

University of North Georgia

Nighthawks Open Institutional Repository

Honors Theses

Honors Program

Spring 2020

A Comparison of Obesity and Nutrition in Chile and Peru between the Years of 2000-2016

Alaina Whitmore
anwhit2941@ung.edu

Follow this and additional works at: https://digitalcommons.northgeorgia.edu/honors_theses



Part of the [Latin American Languages and Societies Commons](#), and the [Public Health Commons](#)

Recommended Citation

Whitmore, Alaina, "A Comparison of Obesity and Nutrition in Chile and Peru between the Years of 2000-2016" (2020). *Honors Theses*. 51.

https://digitalcommons.northgeorgia.edu/honors_theses/51

This Honors Thesis is brought to you for free and open access by the Honors Program at Nighthawks Open Institutional Repository. It has been accepted for inclusion in Honors Theses by an authorized administrator of Nighthawks Open Institutional Repository.

A Comparison of Obesity and Nutrition in
Chile and Peru between the Years of 2000-2016

A Thesis Submitted to
the Faculty of the University of North Georgia
In Partial Fulfillment
Of the Requirements for the Degree
Bachelor of Arts in Modern Languages with Spanish Language and Literature
Concentration
and
Bachelor of Science in Kinesiology with Health and Fitness Concentration
With Honors

Alaina Whitmore
Spring 2020

Abstract

Obesity is a disease characterized by the accumulation of excess energy storage within the body, and it is a risk factor for a number of non-communicable diseases that are increasing in prevalence worldwide. With the use of data collected between 2000 and 2016 by the Food and Agriculture Organization of the United Nations (FAO), it has been determined that adulthood obesity rates have been increasing for all of the South American countries that list Spanish as an official language (Argentina, Colombia, Peru, Chile, Venezuela, Uruguay, Ecuador, Bolivia, and Paraguay). Specifically, Peru and Chile were identified as the countries with the least and greatest percentage growth of obesity between the years of 2000 and 2016, respectively. This study identifies and analyzes information regarding governmental interventions, economic factors, historic and present gastronomy, lifestyle factors, and media influence, for both Peru and Chile in order to find possible contributing factors toward the nationwide prevalence of obesity, especially because the two nations share a similar history and political border. In many ways, the data collected is in contradiction with previously held hypotheses concerning obesity. Specifically, despite the fact that obesity rates are growing faster within the Chilean population, Chile has enacted more governmental interventions, such as the publication of Food-Based Dietary Guidelines (FBDG), than Peru. Overall, the data collected calls into question the absence of research regarding health literacy, which is a relatively new concept that assesses an individual's ability to understand, apply, and adhere to health concepts. Recent research studies support the hypothesis that higher health literacy rates increase the effectiveness of public health interventions, and the contradictions present in this study may be accounted for with a comparison of health literacy rates between the two countries in the future.

Acknowledgements

I would like to thank Melissa Layne, my committee chair, for being a sounding board during my brainstorming, as well as an encouragement throughout this whole process. I would also like to thank Dr. James Brewer for his commitment to reading multiple drafts, revising, and strengthening my conclusions. I would also like to thank Dr. Alvaro Torres-Calderon for his continued mentorship, professional opinions/resources that have shaped this research, and for sharing his personal expertise regarding the culture of both Peru and Chile. This process would not have been possible without these three professors.

Additionally, I would like to thank the Honor's Program at the University of North Georgia for the opportunity to undergo this project. Specifically, I would like to thank Dr. Steve Smith and Dr. Royce Dansby-Sparks for their administrative help. I would also thank the Honors Program for providing me with the funding necessary to present this topic at the 37th Annual Georgia Collegiate Honors Council Conference in February 2020.

Finally, I would like to thank my friends and family for their love and support.

Introduction

Adulthood obesity prevalence and incidence have been steadily rising in developed countries, such as the United States, and, surprisingly enough, many developing countries have similarly experienced an upward trend of adulthood obesity. For instance, as these countries become more urbanized, the cityscape provides a greater option of foods (that are typically calorically-dense, yet lack necessary nutrients), and more women from these countries are stepping out of their traditional gender-roles of daily preparation of traditional-style cuisine for their families (FAO, n.d.-b). It is these changes, and more, that contribute to the weight and wellness of an individual in a developing country. This complex disease has many causes and risk factors that must be thoroughly analyzed through an epidemiological lens, as well as in relation to governmental, economic, historical, and cultural factors in order to be understood properly.

It is interesting to note that all of the countries in continental South America that utilize Spanish as an official language (Argentina, Colombia, Peru, Chile, Venezuela, Uruguay, Ecuador, Bolivia, and Paraguay) have experienced a documented growth in the percentage of adulthood obesity within the respective populations in varying degrees and intensities between the years of 2000 and 2016, according to the statistics that are compiled annually by the Food and Agriculture Organization (FAO). While, one might be tempted to categorize these countries together into one group under the broad title of “Spanish-speaking,” it should be noted that many cultural differences are found within these various country borders, and the recorded obesity percentages aid to demonstrate these wide cultural gaps; for example, Bolivia recorded the lowest percentage of adult obesity in 2016 at 18.7% of the Bolivian population and Uruguay recorded the highest adult obesity percentage during the same year at 28.9% of the Uruguayan population (FAO, 2019-c; FAO, 2019-f). A fascinating aspect of the South American obesity epidemic is the fact that while Peru as a country has experienced the smallest percentage increase in adulthood obesity between the years of 2000 and 2016, its neighboring country, Chile, has experienced the greatest percentage increase during the same timeframe.

Methodology

For this literature review, data listed online by the FAO for the countries in continental South America that document Spanish as an official language (Argentina, Colombia, Peru, Chile, Venezuela, Uruguay, Ecuador, Bolivia, and Paraguay) will be compiled and analyzed. The percentage of obesity within the population of each country was recorded from 2000 to 2016. The country with the largest percentage increase of obesity and the country with the lowest percentage increase of obesity will be analyzed for this literature review. Despite the fact that many of these countries shared a similar history (as first people groups of the Incas, and next as colonies of Spain), obesity percentages are varied between countries, even in countries that share a political border. An overview of this relevant information will provide insights into the topic of obesity that can be utilized in policies enacted in both in South America and in other countries around the world.

Public Health

Public health, occurring in the public or private sector, is defined as “the science of protecting and improving the health of people and their communities [and] this work is achieved by promoting healthy lifestyles, researching disease and injury prevention, and detecting, preventing and responding to infectious diseases,” (CDC, 2019, para 1). Overall, public health efforts play a large role in the wellness of citizens to both developing and developed countries around the world (CDC Foundation, n.d.). While many of these efforts are enforced at a national, state, and local level, several international organizations have been created to oversee the public health endeavors of many countries throughout the world. Some of these organizations include two sub-groups of the United Nations (UN): FAO and the World Health Organization (WHO), with its more specifically focused sub-group the Pan American Health Organization (PAHO).

The FAO is an organization that was founded in 1945 in order to oversee issues related to hunger/food availability and to combat malnutrition throughout the many different regions of the world (FAO, 2019-a). According to the FAO, 88% of countries worldwide are faced with severe burdens of malnutrition (which includes obesity) as classified by two or three of the following: “acute and/or chronic undernutrition, micronutrient deficiencies, obesity and diet-related diseases” (FAO, 2019-g).

The FAO was created by the efforts of President Franklin D. Roosevelt as an international organization that would be able to oversee many of the different issues surrounding hunger, such as malnutrition (which can present as obesity), and the efficiency of fisheries, agricultural sustainability, and forestry in specifically developing countries (Phillips, 1981). While many early projects centered around the improvement of war-related food shortages, many of the current endeavors of the FAO focus on progress towards the completion of several of the “Sustainable Development Goals” that were written by the UN in order to improve the quality of life around the world through the betterment of global health, society, and environment by the year of 2030 (Phillips, 1981; United Nations, n.d.). Specifically, two of the seventeen goals are especially related to the work of the FAO: Goal Two and Goal Three which individually state, “End hunger, achieve food security and improved nutrition and to promote sustainable agriculture” and “Ensure healthy lives and promote well-being for all at all ages”, respectively (United Nations, n.d.). Particularly, these two goals are related to the nutritional efforts of this organization, because “diet is one of the single most important contributors to malnutrition” (FAO, 2019-g, para 4). The largest set-back to these goals, especially in developing countries, is child undernutrition, yet the prevalence of overweight and obese individuals is also an emerging issue. Policy makers are now faced with the challenge of decreasing undernutrition without continuing to increase growing obesity rates (FAO, 2013).

In addition to these two organizations, both the governments of Peru and Chile have a special sector that deals directly with public health. According to the Global Health Data Exchange, the *Ministerio de Salud* (Ministry of Health), abbreviated to MINSAL, in Peru was founded in 1968 (Global Health Data Exchange, 2018). This governmental organization aims to protect personal dignity, promote health, prevent illness, and guarantee the integral attention to health for all Peruvians. Additionally, the MINSAL works to create a strong, integrated, and efficient health system that offers

accessible, high-quality services that support Peruvians throughout their whole lives (MINSAL, 2019). In Chile, the *Ministerio de Salud* (Ministry of Health), abbreviated to MINSAL, was created by a law that was published in 1959. This department directly oversees activities of programming as well as controlling/coordinating disseminated public health material. The mission statement of the MINSAL is to construct a health model with a foundation of strengthened and integrated primary care that places the patient in the center, with an emphasis on the care for the Chilean population throughout the entire human life cycle, and it is a governmental organization that also stimulates health promotion and prevention, as well as monitoring, traceability, and financial coverage (Ministerio de Salud, n.d.).

Obesity

Obesity is often measured as a disease characterized by an individual's Body Mass Index (BMI) that is greater than or equal to 30 kg/m² (FAO, 2019-j). More specifically, obesity is defined as "the increase in the size and the amount of fat cells in the body" (National Heart, Blood, and Lung Institute (NHLBI), n.d., para 1). The prevalence of this chronic disease throughout the world has been steadily increasing in almost all countries, even those that simultaneously struggle with undernutrition, defined as "lack of proper nutrition, caused by not having enough food or not eating enough food containing substances necessary for growth and health," typically associated with not eating enough (FAO, 2019-j; Global Nutrition Report, n.d., para 3). The WHO notes that obesity was previously considered a problem that only affects high-income countries around the world; however, throughout the years, this has proved to be incorrect as obesity rates are on the rise in all income level countries, especially in areas of high urbanization (WHO, 2019-a). On a basic level, obesity can be roughly explained as an "imbalance between food intake and energy expenditure" with an increased in food intake in comparison to energy expenditure, and this lack of equilibrium can lead to an overaccumulation of body fat (FAO and PAHO, 2017, p. 16). While the effects of nutrition on both the prevention and treatment of obesity have not been as studied as consistently as the effects of physical activity, it is generally accepted by the medical community that "the increasing westernisation, urbanization and mechanisation occurring in most countries around the world is associated with changes in the diet towards one of high fat, energy-dense foods and a sedentary lifestyle" (Jodhun, Pem, & Jeewon, 2016, p. 913). As seen from Table 1, while global childhood obesity has remained relatively low, rising only minimally from 5.4% to 5.6% between the years of 2012 to 2017, global adulthood obesity has risen from 11.7% in 2012 to 13.2% in 2016 (FAO, 2019-j).

Table 1

Global Obesity		
Types of Obesity	2012	2017
Childhood Obesity	5.4%	5.6%
Adulthood Obesity	11.7%	13.2%

For this reason, it is important to conduct research through the lens of adulthood obesity, even though many studies solely focus on childhood obesity with the hypothesis that obese children become obese adults, and prevention should begin early as early as possible (FAO, 2019-j). These current obesity patterns are rather worrisome because obesity has been linked to a myriad of chronic diseases, such as hypertension, Type 2 Diabetes Mellitus, and various forms of deadly cancers (WHO, 2019-a). As of 2011, MINSA has identified that 20% of the diseases from which Peruvians suffer are linked to obesity and complications stemming from being overweight (Perez-Leon, Pesantes, Pastrana, Raman, Miranda, & Suggs, 2018). The WHO has strongly encouraged countries to make efforts to combat this condition since the 1990s, and a new word, “globesity,” is often used in literature to refer to the growing climate of obese (and undernourished) individuals around the world (WHO, 2019-b).

Obesity Risk Factors

On an individual basis, adulthood obesity can result from a variety of risk factors and causes that vary depending on personal differences and location (Office of Communications of the NHBLI, 2016). Some unavoidable causes of obesity are non-modifiable (genetic) causes, such as Prader-Willi Syndrome, Bardet-Biedl Syndrome, Alstrom Syndrome, and Cohen Syndrome. Additionally, endocrine disorders, such as hypothyroidism, Cushing’s Syndrome, and the presence of tumors, have a high comorbidity rate with obesity. Other non-modifiable risk factors include age (because an individual is more likely to become obese and gain unhealthy weight as they age), genetics/family history, and sex, as (for example) Polycystic Ovary Syndrome in women has been previously linked to obesity. On the other hand, many modifiable risk factors exist that can be manipulated to mitigate the prevalence of this disease. One example of a modifiable risk factor is physical activity, because it has been proven that incurring less physical activity than is recommended, due in part to the overuse of modern technology such as television and computers, can lead to obesity. Other modifiable risk factors include sleep deprivation and excess amounts of stress, that release the hormone cortisol in the body, which can negatively affect energy and hunger (NHBLI, n.d.). In fact, individuals that regularly obtain less than 7.5 hours of sleep a night are more likely to reach for high-caloric foods, as well as have a blood glucose that is 40% higher than individuals that get more than 8 hours of sleep a night (“Dormir menos de 7 horas hace que subas de peso por estos motivos”, 2019). Modifiable risk factors (such as the presence of unsafe outdoor environments that encourage residents to remain indoors, the over-accessibility of unhealthy foods with the under-accessibility of parks and recreational facilities, and exposure to unsafe chemicals, such as obesogens that play a role in the hormones that are secreted in an exposed individual’s body) can be governmentally controlled to decrease the prevalence of obesity (NHBLI, n.d.). Despite several medical conditions and medications, many of the risk factors for obesity are largely within an individual’s own control, and governments can, and arguably should, enact public health programs to educate their citizens and to provide the necessary resources to combat this disease.

Obesity in South America

For years, the FAO has collected and compiled data regarding the prevalence of obesity throughout many countries around the world. Statistics from Argentina, Colombia, Peru, Chile, Venezuela, Uruguay, Ecuador, Bolivia, and Paraguay were collected and subsequently analyzed for adult obesity trends for this report. It should be noted that each of these countries have seen an increase in the prevalence in adulthood obesity as compared to their respective obesity percentages from previous years. Through an analysis of these Spanish-speaking countries in South America, it was determined that the Peruvian population has seen the smallest percentage increase in adulthood obesity between the years of 2000 and 2016 with an increase from 12.3% of Peruvians to 19.1% of Peruvians, for an overall change of 6.8% (FAO, 2019-e). In comparison, it was determined that the Chilean population has experienced the greatest percentage increase of adulthood obesity between the same sixteen years of 2000 and 2016: adulthood obesity rose from 20.3% of Chileans in 2000 to 28.8% of Chileans in 2016, for an overall increase of 8.5% (FAO, 2019-d). It should also be noted that the country that currently has the lowest adult obesity percentage is Bolivia, at 18.7% in 2016 (with a percent increase of 6.9% since 2000) (FAO, 2019-c). On the other hand, Uruguay is the country within the previously mentioned timeframe that has the most obese adult population with a percentage of 28.9% in 2016 (with a percent increase of 7.9% since 2000) (FAO, 2019-f). All of this data is presented in Table 2.

Table 2

Obesity in South America			
Country	2000	2016	Percent Increase
Bolivia	11.8%	18.7%	6.9%
Chile	20.3%	28.8%	8.5%
Peru	12.3%	19.1%	6.8%
Uruguay	21.0%	28.9%	7.9%

Governmental Factors

Food Based Dietary Guidelines

In accordance with the mission statements of the MINSA and the MINSAL, Peru and Chile have both adopted different governmental public health interventions that could contribute to the difference in the respective obesity percentages of Peru and Chile. For example, Food-Based Dietary Guidelines (FBDG) are guidelines that are published by the government of each country in order to not only help disseminate information to the citizens regarding healthy food practices in relation to specifically noted epidemiological phenomena of the country but also to aid in the establishment of agricultural policies (Fischer & Garnett, 2016). One of the key findings from Fischer and Garnett, two researchers from the Food Climate Research Network who analyzed the FBDG from around the world, was that FBDG are quintessential in the establishment of a “coherent food policy”; however only 83 countries out of 215 of the countries identified within their study in 2016 had published FBDG for its citizens (FAO, 2019-b). Even more alarming is the fact that of these 83 FBDG, quality and the dissemination of correct

information was not considered, and many of the reviewed FBDG were difficult to find on public forums and webpages that were readily available to the average public (FAO, 2019-b.; Fischer & Garnett, 2016). In this study, a correlation was found among wealth and the probability of a country having published a FBDG, as only 2 out of 31 low-income countries having published guidelines, while almost half (43 out of 80) of the high-income countries had published guidelines (Fischer & Garnett, 2016). Chile was identified as a high-income country, and Peru has been identified as an upper-middle income country (Fischer & Garnett, 2016; World Bank Group, 2019).

According to Fischer and Garnett, Peru was working on creating the country's first set of FBDG for its citizens (Fischer & Garnett, 2016). In 2018, the Peruvian Government published, through MINSA with the technical assistance of the FAO, the "*Guías alimentarias para la población peruana*" which is translated as the "Food Guidelines for the Peruvian Population." In this guide, the general state of nutrition in the country is outlined, and at first it is stated that this guide serves to incorporate the most recent health recommendations, the current health/diet of Peru, and the rich gastronomical history of the country. It is also specifically noted that malnutrition is present in both the form of undernourishment (especially in relation to anemia in pregnant women and children) and obesity, sometimes termed as "overnutrition" (FAO, 2019-g).

In the Peruvian FBDG, published in 2018, 12 messages are included with practical tips/applications in relation to daily Peruvian life, a glossary of related terminology, and 15 culturally appropriate/healthy recipes in Spanish. The 12 messages include the following: (1) to choose a variety of foods that are naturally available in the city of residence; (2) to reduce the consumption of processed foods; (3) to stop the consumption of "ultra-processed foods"; (4) to consume a variety of colors by eating varied fruits and vegetables daily; (5) to fortify the body and mind by eating a wide variety of animal based products; (6) to eat a wide variety of stews and legumes; (7) to reduce the consumption of added sugars in drinks and foods; (8) to reduce the consumption of noodles/rice/bread; (9) to reduce the consumption of salt; (10) to drink 6-8 glasses of water a day; (11) to get 30 minutes of physical activity a day; and, (12) and to opt to eat home-cooked meals with company. Many of these messages are typically found in other FBDG from around the world such as the messages to reduce salt consumption (most widely noted among the many countries' FBDG), eating more fruits/vegetables, to obtain the adequate amount of recommended exercise, to reduce sugar consumption, to eat a varied diet, and to opt for home-cooked meals. It is interesting to note that some very common FBDG from around the world also typically include recommendations to reduce fat intake, to reduce alcohol consumption, to reduce the consumption of meats, and to make strides to obtain food that is prepared/handled in sterilized and cleanly manners; however, these recommendations do not appear in Peru's FBDG (Fischer & Garnett, 2016).

In comparison, despite the small geographical distance between the two countries, Chile had its first set of FBDG published in 1997, which was about 10 years before the publication of Peru's FBDG. In 1998, Chile was the only South American country to have published FBDG for children older than two years old (and six years old in the case of Venezuela). Since this time, the Chilean FBDG have been revamped three times (most recently in 2015) by the Institute of Nutrition and Food Technology (INFT) in

conjunction with the FAO and endorsed by the MINSAL. Since the original FBDG, officially recognized as “*Las Guías Alimentarias Basadas en Alimentos*” (loosely translated to “Food Based Nutrient Guidelines”) and appropriately abbreviated to GABA, that were published in Chile, the citizens have experienced great lifestyle changes in the form of a growing influence of technology and marketing. GABA was created to teach the Chilean citizens not only to identify but also to follow the most prevalent food recommendations in order to improve their health (Olivares & Zacarías, 2013). The newest revision of FBDG specifically targets qualities of unhealthy foods, such as soft drinks, in the dissemination of information. According to Chile, foods are analyzed by the amount of energy, saturated fats, sugars, and sodium that they contain, and these qualities are labelled as “critical nutrients” for the Chilean population to avoid (FAO, 2019-h). Interestingly enough, the information presented by Chile regarding saturated fats, sugars, and sodium are all regulations suggested by WHO; however, the information regarding the need to avoid foods high in energy (and low in vitamins and nutrients, such as calorically-dense foods) is a Chilean addition to the WHO recommendations.

In 1997, the Chilean FBDG were published with seven basic messages and a food pyramid that demonstrated healthy food options and portion sizes, and this pyramid was reminiscent of the food pyramid in the United States of America that was published five years earlier. While the pyramids between the United States and Chile were similar, several foods were classified differently between the two countries. For example, nuts were classed with proteins in America, but these foods were found in the part of the pyramid with fats in Chile. The seven original messages urged the Chilean population to do the following: (1) to eat different types of foods during the day; (2) to increase the consumption of fruits, vegetables, and legumes; (3) to use vegetable oils and to decrease the amount of animal fats; (4) to eat meats such as fish, turkey, and chicken; (5) to increase the consumption of low-fat dairy; (6) to reduce the consumption of salt; and, (7) to moderate the consumption of sugar. In 2005, as a result of several governmental studies, these guidelines were revamped, and the seven messages were changed to be more impactful and specific. The guidelines included: (1) to consume half-skimmed or skimmed dairy products three times a day; (2) to consume at least two servings of colorful vegetables and 3 servings of colorful fruits a day; (3) to consume lentils and peas in place of meat at least twice a week; (4) to consume cooked, grilled, steamed, pan-cooked fish at least twice a week; (5) to opt for foods low in saturated fats and cholesterol; (6) to reduce the daily consumption of sugar and salt; and (7) to drink six to eight glasses of water per day. In 2013, the Chilean FBDG were expanded to include eleven messages, such as the following: (1) to maintain a healthy weight by eating healthy foods and getting daily exercise; (2) to minimize time spent in front of a computer and/or television, while walking briskly for at least 30 minutes a day; (3) to consume foods with little salt and remove the saltshaker from the table; (4) to avoid sugar, candies, soft drinks, and sugary juices; (5) to avoid fried foods and foods with high fat content such as cured meats and mayonnaise; (6) to consume five servings of colorful fruits and vegetables per day; (7) to build skeletal strength, consume at least three servings of low-fat (and low-sugar) dairy products each day; (8) to keep a healthy heart, eat baked or grilled fish two times a week; (9) to consume legumes without cured meats at least twice a week; (10) to maintain proper hydration, drink six to eight glasses of water a day; and, (11) to read and compare food labels to eat less fat, sugar, and salt

(Olivares & Zacarías, 2013). Like Peru, Chile's FBDG are similar to the FBDG from around the world. Some of the popular recommendations from around the world that appear in Chile's FBDG are to reduce salt, to consume more fruits and vegetables, to obtain the recommended amount of exercise, to reduce fat consumption, and to reduce sugar consumption. Some common recommendations from around the world that are absent in Chile's FBDG are the explicit recommendation to eat a varied diet (though present in the FBDG from 1997), to reduce alcohol consumption, to certify the use of proper food safety and hygiene practices, and to opt for food prepared at home (Fischer & Garnett, 2016).

A new graphic was created in 2015 to supplement the Chilean FBDG published in 2013. This graphic, circular like a plate, presents five unequal, "pie-shaped" sections surrounding one circular, center section (which shows the importance of hydration with a graphic of seven full water cups and a water pitcher). The wedge-shaped sections surrounding the water recommendation are unequally sized to demonstrate the percentage of the daily diet the pictured food should encompass. These sections are labelled in Spanish: vegetables, oils, grains, meats/legumes/eggs, dairy, and fruits. Around the outside of the circle is the label "Daily Physical Activity" with five pictures of people performing active activities. Finally, below the circle is a black box that features foods that are to be avoided: these seven pictures are of a sugar jar, a soft drink, a hot dog, a to-go box of French fries, several candies, and a saltshaker (FAO, 2019-h). It is interesting to note that Peru does not have an accompanying graphic like Chile does.

Some similarities exist between the two FBDG. For example, both countries outline the importance to get the recommended 30 minutes of daily exercise, to reduce salt consumption, to drink 6-8 glasses of water daily, to avoid sugars, to eat fish and legumes, and to eat a variety of fruits and vegetables daily. On one hand, Chile recommends to avoid fried-foods and fat, to consume dairy daily, and to read food-labels. On the other hand, Peru specifically recommends to eat locally grown/produced foods, to reduce the consumption of processed foods, to reduce processed carbohydrates, and to eat at home with company. These two countries appropriately show that FBDG are varied across country borders; however, the Peruvian FBDG did not contribute to the currently discussed obesity epidemic, as they were published after the data surrounding obesity was collected by the FAO that was utilized for this report. It is noteworthy to point out that while Peru was a decade behind Chile in regard to FBDG publication, Peru has had more success in controlling the obesity epidemic, which does not support the obvious assumption that widely-available, governmentally-endorsed nutritional recommendations and education would translate to lower obesity rates. Unfortunately, it was determined by a 2010 study, conducted by the FAO and PAHO/WHO in 2017, that three or more nutritional guidelines are followed by only about 14% of Chilean individuals, while a healthy diet is only consumed by about 5% of the population (FAO and the PAHO/WHO, 2017). This information then begs the question as to whether or not Chile is appropriately disseminating the Chilean FBDG and if the information found inside is helpful/accurate. More topics that can be explored through future studies include the following: determining the future effect of FBDGs on these two specific populations now that both countries have published FBDG, what changes should be made to Chile's FBDG (if any) to have success similar to that of Peru, as well as the usefulness/understandability of a graphic rather than a written report regarding FBDG.

Governmental Laws

In addition to FBDG and Ministries of Health recommendations, governments also enact laws to aid in public health endeavors. For example, in 2017 and 2018, a Peruvian warning manual for food labels was created under the Law on the Promotion of a Healthy Diet, which would require standardized labels to be placed on the packages of foods that contain a high amount of sugar, salt, saturated fats, and trans fats. The MINSA worked to enact this law with the help of the PAHO, which has set recommendations to limit the consumption of sugar, salt, and saturated fats and to avoid the consumption of trans fats. This law was adapted from a law that had previously been enacted in Chile regarding junk food: a law primarily meant to benefit children because this age group (and their parents) in larger cities of Peru, such as Lima, composed the majority of participants in research trials (Krizanovic, 2018). Salt, fat, and sugar act as the foundation for most processed foods. On one hand, salt and sugar activate the release of feel-good chemicals in the brain, in a way that mimics cocaine use. On the other hand, the consumption of saturated and trans fats have been specifically related to the accumulation of fat cells in the body. This combination leads to the overconsumption of calorically-dense (fattening) foods (Pogue, 2014) These warning labels were created to quickly and simply provide information about unhealthy foods to the general Peruvian population, and it is important to note that this law was placed into effect after the retrieval of data for obesity that was used within this report. It would be interesting to see if/how these warning labels have impacted the food choices of the general public after their publication. Another interesting note is that these laws were adapted from previous Chilean laws, despite the fact that Peru has had more success with controlling the obesity epidemic than Chile.

The original Chilean laws, which target “products with high content of key nutrients [salt, sugar, and fat] associated with non-communicable diseases,” were originally enacted in Chile in June of 2016, and they have been additionally adopted by Peru, Uruguay, and Israel. These Chilean warnings feature black octagons that individually indicate high levels of salt, sugar, fat, or calories (energy) on the front of the package of a specific food item. While these front-of-pack nutritional labelling warnings are able to provide an incentive to food manufacturers to change their formulas (in order to not be branded with a black octagon denoting to potential customers a poor healthy choice), they also act as a small “nudge” toward better food choices for consumers, instead of attempting to promote drastic consumer habit changes. For example, instead of attempting to prevent Chilean citizens from buying a packaged food, the warning labels simply nudge the consumer to buy a version of the packaged food with less/no warning labels (Schnettler, Ares, Sepúlveda, Bravo, Villalobos, Hueche, & Adasme-Berríos, 2019). In a particular study conducted in 2019 by Schnettler, Ares, Sepúlveda, Bravo, Villalobos, Hueche, and Adasme-Berríos, frankfurters, a food in which the traditional product features warning labels for fat and salt, 494 Chilean parents with young children were surveyed about the perceived healthfulness and intention to buy frankfurter products based on brand, nutritional warnings, and health claims a year after the nutritional warnings were mandated by law. This study found that the absence of both the salt and fat nutritional warnings was perceived as more healthful and more likely to be purchased than packages of frankfurters with one or more warning labels, especially by families that are self-reported to typically consume a large number of frankfurters.

This study, while limited by its homogenous sample group, helps to reinforce the usefulness of front-of-pack nutritional labelling in Chile in order to influence buyer decisions (Schnettler, Ares, Sepúlveda, Bravo, Villalobos, Hueche, & Adasme-Berríos, 2019).

In addition to the front-of-package warning labels, a tax on non-alcoholic beverages (called the *Impuesto Adicional a las Bebidas Analcoholicas* (IABA)) such as soft-drinks with added colorants, flavorings, and sugar, has been in effect in Chile since 1960. While this tax has remained relatively stable at 13% since 1976, the IABA was modified by Parliament in March of 2014 (Nakamura Mirelman, Cuadrado, Silva-Illanes, Dunstan, & Suhrcke, 2018). A threshold of 6.25 grams per 100mL was established so that soft-drinks below this threshold would be taxed at 10% (rather than 13%), and soft-drinks above this threshold would be taxed at 18% (rather than 13%) (Nakamura Mirelman, Cuadrado, Silva-Illanes, Dunstan, & Suhrcke, 2018). According to data compiled in 2017, Chile was found to have the highest per capita soft drink consumption in the world, as well as the second-highest consumption of “ultra-processed” foods (FAO and the PAHO/WHO, 2017). In fact, according to the National Food Consumption Survey from 2010 to 2012, found that the median consumption is about 500 mL of soft drinks in Chilean children per day (Nakamura Mirelman, Cuadrado, Silva-Illanes, Dunstan, & Suhrcke, 2018).

Health Literacy Programs

Health literacy, defined as the ability to “gain access to, understand and use information in ways which promote and maintain good health,” (WHO, 2016, para 1) has become a major focus of WHO, because health literacy is necessary in order to successfully obtain the previously mentioned Sustainable Development Goals (SDG). It has been noted that health literacy, while a dynamic concept, is recognized as more than just simply the ability to read public health materials or fill a prescription from a doctor (WHO, 2016). In fact, a high health literacy is marked by more than just literacy skills, which relate to the ability to read and write (as well as speak and solve problems), as individuals with a high health literacy should have a wide variety of skills, such as measuring medications and calculating blood sugar (U.S. Department of Health and Human Services Office of Disease Prevention and Health Promotion, n.d.). In 1974, the first identification of “health literacy” was published; however, the definition of this phrase has changed since this time (Hernandez & Pleasant, 2013). According to the United Nations ECOSOC Ministerial Declaration of 2009, “health literacy is an important factor in ensuring significant health outcomes and in this regard, call for the development of appropriate action plans to promote health literacy [are necessary]” (WHO, 2016, para 3). While several studies have investigated the correlation between health literacy and childhood obesity as well as caregiver health literacy and childhood obesity, fewer studies have focused on the correlation between adult health literacy and adult obesity. More research is needed to identify if any specific links are present; however, it is conventionally understood that a low health literacy translates, usually in the poorest/least educated individuals, to a poorer health status and a lessened use of (public) health programs (U.S. Department of Health and Human Services Office of Disease Prevention and Health Promotion, n.d.).

As shown in Table 3, literacy rates in Peru have grown from 88% in 2004 to 94% in 2015, and literacy rates in Chile have risen from 96% in 2004 to 97% in 2015 (Roser & Ortiz-Ospina, 2018). While literacy rates are often reported, health literacy is not as widely recognized, reported, or defined by governments from around the world.

Table 3

Literacy Rates		
Country	2004	2015
Peru	88%	94%
Chile	96%	97%

According to a retrospective study conducted in 2013 by Hernandez and Pleasant, no health literacy publications had arisen from either Peru or Chile. At this time, no Peruvian governmental policies regarding health literacy had been reported; however, several organizations exist with mission statements that mimic health literacy goals, such as the *Iniciativa Contra la Desnutricion Infantil*, loosely translated to the Initiative Against Child Malnutrition. Another program, “Arts for Behavior Change,” worked to improve household hygiene with the following definition of public health: that health literacy is the “public and personnel [workings] in all health-related contexts to find, understand, evaluate, communicate, and use information [and] health literacy is the use of a wide range of skills that improve the ability of people to act on information in order to live healthier lives [and such abilities] include reading, writing, listening, speaking, numeracy, and critical analysis, as well as communication and interaction skills” (Hernandez & Pleasant, 2013, p. 174). Similar to Peru, no health literacy governmental policies had been reported in Chile as of 2012, but other programs exist that shadow this idea of health literacy that is growing in popularity. One program, *Vida Chile* translated as “Chilean Life,” helps to engage communities and schools in the promotion of healthy lifestyles. Additionally, one governmental policy that is similar to health literacy policies works to ascertain standards of care in primary health centers, with a focus on health promotion on a family health model (Hernandez & Pleasant, 2013). These health literacy programs are important, because it is hypothesized that without proper health literacy rates, even the most inclusive and comprehensive FBDG would not be utilized to the fullest extent.

Economic Factors

Food Insecurity and Food Availability

Unsurprisingly, economic factors play a large role in the type and amounts of food eaten within a culture. In U.S.-based research studies, food insecurity, defined as “not having access at all times to enough food for an active, healthy lifestyle because food products are not consistently available or households are not consistently able to afford such food products” (Martin & Ferris, 2007, p. 31) has previously been identified as a risk factor for obesity. One study, conducted by Martin and Ferris (2007) on food insecurity principally used participants of a Hispanic ethnicity living in Hartford, Connecticut, which had been identified as the “second-poorest medium-sized city in the

United States, according to the 2000 Census” (Martin & Ferris, 2007, p. 32). This particular study, different from previous American studies in its use of non-White participants that were not identified as parents or children, was able to identify the risk of obesity associated in both children and adults. In fact, food insecurity was identified through this study as a risk factor for only adults and not children. These findings identify that more studies should be investigating the obesity risk factors present for adults, because age appears to be a risk factor, especially in studies identifying food insecurity. In this study, it was hypothesized from the results that food insecurity increases the risk of obesity due to the fact that in most cases foods that are calorically-dense (albeit with less nutrients) are available at a cheaper price than healthier foods that are nutrient-dense. Additionally, the periods of “feast and famine” that are associated with the daily-life of a food insecure individual can have detrimental effects on the metabolism that can contribute to a larger fat-deposit, and these periods of “feast and famine” are believed to explain why poverty alone is not a risk factor for obesity. More research is needed to provide a causal relationship, as physical fitness or the lack thereof could also be playing a large factor (Martin & Ferris, 2007). Finally, it should be noted that in addition to food insecurity becoming a pathway to obesity an increase in the consumption of calorically-dense foods due to unattainable healthier options, obesity can also manifest from disordered eating patterns that result from a feeling of anxiety or depression due to an unreliable access to healthy food (FAO, 2019-j). With this data, it can be hypothesized that Chile would have more food insecure individuals than Peru, because the percentage of obese citizens has risen fast in Chile than in Peru.

The food insecurity situation in Chile is not well documented by the FAO, as information is only available in 3-year averages between the years of 2014-2016 and 2015-2017. According to this data, the percentage of severely undernourished individuals in this country has slightly risen from 700,000 individuals (3.9% of the population) to 800,000 individuals (4.4% of the population (FAO, 2019-d). This information is depicted in Table 4.

Table 4

Food Insecurity in Chile		
Several Undernourished		
Year	Individuals	Percentage of Population
2014-2016	700,000	3.9%
2015-2017	800,000	4.4%

In fact, in 2014, Chile was among three countries (including China and Morocco) that received recognition from the FAO in their efforts that led to “outstanding progress in fighting hunger”, as they reached specific target outcomes before 2015 (FAO, n.d.-a, para 1). This Millennium Outcome Goal 1, that petitioned countries to “halve the proportion of hungry people in the population before the end of 2015 compared to the level in 1990” was outlined in the UN General Assembly in 2000 (FAO, n.d.-a, para 3). Of the three countries listed, Chile was also added to an elite group of 18 countries that had additionally met the World Food Summit Target which aimed to “at least halve the number of hungry people in the population before the end of 2015 compared to the level

in 1990” which is a lofty goal that was outlined by 180 countries’ leaders who met in Rome of 1996 (FAO, n.d.-a, para 3). This accomplishment does not match the data compiled by the FAO which showed an increase in food insecure individuals between the years of 2014-2016 and 2015-2017.

As of 2011, around 38% of Peruvians (11 million people) do not have access to the minimum caloric daily intake of 2,100 kilocalories (Food Security Portal, 2019). Much of the documented trends seem to largely focus on other (more tangible) data, such as the number of pregnant women/children with anemia, child wasting, child stunting, and many others. Another trend in recent studies is to focus solely on one part of the country, as disparities among different people groups exists in Peru, with 45% of the Peruvian population being identified as indigenous in 2016. From this same 2016 research study conducted by Townsend (2016), it was also estimated that 52% of those living in poverty within Peru are indigenous (Townsend, 2016). In fact, the *Ministerio de Agricultura* (translated to the “Ministry of Agriculture”) has noted that at least 33% of Peruvians are at risk of being food insecure, with about 33.2% of families at a calorie deficit (and 37.7% of rural families at a deficit) (FAO, 2012). While the FAO lists “food and nutrition security” as one of its main goals within the country, information regarding food security for Peru are unavailable on the country’s statistics page on the FAO website (FAO, 2019-i). Some other related statistics are available that share that anemia in women between the ages of 15 and 49 years has decreased by 13.9% (from 32.4% to 18.5%) between the years of 2000 and 2016, and that the average supply of animal protein has increased by 6 grams of caput per day (analyzed as a three year average) from 21 grams per-capita, per-day in 1999-2001 to 27 grams per-capita, per-day in 2011-2013 (FAO, 2019-e). In other words, women’s health (through the lens of iron deficiency) has improved in the past years; however, it is unclear whether this has been in part by an increased consumption of iron rich foods because of greater food security/availability or governmental programs that have advocated for a healthier, iron-filled diet. The former is possible, as the amount of animal protein (which is typically high in iron) available has increased. While an iron deficiency (or anemia in women) is typically used to measure “hidden hunger,” which is classified as a micronutrient deficiency, it can also be analyzed through the lens of food security, or available/healthy foods to which the population has reliable access (FAO, 2019-j). More information regarding the trends of food insecurity within this nation would need to be available in order to analyze whether food insecurity (increasing or decreasing) has any correlation to the growing obesity trend.

Unlike Peru, the anemia in Chilean women between the ages of 15 and 49 years old has increased from 10.4% in 2000 to 15% in 2016, as depicted with anemia in Peruvian women on Table 5. This upward trend is in spite of the fact that the average supply of animal protein has increased by 7 grams of caput per day (analyzed as a three year average) from 37 grams per-capita, per-day in 1999-2001 to 44 grams per-capita, per-day in 2006-2008, after which a decrease was observed to 41 grams per-capita, per-day in 2009-2011 before an additional increase to 43 grams per-capita, per-day in 2011-2013 (FAO, 2019-e). This information is shown on Table 6 for both Peru and Chile. It is unclear whether this increase in anemia is due to an unavailability to resources for specific people groups, a lack of appropriate information dissemination, or another cause.

Table 5

Hidden Hunger (Anemia in Women Aged 15 to 49)		
Country	2000	2016
Peru	32.4%	18.5%
Chile	10.4%	15%

Table 6

Animal Protein Supply (Reported in Grams Per-Capita, Per-Day)		
Country	1999-2001	2011-2013
Peru	21	27
Chile	37	43

Note: These statistics are only reported by the FAO in increments of three-year averages.

Food availability as a whole measures both foods that are both gained through food trade and locally grown through food production. Additionally, economic climate and importation can be used to explain food insecurity. In Peru, 44.59% (23,124,000 hectic acres) of the land in 2000 was devoted to agriculture, and this percentage has decreased slightly to 42.69% (23,687,000 ha) of the land in 2016 (FAO, 2019-e). In comparison, Chile's land devoted to agriculture in 2000 was 25.82% (15,110,000 ha) of the land, which has increased slightly to 27.95% (15,741,000 ha) of the land in 2016. All of this data is depicted on Table 7.

Table 7

Percentage of Total Land Dedicated to Agriculture		
Country	2000	2016
Peru	44.59%	42.69%
Chile	25.82%	27.95%

Despite these drastically different percentages, the total amount of land between these two countries is relatively similar: the total amount of land in Peru slightly decreased from 58,519,200 ha to 56,317,400 ha, and the total amount of land in Chile slightly increased from 51,853,000 ha to 54,194,600 ha, which is depicted by Table 8.

Table 8

Total Amount of Land		
Country	2000	2016
Peru	58,519,200 ha	56,317,400 ha
Chile	51,853,000 ha	54,194,600 ha

This data regarding agricultural land shows that Peru should have more food production than Chile; however, other factors affect food availability, such types of food produced, population, and amount of food received through trade. More research is needed to fully grasp the risk factors between obesity and food insecurity within the two countries, as it is assumed that extraneous factors are at play, because current data does not support recent research trials that found that food insecurity is linked to obesity in adults.

Global Hunger Index

The Global Hunger Index (GHI) receives most of its data from branches of the United Nations, and their definitions of “hunger” and “malnutrition” are relatively standard for the industry. Hunger denotes a status of “stress” due to the inability to consume sufficient calories; while, “malnutrition” denotes the associated problems with both overnutrition and undernutrition. In this case, “overnutrition” is considered the overaccumulation of calories, with or without the daily essential micronutrients. As it was discussed above, obesity typically results from overnutrition (GHI, 2019-a; GHI, 2018).

A more concrete manner of analyzing food insecurity and food availability is the use of the GHI, which is calculated each year for each country through the incorporation of data regarding child mortality, child undernutrition, and inadequate food supply. Even still, these statistics utilize children’s health in order to identify the overall health of a nation. Within the topic of child undernutrition are the subcategories of child wasting and child stunting, which assess both acute and chronic undernutrition respectively (FAO, 2019-e). According to the WHO, indicators such as a child being underweight, child wasting, and child stunting are all types of anthropometric indicators, or indicators that assess height and weight by age, that are used to determine child nutrition and development (WHO, 2015). According to the FAO and depicted in Table 9, child stunting in Peru has decreased from 31.3% in 2000 to 13.1% in 2016, while child wasting dipped around 2009 to 0.6% it has remained relatively stable from 1.1% in 2000 to 1% in 2016 (FAO, 2019-e).

Table 9

Child Undernutrition in Peru		
Factors	2000	2016
Child Stunting	31.3%	13.1%
Child Wasting	1.1%	1%

Note: This information is recorded as percentage of the child population in Peru.

One of the main priorities of Alan Garcias’ presidency was decreasing child stunting, which comes about because of a variety of factors, such as diarrheal diseases, unclean water, and insufficient nutrient ingestion. Overall, this president was able to drop child stunting 10 percentage points in 5 years. The year 2016 marked another record for Peru, which has decreased chronic malnutrition by 15% in just 8 years with the help of the presidents/presidential candidates (CGTN America, 2018). Despite these efforts, the

data shows that chronic undernutrition, while decreasing, is still a larger issue than acute undernutrition in Peru. Of the five categories of hunger recognized by the GHI, with the lowest category being under 9.9 points and the highest category beginning above 50 points, Peru ranked at 8.8 points in 2018, which places this country in the lowest category of hunger. This score has dropped 11.2 points from 2000, and the percentage of the proportion of undernourished Peruvians has dropped 13% total from 21.8% in 2000 to 8.8% in 2017 (GHI, 2019-c).

According to the FAO, this percentage change equals out to a drop of undernourished people in the population from 5.7 million Peruvians in 1991-2001 to 2.8 million Peruvians in 2015-2017 (FAO, 2019-e).

Similar to Peru, Chile ranks a score less than 5 points, which has remained the same since 2000. This score indicates that “Chile suffers from a level of hunger that is low” (GHI, 2019-b). Both of the GHI scores for Peru and Chile are recorded on Table 10.

Table 10

Global Hunger Index Scores		
Country	2000	2016
Peru	20	8.2
Chile	5	5

The percentage of undernourishment has decreased from 4.7% in 2000 to 3.3% in 2018, which according to FAO is equal to a drop from about 700,000 to 600,000 Chilean individuals over these marked 16 years (GHI, 2019-b; FAO, 2019-d). Undernourishment for Peru and Chile are recorded on Table 11.

Table 11

Undernourishment		
Country	2000	2017/2018
Peru	21.8%	8.8%
Chile	4.7%	3.3%

Child wasting in Chile has dropped slightly from 0.5% in 2000 to 0.3% in 2018, while child stunting in Chile has dropped from 3.0% to 1.8% within the same time frame (GHI, 2019-b). Data for both child wasting and stunting are recorded on Table 12.

Table 12

Child Undernutrition in Chile		
Factors	2000	2018
Child Stunting	3.0%	1.8%
Child Wasting	0.5%	0.3%

Note: This information is recorded in percentage of the child population of Chile.

From this data, one can see that child stunting, which demonstrates chronic malnutrition, has decreased for both countries; however, percentages from Peru were significantly higher than the percentages in Chile. Additionally, child wasting, which shows acute malnutrition, has remained relatively stable in Peru, while it has decreased in Chile. Even still, the percentages were higher for Peru than Chile. Following the same trend, the percentage of the population that is undernourished has decreased within both countries; however, percentages are still higher in Peru. At 2016, more Peruvians were defined as being “hungry” than Chileans, which still goes against the research listing food insecurity as a risk factor for obesity.

While the influence of sanitation has not been previously linked to obesity, the WHO has identified that poor sanitation has been linked to childhood undernourishment which has been linked to adult obesity: in other words, “Children who have suffered from undernutrition and were born with low birthweight or are short for-age (stunted) are at far greater risk of developing overweight and obesity when faced with energy-dense diets and a sedentary lifestyle later in life” (WHO, 2017, p. 6). Data has shown that a connection between sanitation and nutrition exists in three different manners: the presence of diarrheal diseases, environmental enteropathy, and nematode infections. As of 2008, the WHO has determined that poor WASH, otherwise known as Water and Sanitation for Health by UNICEF, is associated with about 50% of childhood undernutrition throughout the world. Diarrheal disease, which can lead to chronic malnutrition (usually in the form of undernutrition, as an infected individual will often excrete food faster than the absorption of essential nutrients in the intestines), can arise from poor sanitation and the inability to dispose of human excrement properly. Similarly, environmental enteropathy arises from the ingestion of bacteria from human excrement that causes malabsorption in the small intestines, that might lead to stunting; however, more research is necessary for conclusive data. Finally, nematode infections, which are a worm-related infection, arises from the ingestion of “soil contaminated with human faeces containing worm eggs.” A study from 2014, conducted by Chitty, found that proper sanitation, usually in the form of available bathroom facilities, decreased the likelihood of these nematode infections (Chitty, n.d). According to the FAO, the percentage of Peruvians that have access to at least basic drinking water services rose from 80.5% to 89.9% between the years of 2000 and 2015 (FAO, 2019-e). For comparison, this percentage of Chilean individuals with access to at least basic drinking water services has risen from 95.3% to 100% within the same timeframe (FAO, 2019-d). In relation to the percentage of Peruvians that have at least basic sanitation services, the percentage has risen from 62.6% in 2000 to 76.8% in 2015 (FAO, 2019-e). Comparatively, the percentage of Chileans has risen from 91.9% to 99.9% (FAO, 2019-d). Information regarding sanitation can be found on Table 13.

Table 13

Sanitation		
Country	Percentage of Individuals with Access to Basic Drinking Water (2000 & 2015)	Percentage of Individuals with Basic Sanitation Services (2000 & 2015)
Peru	80.5% & 89.9%	62.6% & 76.8%
Chile	95.3% & 100%	91.9% & 99.9%

A longitudinal study by Chitty in Peru found in 2004 that a 1 cm height decrease in children up to two years old (child stunting, chronic malnutrition) was observed in children that had an environment of “inadequate disposal of sewage, and poor water sources” as compared with their counterparts; on the other hand, data from multiple research studies has not found a link between WASH interventions and child wasting, or acute malnutrition. Although access to clean drinking water has increased while child stunting has decreased in Peru, more research is needed to additionally draw a link between a child being underweight and sanitation (Chitty, n.d).

Malnutrition

Both forms of malnutrition, obesity (overnutrition) and undernutrition, are growing simultaneously within developing countries, which is commonly termed the “double burden of malnutrition.” Current trends show that malnutrition is often a problem that is felt most heavily by the poor: with obesity becoming an issue in the lower economic classes of high-income countries. Similarly, this double burden is felt within middle-income countries and lower and also within the lower economic classes of different countries (FAO, 2019-j).

Fast Food

Another possible risk factor towards rising obesity rates, is the relationship between fast food acting as an environmental risk factor for obesity. Typically, fast food restaurants are known for their calorically-dense, yet highly innutritious foods, that have been associated with an increase in body weight through many scientific studies; however, concrete data is currently unavailable to fully support this claim. A study conducted in Michigan in 2006 by Jeffery, Baxter, McGuire, and Linde, found that “reported eating at fast food restaurants was associated with having children with poorer eating and exercise habits and with higher BMI” (Jeffery, Baxter, McGuire, & Linde, 2006, para 19); however, it is unknown what other factors may contribute to fast food usage or obesity in general. It is unknown whether or not obesity is caused by these foods, or whether people with obesity tend to frequent these establishments more so than other individuals of lower BMIs. Despite these inconclusive findings, a positive association was drawn between BMI and the consumption of foods that are sold at typically defined fast food restaurants (Jeffery, Baxter, McGuire, & Linde, 2006). According to the 2016 World Industry and Market Outlook of the Fast-Food Industry published by Barnes Report and recorded on Table 14, 10,215 fast-food eating

establishments in Peru made a total of 543 million dollars' worth of sales in 2016. As a comparison, Chile had a total of 5,750 fast-food restaurants that made 748 million dollars' worth of sales in 2016 (Fast Food Restaurants Industry, 2016).

Table 14

Fast Food in 2016		
Country	Number of Establishments	Millions of Dollars in Sales
Peru	10,215	543
Chile	5,750	748

These statistics are slightly confounding, as the prevalence of fast-food restaurants seems to be larger in Peru, whose population is significantly less than in Chile, which has spent more money on the consumption of fast-food. Overall, more information is necessary to determine the relationship between fast-food consumption and adult obesity in both countries.

Historic Gastronomy

Incan Civilizations

Present-day Peru and Chile were once part of the Andean civilization that was dominated by the Incan people groups. Like many early people groups, food played a tremendous role in the daily lives of the Incas: as large storage facilities were fashioned that safeguarded the community against shortage and droughts. Additionally, rulers often gave food as gifts in order to increase their social standing. On a larger scale, the Incas were primarily known for their farming, as many of these people were vegetarian, supplementing with several forms of meat as availability permitted. On a familial level, each family was self-sustaining with their agricultural endeavors. On a community level, farmers were grouped in packs of 7 or 8 to grow crops that were required in large commodities. In this civilization, women and men were viewed as equals; in other words, women could inherit land and both genders were responsible for farming. While men typically hoed the fields, the women would sow the seeds, and the children would tend to the livestock, which were usually made of camelids that were eaten for special occasions and llamas/alpacas that served many purposes for the families including supplementation as a food source. Interestingly enough, many of the Incan land projects focused on creating better farmland: for example, canals were created to increase irrigation in flatlands, and wetlands were often drained to allow them to be better utilized as farmland. For the Incas, farming held such a high import in the society that it was closely tied to the religion as many sacred fields in Cuzco, Peru, grew crops that were used only in offerings (Cartwright, 2015).

One of the largest contributions to the world was the Incan cultivation of more than 1,000 varieties of potato before the arrival of the Spaniards, and one of the more popular dishes from this region happens to be *Papa a la Huancaína*, which is a potato dish that boasts a creamy and garlicky sauce. Many recipes from the Incas have remained within present-day Peruvian culture, and some traditional ways of cooking,

such as *Pachamanca* which includes burying food atop of hot coals for hours. Other traditional foods include alpaca, guinea pig, and quinoa, the latter of which contains all the essential amino acids with a low carbohydrate content. The Spaniards brought with them new foods that were slowly introduced into the typical cuisine such as grapes, olives, beef, chicken, rice, and milk products. In fact, *Papa a la Huancaína* (mentioned above) is a classic example of this mixture with its Incan potatoes and Spanish milk (Gill, 2010).

One defining feature of a culture are the routines that are established around eating, because these routines can show the collective, cultural attitudes towards food and the number of calories typically ingested. The Incas often ate two meals during the day: in the morning and in the evening. The foods were typically roasted or boiled, and occasionally foods such as potatoes and meats were freeze-dried. Alcoholic drinks were also consumed, and a popular drink, *chicha*, was created by the women who would chew-up corn to create a pulp that would later ferment (Cartwright, 2015).

The Incas held a relatively healthy lifestyle that was riddled with rich sources of vegetables and fruits and supplemented with protein sources of meats and quinoa. While it is possible that these Incan customs have impacted the individual lives of the indigenous peoples in Peru, many of whom live in more rural areas that are marked with lowered obesity rates, more studies focusing on food perceptions and eating habits are necessary to identify whether these customs can be attributed to the lowered increase in obesity in Peru. It could be hypothesized that the Incan customs contribute more to Peruvian culture than Chilean culture because Chile has undergone more urbanization/westernization.

Recent Gastronomy

In 2007, Peruvian gastronomy had been hailed to the rank of national heritage by the nation's government, and by doing so, the gastronomy of this country gained more widespread attention and respect (Matta, 2013). Peruvian gastronomy is recognized around the world as a special gem, and food tourism within the country has been on the rise. A large factor that lends to the uniqueness of the Peruvian food landscape is the utilized wide array of foods that are present within the country itself such as seafood from the coast and a large diversity of plants that are harvested throughout the jungle. Another factor is the cultural diversity that has grown within the country, stemming from the original Inca roots that slowly began to incorporate elements from the Spaniards, Africans, and other people groups as they came to the country. While Lima has become a popular destination for famous chefs around the world to open restaurants and a hub of culinary variety, other cities around the country have become known for their own types of cuisine, such as the infamous desserts from Ica and the prized wine from Pisca. The jungle food from Peru is also filled with an outstanding variety of antelope, turtle, wild boar, and other animals that are found in this region. The Peruvians enjoy a similarly varied seafood diet as well; for example, *ceviche*, Peru's most popular dish, is made with fish, lime, salt, onion, and *ají*. A rather popular dining option is street food, of which is consistently fried/boiled. Many fruits and vegetables are found within the varying landscapes, around the jungle and coast (Gill, 2010).

In the 1980s, immigrants fled Lima at the outbreak of a civil war. Due to the fact that strict nightly curfews fell over this booming city, many Peruvians refrained from

eating at the local street vendors, as is custom present-day. It was not uncommon for bombs to explode in the middle of the streets of the capital in the 1980s; nevertheless, immigrants still gathered to share traditional meals, despite the ghost-town they encountered after dark. Even though the civil war endured into the early 2000s, one of the most prominent restaurants “Astrid and Gaston”, owned by a Peruvian and his German wife who both studied culinary arts in Paris, began to serve food in the streets for the brave few that would venture out into the streets that were often wrought with terrorist attacks. They served both Parisian foods and traditionally Peruvian dishes such as dishes of chicken and rice (*arroz con pollo*) and *ceviche* (Avilés, 2015). While these two restaurateurs originally began serving Parisian food, it did not take long before their new restaurant was known for its Novoandina food that was created with sophistication, creativity, and the use of traditional Peruvian foods to create new variations of the well-loved Peruvian cuisine (Yamada & Chacaltana, 2007). It is often believed that this restaurant helped to incite a larger interest in culinary arts and restaurateurs in the city of Lima, and in 2015, it was documented that close to 80,000 young adults began studying the culinary arts, which had steadily begun to be considered a respectable, and even desirable, profession. To this day, “Astrid and Gaston”, which prepares dishes with vegetables that are grown in a garden next to the restaurant, remains as one of the most popular restaurants in Lima, Peru. Marco Avilés, a Peruvian writer, shares from a first-person point-of-view that Lima is visually and architecturally unimpressive with its minimal parks, poorly designed cityscape, and older buildings. It is not uncommon for tourists to be asked about the foods that they have tried, rather than the sights that they have been able to see, as the Peruvian food is seen as a more defining feature of the capital than the physical or historical landmarks. Non-chain restaurants serve to provide a “cohesiveness” to a rather incoherent city, because people from all socioeconomic classes venture out in search of delicious food. Additionally, many immigrants have opened restaurants there that fuse the cuisine from their cultures with the Peruvian culture. More traditional Peruvian restaurants serve dishes that were, until the early 2000s, enjoyed within the family, as going out to eat was perceived as a dangerous activity and largely unnecessary. For this reason, cuisine and going out to eat can provoke nostalgic feelings of familiarity and comfort for many Peruvians (Avilés, 2015).

The culture around eating meals in present-day Peru is that of typical Latin America. Peruvians usually eat three large meals a day: breakfast, lunch, and dinner. Breakfast meals are typically light, and lunch is treated as the most important meal of the day. This follows the Incan belief that the altitude slowed digestion, which called for light dinners at around nine in the evening (Gill, 2010).

It is important to note that not all Peruvians are alike, as there are many social and cultural differences between the citizens that could translate to different food cultures. In a separate study, conducted by Perez-Leon, Pesantes, Pastrana, Raman, Miranda, and Suggs (2018), the food perceptions of Peruvian citizens from the province of Ayabaca in northern Peru, which consists of a population of 140,000 people with 73% of whom are considered to be living in poverty, were qualitatively analyzed through an interview of 138 participants who were diagnosed with either Type 2 Diabetes Mellitus, epilepsy, or hypertension or who were acting as the head of a household. Additionally, commentary was provided by other members from the community. While this study did not focus on obesity specifically, it outlined many preconceived notions about food and nutrition that

are found in rural areas of the country, especially by people that have diagnoses that are typically in conjunction with obesity. In this study, the participants as a whole noted that they believe that the portions in rural communities are larger than the meal proportions found in more urban areas. Additionally, rural meals are typically consisting of both a protein and a starchy, carbohydrate rich ingredient, such as plantains, potatoes, noodles, yucca, and rice. Common protein sources include chicken and fish, because pork and pig-based meats are difficult to obtain for daily meals prepared within the home: these pork dishes are often served in restaurants. Interestingly enough, cruciferous vegetables are not widely eaten in this region, as their consumption is based on availability by harvest season. While a few types of vegetables and fruits, such as lettuces, bananas, and corn are eaten, these foods are often expensive in markets. Despite these observable patterns, 59.7% of a sample size of 62 participants identified that a variety of vegetables is required for a nutritious diet, as compared with only 14.5% that identified that starchy vegetables are nutritious. Of the same sample size, 29.0% of participants identified that meat, specifically pork, was innutritious, which is largely in part due to its high fat content. Overall, many participants shared their ideas about healthy food that were related to the use of chemicals and pesticides. The participants noted that there was a large distrust of vegetables from the markets, because their origin and growing process is usually undisclosed. For this reason, these people typically grow all of the vegetables that are normally consumed, because the people can ascertain that no chemicals are used in the growth process of local produce. The investigators of this study noted that the cuisine of the poor is often a combination of the foods that are perceived as healthy and the foods that are available (Perez-Leon, Pesantes, Pastrana, Raman, Miranda, & Suggs, 2018). This study shows that the consumption of an unhealthy diet can be a mixture of more than one factor; as with the people living in the province of Ayabaca who are confined to eating locally grown produce, rather than a well-rounded diet.

Much like Peru, the daily Chilean lifestyle, and ultimately the food landscape, was shaped by political change. In the 1970s, the midday “siesta” (or afternoon break/nap) was rather prevalent as businesses would close between the hours of 2:00 P.M. and 5:00 P.M. for the Chileans to eat a home-prepared lunch with their family. Additionally, it was common-place for men to be working throughout the day, while women stayed home to prepare meals. These meals were traditionally eaten with a wide variety of foods including an appetizer (consisting of soup, salad, or seafood), a main dish (which often consisted of protein in the form of legumes and meats with a carbohydrate such as pasta, rice, or potatoes) (Hamilton, 2006). Some popular main dishes include *lomo a lo pobre*, which is a large portion of beef covered in two fried eggs and homemade potato chips, *parillada*, which is a dish of grilled meats such as intestines and blood sausages, and *curanto*, which is a dish featuring a “hearty stew of fish, shellfish, chicken, pork, lamb, beef, and potato” (Shields, 2003). Similar to the Peruvian diet, potato was featured in various dishes, which might relate back to the large prevalence and presence of potato in the Incan diet. As one can see, these popular dishes were a combination of the various landscapes that were present, for example featuring foods from the mountains, the ocean, and the plains (Shields, 2003). Salads were prepared fresh from ingredients bought from local farmers markets, local stores/vendors, and meat markets on the day that they would be eaten. Chilean women often prepared meals according to the ingredients available by season. Different styles of foods (indigenous, Arabic, European, Spanish, etc.) were

blended to create a Chilean cuisine that was thoroughly enjoyed by families all over the country. After the main dish, accompanied by side dishes and wine if desired, a dessert or hot beverage was also traditionally enjoyed (Hamilton, 2006). The wines that typically accompanied dinner were well renowned around the world: the most popular Chilean wine is a pisco sour which is a grape brandy made from “Chilean grapes [and] served with lemon juice, egg whites, and powdered sugar” (Shields, 2003). In addition to the large amount of nutrient-rich foods such as carrots, green beans, peas, etc. that were featured alongside protein-rich foods such as grilled meats, seasoned beef culturally known as *carne arollada*, hard-boiled eggs, seafoods like eel, mussels, and fish, etc., the Chilean diet also contained a large amount of fried/high-fat foods such as fried fish, fried cauliflower culturally known as *coliflor frito*, homemade mayonnaise, and homemade French fries. Despite the prevalence of these traditionally unhealthy foods that may lead to high cholesterol, the portion sizes in Chile were rather modest (Hamilton, 2006).

Around the 1970s, Dictator Augusto Pinochet rose to power, unfortunately at the expense of horrific “crimes against humanity,” to promote the U.S.-imported economic model that significantly increased the Chilean economy. This economic increase led to a change in the daily lifestyle of many Chileans, who began to live more hurried lifestyles, and an increase in commercial shopping centers. Since this time, the midday siesta has decreased in popularity, both due to the westernized business environment of only having one hour for lunch, but also due to the larger number of women that are working, rather than cooking at home. While older women are still attempting to preserve their cultural culinary traditions, women younger than fifty years old are becoming less interested in cooking, especially due to the growing number of supermarkets and convenience of eating ready-made foods. Additionally, cultural expectations have fallen away from the view of women as stay-at-home moms, especially after the 2002 election of the first female President of the Republic Michelle. Women who do cook, often opt for easy-to-make recipes rather than the traditional recipes passed down from the older women in their families. Another change stems from architectural changes to modern homes, as most families living in the cities no longer have access to traditional wood fires that were used to make traditional breads (Hamilton, 2006).

Schnettler, et al., (2018), originally sought to find factors for adolescent life satisfaction through a conducted survey, found that a positive relationship was demonstrated between perceived parental support and adolescent food satisfaction, of the satisfaction within the scope of foods eaten or habits surrounding foods. It has been hypothesized that this positive relationship comes from the cultural expectation of eating meals as a family, whereby this special time is when parents provide emotional support for their children. This study helps to reinforce previous studies that have identified that a low perceived parental support (largely due to work hours) is associated with less family mealtimes, less focus/encouragement to make healthy choices, and food environments that are not typically healthy (Schnettler, et al., 2018). It is possible that less frequent lunchtime family meals in Chile has contributed to an unhealthier lifestyle; however, more research is needed to identify life satisfaction in adults related to eating habits.

While these two countries are culturally different, some gastronomical habits overlap largely because of the close proximity of the countries and their similar history. Both of these countries had originally been indigenously inhabited by the Incan people

groups and become colonies of Spain: Chile received their independence from Spain on September 18, 1810, and Peru received their independence from Spain on July 28, 1821 (Belanger, 2018; Nagy, 2018). In fact, for two years (1881-1883) during the War of the Pacific, the Peruvian capital, Lima, had been overtaken by the Chilean army. At the end of this war, it was Bolivia and Peru that had lost not only the war, but a large portion of their specific territories. Additionally, the culture within the two countries is very different; for instance, Chileans consider their country to be a progressive, European-esque, wealthy country, while Peruvians are often stereotyped by Chileans as poor and indigenous. Despite the conflicted past of these two countries, Santiago, Chile is a popular location to which Peruvians are currently immigrating. By 2013, Peruvians comprised 2.5% of the Chilean population and about 37% of the foreign population and 8,000 Peruvians were living in Santiago, Chile. Food migration, “the movement of foodstuffs and culinary practices during human migration,” plays a large role as migrant Peruvians are using food, and restaurants that dawn Peruvian flags and memorabilia, in order to retain and demonstrate their Peruvian identity, even though the dishes are often tailored to the tastes of the local Chilean population (Imilan, 2015, p. 227). Overall, gastronomy and food habits have played a treasured role within the society past and present of both Chile and Peru, and people often equate their gastronomical practices to their specific culture.

Lifestyle Factors

Epidemiology, one sector of Public Health, helps to provide more information on the risk factors and causes of obesity, because a disease analyzed through an epidemiological lens illuminates the distribution of the disease throughout many different populations, divided into social classes, rural/urban residencies, etc. For example, Chilean individuals from a lower socioeconomic class are more likely to be obese or overweight than their counterparts (Caro, Ng, Taillie, & Popkin, 2017). In Peru, the distribution of obesity throughout the country is rather unequal. Additionally, obesity is more prevalent in Peruvian women, than Peruvian men (Huerta, 2018). It should be noted that obesity is more prevalent in individuals that have completed more schooling, including attendance up to graduate school (Center for Disease Control and Prevention, 2018; Huerta, 2018). In Peru, obesity is found more prevalently within the more urban areas throughout the mountains of the country, rather than the more rural areas that are located along the coast (Huerta, 2018). Continuous with this general claim correlating urbanization and obesity is the data received from a study of the indigenous Ashaninkas group of the Junin Region of the Peruvian Jungle conducted by Romero, Zavaleta, Cabrera, Gilman, and Miranda (2014); whereby, research was conducted on five separate native tribes that have had an extremely limited connection to the modernized areas of Peru. Through this study, conducted in 2014, only 4% of the indigenous peoples were classified as obese though the use of BMI scale (Romero, Zavaleta, Cabrera, Gilman, & Miranda, 2014).

The number of Peruvian rural inhabitants is larger than the number of Chilean rural inhabitants. According to the FAO, Peru’s population has steadily grown from an estimated and projected 25,999,920 individuals in 2000 to an estimated and projected 31,549,780 individuals in 2016. Additionally, the rural population has decreased slightly from 26.96% (7,009,000 individuals) in 2000 to 21.04% (6,649,000 individuals) in 2016

(FAO, 2019-e). On the other hand, Chile's population has also steadily grown from an estimated and projected 15,454,100 individuals in 2000 to an estimated and projected 18,073,070 individuals in 2016. The rural population in this country has also slightly decreased from 13.93% (2,152,000 individuals) in 2000 to 10.30% (1,862,000 individuals) in 2016 (FAO, 2019-d). This information is depicted in Table 15.

Table 15

Population of Rural Inhabitants		
Country	Estimated Population in Millions (2000 & 2016)	Rural Percentage of Population (2000 & 2016)
Peru	26.0 Million & 35.1 Million	26.96% & 21.04%
Chile	15.4 Million & 18.0 Million	13.93% & 10.30%

From this data, it is easy to see that the Peruvian population between the years of 2000 and 2016 is significantly larger than the population in Chile between the same years. This information is important because a larger population typically requires more sanitation programs, more public health programs, and more food than a smaller population. This need for more resources could impact obesity rates depending on if the requirements of the population are being met. Additionally, the percentage of Peruvian rural inhabitants is also significantly larger than the percentage of Chilean rural population. This data is rather important, because urbanization, typically found within highly populated cities, is typically considered a large risk factor for obesity.

There is a large difference between urbanization and industrialization. While "industrialization" is marked by an increase in transportation, security, communication, and business that require such increases, "urbanization" is the increase in a population within a small area that leads to cities. It is noted too that the term "urbanization" does not simply connote the city itself but also the mindset that the citizens adopt that is filled with loneliness, individualization, and overstimulation of the nervous system (Urbanization, n.d.). Stress often arises from both the urban social landscape in the physical environment, and it can manifest from a wide range of experiences such as exposure to poverty and traffic noises. Other aspects of urbanization that could lead to stress are higher levels of water, air, and noise pollution, and physical threats such as violence and attacks (Gruebner, Rapp, Adli, Kluge, Galea, & Heinz, 2017). Unfortunately, in underdeveloped countries, urbanization is on the rise without the economic benefits of industrialization. These overcrowded, poorer areas on the outskirts of cities are filled with unemployment and unsanitary conditions (Urbanization, n.d.). These cities in Peru, often called Shanty Towns (or *Pueblos Jovenes*, meaning "Young Towns") are often illegally created with little support from the government, and these towns feature overpopulation, poor water sanitation, poor schooling, and a myriad of other setbacks. While improvements have been made to some of these *Pueblos Jovenes*, largely due to the work and determination of the inhabitants themselves, many remain without proper support from the government (Council on Hemispheric Affairs, 2011).

One organization striving to make a difference in these *Pueblos Jovenes* is Partners in Health (PIH) (known as “*Socios en Salud*” in Peru). This organization offered a new program between the years of 2013 and 2016, with the help of the MINSA called *Proyecto Casita* (or “Project Little House”) in Carabayllo, which is a slum that is north of Lima, Peru. The poverty found in this region is characterized by a people group tormented with “malnutrition, domestic violence, teen pregnancy, and chronic illness” (Partners in Health, 2017, para 10). This organization works to help children who have developmental delays and teach mothers about nutrition (Durand & Gardiner, 2013). According to PIH, about 70% of the women that participated in *Proyecto Casitas* documented feelings of depression and stress (Partners in Health, 2017).

One cultural factor that determines weight gain through an increased appetite is stress. While short-term stress decreases appetite with a high amount of epinephrine secreted into the body, long-term (chronic) stress can lead to an increased appetite overtime due to the elevated presence of cortisol, which “plays an important role in metabolism and determining where fat is stored” (Harvard Health Publishing, 2018; Orgill, 2017, para 3). Additionally, stress often causes cravings for foods that are high in sugar and fat, because these foods act to counteract stress. Despite these general findings, many effects of stress on individuals are unknown, and it is believed that women, rather than men, are more likely to rely on an increased consumption of food to cope according to a Finnish study of 5000 individuals. Additionally, a Harvard study found that only overweight individuals became obese with the presence of long-term stress, which suggests that other hormones, such as insulin also play a role. It is important to keep in mind that many other factors may contribute to weight gain in highly stressful events, such as the amount of cortisol produced individually as well as sleeping, eating, and exercising habits (Harvard Health Publishing, 2018). Through the English Longitudinal Study of Ageing, a four-year investigation was completed on hair samples from 2,527 men and women over the age of 54 that determined the correlation to body cortisol levels and weight in 2017. Unsurprisingly, it was determined that individuals with hair samples that contained higher levels of cortisol were correlated to individuals that are more likely to have higher BMIs, weights, and waist circumferences (Orgill, 2017).

Stress levels can lead to obesity, and it is important to remember that a greater percentage of the Chilean population (in comparison to the Peruvian population) lives in urban landscapes that could be exposed to stressful lifestyles. Unfortunately, no large studies have been conducted regarding a similar methodology for stress levels documented in Peru and Chile between the years of 2000 and 2016. More research is necessary in order to truly compare the lifestyles of these two nations. To supplement this lack of research, smaller, more focused studies have been conducted. For example, the Integration Institute of Peru found through a 2014 study of 2,000 individuals conducted by Ojeda that 58% of Peruvians had lived a “stressed” or “very stressed” life over the course of the past year (Ojeda, 2015). A separate study, conducted by the OECD Better Life Index, found that most blue-collar workers in Chile average less than 15 hours per day on eating, sleeping, self-care, and socialization: this fact may show that an unequal work-life balance could lend towards increased stress (OECD Better Life Index, n.d.).

One study, conducted by Najera, Nandy, Carrillo-Larco, and Miranda (2019), aimed to identify any correlations between female obesity and migration between the

years of 2005 and 2012 in Peru, as a way of analyzing the urbanization and obesity correlation claim. In the study, information was collected from over 90,000 Peruvian women aged 14 to 49, and four categories of migration within Peru were determined: intra-rural migrants (from one rural area to another), intra-urban migrants (from one urban area to another), rural to urban migrants, and urban to rural migrants. Within these four groups, two other groups were identified as well: urban-stayers and rural-stayers. Overall, obesity rates were increased in each group (except for urban to rural migration, which resulted in statistically insignificant data), as obesity in Peruvian women increased from 15% to 18% from 2005 to 2012. Extraneous factors were mitigated, and it was determined that rural-stayers have the lowest rates of obesity, while rural to urban migrants and urban-stayers had the highest rates of obesity. The rural-stayers had a 10% prevalence of obesity, while the rural to urban migrants and the urban-stayers had a 21% prevalence of obesity. The largest increase of obesity (by 6.6%) was found in rural stayers. Interestingly enough, those participants that had exposure to the urban environment (including urban to rural migrants) had a two- or three-fold increase in obesity prevalence. Additionally, rural migrants showed a 42% greater possibility of obesity in comparison to rural citizens that are not migrants. This study determined that the large risk factors of obesity in Peruvian women are being exposed to urban areas and migrating, with duration acting as a predictable factor. While it might seem contradictory that even intra-rural migrants showed an increase in their risks of obesity, the researchers from this study note that migration tends to bring about many changes in an individual's life that could alter behavioral (eating, exercising, etc.) habits. One possible explanation for these particular results are found through an analysis of socio-economic status, because migration towards urban areas is typically undergone by individuals of a higher social class or wealth (in relation to rural-stayers); however, this is not the case in Peru, as rural to urban migrants are typically illiterate, indigenous women moving to the outskirts of Lima in search of greater opportunities with the addition of a more stressful lifestyle. Finally, the researchers indicate that while obesity is correlated strongly with migration, the fact that obesity rates are rising in rural areas as well could be a sign that nutrition and other factors should also be considered in order to create solutions to avoid increased obesity rates. Unfortunately, data for older women and men was not similarly available; however, the data collected from this study shows that future studies with more diverse sample groups are warranted in order to understand the growing obesity rates with exposure to urban areas, especially since the more rural areas of Peru are steadily becoming more urban (Najera, Nandy, Carrillo-Larco, & Miranda, 2019). While similar migration studies are unavailable for Chile, it should be noted that internal migration, or migration of the Chilean population throughout the country itself, is largely restricted due to the restriction of land sales by the government and familial attractions/obligations (*Chile Society & Culture*, 2011).

Media Influence

Television/Radio

Another culturally defining characteristic that can influence the eating patterns of a community are the representations of food and obesity that are shown in the media. In 2011, the food industry of Peru decided to adopt the self-regulatory practice of including healthy practices and images into food advertising in order to promote a healthy lifestyle

subconsciously. Interestingly enough, few studies have been conducted on the effectiveness of these health cues. The few studies that have been completed seem to focus most on children, and the link between childhood obesity and watching television lies both in the sedentary lifestyle that is created as well as the persuasion of consumption of unhealthy foods. During a study in 2016 conducted by Busse and Bernabé-Ortiz, one week's worth of commercials on popular children's networks were analyzed. Out of 799 advertisements, health cues appeared in 71.7% of sugary drink advertisements, 40.5% of salty food advertisements, and 16.6% of sugary food advertisements. These health cues are typically visual demonstrations of healthy actions (either in promoting a physical lifestyle or healthful foods) for about 5 seconds (Busse & Bernabé-Ortiz, 2018).

One initiative of the World Food Programme (WFP) in Peru is *Cocina con Causa*, roughly translated to "Kitchen with a Cause", which is a collaboration between Peru TV, United Nations, the MINSA and more, has a main goal of sharing recipes in order to preserve the Peruvian gastronomy while ending hunger and improving childhood nutrition. This organization specifically targets ideas and problems surrounding hunger and nutrition through the use of media, whether in television productions or through radio (World Food Programme, n.d.). One example is "La sangre llama", a radio soap opera that translates to "The Blood Calls". This soap opera specifically targets families living in Sechura, a northern city in Peru that is largely ostracized from television programs and whose rate of infant anemia is around 66%. This subgroup of the Peruvian population has access to radio programs (not television), and for this reason, a program that shares the story of a lovestruck couple facing the challenges of feeding their children was created in 2018. While this soap opera specifically aims at improving the nutrition of children, in many cases, these household changes can articulate into improving the nutrition of the whole family (World Food Programme, 2018). Many efforts by the government and global organizations focus primarily on improving the nutrition and health of children. It is important to note that in addition to children acting as a gauge of community health, children that are undernourished are also more likely to grow up to become obese adults as previously stated (FAO, 2019-j). Additionally, *Cocina con causa* has about a dozen episodes available online, and there are many articles in Spanish on the same webpage with topics such as nutrition for college students, and articles focusing on ingredients/foods such as French fries, fish, and trans fats (World Food Programme, n.d.).

Chile also has enacted changes to advertising in order to help combat the growing obesity epidemic. For instance, Act 20.606, put into effect in 2016, not only affected the warning labels that are presently mandated on processed food, but the law was actually far more reaching. The law was partly enacted due to the staggering 60% of Chilean adults (15 to 64 years old) that are considered overweight and obese, which is marked by a BMI that is greater than 25 kg/m² (FAO and the PAHO/WHO, 2017). This act required warning labels on packaged foods and prevented these foods with warning labels from being promoted, sold, or given to children in schools. Additionally, advertisement of these products with warning labels are not allowed to be directed towards children that are 14 years old or younger, and this includes the use of commercial hooks such as prizes or incentives (Sobre composición nutricional de los alimentos y su publicidad Act of 20,606, 2012). This law could be revolutionary, as according to the FAO, this law is "the first law in the world to simultaneously regulate three measures contributing to the reduction of obesity while increasing the consumption of healthier food in an integral

manner: warning labels on the front of food packages; advertising restrictions for children under the age of 14 and restricted food sales at schools and surrounding areas” (FAO and the PAHO/WHO, 2017, p. 16). Even though this Act was created in 2006, it was not placed into effect until June of 2016, meaning that this law had minimal to no effect on the data set of this report (FAO and the PAHO/WHO, 2017). More research is needed to determine the effectiveness and ramifications (positive or negative) of this new law.

Studies show that children normally exposed to about 30 different food commercials every day, and these commercials often contain highly persuasive material. Unfortunately, in this domain, children seem to be targeted, as more food commercials were found to play at the times of children’s programs rather than during the programs that are directed at the population in total. From a 2011 study, conducted by González-Hidalgo, of four Chilean broadcast stations that are accessible over the entire country, 144 hours of television during the weekends and a weekday had 64 food-centered commercials, which includes the 30 food-centered commercials that were directly toward a child audience. In total, 71.9% of the advertised foods were “ultra-processed”; however, the proportion of foods was unequal. 93.3% of the advertisements to children and families were ultra-processed; however, only 47.6% of the adult-focused advertisements were ultra-processed. Of the sixteen sweet foods and drinks advertised between children’s programs, 93.5% were found to surpass the limit of free sugars (sugars that are both added to the foods in manufacturing and the naturally occurring sugars) set by both the PAHO and the Ministry of Health in Chile. In fact, of the 20 commercials that were exclusively advertised towards children and families, 40% exceeded the energy limit, 75% exceeded the sugar limit, 20% exceeded the saturated fat limit, and 25% exceeded the salt limit if compared against the Ministry of Health’s standards. If the commercials are compared against the standards set by the PAHO, the respective percentages are 75% exceeding the sugar limit, 25% exceeding the saturated fat limit, and 35% exceeding the salt limit. More frequently advertised towards adults were fruits, unprocessed dairy products, *carmelos* (popular sugar-based candies), teas, breads, sugar-free cookies, fast-food, and salt-rich foods (González-Hidalgo, 2017). As one could see, this new Chilean law could make a large impact in the obesity prevalence in children, and more research is needed to determine the effectiveness.

Food Literature

One fairly new phenomenon of the media is the growing sector of literature surrounding the growing food landscape in Peru. Before 1990, there had been only about a hundred books published within this genre: these one hundred books were different styles of cookbooks, and scholarly books were largely unavailable. Since this time, the field of gastronomy, specifically Peruvian gastronomy, has increased greatly, with many new publications each year that add to the knowledge of this professional field. While academic books have since been published, they largely are written towards a non-specific audience in an informal tone, and published books contain “very little discussion of the historical, social and cultural circumstances that contributed to the development of Peruvian cuisine”. Books for light reading, also known as coffee-table books, are usually rather expensive; however, several have sought to identify culturally important artwork that corresponds to the culinary advances of the Peru through a style of book that is usually dictated by few words and many pictures. Many more recipe books have been

published; however, it is unclear the number of Peruvians that are buying these books. In many cases, tourists are buying these, often bilingual, books as souvenirs (Matta, 2013). No research was readily available regarding the food literature published in Chile, or the growth/diminishment of this field.

Conclusion

Obesity rates in the Spanish-speaking South American countries have been on the rise between the years of 2000 and 2016; however, neighboring countries Chile and Peru have experienced the largest and smallest growth of the percentage of obese individuals in their population, respectively. A difference between these two countries is their governing bodies and the manners in which they are attempting to combat the obesity epidemic. FBDG, which are widely different between countries, were not published in Peru until 2017. On the other hand, Chile's FBDG had been rewritten several times since their initial publication in 1997. This information is interesting because one would hypothesize that the country with the early publication of FBDG would have a lowered prevalence in obesity following research-based nutritional advice. This data suggests that more research should be done on the usefulness of FBDG as well as the accessibility and efficiency of the Chilean FBDG wording, information, and dissemination. One reason that this data shows unexpected results is that neither country has placed a public health focus on Health Literacy Programs, which would assess the knowledge of citizens regarding health terminology among other knowledge of health. Another interesting point about governmental factors was the fact that laws regarding the packaging of unhealthy foods was adopted from Chile by Peru, and future studies are needed to determine the effectiveness of these laws in both countries.

The economic factors created an even deeper divide between the two countries, because the statistics for food insecurity, hunger, sanitation, and malnutrition were very different. Peru currently has a higher percentage of food insecurity, hunger, and malnutrition, despite the fact that these individual assessments have previously been correlated with an increase in obesity prevalence for a particular region.

In relation to gastronomic/historic factors, these two countries have a common ancestor in the Incan people groups and the common rule of Spain until the 1800s. Despite a brief stint of Peru being under Chilean rule and the microscopic incorporation of Peruvian cuisine into the Chilean cityscape by immigrants, the two countries have developed independently. The Incan diet was well-balanced with adequate exercise, and the current Peruvian cuisine more closely follows this diet, especially in the rural cityscapes. While Peru has worked to maintain their traditional cuisine, Chile, as a whole, has placed less emphasis on their traditional dishes in favor of more convenient cooking styles and ingredients, especially in the current industrialization that is being experienced. This is even seen in the fact that Chile consumes greater amounts of fast food than Peru, despite the fact that more fast food restaurants are operating in Peru.

In relation to lifestyle factors, chronic stress, which is often associated with industrialization and urbanization, has been linked to obesity. This lens can help to explain the heightened trends of obesity in Chile, especially given the national pride the Chileans display of becoming "westernized".

In relation to media influences, in both instances, Chile and Peru are using technology to disperse health information and combat obesity. It is difficult to compare

their two strategies, and more research will be needed in order to accurately assess their individual influences. Chile has enacted laws that censor commercials aimed towards children, and Peru has special television (and radio) programs that aim to improve the nutrition of children by influencing parent's opinions. In both cases, children are targeted specifically, rather than specifically targeting adults. It is unclear the influence of food literature in Peru due to the large number of tourists that are purchasing these books, rather than Peruvians.

Next Steps

More research is needed to augment this literature review for application into public health endeavors. This project only analyzed obesity through the lens of nutrition by means of governmental factors, economic factors, historic/gastronomical factors, lifestyle factors (excluding physical movement and exercise), and media influence for adults. More research is needed on adults in all scenarios, especially in relation to the effects of media influence. Additionally, more research is needed on men, as current research tends to focus on women and other minority groups. More research should also be implemented on the impact of social class from a psychological aspect.

References

- Avilés, M. (2015). The Inca Road: How food became religion in Peru's capital city. Retrieved December 23, 2019 from <https://www.smithsonianmag.com/travel/lima-peru-food-culinary-boom-cooking-restaurants-180956467/>
- Belanger, C. (2018). Peru. *Salem Press Encyclopedia*. Hackensack, New Jersey: Grey Hound Publishing.
- Busse, P., & Bernabé-Ortiz, A. (2018). Self-regulation of the Peruvian food industry: Health message cues in the context of food and beverage advertisements. *Public Health, 159*, 1–3. <https://doi.org/10.1016/j.puhe.2018.03.003>
- Caro, J. C., Ng, S.W., Taillie, L. S., & Popkin, B.M. (2017). Designing a tax to discourage unhealthy food and beverage purchases: The case of Chile. *Food Policy, 71*, 86–100. <https://doi.org/10.1016/j.foodpol.2017.08.001>
- Cartwright, M. (2015). Incan food and agriculture. Retrieved December 23, 2019 from <https://www.ancient.eu/article/792/inca-food--agriculture/>
- CDC Foundation (n.d.). What is public health? Retrieved December 23, 2019 from <https://www.cdcfoundation.org/what-public-health>
- CDC (2018). Public health 101 series: Introduction to public health. Retrieved December 23, 2019 from <https://www.cdc.gov/publichealth101/public-health.html>
- CGTN America [CGTN America] (2018). Peru cuts childhood malnutrition rate in half [Audio File]. Retrieved December 23, 2019 from <https://www.youtube.com/watch?v=WmJRJpaHJro>
- Chile Society & Culture* (2011) (Vols. 2). Petaluma, California: World Trade Press.

- Chitty, A. (n.d.). The impact of poor sanitation on nutrition [PDF File]. Retrieved December 23, 2019 from <https://thousanddays.org/wp-content/uploads/The-Impact-of-Poor-Sanitation-on-Nutrition-1.pdf>
- Council on Hemispheric Affairs (2011). Some “Young Towns” in Lima not so young anymore. Retrieved December 23, 2019 from <http://www.coha.org/some-young-towns-in-lima-not-so-young-anymore/>
- Dormir menos de 7 horas hace que subas de peso por estos motivos (2019, December 27), *Caretas-illustracion peruana*. Retrieved from <https://caretas.pe/>
- Durand, O., & Gardiner, E. [Oliver Durand] (2013). Mothers fight malnutrition in Peruvian shantytown with education [Audio File]. Retrieved from <https://vimeo.com/58692754>
- Fast Food Restaurants Industry (2016). World Industry & Market Outlook Report, 1–166.
- Fischer, C.G. & Garnett, T. (2016). Plates, pyramids and planets developments in national healthy and sustainable dietary guidelines: A state of play assessment [PDF File]. Retrieved from <http://www.fao.org/3/i5640e/I5640E.pdf>
- FAO (2013). The State of food and agriculture 2013: Food systems for better nutrition. *Rome: FAO*.
- FAO and the PAHO/WHO (2017). Approval of a new food act in Chile: Process summary [PDF File]. Retrieved December 23, 2019 from <http://www.fao.org/3/a-i7692e.pdf>
- FAO and PAHO (2017). 2017 Panorama of food and nutrition security in Latin America and the Caribbean [PDF File]. Retrieved December 23, 2019 from <http://www.fao.org/3/a-i7914e.pdf>

FAO (2019-a). About FAO. Retrieved December 23, 2019 from

<http://www.fao.org/about/en/>

FAO (2019-b). FAO regional office for Latin America and the Caribbean. Retrieved

December 23, 2019 from <http://www.fao.org/americas/acerca-de/en/>

FAO (2019-c). FAOSTAT: Bolivia. Retrieved December 23, 2019 from

<http://www.fao.org/faostat/en/#country/19>

FAO (2019-d). FAOSTAT: Chile. Retrieved December 23, 2019 from

<http://www.fao.org/faostat/en/#country/40>

FAO (2019-e). FAOSTAT: Peru. Retrieved December 23, 2019 from

<http://www.fao.org/faostat/en/#country/170>

FAO (2019-f). FAOSTAT: Uruguay. Retrieved December 23, 2019 from

<http://www.fao.org/faostat/en/#country/234>

FAO (2019-g). Food-based dietary guidelines. Retrieved December 23, 2019 from

<http://www.fao.org/nutrition/education/food-dietary-guidelines/background/en/>

FAO (2019-h). Food-based dietary guidelines: Chile. Retrieved December 23, 2019 from

<http://www.fao.org/nutrition/education/food-dietary-guidelines/regions/countries/chile/en/>

FAO (2019-i). Peru. Retrieved December 23, 2019 from

<http://www.fao.org/countryprofiles/index/en/?iso3=per>

FAO (2019-j). The state of food security and nutrition in the world [PDF File]. Retrieved

December 23, 2019 from <http://www.fao.org/focus/e/obesity/obes2.htm>

FAO (n.d.-a). Chile, China and Morocco join others in moving closer to eradicating hunger. Retrieved December 23, 2019 from

<http://www.fao.org/news/story/en/item/235416/icode/>

FAO (n.d.-b) The nutrition transition and obesity. Retrieved December 23, 2019 from

<http://www.fao.org/focus/e/obesity/obes2.htm>

Food Security Portal (2019). Peru. Retrieved December 23, 2019 from

<http://www.foodsecurityportal.org/peru/resources>

Gill, N. (2010). Peru's amazon & southeastern jungle. Edison, New Jersey: Hunter Publishing

Global Health Data Exchange (2018). Ministry of health (Peru). Retrieved December 23,

2019 from <http://ghdx.healthdata.org/organizations/ministry-health-peru>

GHI (2018). 2018 Global Hunger Index forced migration and hunger [PDF File].

Retrieved December 23, 2019 from

<https://www.globalhungerindex.org/pdf/en/2018.pdf>

GHI (2019-a). About: The concept of Global Hunger Index. Retrieved December 23,

2019 from <https://www.globalhungerindex.org/about/>

GHI (2019-b). Chile. Retrieved December 23, 2019 from

<https://www.globalhungerindex.org/chile.html>

GHI (2019-c). Peru. Retrieved December 23, 2019 from

<https://www.globalhungerindex.org/peru.html>

Global Nutrition Report (n.d.) About malnutrition. Retrieved December 23, 2019 from

<https://globalnutritionreport.org/about-malnutrition/#0718a918-undernutrition>

- González-Hidalgo, C. (2017). [Analysis of foods advertised to childhood audience on Chilean television]. *Salud Publica De Mexico*, 59(6), 691–700. <https://doi-org.libproxy.ung.edu/10.21149/7706>
- Gruebner, O., Rapp, M. A., Adli, M., Kluge, U., Galea, S., & Heinz, A. (2017). Cities and mental health. *Deutsches Arzteblatt international*, 114(8), 121–127. doi:10.3238/arztebl.2017.0121
- Hamilton, D. (2006). What's cooking in Chile? Tradition may leave this South American country through the kitchen door. *World & I*, 21(10), 12.
- Harvard Health Publishing (2018). Why stress causes people to overeat. Retrieved December 23, 2019 from http://www.health.harvard.edu/newsletter_article/why-stress-causes-people-to-overeat
- Hernandez, L. M., & Pleasant, A. F. (2013). *Health literacy: Improving health, health systems, and health policy around the world: Workshop summary*. Washington, District of Columbia: National Academies Press.
- Huerta, E. (2018). Más de la mitad de los peruanos somos gordos o supergordos. El Comercio. Retrieved December 23, 2019 from <https://elcomercio.pe/tecnologia/ciencias/salud-peru-tercer-pais-obesos-region-noticia-503786>
- Imilan, W. A. (2015). Performing national identity through Peruvian food migration in Santiago de Chile. *Fennia*, 193(2), 227. <https://doi-org.libproxy.ung.edu/10.11143/46369>

- Jeffery, R.W., Baxter, J., McGuire, M., & Linde, J. (2006). Are fast food restaurants an environmental risk factor for obesity? *International Journal of Behavioral Nutrition and Physical Activity*. <https://doi.org/10.1186/1479-5868-3-2>
- Jodhun, B. M., Pem, D., & Jeewon, R. (2016). A systematic review of factors affecting energy intake of adolescent girls. *African Health Sciences*, *16*(4), 910–922.
[doi:10.4314/ahs.v16i4.5](https://doi.org/10.4314/ahs.v16i4.5)
- Krizanovic, P. (2018). Peru issues warning labels for foods high in fat, salt, sugar. Retrieved December 23, 2019 from https://www.just-food.com/news/peru-issues-warning-labels-for-foods-high-in-fat-salt-sugar_id139501.aspx
- Martin, K. S. & Ferris, A.M. (2007). Food insecurity and gender are risk factors for obesity. *Journal of Nutrition Education and Behavior*: *39*(1), 31-36.
<https://doi.org/10.1016/j.jneb.2006.08.021>
- Matta, R. (2013). Valuing native eating: The modern roots of Peruvian food heritage. Retrieved December 23, 2019 from <https://journals.openedition.org/aof/7361>
- Ministerio de Salud (n.d.). Historia del Minsal. Retrieved December 23, 2019 from <https://www.minsal.cl/historia-del-minsal/>
- MINSA (2019). ¿Qué hacemos? Retrieved December 23, 2019 from <https://www.gob.pe/739-ministerio-de-salud-que-hacemos>
- Nakamura, R., Mirelman, A.J., Cuadrado, C., Silva-Illanes, N., Dunstan, J., Suhrcke, M. (2018). Evaluating the 2014 sugar-sweetened beverage tax in Chile: An observational study in urban areas. *PLoS Med* *15*(7): e1002596.
<https://doi.org/10.1371/journal.pmed.1002596>
- Nagy, K. (2018). Chile. *Salem Press Encyclopedia*.

Najera, H., Nandy, S., Carrillo-Larco, R. M., & Miranda, J. J. (2019). Within-country migration and obesity dynamics: analysis of 94,783 women from the Peruvian demographic and health surveys. *BMC Public Health*, *19*(1), 263. <https://doi-org.libproxy.ung.edu/10.1186/s12889-019-6586-7>

National Heart, Blood, and Lung Institute (NHBLI) (n.d.). Obesity and overweight. Retrieved December 23, 2019 from <https://www.nhlbi.nih.gov/health-topics/overweight-and-obesity>

OECD Better Life Index (n.d.). Chile. Retrieved December 23, 2019 from <http://www.oecdbetterlifeindex.org/countries/chile/>

Office of Communications of the NHBLI (2016). What causes obesity and overweight? Retrieved December 23, 2019 from <https://www.nichd.nih.gov/health/topics/obesity/conditioninfo/cause>

Olivares, C.S., & Zacarías H.I. (2013). Estudio para revisión y actualización de las guías alimentarias para la población chilena [PDF File]. Retrieved December 23, 2019 from https://www.minsal.cl/sites/default/files/files/Estudio%20para%20revisi%c3%b3n%20y%20actualizaci%c3%b3n%20de%20las%20Gu%c3%adas%20Alimentarias%20para%20la%20poblaci%c3%b3n%20chilena_%20MINSAL%202013.pdf

Ojeda, H. (2015). 58% of Peruvians live a stressful life. Retrieved December 23, 2019 from <https://www.livinginperu.com/fifty-eight-percent-of-peruvians-live-stressful-life-105153/>

- Orgill, M. (2017). Long-term stress linked to higher levels of obesity. Retrieved December 23, 2019 from <https://www.ucl.ac.uk/news/2017/feb/long-term-stress-linked-higher-levels-obesity#sthash.731B3U3v.dpuf>
- Partners in Health (2017). CASITA program helps at-risk children excel in Peru. Retrieved December 23, 2019 from <https://www.pih.org/article/casita-program-helps-risk-children-excel-peru>
- Perez-Leon, S., Pesantes, M.A., Pastrana, N.A., Raman, S., Miranda, J. & Suggs, L.S. (2018). Food perceptions and dietary changes for chronic condition management in rural Peru: Insights for health promotion. *Nutrients*, (11), 1563. <https://doi-org.libproxy.ung.edu/10.3390/nu10111563>
- Phillips, R.W. (1981). FAO: Its origins, formation and evolution [PDF Files]. Retrieved December 23, 2019 from <http://www.fao.org/3/a-p4228e.pdf>
- Pogue, J.M. (2014) Salt sugar fat: How the food giants hooked us by Michel Moss. *Baylor University Medical Center Proceedings* 27(3), 283-284. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4059590/pdf/bumc0027-0283.pdf>
- Romero, C., Zavaleta, C., Cabrera, L., Gilman, R. H., & Miranda, J. J. (2014). Hipertensión arterial y obesidad en indígenas Asháninkas de la región Junín, Perú. *Revista peruana de medicina experimental y salud pública*, 31(1), 78–83. <https://doi-org.libproxy.ung.edu/10.17843/rpmesp.2014.311.11>
- Roser, M. & Ortiz-Ospina, E. (2018). Literacy. Retrieved December 23, 2019 from <https://ourworldindata.org/literacy>

- Schnettler, B., Ares, G., Sepúlveda, N., Bravo, S., Villalobos, B., Hueche, C., & Adasme-Berríos, C. (2019). How do consumers perceive reformulated foods after the implementation of nutritional warnings? Case study with frankfurters in Chile. *Food Quality and Preference*, *74*, 179–188. <https://doi-org.libproxy.ung.edu/10.1016/j.foodqual.2019.01.021>
- Schnettler, B., Miranda-Zapata, E., Lobos, G., Saracostti, M., Denegri, M., Lapo, M., & Hueche, C. (2018). The mediating role of family and food-related life satisfaction in the relationships between family support, parent work-life balance and adolescent life satisfaction in dual-earner families. *International Journal of Environmental Research and Public Health*, *15*(11). <https://doi-org.libproxy.ung.edu/10.3390/ijerph15112549>
- Shields, C. J. (2003). Chapter 4: Chile's people and culture. *Chile*, 37.
- Sobre composición nutricional de los alimentos y su publicidad Act of 20,606 (2012)
- Townsend, M (2016). Hunger in Peru: The problems, the progress, and your role. Retrieved December 23, 2019 from <https://www.panoramas.pitt.edu/health-and-society/hunger-peru-problems-progress-and-your-role>
- United Nations (n.d.) Sustainable development goals. Retrieved December 23, 2019 from <https://sustainabledevelopment.un.org/?menu=1300>
- Urbanization (n.d.) Encyclopaedia Britannica Online. Retrieved from <https://www.britannica.com/topic/urbanization>
- U.S. Department of Health and Human Services Office of Disease Prevention and Health Promotion (n.d.) Quick guide to health literacy: Fact sheet. Retrieved December

23, 2019 from

<https://health.gov/communication/literacy/quickguide/factsbasic.htm>

World Bank Group (2019). Peru. Retrieved December 23, 2019 from

<https://data.worldbank.org/country/peru>

WHO (2015). Improving nutrition outcomes with better water sanitation and hygiene:

Practical solutions for policies and programmes [PDF File]. Retrieved from

https://apps.who.int/iris/bitstream/handle/10665/193991/9789241565103_eng.pdf;jsessionid=2A2E9599A6206F1ECED7B6F214C112B2?sequence=1

WHO (2016). Health promotion: The mandate for health literacy. Retrieved December

23, 2019 from <https://www.who.int/healthpromotion/conferences/9gchp/health-literacy/en/>

WHO (2017) Assessing and managing children at primary health-care facilities to

prevent overweight and obesity in the context of the double burden of

malnutrition [PDF File] Retrieved December 23, 2019 from

<https://apps.who.int/iris/bitstream/handle/10665/259133/9789241550123-%20eng.pdf?sequence=1>

WHO (2019-a). Health topics: Obesity. Retrieved December 23, 2019 from

<https://www.who.int/topics/obesity/en/>

WHO (2019-b). Nutrition: Controlling the global obesity epidemic. Retrieved December

23, 2019 from <https://www.who.int/nutrition/topics/obesity/en/>

World Food Programme (2018). Peru annual country report 2018 [PDF File]. Retrieved

December 23, 2019 from <https://docs.wfp.org/api/documents/WFP->

0000104304/download/?_ga=2.99329431.840785505.1559226652-
1751965050.1559226652

World Food Programme (n.d.) Cocina con causa. Retrieved December 23, 2019 from
<http://cocinaconcausa.com.pe/>

Yamada, G. & Chacaltana, J. (2007). Generación de empleo en el Perú: seis casos
recientes de éxito [PDF File]. Retrieved December 23, 2019 from
<http://repositorio.up.edu.pe/handle/11354/259>