age of 5 experiences anemia.¹³³ In one area of Southwestern Guatemala, the rate of anemia among infants was as high as 56%.¹³⁴ The prevalence of anemia among children in Guatemala (ages 6–59 months) has steadily declined from 33% in 2004 to 10% in 2019.¹³⁵

Diarrheal Diseases

Globally, diarrheal diseases are listed as one of the leading killers of children under the age of 5; they cause more than half a million deaths each year worldwide.¹³⁶ According to a 2012 report, 18.4% of Guatemalan children died from diarrhea, making it the country's second-highest killer of children after pneumonia.¹³⁷

Undernutrition leads to an increased frequency of diarrheal illnesses, and it also increases the duration of episodes of diarrhea.¹³⁸ This effect makes it more difficult for children to recover from these bouts of diarrhea and leaves them more vulnerable to other diseases.¹³⁹ Diarrheal illnesses have a cyclical effect; undernutrition makes children more vulnerable to diarrheal diseases, and diarrheal diseases make children more susceptible to undernutrition.

Practices

Postnatal Care

Only about 63% of women in Guatemala attempt to breastfeed

within the first hour of life, a practice that is proven to have serious developmental benefits for infants.¹⁴⁰ In regards to exclusive breastfeeding (EBF), the World Health Organization recommends that EBF messages should be reinforced during pregnancy and during all postnatal care visits.¹⁴¹ Evidence shows that EBF reduces the risks of mortality and morbidity in the first month of life.¹⁴² It also improves post-neonatal outcomes and gives children a better chance of being properly nourished during the first months of their life.¹⁴³



The United States Agency for International Development (USAID) has implemented educational programs that teach about the importance of establishing and following appropriate health and nutrition practices,

including a focus on the importance of breastfeeding.¹⁴⁴ The days and weeks after childbirth are a critical phase in the lives of newborns.¹⁴⁵ Providing proper postnatal care is one of the best ways to prevent nutritional deficiency and allow proper growth and development. Focusing on educating communities—specifically mothers—on appropriate practices during these first months has had positive effects on decreasing rates of undernutrition. In Sri Lanka, community outreach and other interventions meant to support mothers helped the rate of EBF rise from 17% in 1995 to 76% in 2007.¹⁴⁶ The USAID programs reach out to influential members of the community to positively impact practices and norms, along with promoting early and exclusive breastfeeding.¹⁴⁷ USAID is in the middle of implementing a project that focuses on the health and nutrition of women and children, specifically those in the Western Highlands. This activity aims to strengthen health and nutrition

policies. It started in July 2020 and is planned to run through July 2025.¹⁴⁸



Other USAID programs have had a widespread impact in Guatemala, where over 50,000 people received nutrition and child health training in 2017.¹⁴⁹ During educational sessions, youth and young adults learn about positive health behaviors. By learning about and understanding the benefits of breastfeeding, the participants are able to be advocates in their own households and communities. One young Guatemalan man, Ronal, was able to help his sister learn how to correctly position her baby during

breastfeeding, which allowed for the baby to receive the milk and nutrients that she needed.¹⁵⁰ In 2021, 293 individuals received professional training related to nutrition.¹⁵¹

Through USAID programs, 70,000 children under the age of 5 were able to receive nutrition-specific interventions (although the report does not specify which ones).¹⁵² In addition, 8,900 babies received postnatal care within 48 hours of birth.¹⁵³

While USAID is a thorough organization, there is no specific data available to the public about specific outputs and outcomes. As a global development organization, they may not be able to account for all of the barriers that may stand in the way of the implementation of best practices. Although these best practices have been tested and proven, it is still difficult to adapt and ensure that they are put into place, especially in regions of the world where these practices may clash with local belief systems or widespread ideas. For example, in some areas, it is very common to use midwives and other local methods of

delivery and nutritional care, but some of these people have not been trained in newer healthcare techniques and practices, or they may not know the benefits.

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