Examining Processed Foods in Food Banks and the Presence of Chronic Diseases in Food Bank Clientele

Elizabeth Counts and Dr. Elizabeth Smith

ABSTRACT

Food insecurity affects millions of Americans and puts them at an increased risk of developing chronic disease. Food banks are essential in improving food access for this population. However, previous studies have identified gaps in the nutritional quality of items donated to food banks, thus decreasing clients' access to nutritionally adequate food. The first part of this study examines the presence of chronic disease in food bank clientele by distributing a survey to clients in the waiting room of a local food bank. The second part assesses the nutritional quality of donated items based on their level of processing using the NOVA Food Classification tool. The study found that the majority of food bank clients had been diagnosed with a diet-related chronic disease and that slightly over half of donations were ultra-processed foods. This information can be used to form collaborative approaches between food bank staff, their clientele, community leaders, and donors to help improve access to nutritious food for those facing food insecurity.

Introduction

Food security is defined as having access to enough food for an active, healthy life. Conversely, food insecurity is defined as a household-level economic and social condition of limited or uncertain access to adequate food.Sixty-three thousand food pantries across the U.S. provide food for millions of Americans facing food insecurity.[1] However, due to the prevalence of chronic diseases among this population, it is important to consider the role that nutrition plays in this issue.

According to the United States Department of Agriculture, food insecurity affects 44.2 million Americans.[1] Minority populations are disproportionally affected. Black and Hispanic populations are the most at risk of becoming food insecure compared to non-Hispanic whites. Households with children are also more likely to face food insecurity, especially single parent households. Additionally, food insecurity among older adults living alone and households with no children has been increasing.[1] There are several factors that may lead to a person or family becoming food insecure, such as poverty, loss of a job, lack of affordable housing, chronic health conditions making it difficult to work, medical emergencies, and natural disasters.[2]

Food insecurity has major health impacts on those it affects. A study published by the USDA analyzing five years' worth of data from the National Health Interview Survey found that food insecurity is associated with ten chronic diseases including hypertension, coronary heart disease, cancer, diabetes, and kidney disease.[3] Researchers found that that the number of chronic diseases in low food-security households was 18% higher than in high food-security households. They found that high blood pressure, for example, was 10.5 percentage points more likely in adults with very low food-insecurity than in those with high food-security.[3] Another study on food insecurity and chronic disease had similar findings, concluding that food insecurity was strongly associated with hypertension and diabetes. They found that that the risk of diabetes was 50% higher in food-insecure adults than in adults in food-secure households.[4] Not only do these conditions result in negative physical and mental health outcomes, but they can also lead to further economic hardship with increased doctor visits, hospital stays, and medications payments.

Many who are facing food insecurity receive food from food assistance programs such as food pantries, soup kitchens, and shelters. An estimated one in six Americans rely on these facilities.[2] Food pantries provide food for ninety percent of those who rely on food assistance programs while soup kitchens and shelters make up the remaining amount. Food pantries distribute food directly to individuals from larger warehouse-like facilities called food banks. Food banks receive food from three

sources.[5] The first is from the United States Department of Agriculture (USDA), which purchases food from farmers and then distributes it to food banks. The second source is food purchased by food banks themselves with monetary donations. However, the largest source of food comes from donations from individuals, companies, and local businesses.[5] Due to the constraints surrounding collecting, storing, and distributing donated food, such as lack of refrigeration, the majority of these foods tend to be canned or packaged goods that can maintain a long shelf life. These foods are often energy-dense and solve the more pressing issue of hunger. However, the nutritional content and the effects of long-term consumption of these types of packaged foods is important to consider, especially for populations at risk of developing or already diagnosed with chronic disease.

Food pantries are essential organizations for fighting food insecurity with the primary goal of addressing the issue of hunger. However, it is also important that populations facing food insecurity are not only given access to food, but to food that provides health-promoting nutrients and that is limited in additives that may put them at risk of developing diet-related chronic diseases. Several studies have investigated food banks to identify the predominant food or nutrient groups in their supplies and those that are in short supply. One study examining several food pantries in Massachusetts found that the largest supplied groups of food were fats, oils, and sweets followed by breads. They also found that vitamin C and calcium were deficient in the food donated to the pantries.[6] Another study found that food groups containing bread, cereal, rice, and pasta were the largest in quantity (after excluding for sweets and fats) while the pantries tended to be limited in dairy and vegetables. They also found that over a one-month period, 19,590 sweets and 12,041 servings of fat were distributed each day which primarily came from donations of candy, desserts, and cream cheese.[5]

While many studies have examined what food and nutrient groups are the most abundant in food pantries, few have looked specifically at the prevalence of ultra-processed foods. According to Harvard Health, "unprocessed or minimally processed foods are whole foods in which the vitamins and nutrients are still intact. The food is in its natural (or nearly natural) state" while processed and ultra-processed foods are foods that have added ingredients such as sugar, salt, fat, and artificial colors or preservatives.[7] These products are often high in refined sugars, sodium, saturated fats, and trans fats while being low in fiber and other nutrients. Processed food has been linked to various chronic diseases. A systematic review of thirty-eight studies concluded that there is overwhelming evidence that a higher consumption of ultra-processed foods is positively associated with obesity and diet-related diseases such as high blood pressure and diabetes

mellitus.[8] This study aims to examine chronic disease prevalence in food pantry clientele and explore the proportion of ultra-processed food present in food pantries. It was hypothesized that there would be a high percentage of food pantry clientele with one or more chronic diseases as well as a high proportion of ultra-processed food available to these clients.

Methodology Part I

The purpose of Part I of the research was to determine how many clients of Nourish Food Bank have one or more diet-related chronic disease. To accomplish this, a Qualtrics© survey was administered to clients while they waited in the Nourish waiting room. Data was collected over a one-month period to prevent any duplication, as clients are permitted to visit Nourish Food Bank for provisions once every thirty days. Nourish operates Monday through Friday and survey results were collected throughout every day of the week to ensure a widely representative sample. The survey began with a consent page that clients had to agree to before advancing on to the survey questions. The survey contained five questions and took participants no more than two minutes to complete. The client was asked to indicate their age group and gender. Then they were asked to check a box next to any of the listed chronic diseases in which they had been diagnosed. Another question followed asking the client to indicate if a member in their household had been diagnosed with any of the listed chronic diseases. All diseases were listed in Layman terms and included high blood pressure, high blood sugar, high cholesterol, overweight, obese, kidney disease, and any type of cancer. The data collected on chronic disease was then compared to the overall U.S. population using data from the National Center of Health Statistics. Lastly, participants were asked to indicate how often they use a food pantry. Participants excluded from the survey were those below the age of eighteen and pregnant women.

Results Part I

A total of 137 survey responses were collected. Twenty-eight percent of participants were in the 55 to 64 age range followed by the 25 to 34 age range at 20%. The smallest age group was 18 to 24 at only 3%. Females made up the majority of food pantry clientele at 66% compared to men at 31%. The majority of participants reported having one or more diet-related conditions at 70%. Of those clients, the most reported conditions were hypertension (71%), being overweight or obese (48%), high cholesterol (35%), and diabetes (32%). Others reported having high blood sugar (21%), heart disease (20%), kidney disease (9%), cancer diagnosis (9%), and history of a stroke (7%). Participants also reported that members of their household had diet-related conditions at 40%. Of those household members, the majority had hypertension at 69%. The next most prevalent conditions were overweight or obesity (53%), high

cholesterol (44%), diabetes (35%), and high blood sugar (31%). Following that were cancer diagnoses (20%), heart disease (16%), history of stroke (16%), and kidney disease a (13%). The majority of participants (53%) indicated that they visit a food pantry once every month. Other participants visited less frequently with 22% using a food pantry a few times a year and 17% using one every few months.

As displayed in Figure 1, food bank clients were more likely to have high blood pressure at 49.64% compared to 24.8% in the U.S population, representing a 24.8 percentage point difference.[9] Food bank clients were also more likely to have diabetes (by 13.13 percentage points), heart disease (by 2.67 percentage points), stroke (by 4.37 percentage points), and cancer (by 1.08 percentage points).9,10,11 Conversely, food bank clients were less likely to be overweight or obese (by 31.52 percentage points).[12] It is worth noting that although less likely to be overweight or obese compared to the U.S. population, of the food bank clients who indicated they had 1 or more chronic conditions, a significant amount at almost half (48%) indicated being overweight or obese as one of those conditions. High cholesterol and high blood glucose were unable to be compared due to the lack of data for the U.S. population.

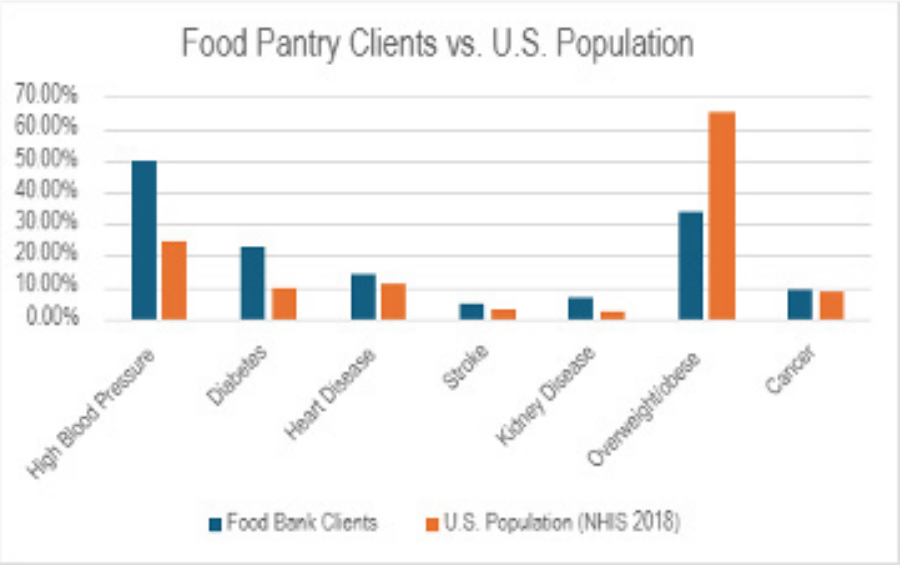

Figure 1. Chronic disease in food pantry clients compared to the general U.S. population.

Methodology Part II

The purpose of the second part of the research was to determine the health quality of food donations that food pantry clients can access. To accomplish this the NOVA Food Classification System was employed.[13] This system separates food into four groups based on their level of processing. Group 1 is comprised of unprocessed or minimally processed foods. Unprocessed means that the food is "obtained directly from plants or animals and does not undergo any alteration following their removal from nature."[13] Minimally processed is defined as a natural food that has had inedible parts removed or has been dried, frozen, pasteurized, or fermented but has no oils, sugar, salt, or other substances added to it. Examples of Group 1 foods include frozen vegetables, packaged grains such as rice, oats, and corn kernels, eggs, dried fruits, beans, nuts and seeds, milk, and yogurt. Group 2 comprises processed culinary ingredients, which are products extracted from natural foods for cooking or seasoning. These foods include oils made from seeds and nuts, cane or beet sugar, honey, maple syrup, butter, coconut fat, and salt. Group 3 are processed foods which are "products manufactured by industry with the use of salt, sugar, oil or other substances (Group 2) added to natural or minimally processed foods (Group 1) to preserve or to make them more palatable."[13] This includes canned vegetables and legumes preserved with salt, fruits in sugar-added syrups, beef jerky, salted or sugared nuts, canned fish, salted, dried, smoked or cured meat, cheeses, and bread. Lastly, Group 4 is ultra-processed foods which are "industrial formulations made entirely or mostly from substances extracted from foods (oils, fats, sugar, starch, and proteins), derived from food constituents (hydrogenated fats and modified starch), or synthesized in laboratories from food substrates or other organic sources (flavor enhancers, colors, and several food additives used to make the product hyper-palatable)."[13] Examples of these foods include packaged snacks, soda, candy, instant soups/noodles, pre-prepared pizza, chicken nuggets, sausages, hamburger buns, breakfast cereals, pastries, and cakes.[13]

To determine how many foods make up each of the four NOVA categories, an inventory was obtained of all the food donated to Nourish Food Bank. The Nova Food Classification guidelines were used to sort products into unprocessed or minimally processed (Group 1), culinary ingredients (Group 2), processed (Group 3), and ultra-processed (Group 4) to determine the number of products that make up each group. In cases where the product listed was too vague to determine the exact NOVA group, the ingredients of Walmart Inc.'s Great Value branded versions were assessed. Being the largest supermarket chain in the United States, this provided the most likely ingredients

contained in the donated product.[14] Baby formula and baby food was excluded from the inventory and accounted for 160 items. Indecipherable products such as "Kroger box", "Food Lion Box" and "treat bags" were also excluded and likely contained an assortment of food products from any of the four NOVA categories.

Results Part II

From the inventory of donated products over a one-year period, 44,724 products were assessed.15 Of those products 51.25% made up the ultra-processed Nova Group 4.[15] Examples of contributors to this group included juices made from concentrates and other sweetened beverages, pop tarts, packaged ramen, canned soups, cereal and protein bars, packaged mac and cheese, instant oatmeal, crackers, and chips.[15] The second largest group was the processed food group (Nova Group 3) with 37.93% of products belonging to it. Some of these products included apple sauce, salted nuts, canned vegetables and fruits with added salt or sugar, canned fish, popcorn, pasta sauce, and canned beans.[15] The third largest food group was unprocessed or minimally processed foods (Nova Group 1) at 10.32%. Examples of these foods in the inventory included fruit, milk, vegetables, frozen meats, beans, and grains.[15] The smallest food group was culinary ingredients (Nova Group 2) at 0.499%. Primary contributors of this group included cooking oils, salt, sugar, and baking powders.[15]

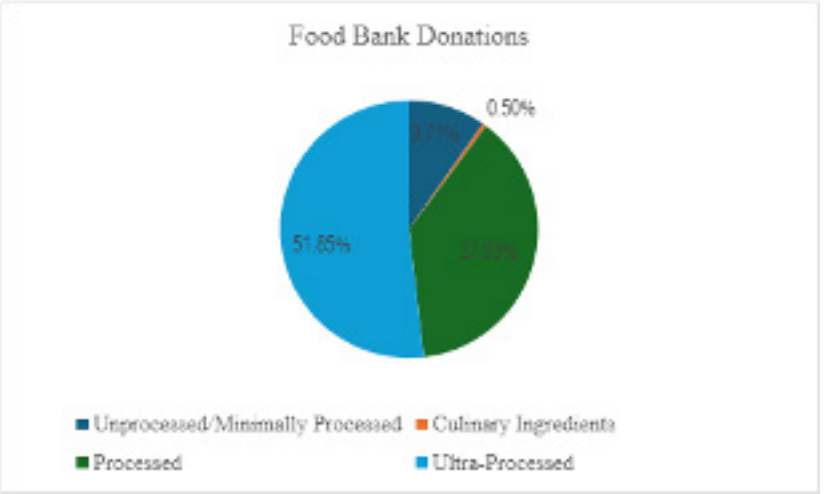

Figure 2. Nourish food donations compared by NOVA categories

Discussion

Food insecurity is faced by millions of Americans and has been associated with the development of various diet-related chronic diseases. Many rely on food-assistance programs such as food pantries and food banks. Previous studies have determined gaps in the nutritional quality of donated food bank items including a lack of Vitamin C and calcium as well as limited donations of vegetable and dairy items.[6] Few studies, however, have examined food donations using the NOVA Food Classification System. The aim of this study was to utilize the NOVA ranking tool in order to determine what proportion of donated products are ultra-processed foods which have been heavily linked to the development of chronic disease. The study also aimed to determine if the same clients consuming these products were likely to be diagnosed with a chronic disease. The findings of this study provide more insight into the characteristics of this population as well as the food that they may have access to.

Of the food bank clients surveyed, it was determined that the majority had been diagnosed with one or more chronic diseases. Over a third of clients had members of their household who had been diagnosed with a chronic disease as well. Compared to the U.S. population, the data showed that these food bank clients were more likely to have high blood pressure, diabetes, heart disease, stroke, and cancer. This builds on previous studies that have linked food insecurity with an increased risk of developing disease.3 This data demonstrates a need for improving factors that contribute to disease risk and worsen conditions that already exist. A major factor is adequate nutrition and limiting the consumption of ultra-processed foods.[8]

The food that these clients have access to was categorized into the four NOVA classification groups including minimally processed, culinary ingredients, processed, and ultra-processed. It was determined that slightly over half of all donated products were ultra-processed. This adds to the previously existing data on nutrition quality gaps in food pantry donations.[6] Ultra-processed foods tend to be high in calories, sugar, sodium, saturated and trans fats which contributes to their long shelf-life and hyper palatability, but also to their link to an increased risk of chronic disease.[8] Ultra-processed foods are also lower in fiber, vitamins, minerals, and other nutrients that help protect against disease.[8] The results showed that most donations are ultra-processed which limits the nutritional quality of food that clients have access to. The fact that the majority of clients were diagnosed with a chronic disease emphasizes the need to improve their access to more nutritious food options.

Study Limitations

It should be noted that the data collected for the frequency in which clients use food banks may not be representative of most food bank clientele. The specific food pantry where the study was conducted only allowed clients food provisions every 30 days. Future studies should aim to investigate a wider range of facilities. Another limitation is that the inventory used did not include exact brand names or versions, meaning the ingredients within the product can vary slightly and therefore possibly change their assigned NOVA category. To address this issue, future research could gather more comprehensive descriptions of food products by monitoring donations over an extended period.

Lastly, while the results from this study provide valuable insights to both food pantry clientele and food bank nutrition quality, they should be interpreted with caution due to the lack of data analysis. Both the data on chronic disease collected from this study's survey as well as the survey from the NCHS contained multiple-response questions, inhibiting the ability to conduct statistical testing due to the lack of mutually exclusive data points. Future studies should aim to determine whether the differences in chronic disease between food pantry clients and the U.S. population are statistically significant. Additionally, in order to add to the data collected on the proportion of donations in each of the four NOVA categories, more extensive future studies should investigate how these proportions compare to those of an average American diet, or the products supplied in an average U.S grocery store.

Implications

As stated previously, the largest source of food supplied at food banks comes from generous donations made by individuals and companies. There are several challenges in increasing the health quality of these donated items. The first is simply that most donators may not have knowledge of the issue that this study aims to bring awareness to. Another challenge is that donations are likely influenced by the food consumption habits and products available to the U.S. population, a large portion of which is processed and ultra-processed foods.16 This represents a much larger issue in our food system that cannot be easily fixed. Another challenge is the limited refrigeration and freezer storage of food bank facilities and, in some cases, their clients. This makes processed and ultra-processed foods preferred due to their ability to maintain a long shelf-life. Nevertheless, there are still solutions that could improve the health quality of donated items.

One possible solution could be a resource that provides guidance for those purchasing items to donate. This list could include healthier versions of shelf-stable

products such as low sodium canned soups and vegetables, no sugar added fruits, dried grains, canned fish, dried or canned legumes, nuts, popcorn, peanut butter, and low-sugar cereals. Some food banks have moved a step further and implemented nutrition quality regulatory policies, eliminating the distribution of items like candy and soda. One study gathering the opinions of food bank directors and staff showed varying responses to this.[17] Many were concerned that this would harm donator relationships thus decreasing overall donations. However, a few food banks who have implemented these policies on soda donations found that donors were willing to accommodate this request, and in cases where some donators were lost, more were gained to fill in this gap. The study noted that more research is needed to determine if regulatory nutritional policies are an effective approach in improving nutritional quality without decreasing donations.[17]

Another challenge that food bank staff cited was being able to properly store and distribute perishable goods.[17] This requires adequate refrigeration, staff, and volunteers to process these goods, and a means of transporting goods to clients. Encouraging monetary donations to food banks and increasing their resources may help mitigate these barriers and improve the distribution process. For example, many food banks nationwide have been able to implement mobile pantries to quickly distribute perishable items.[17]

One solution for obtaining more of these nutrient-dense items is to increase partnerships between food banks and local farmers. These programs already exist in several states such as Connecticut, Georgia, Kentucky, Maryland, Oregon and Rhode Island.[18] Other states like Arizona, California, Colorado, Oregon, Iowa, and Kentucky offer tax credits to farmers donating extra produce to food banks.[18] Furthermore, programs like Grow to Give and Ample Harvest encourage home and community gardeners to donate a portion of their produce to food banks as well.[18]

As a donor, a first step when deciding what to donate would be to contact the intended food bank or consult the food bank's website to determine what donations they are able to accept and what foods are in low supply. If there are no specific requests or guidelines, a general recommendation to follow is to look for shelf-stable products of the five food groups: proteins, dairy, grains, fruits, and vegetables. Examples of shelf-stable proteins would be canned fish, canned chicken, canned legumes, and nut butters. Dairy options that also serve as a source of protein include shelf-stable dairy milk or powdered milk. Examples of shelf-stable grains would be whole grains such as oats, brown rice, quinoa, popcorn, whole wheat pasta, and whole grain cereal. Lastly, there are a variety of shelf-stable fruit and vegetable options that are canned or jarred. Some helpful labels to look for when choosing these items would be "reduced sodium," "low sugar," or "no added sugar," and "whole grain." Additionally, if the food bank is need

of more allergen-friendly foods, labels reading "allergy free" or "free from" common allergens such as wheat, dairy, eggs, peanuts, tree nuts, eggs, shellfish, and soybeans may also be helpful. It should be noted that several of the example items listed are considered Group 3 processed foods meaning they are manufactured with the use of salt, sugar, oil or other added ingredients to natural or minimally processed foods. This is often required for shelf-stable products but can also be a part of healthy diet. However, Group 4 ultra-processed foods in high amounts are typically associated with a higher disease risk due to their addition of excessive fat, sugar, sodium, preservatives, and artificial flavors. Examples of these foods that generally should be limited in donations include candy, chips, sugar-sweetened beverages, and baked goods.

Conclusion

Food insecurity impacts millions of Americans, and those who face food insecurity are at a greater risk of developing chronic disease. This also puts them at a greater risk of further financial instability from medical bills and hospital stays. Many who are food insecure rely on food banks and food pantries which are largely dependent on donations. This means that food banks have limited control over the food they supply, and their clients have limited access to nutritionally adequate food. Additional research is needed to accurately assess how the prevalence of chronic diseases among food pantry clients compares to that of the U.S. population. However, this study displays valuable insights into the health characteristics of food pantry clientele and the types of items food banks typically receive. The majority of clients surveyed had been diagnosed with one or more diet-related chronic diseases, and slightly over half of all food bank items were ultra-processed. Information in this study can be used to draw attention to this gap in access to nutritious food combined with the health risks already present in this population. From there, a collaborative approach between food bank staff, their clients, community leaders, and donors can be used to develop solutions to help fill this gap. It is important that those facing food insecurity not only have access to food but also to nutritionally adequate food that is essential for maintaining health, preventing disease, and contributing to a higher quality of life.

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