2017

Statewide Global Health Case Competition

Impact of Malnutrition in the First 1,000 Days on a Child's Health in Rural Ethiopia

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All characters and plots described within the case are considered fictional and bear no direct reflection of existing organizations or individuals. The case topic, however, is a true representation of circumstances in Ethiopia. The case scenario is complex and does not necessarily have an ideal solution, thus encouraging a discerning balance of creativity and knowledge. Provided are informative facts and figures within the case and appendices to help teams create a proposal. The data provided are derived from independent sources, may have been adapted for use in this case, and are clearly cited allowing teams to verify or contest them within their recommendations, if necessary. Teams are responsible for justifying the accuracy and validity of all data and calculations that are used in their presentations, as well as defending their assertions during judging.

Opening Scenario

After a recent United Nations Economic and Social Council report on the social and economic impact of childhood malnutrition in Ethiopia, UNICEF contacted nine NGOs to coordinate a united effort to combat childhood malnutrition. Your NGO has been placed in the Amhara Region of Ethiopia to reduce malnutrition and stunting rates. While discussing pediatric health outcomes with local NGOs, your team realizes there is a significant gap in responses for malnutrition in children under two years of age when compared to responses for malnutrition in children under five years.

After the meeting, you were able to speak with a mother from one of the surrounding kebeles (neighborhood) about her 13 month old infant son, Lema. Lema's family depends on the agricultural trade within Amhara to provide food, shelter, and other basic necessities for their family, but the recent droughts have made it extremely difficult to afford adequate food. Lema is still exclusively breastfed, and his three year old sister, Abeba, only receives one meal of solid food a day at home. While Abeba has grown for her age, her mother noticed that she is not as tall as her peers and is now concerned that Lema has not grown at all. Lema has also stopped playing with Abeba and his mother recently, and seems disinterested in breast milk. His mother is concerned that Lema may become extremely ill and could even die.

Introduction

Malnutrition refers to a diet that "does not provide adequate calories and protein for growth and maintenance" or when people are "unable to fully utilize the food they eat due to illness" (United Nations Children's Fund [UNICEF], 2006). While malnutrition covers both undernutrition and obesity, Ethiopia routinely experiences more cases of undernutrition, especially in children under two years of age. The Amhara Region is particularly affected by malnutrition, with 52% of children stunted in this region alone (United States Agency for International Development [USAID], 2016).

The intergenerational cycle of malnutrition perpetuates the negative effects of stunting, as young girls who are stunted will often later give birth to malnourished children who will then become stunted. Stunting occurs when a child has not reached their appropriate height for his or her age, and has many detrimental effects. Stunting may be a sign of maternal malnutrition before, during and after pregnancy in the first 1,000 days of a child's life. Stunting can affect a country's economy. Some evidence suggests that stunting can reduce a country's GDP by as much as 12% (1,000 Days, 2017). Children who are stunted suffer from serious health issues such as weakened immune systems, a decreased ability to learn, and are also at a higher risk of chronic illnesses and premature death.

Causes of malnutrition include food access and quality, access to proper prenatal and general health care, poverty, and inequality. These issues are compounded during the first 1,000 days of a child's life, the most important period for a child's growth and development. The first 1,000 days include: 270 days during pregnancy, 365 days in the first year, and 365 days in the second year of life (Danone Nutricia, n.d.; 1,000 Days, 2017). The first 1,000 days of a child's life are the keys to breaking the cycle of malnutrition, poverty, and stunting. Cognitive and physical development are dependent upon maternal nutrition during pregnancy and access to proper nutrition post pregnancy up to 2 years of age. A disruption in proper nutrition in the first 1,000 days leads to delays in learning capabilities and physical development such as stunting, which leads to decreased economic productivity in adulthood (The World Bank, n.d.).

Case Background

The Federal Democratic Republic of Ethiopia (Ethiopia) is a landlocked country located centrally in the Horn of Africa, East Africa. Ethiopia consists of nine ethnically territorial regions that include Afar, Amhara, Benishangual-Gumuz, Tigray, Gambella, Oromia, Southern Nations, Somali and Harari (Ezilon Maps, n.d.). The capital city, Addis Ababa, is the largest city in Ethiopia and it is one of two chartered cities in the country (Revolvy, n.d). The population size of Ethiopia is 99.4 million, making it the second most populous country in Sub-Saharan Africa and one of the most populous country in the world (The World Bank, 2016). Ethiopia is one of the least developed countries in Sub-Saharan Africa with 33% of Ethiopians living below the poverty line ($1.90 per day) (The World Bank, 2016). Within recent years, Ethiopia has seen a decrease in poverty attributed to an increase in the agricultural sector (The World Bank, 2016).

Amhara has an estimated population of 17.7 million, which makes up 18% of Ethiopia's population. It is located in the northwest part of Ethiopia (Amhara Development Association [ADA], 2012). The religious sects in Ethiopia include Ethiopian Orthodox (43.5%), Protestant (18.5%), traditional (2.7%), Catholic (0.7%) and other (0.6%) (Central Intelligence Agency, n.d.). The official national language is Amharic, a Semitic language closely linked to Arabic and Hebrew. Agriculture is the economic powerhouse in the region, with agricultural areas being split into 3 major climatic zones: highland, semi-highland and lowland (ADA, 2012). Severe droughts across the country have a major impact on the agricultural industry and food security.

Access to healthcare services in Ethiopia is limited, especially in rural regions like Amhara. The World Health Organization (WHO) estimates that there is less than 1 physician for every 10,000 people (Our Africa, n.d.). Only nineteen percent of females utilize adequate antenatal care (4+ visits). According to the WHO, 80% of the population lack access to proper sanitation and 75% of the population lack access to clean water (WHO, n.d.b). Education is important as it relates to health behavior and health outcomes. A literacy gap persists between men and women in Ethiopia, with only 17% of women being literate in comparison to 47% of men (Link Ethiopia, 2016).

Child Health and Nutrition in Ethiopia

Poverty, lack of access to proper healthcare services, and lack of dietary nutrients are leading factors that disrupt cognitive and physical development in the first 1,000 days. This damage that occurs in early childhood might be irreversible (National Healthy Mothers, Healthy Babies Coalition, 2014).

Fifty-three percent of child mortality (under 5 years of age) in Ethiopia is attributed to malnutrition, and 44% of children are classified as stunted (USAID, 2016). Malnutrition leads to a higher susceptibility to infections and an increase in mortality due to common infections. Factors such as improper feeding practices, limited micronutrient dietary selections, and a lack of introducing complementary nutritional foods at appropriate times are the leading causes of malnutrition in Ethiopia (USAID, 2016). Approximately one third of children are not breastfed within one hour of life, and less than 50% of babies six months and younger are not exclusively breastfed (The World Bank, n.d.). Over 50% of children are not appropriately introduced to a mixture of breast milk and solid foods during the transition phase of six to nine months (USAID, 2016). Four percent of Ethiopian children are not receiving the minimal dietary recommendation (USAID, 2016).

Maternal health and nutrition prior and during pregnancy are contributing factors to child malnutrition. One quarter of Ethiopian mothers are malnourished. Maternal malnutrition during pregnancy might result in a low birthweight infant, congenital anomalies, delayed cognitive and physical development of a child, stunted offspring, and increased child mortality (UNICEF, 2016b). To avoid malnutrition and adverse birth outcomes, pregnant women are advised to nutritionally supplement vitamin A, iodine, folate, calcium, and iron (Core Group, 2004). Supplementation will decrease the likelihood of anemia, increase energy and decrease infections (Core Group, 2004).

UNICEF reports a decrease in stunting prevalence from 40% in 1990 to 26% in 2011 worldwide (UNICEF, 2013a). Africa has experienced a slow decline in childhood malnutrition in comparison to other regions of the world. In many respects, malnutrition rates (consisting of children who are underweight, stunted, and wasted) have fallen in Ethiopia. Between 2000 and

2014, there was a 41% to 25 % decrease in the number of Ethiopian children who are underweight (UNICEF, 2016a). During the same four-year span, stunting decreased from 58% to 40% respectively (UNICEF, 2016a). However, Ethiopia still constitutes 3% of the global burden of stunting (UNICEF, 2013b).

Rural areas are more likely to have a higher percentage of stunted children (46%) in comparison to urban environments (36%) in Ethiopia (USAID, 2016). Amhara has the highest percentage of stunted children at 52% followed by Tigray (51%), Afar (50%), and Benishangul-Gumuz (49%) (USAID, 2016).

Figure 1. Ethiopia: Nutrition Profile (USAID, 2016). Lists and compares the nutritional profile of Ethiopia in 2005 and 2011.

Population (2012)	91.2 Million	
Population under 5 years of age (0-59 months, 2012)	15.5 Million	
	2005	**2011**
Prevalence of stunting among children under 5 (0-59 months)	51%	44%
Prevalence of underweight among children under 5 (0-59 months)	33%	29%
Prevalence of wasting among children under 5 (0-59 months)	12%	10%
Prevalence of anemia among children aged 6-59 months	54%	44%
Prevalence of anemia among women of reproductive age (15-49 years)	27%	17%
Prevalence of thinness among women of reproductive age (15-49 years)	27%	27%
Prevalence of children aged 0-5 months exclusively breastfed	49%	52%
Prevalence of breastfed children aged 6-23 months receiving a minimum acceptable diet	3%	4%

Figure 2. Undernourished children development (UNICEF, n.d.). Lists developmental and economic impact of undernourished children.

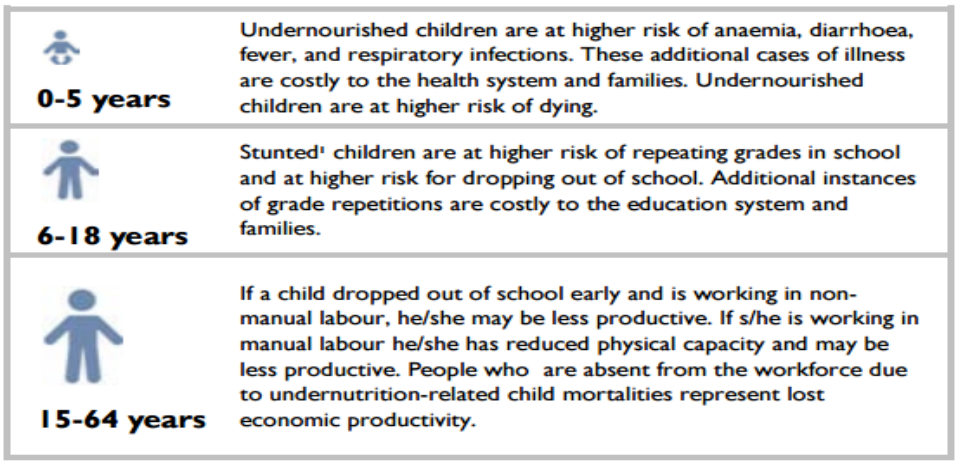

Figure 3. Child nutrition in Ethiopia (World Food Programme, 2013). Lists 10 things everyone should know about child nutrition in Ethiopia.

1. Today, more than 2 out of every 5 children in Ethiopia are stunted.
2. As many as 81% of all cases of child undernutrition and its related pathologies go untreated.
3. 44% of the health costs associated with undernutrition occur before the child turns 1 year old.
4. 28% of all child mortality in Ethiopia is associated with undernutrition.
5. 16% of all repetitions in primary school are associated with stunting
6. Stunted children achieve 1.1 years less in school education.
7. Child mortality associated with undernutrition has reduced Ethiopia's workforce by 8%
8. 67% of the adult population in Ethiopia suffered from stunting as children.
9. The annual costs associated with child undernutrition are estimated at Ethiopian birr (ETB) 55.5 billion, which is equivalent to 16.5% of GDP.
10. Eliminating stunting in Ethiopia is a necessary step for growth and transformation.

Nutritional Strategies (pregnancy + first 2 years)

There are several identified causes of stunting, but main areas of concern include:

- Nutrition
- Health
- Poverty
- Inequality
- Conflict

Known MCH strategies to address these causes have been implemented across national borders worldwide. Focus for intervention implementation can be (1,000 Days, 2016):

- Pregnancy
- Birth
- 0-5 months
- 6-23 months

WHO issued a Stunting Policy Brief and endorsed a *Comprehensive implementation plan on maternal, infant and young children nutrition* to address stunting and child nutrition (WHO, n.d.c) Key proven practices from WHO and UNICEF recommend strategies, including food fortification, appropriate infant feeding practices, and overall food availability.

Food Fortification: Global Alliance for Improved Nutrition (GAIN) and Concern Worldwide have partnered to implement a home fortification project in Ethiopia (Global Alliance for Improved Nutrition [GAIN], n.d.). Through community-based efforts, this project provides micronutrient supplements (MNS), identifies potential delivery channels, and works to inform and influence future legislation for the Government of Ethiopia (GoE). ASTCO Food Complex in collaboration with Partners in Food Solutions, TechnoServe, and the USAID launched a fortified wheat flour in Ethiopia (USAID, 2015). The flour contains the vitamins and minerals needed to combat malnutrition.

Appropriate infant feeding practices: A study focused on maternal and child health found that breastfeeding duration and exclusivity had a significant relationship with healthier growing patterns in infants 6-9 months (Kramer, 2011; WHO, n.d.a).

Food availability and access: We see different effects from undernutrition when discussing food insecurity and food diversity. The issue of food availability appears in many forms, from the amount of food to the amount and type of nutrients included in a person's diet, and the body's response varies accordingly. A previous study conducted in Ethiopia in 2013 found that stunting, underweight, and wasting are associated with food diversity, number of meals, and food insecurity, respectively (Motbainor, Kumie & Worku, 2015).

Summary of Team Assignment

Childhood malnutrition has many harmful effects that are particularly devastating in the first 1,000 days of life. The climate, geography, economy, and resources present in Ethiopia all contribute to childhood malnutrition and stunting. You may partner with other institutions (NGOs, universities, local governments, etc.) and have a budget of up to $2,000,000 USD to be used over five years to combat this issue. Your team must present its proposed strategies to address malnutrition in children under two in a presentation format on February 25, 2017. To receive the funding, your team will have to present the proposal to a panel of local and global experts selected by UNICEF. You will need to be able to justify the decisions you make towards the development of your final strategies and be prepared to explain details of your choices.

Important Considerations:

- Choice of Target Population: Who is the target population and why did the team choose to target them?
- Who will you develop partnerships with (other NGOs, local government, etc.) to leverage resources and expertise?
- Who are the stakeholders and decision makers?
- How will you monitor and evaluate your project?
- Are the proposed strategies feasible, effective and culturally appropriate?
- For your intervention program, what are the:
    - Objectives?
    - Strategies?
    - Settings?
    - Budget?

- Timeline?
- Sustainability?

- What are your specific plans to address:
  - Malnutrition
  - Stunting
  - The first 1,000 days of life
  - Child health
  - Health education
- What impact will this implementation have at the individual, family, community, and national level?
- Are there any long-term or short-term economic consequences?
- Can a socio-ecologic framework be used in assessing this problem and how will this be accomplished?

Important Aspects of Proposed Strategy

- Social Benefit/Social Return on Investment: Impact on health outcomes, economic improvement, and productivity at the personal, family, and community levels
- Feasibility: How well do the proposed strategies utilize and/or improve capacity of current health systems, training/education required to implement plan, what provisions for education, product, or service delivery?
- Economic Impact: Direct costs associated with proposed strategies; transportation and/or opportunity costs to stakeholders
- Cultural Acceptability: Cultural perceptions of the proposed strategies and the extent to which they have taken in local cultural context and technologies
- Legal and Ethical Issues: Strategies for how these will be addressed, if applicable

- Scalability: Application of recommendations to other communities or more extensive coverage beyond Ethiopia, provided there is evidence of success
- Sustainability: Plans for how the program will proceed once funding ends
- Monitoring and Evaluation: Comparison of baseline data, to data collected during and after proposed intervention(s) and how this information will be used to inform program improvements and demonstrate impact
- Risk Identification & Mitigation Strategies: Potential challenges/risks associated with recommendation(s) and how those will be addressed
- Innovation: Are there aspects of the proposal which could be considered particularly innovative or creative; novel application of existing technologies or new products/services proposed?

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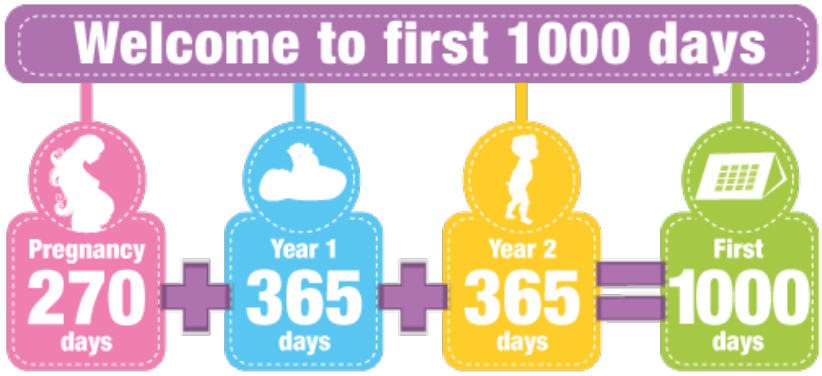
Appendices

Appendix A: Political Map of Ethiopia

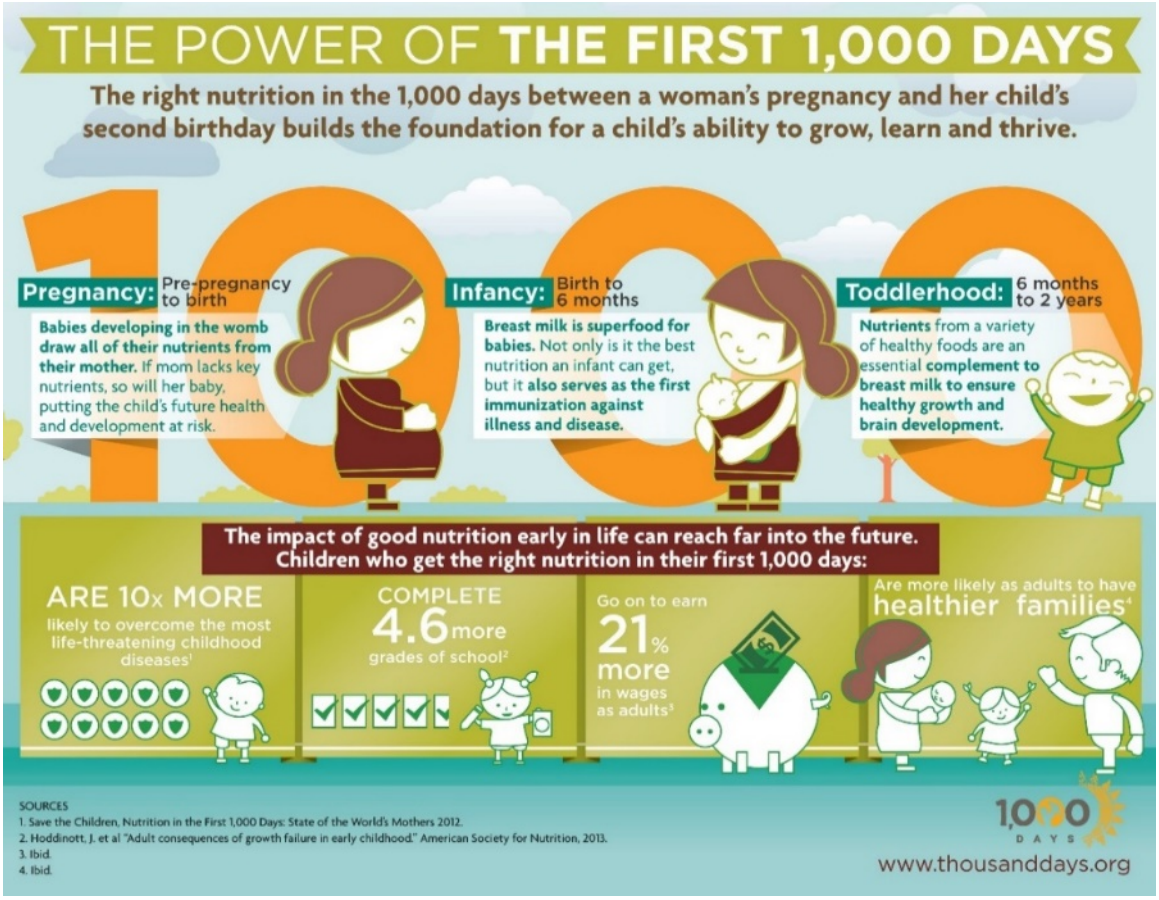
Source: *Ezilon Maps* (n.d.). *Ethiopia Map – Political Map of Ethiopia*. Retrieved from http://www.ezilon.com/maps/africa/ethiopia-maps.html

Appendix B: Welcome to First 1000 days



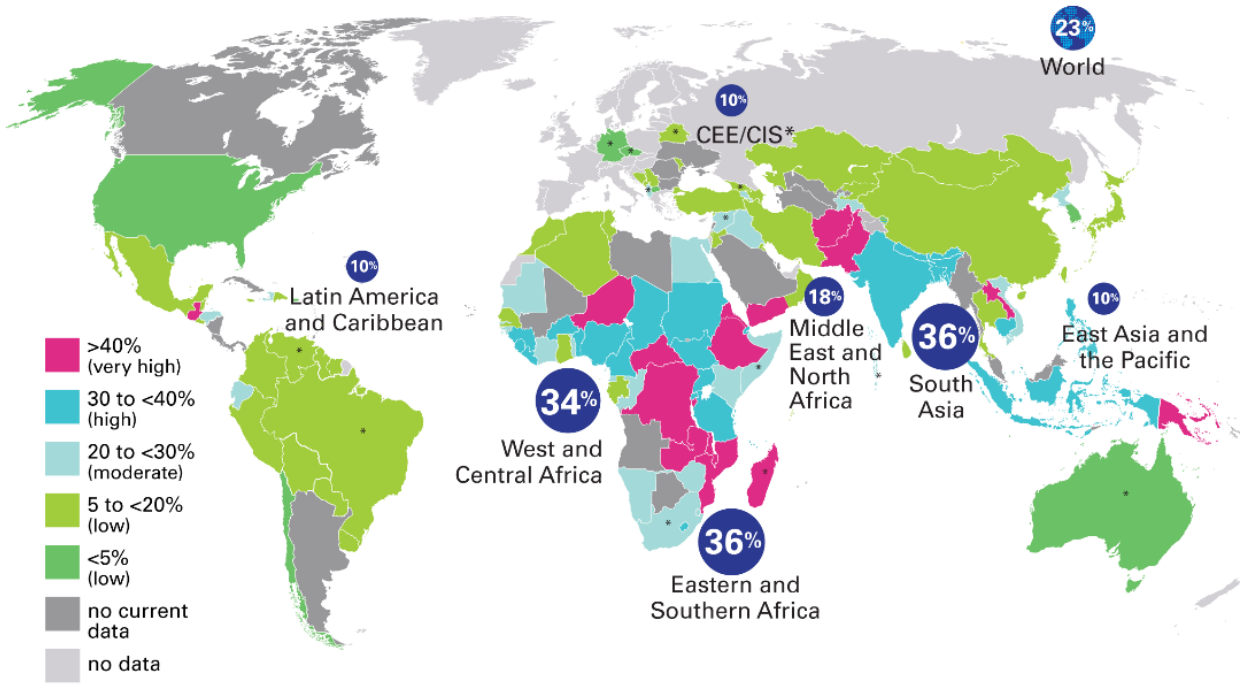
Source: Danone Nutricia.. India (n.d.). *First 1,000 Days – nutrition during pregnancy.* Retrieved from *http://danonenutricia.in/pregnancy/nutrition-in-the-first-1000-days/*

Appendix C: The Power of the First 1,000 Days



Source: National Healthy Mothers, Healthy Babies Coalition (2014, Mar 6).*Why the First 1,000 Days Matter.* Retrieved from http://www.hmhb.org/2014/03/1000-days-matter/

Appendix D: Undernutrition in Children Under 5



Source: UNICEF (2016). *Undernutrition contributes to nearly half of deaths in children under 5 and is widespread in Asia and Africa.* Retrieved from *https://data.unicef.org/topic/nutrition/malnutrition/*