The Importance of Food Security in Preventing Cardiometabolic Disease

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Food insecurity is defined as "the limited or uncertain availability of nutritionally adequate and safe foods, or limited or uncertain ability to acquire acceptable foods in socially acceptable ways[1]". Healthy People 2030 has identified the reduction of household food insecurity and hunger as a top priority, with data from 2018 showing a baseline of 11.1% of U.S. households counting as food insecure, with a goal to decrease this percentage to 6% by 2030[2]. Disparities in food security are a key determinant of health and are intimately linked to adverse cardiometabolic health outcomes. Those with food insecurity tend to eat less nutritionally dense foods, which often leads to increased risk of adverse health outcomes as well as poorer diet later in life. Passing legislation and providing resources such as food banks, cooking classes and education to both adults and children will decrease incidence of cardiometabolic disease, help ensure better dietary habits in old age and foster community around food production**.**

The importance of access to adequate foods cannot be understated. A paper published by the AHA in 2020 found a significant correlation between food insecurity and death from not only cardiovascular disease, but all-cause mortality among US adults[3]. Aside from mortality, food insecurity has a strong correlation to numerous cardiometabolic conditions which are prevalent in the general population. These include diabetes, hypertension, coronary artery disease, chronic kidney disease, congestive heart failure, and stroke as well as a greater prevalence of overweight / obesity in the adult U.S. population[4]. There are less studies involving children at this time, but they do show an association with numerous risk factors for poor cardiometabolic health, with food insecurity serving as a precipitating factor for the development of these conditions[5,6]. These correlations are striking and have significant implications for public health efforts, especially in the setting of cardiovascular disease continuing to be the number one cause of mortality within the United States, with an estimated cost upwards of $378 billion in 2017-2018[7]. Understanding

the root causes of disease provides potential pathways for mitigation with programs and social support systems.

The treatment for numerous cardiometabolic diseases such as diabetes, hypertension and coronary artery disease are all intimately linked to diet, meaning that individuals with food insecurity are especially susceptible to nonadherence to treatment plans and more likely to have poor health outcomes[8]. 'Lifestyle modifications' is often the first-line treatment and is preferable to medications in many early cases. This generally means eating nutrient rich foods, decreasing intake of certain categories of foods like salts, starches and sugars, increasing exercise and decreasing the amount time spent being sedentary. When providers discuss treatment plans with patients, there is often an inherent assumption that the patient has access to certain things, which can be a dangerous assumption in food insecure individuals. With diet being the cornerstone of treatment for many chronic cardiometabolic diseases, providing access to nutritious foods is a key factor in managing patient health and should be at the forefront of provider's minds.

The pathways by which food insecurity leads to metabolic conditions are numerous. The traditional thought process is that foods which are more saturated in fats, sugars and salt are cheaper and more readily available than organic produce, high quality grains and certain protein sources. Thus, food insecurity often leads to consumption of less healthy foods with a higher caloric density which directly contributes to an increased risk of becoming overweight / obese and an increase in incidence of cardiometabolic disease[9]. From an economic standpoint, those within the food insecure category often also fall below the poverty line and are forced to make difficult decisions which may include choosing between medications (insulin, hypertension medications) or food for the week, deciding between gas to get to their job or groceries, etc.

From a biological perspective, food insecurity is associated with higher levels of anxiety, depression, issues with medication adherence and stress than their food secure counterparts[9].

The origin of dietary habits in older age is complex and has not been well-studied, but early intervention and access to nutritionally complex foods as a kid is thought to influence diet throughout the rest of life. A prospective and cross-sectional analyses found a correlation between childhood consumption of vegetables with a healthier diet in old age, as determined by 12 markers of dietary quality and found that early educational intervention and implementation is an effective method in ensuring healthy diet in older age[10]. In children, access to nutritional foods is a key determinant of health and an issue of equity which should be at the forefront of public health efforts going forward. Food insecurity has been consistently correlated with poor health outcomes in children, especially regarding chronic health problems and effects on cognitive function and behavior[5]. In 2019-2020 it was found that the percentage of children living in food insecure households within the U.S. was as high as 10.8%, though this number varied significantly varied by race and disability status. Children within non-Hispanic White households were 2-3x less likely (6.5%) to live within food insecure households than children from either Non-Hispanic Black (18.8%) and Hispanic (15.7%) households. Equally striking is the disparity between children with or without disability, with 19.3% of children with disability meeting the criteria to be food insecure, as opposed to 9.8% of those without disability[11].

The current nutritional support system in the U.S. is insufficient to truly prevent food insecurity, as evidenced by the fact that 13.8 million households in the U.S. reported being food insecure in 2020[1]. I advocate for a tiered, multipronged approach to tackling nutritional security, involving the education of legislators and community organizations. At the base, having the metaphorical band-aid provided by food banks is essential – providing basic food staples to those

who can pick it up from a stationary location. There are issues with relying on this as a sole solution, as studies have found that the nutritional value of the resources provided by many food banks are lacking in essential nutrients[12,13]. They are also more likely to provide bulk foods, which while great in the short term often means they contain higher levels of processed foods, added sugars and salt, which may exacerbate chronic health conditions. Food banks /pantries are a great start, but too often have issues with access and lack essential foods. Ideal programs include multitiered infrastructure of support and community led programs – this includes mobile as well as stationary food pantries with delivery, cooking classes, payment for travel to and from resources, and help with building gardens within communities so that travel is not a necessity.

One of the most important things that can be done to lessen food insecurity is the passing of legislation and creation of support systems which knock down barriers to food access, especially within vulnerable and resource-starved populations. The AHA emphasizes the need for availability, accessibility and affordability when discussing nutritional security. meaning that an equitable society would have an appropriate access to the necessary quality and quantity of nutritious foods at a price that is affordable[13] – which is not the reality within the U.S. There are many programs which have been working towards a more equitable food system, including Supplemental Nutrition Assistance Program (SNAP), National School Lunch Program, Summer Food Service Program, Women, Infants and Children (WIC). Each of these programs benefit a wide swathe of the population, but each carry restrictions and have gaps which leave people vulnerable to food insecurity. For instance, SNAP benefits are a federal program and both immigrants and previously incarcerated individuals are ineligible to apply, even though these populations are often in the most need of support. New legislation which is more inclusive would provide a broader and more equitable support net for those experiencing food insecurity. In

Oregon, there is state legislation in the making that would extend support benefits to Oregonians to those who are ineligible to receive SNAP benefits due to their immigration status (Food For All) as well as local organizations such as Hunger-Free Oregon which work towards community organization and equitable legislation[14].

A study performed in New York followed Hispanic and Latinx pediatric patients with documented food insecurity after enrolling them in a mobile food pantry program called FARMacia[15]. The families were provided with twice monthly grocery packages for 6 months, nutrition counselling, as well as cooking classes, help with supplemental food programs and payment for travel to and from food pantries / farmers markets. This was found to be an effective and engaging way to provide food, resources and support to families and lead to a significantly lessened level of food insecurity among children. The use of several tools of engagement was effective in retaining people within the program until the end of the pilot at 6 months. Another community-centered approach is to focus efforts on increasing the number of community and personal gardens within cities. Teaching individuals and families how to start and maintain their own gardens, providing the resources to do so, and increasing access to greenspace has been shown to increase the intake of nutritional foods and decrease food insecurity in the long term. An observational study of 42 Hispanic farm worker families within Oregon found that intervention with community garden resources and education was effective in creating a three-fold increase in the amount of vegetables that the children ate each day as well as a stark decrease in the level of food insecurity found on the post gardening intervention survey, from 31% to 3.1%. They also found that as an additional benefit, the act of gardening as a family cultivated a strong sense of family togetherness and strengthened family relationships[16].

Food as medicine is not a new concept, and the importance of having access to high-quality nutritional resources is crucial for the development of children and the treatment and prevention of chronic disease. Food insecurity is present in a wide swathe of the U.S. population, especially with historically marginalized communities and is strongly correlated with cardiometabolic disease and poor health outcomes. It has been shown that providing multimodal resources and continuous support improves health outcomes, lessens food insecurity and can be a means of bringing community together. The creation of a sustainable food system and infrastructure is possible through legislation, federal and state programs, as well as community organization and will lead to a healthier population.

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