

PLAYING THE LONG GAME: EXAMINING THE
LONG-TERM EFFECTS OF FOOD INSECURITY ON
ADULT MENTAL HEALTH FROM GLOBAL TO LOCAL

Quinton R. Perry Sr.
Healthcare Leadership
May 2025

Faculty Adviser: Dr. Christine Stevens

Essay completed in partial fulfillment of the requirements for graduation with Global Honors,
University of Washington, Tacoma

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- I. Introduction
 - Background on Food Insecurity/Food Apartheid and its global prevalence.
 - Overview of mental health challenges and their public health significance.
 - Scope of the thesis and its objectives.
- II. Methods
 - Thesis Literature Criteria
 - Selection Process
 - Behavioral Risk Factor Surveillance System (Survey)
- III. Biological and Psychological Pathways
 - The role of nutritional deficiencies (e.g., folate, iron) and stress in intensifying mental health issues.
 - The relationship between micronutrient deficiencies and poor mental health.
- IV. The Relationship Between Food Insecurity/Food Apartheid and Mental Health
 - Prevalence of food apartheid and the two-tier food system
 - Local to Global impact of Food insecurity and Mental Health
- V. Maternity and Food Insecurity
 - Challenges and Barriers to FIS
 - Children and adolescents
- VI. Limitations
- VII. Conclusion
 - Key findings
 - Interventions

Introduction

Overview of Mental Health Challenges and Their Public Health Significance.

Mental health disorders are a leading cause of disability, affecting close to 1 billion people worldwide. Current research highlights the bidirectional relationship between food insecurity and mental health. (McMichael et al., 2021) FIS creates an environment for chronic stress and nutritional deficiencies that increase adverse health outcomes. Also, poor mental health reduces a person's capacity to work and maintain stable living conditions, increasing their susceptibility to FIS. It affects 1 in 9 people globally. (FAO et al., 2023) This complex interplay is especially prevalent amongst women and children, who are the most vulnerable to both situations at higher rates than other demographics. (Maynard et al., 2018) FIS is associated with a 257% higher risk of anxiety and 253% higher risk of depression, with the largest impact being among low-income households and marginalized racial groups. (Seligman, H. K., & Berkowitz, S. A. (2019))

The purpose of this thesis is to explore the relationship between food insecurity and food apartheid and the long-term effects on the mental health of vulnerable populations. This thesis will explore recent studies to understand how FI affects mental health through biological, psychological, and social mechanisms. Through identifying and examining the physiological, social, and early-stage developmental impacts on the mental health of vulnerable populations. By doing so, it contributes to ongoing discussions about the larger impact of social determinants of health (SDOH) and the need for extensive evidence-based solutions.

Background on Food Insecurity/Food Apartheid and its global prevalence.

Food Insecurity (FIS) is the limited or uncertain access to affordable, quality, and healthy food. (United States Department of Agriculture, 2023) However, we cannot encompass the entirety of the food insecurity landscape without including food apartheid. Food Apartheid (FA) is the purposeful and intentional denial of access to affordable, quality, and healthy foods to a specific demographic. (Brones, 2018) FIS and FA are immediate global issues with far-reaching consequences. FIS and FA are critical in physical and mental health (PH) (MH), affecting millions globally. In higher-income countries, marginalized groups, including single-parent households, ethnocultural minorities, those with physically limiting disabilities, chronic illnesses, MH issues, and Serious Mental Issues (SMI), are affected at a disproportionate rate. SMIs are defined separately from other mental health issues such as depression and anxiety. Serious Mental Illness will be described as a long-term mental illness that significantly affects functional impairment over multiple symptom categories which can lead to an inability to maintain employment, repeated inpatient hospitalization, diminished social support, homelessness, incarceration, along susceptibility to substance abuse. (Berkman et al., 2016) SMIs can also be defined acutely as individuals scoring higher than 13 on the Kessler 6 questionnaire for psychological distress. (Berrett-Abebe, Reed, 2024). Studies show that FIS is positively related to higher rates of mental health disorders such as anxiety and depression, and SMIs increase the risk for negative health outcomes. (Berrett-Abebe, Reed, 2024).

Methods

Literature Criteria

The criteria for eligibility of use for this systematic review were peer-reviewed articles, studies, surveys, and reports between 2015 and 2025. These were sourced through the University of Washington Library's CINAHL database, PubMed, and Washington Behavioral Risk Factor

Surveillance System (BRFSS) that quantitatively and qualitatively examined the associations between adults considered Food Insecure (FIS), who also experience anxiety, depression, and Serious Mental Illness (SMI) and its global and local impact. This thesis will include data from several peer-reviewed sources that refer to children from birth to pre-adult in small portions to illustrate the developmental impact of FIS on mental health as well as the effects of FIS and MH maternal mortality rates globally, though they will not be the focus of this thesis. A systematic search of literature was conducted using the University of Washington's online library database for scholarly peer-reviewed literature using the following keywords: FIS, global, social determinants of health, food apartheid, mental health, and chronic health issues. The book "Body and Soul: The Black Panther Party and the Fight Against Medical Discrimination" was selected due to its relevance to the interventions in healthcare and other community-based public health and nutrition programs targeting community risk factors locally and nationally.

Selection Process

The process began with more than 30 identified sources of literature, ranging from a vast number of topics relating to FIS, access to care, and the physiological and psychological effects of FIS on the human body from a local and global viewpoint. Several individuals were identified as sources within the local community to consult with to acquire information about access to MH care within the local community. A survey was planned to gain a sample of the population's perception of access to MH care in the local community. Due to a change in deadline, this had to be replaced with datasets extracted from the Pierce County section of the Washington Behavioral Risk Factor Surveillance System (BRFSS), and 20 sources of literature in the form of reports, books, studies, and peer-reviewed articles relating to the FIS, MH, PH, and their relationship to the population.

Data was sourced using the Healthy Eating Index (HEI) which is a diet quality indexed created by the United States Department of Agriculture (USDA) and adapted for use in Canadian populations. This will be used to explain the biological relationship between FIS and its biological effects on the sample populations through measuring nutrients through energy intake (EI) in relation to estimated energy requirements (EER)

Washington Behavioral Risk Factor Surveillance System (BRFSS)

Pierce County Datasets and survey questions relating to FI, MH, and PH, were collected and analyzed from the 2023 BRFSS. This is a. landline/mobile phone survey conducted by the Washington State Department of Health Center for Epidemiology Practice, Equity, and Assessment, the Centers for Disease Control and Prevention, the National Center for Chronic Disease Prevention, and Health Promotion. The Office of Adult and Community Health Behavioral Surveillance Branch which collects data on health behaviors and conditions in Washington State for its applicable use in health trend monitoring, and targeted programs to intervene in community health risk factors. The covariates included in the datasets examined responses to a voluntary questionnaire administered over the phone to participants from Pierce County (n=2,2632). The variables were selected based on the research question “Does FIS impact the number of reported poor days of physical and mental health. The covariate questions were age, race/ethnic identity (_llcpm02), number of days experiencing poor MH (menthlth), as well as days experiencing poor PH (physhlth), and frequency in which they were hungry and could not afford or acquire food within the last 12 months (FIS) (sdhfood1). This was measured on a scale of one through nine with each number representing a qualitative response. The responses were recorded as 1. Always, 2. Usually, 3. Sometimes, 4. Rarely, 5. Never, 7. Don’t know, 9. Refused, and blank spaces were left for those who chose not to respond. These were

selected to examine the relationship between reported poor mental and physical health to the age and race/ethnicity of the participants, to see if there is a positive and negative relationship between the age and ethnicity and days of poor MH and PH. The datasets were cleaned to eliminate any responses from non-adults, refusals, and non-answered survey questions. The variable FIS was measured concerning self-reported days of poor physical and mental health.

The participants who answered 1,898 answered 5 (Food Secure) with 461 participants reporting some form of FIS with the last 30 days of taking the survey. Participants answering between 1-3 (218) on average reported experiencing on average 10 days of poor mental health and four days of poor physical health within the surveyed 12-month period assessed. Findings show participants who reported always feeling food insecure within the last 12 months (31) experience an average of 14 days of poor mental health and 7 days of poor physical health.

Biological and Psychological Pathways of Food Insecurity

The role of nutritional deficiencies in mental health

The pathological effects of FIS are present across all societies. High-income countries (HIC) may experience a rise in negative outcomes such as hypertension, diabetes, poor quality of life, and reduced physical functions while increasing the use of the healthcare system. While Low-Middle-Income Countries (LMIC) may experience FIS effects by way of undernutrition, (McMichael et al., 2021). The brain can be negatively impacted by malnutrition through low-quality diets, nutrient deficiencies, and stress. A 2017 Canadian study of adults 19-70 (n=20,948) across 10 Canadian provinces found that poor diets were more common amongst the population with poor mental health at measured 33 percent as opposed to the 26% of those who reported with good mental health. This was consistent when measuring males 31 to 70 in carbohydrates,

protein, and fiber, as well as women and their thiamine, vitamin A, multiple vitamin B's, vitamin C, D, magnesium, phosphorus, and potassium. (Davison et al., 2017) Women who reported low MH were found to be FIS more often than those who were not. Accept in vitamin B. Women who reported being FIS tested slightly higher than their food secure participants.

FIS has been linked to over-and-undernutrition, eating disturbances (anorexia, bulimia), and nutritional deficiencies that bring about psychiatric symptoms. Suboptimal nutrition was present in a study of adults with mood disorders, specifically reduced vitamins and mineral nutrients. (Davison et al., 2017) The gut-microbiota-brain axis is the bidirectional communication between the gastrointestinal bacteria and the central nervous system. This can be negatively impacted through a deficient diet, causing inflammation, immune responses, gastrointestinal diseases, and other negative health outcomes that have been known to increase mental health episodes. (Petra et al., 2015) Poor dietary quality has been documented amongst the populations with mental health diagnoses and FIS. Poor diet, FIS, and deficiency in vitamins, protein, iron, and folate were also discovered to be predictors of poor mental health in study participants.

The relationship between micronutrient deficiencies and poor mental health.

The Acceptable macronutrient ranges (AMDRs) are recommended ranges of carbohydrates, fats, and protein ranges a person should be in based on epidemiological evidence to reduce the risk of chronic illnesses. (Lee et al., 2015) The Canadian adult participants who reported FIS were further outside the AMDR than the food secure participants. A greater difference in ranges was found in those experiencing poor mental health as well as FIS. Similar results were found when measuring the estimated average requirement (EAR), which refers to an estimated level of intake that half of the population within a person's gender and life stage group

consumes daily. Poor diets were more prevalent amongst participants who were experiencing poor mental health. Food security, mental health, and diet quality show significant associations, specifically in fiber intake in male and female identifying participants between the ages of 31 to 50 and 51 to 70. For instance, women 31 to 50 who reported poor mental health and FIS tested lower in vitamin C intake than food-secure patients with good mental health (Table 1)

Variable	Good Mental Health		Poor Mental Health	
	Food Secure	Food Insecure	Food Secure	Food Insecure
		AMDRs		
		Protein		
<20%	9.9	15.4 **	10.6	18.6 **
20% to 35%	52.7	51.7	55.4	53.1
>35%	37.4	32.9 **	34.0	28.3 **
		Fat		
<45%	20.3	16.3 **	19.0	21.3
45% to 65%	52.8	58.4 **	56.9	64.5 **
>65%	26.4	25.2	24.1	14.2 **
		EARs		
Vitamin A	52.3	62.8 **	54.4	67.0 **
Vitamin B ₁ (Thiamin)	18.1	21.7 **	24.4	39.2 **
Vitamin B ₂ (Riboflavin)	15.8	21.2 **	19.7	37.7 **
Vitamin B ₃ (Niacin)	2.5	4.3 **	6.4	8.7 **
Vitamin B ₆ (Pyridoxine)	26.7	33.0 **	39.6	42.5 **
Vitamin B ₉ (Folate)	79.4	82.7 **	87.1	87.2
Vitamin C	35.9	46.0 **	43.2	55.7 **
Iron	7.3	11.3 **	12.5	18.9 **
Magnesium	49.8	59.5 **	58.5	61.2 **
Phosphorus	10.4	17.1 **	16.7	23.7 **
Zinc	33.5	43.9 **	37.9	45.6 **

Food insecure participants, when measured against the dietary reference index, found that those who were food insecure had a lower protein intake than AMDR recommendations, regardless of the mental health status, and those who were food insecure with poor mental health recorded intake numbers below EAR.

The Relationship Between Food Insecurity/Food Apartheid and Mental Health

Prevalence of food apartheid and the two-tier food system

“The deliberate disinvestment in Black and Brown neighborhoods-creating food deserts-is a form of structural violence that leads to chronic mental health burdens akin to prolonged trauma exposure.” – Lean Penniman (Penniman, L. (2018)

In the United States, single mothers experience hunger at three times the rate as other demographics. (de Souza, 2023). Like many others affected by FIS, families make attempts to supplement nutritional gaps using farmers’ markets, food banks, and Supplemental Nutrition Assistance Program (SNAP) (a government-funded cash benefit nutrition assistance program), which, depending on the needs, capability, and ability of the community may not be sustainable sources of quality and affordable nutrition. Food apartheid, a term which refers to the two-tiered food system that limits and, in some places, eliminates specific racial, and socioeconomic groups (poor, disabled, imprisoned) access to affordable and quality nutrition, which adds the layer of race and inequality to the conversation. (Washington, K., & Penniman, L. 2019).

Within this second-tier of this two-tiered food system, many adults are forced to source food from multiple pathways (SNAP, food banks, pantries, charitable organizations), subjecting adults and children to the stigma that accompanies poverty in America. Phrases like “Beggars can’t be choosers, and you get what you get” are spoken by adults to children but reflect the

inadequacy and lack of choice for those who are forced to utilize the resources for survival. (de Souza, 2023) FIS amongst children can bring about feelings of irritability, guilt, shame, and lead to greater potential mental health problems. (Fang et al., 2021) Creating and fostering conditions for inadequate access to affordable, nutritional, and culturally relevant foods by enacting laws, rules, and sanctions is structural racism. (Gripper et al., 2022)

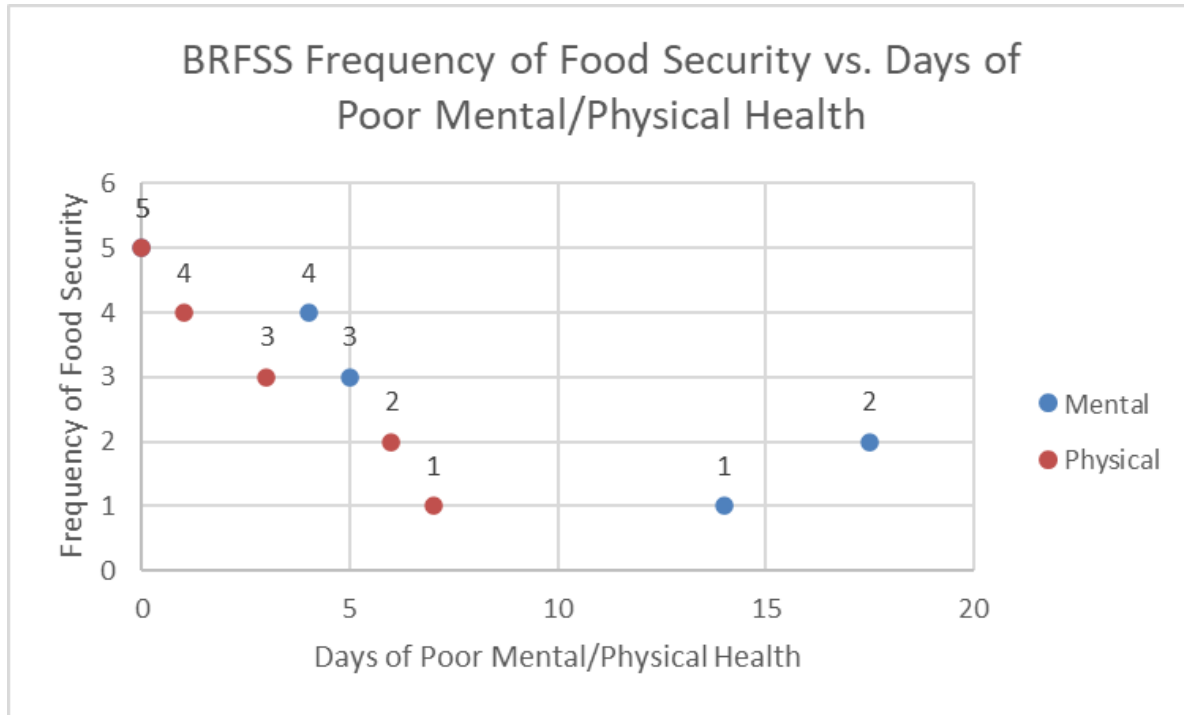
Systemic barriers to accessing nutrient-rich affordable foods are not uncommon nor are they strongholds of the distant past. Sharecropping, private credit and one-sided rental agreements prevented black farmers from cultivating and sustaining farms. The USDA acknowledged the presence of discriminatory lending practices towards black farmers which led to the creation of the Discrimination Financial Assistance Program (DFAP) in 2023. DFAP is a financial assistance program for farmers and landowners who can prove lending discrimination but doesn't include non-USDA loans or discrimination by non-USDA employees. *Pigford vs. Glickman* (*Pigford v. Glickman*, 2000) Food Apartheid in today's landscape looks like Philadelphia, where black and low-income neighborhoods tend to have a larger presence of fast-food restaurants, and fewer healthy, affordable produce options, with 81 percent of food stores offering unhealthy options. (Gripper et al., 2022)

Local to Global impact of Food insecurity and Mental Health

According to the USDA in 2023, 47.4 million people in America were considered food insecure. 7.2 million children lived within food insecure households. 5.1 percent of U.S. households with very low food security are on the cusp of losing vital access to nutrients needed to maintain their homeostasis. (United States Department of Agriculture, 2023) Pierce County residents according to BRFSS data show a negative relationship between reported FIS and days of poor mental and physical health on average. Results show study participants' days of poor

mental health and physical health increased on average based on the level of FIS a participant reported. (Table 2)

Table 2



Food insecurity is linked to compromised mental health amongst women in high income countries (United States, United Kingdom, Australia). Lack of access to quality, affordable foods has a cyclical relationship with poor health, increasing the likelihood of substituting quality foods for a supplemental, less healthy option, creating barriers to self-management of chronic conditions. (Maynard et al., 2018) A study conducted in Tanzania in 2020 found a significant connection amongst women at risk of pregnancy with children up to age five and child stunting (the impeding of growth and development of a child) through chronic malnutrition. (DiClemente et al., 2020) A 2020 study that examined FIS and good mental health and wellbeing in 160 countries found that FIS affects more than 2 billion people globally, is related to reduced life

satisfaction, negatively impacts the mental health of women between the ages 25-64 the most, and adults and the elderly are the next potential group at risk for FIS. (Elgar et al., 2021).

Children who experience persistent FIS exhibit higher rates of ADHD, cognitive delays, and emotional dysregulation far into their adult years, furthering a cycle of poverty and poor mental health. (Shankar, P., Chung, R., & Frank, D. A. (2017))

Maternity and Food Insecurity

Challenges and Barriers of FIS

Mothers often live with the societal expectations of motherhood in conjunction with managing the landscape of food within the home. Mothers are often the first line of defense against FIS in the home. The stigma that a “good mother” places the needs of the children above her own can lead to parental burnout. In 2022, 17.3 percent of U.S. households with children experienced FIS. Amongst the households led by single mothers, 33.1 percent experienced FIS. (Liebe et al., 2024) A 2024 study also found that in homes where only adults are food insecure and homes where the children are insecure, poorer mental health and well-being were reported than adult-only and child-only food secure households.

Programs like SNAP were implemented to provide food-related benefits to families to supplement the grocery costs. This supplemental benefit can increase depressive symptoms among users. It was also found that SNAP participation was associated with reduced social support and poorer physical health. (Liebe et al., 2024) Which can be a cycle as mothers from adult-only and child-only food-insecure households were more likely to use food coping strategies, reported higher perceived stress, lower life satisfaction, and poorer diet quality than

the food-secure adult-only and child-only households. This can cause mothers to seek food coping strategies and mechanisms to supplement the nutritional gap within the household.

A study that examined the impact of FIS and malnutrition on the maternal mental health amongst Lebanese and non-Lebanese (Syrians, Palestinians, Sudanese, Bangladeshi, and Egyptians) mothers found that the mothers had 70 percent of the participants were FIS, and 66 percent had moderate to severe depression. (Rahi et al., 2025) Mothers used coping mechanisms such as self-sacrificial behavior, which mothers may skip meals and reduce parental meal portion sizes to conserve food. Limiting quantities of food by limiting mealtimes, preparing diluted infant milk, minimal meal choices, and eating the same meal for days. Mothers may fall under financial restraint and borrow money, skipping bills to afford food, and limiting spending to afford food. Mothers may use distractions from hunger and even separate their children from other families or family members who are more food secure to prevent shame.

Limitations

The selection process was limited to sources that included anxiety, depression, and a generalized term SMI. Mental health has a vast number of diagnoses and more specific focus on a may prove beneficial for generalization. The timeframe in which to gather data and information was limited, which restricted the number of resources (interviews, surveys, datasets, books, and documentaries), which limited some valuable information that was omitted to protect the integrity of the information. Omitted data from the Pacific region may have been useful to understand the dietary effects on mental health in FIS environments in the Pacific. BRFSS datasets were taken from a questionnaire that is self-reported and relies on the time of day and the accuracy of the individual providing data. The food security question within the 2023 BRFSS

codebook provides a minimal look into food security only inquiring about having the means to acquire food. It does not inquire about the status of the individual, dietary practice, or any status defining questions to determine an accurate depiction of the participant's food security status. I had hoped to engage local organizations in Tacoma to include specific programs that may have insight to further generalize the information to the local environment but also was limited due to deadline constraints and the ability to accurately and effectively convey the information within the given timeframe. A longer time frame for research would allow for more data collection over time through multiple resources.

Conclusion

Key Findings

FIS has a global impact that reaches households in a multitude of ways. Common life occurrences can change the landscape of a family's access to quality affordable food. A change in a family's status such as a discovered food allergy, a medical dietary restriction, pregnancy, or a change in socioeconomic status can all thrust a family into FIS. Households locally and globally are challenged with providing equitable access to quality foods not only for their community but for every individual who lives within their household. The pressures of providing adequate nutrition have a significant negative impact on the mental health of the affected population. Specifically, women between the ages of 25 to 64 years of age, single mothers, children, and the elderly. Nutrient deficiencies can cause numerous chronic health issues and can increase the risk of depression and more severe mental health issues as well as exacerbate existing conditions. Vitamin and iron deficiencies have a direct relation to poor mental health. FIS can be a chronic stress trigger. Chronic stress can lower the volume of grey matter in the brain and raise the risk

of depression and dementia. (McMichael et al., 2021) Depression was significantly present in FIS communities across all studies in various ethnic communities from western countries like the United States to Lebanon and Tanzania. Poor mental health seems to be an inevitability if a person exists in a state of FIS or near FIS with little or no sufficient intervention. Some studies noted the increased risk of substance abuse and domestic violence among the many negative impacts of prolonged FIS.

Food apartheid forces communities to band together to source their food by their means. The intentional limitation of access to quality and affordable foods requires not just a grassroots solution but one that includes dismantling the barriers that prevent equitable access to resources. SNAP and similar low-income supplemental nutrition benefit programs intend to balance the inequity in food access but also create new barriers and leave older ones unaddressed. These programs have become synonymous with low socioeconomic status, which can carry a negative social interpretation of the participants. Dietary options are limited in places of high FIS, and coping mechanisms can develop to supplement the gap in nutrition. Creating long-term poor dietary practices increases the risk of chronic diseases and poor mental health outcomes. This isn't limited to those who are FIS, but those who are on the verge of FIS experience increases the risk of anxiety and depression.

Women are a high-risk group for FIS and its additional mental health impacts. Single-mother-led households are at a greater risk of food insecurity and have a large negative impact on their mental and physical health. Women in food insecure households present higher levels of Post Traumatic Stress Disorder (PTSD), anxiety and suicidal ideations due to the added stress of caregiving while facing FIS. (Hernández, D. C., Reesor, L. M., & Murillo, R. (2017))

The pressures of maintaining the food environment of the household can increase the risk of anxiety and depression. A mother experiencing FIS may not be able to provide adequate nutrition through nursing to nourish her child due to her malnourishment. In some societies, mothers are responsible for the landscape of the dietary environment in the home. Which may lead to the establishment of negative coping mechanisms that can increase the risk of negative mental health outcomes. The same can be said about the threat of food insecurity, which can also carry similar risks as being FIS.

Interventions

A greater focus should be put into studying the impact of community gardens on the mental health of FIS households in neighborhoods experiencing FIS. Karen Washington, black farmer and founder of the Black Urban Growers (BUGS), promotes getting back to the land. Changing the way we think about farming from a slavery to a way to create a sustainable food system. (Washington, K., & Penniman, L. 2019) Sustainable local food systems make it possible for the community to control the flow and access to some healthy, affordable, and sustainable fruits and vegetables. A community farm is a possibility in some neighborhoods, but that would depend on the location and community buy-in. Also, even with access, a willingness to change dietary behaviors can be a hurdle when introducing new habits. Community events where residents can try and prepare new healthy recipes that can reduce apprehension to introducing these new experiences into their daily routines.

Dr. Alonndra Nelson wrote about how The Black Panther Party created free community health clinics in which some ran into the 1970s. (Nelson, 2013) They were effective in spreading information about sickle cell anemia throughout the community. They were staffed by

physicians, nurses, volunteers, and medical students. Creating community clinics with a focus on mental health services, public health on a community level, with physicians, nurse practitioners, and physician assistants whose expertise focuses on the local communities they serve.

Community workers can advocate for those experiencing mental health due to FIS and would be able to connect them to available services seamlessly. This could reduce chronic diseases within a community, promote community engagement, and erode the stigma of low-income programs by bringing the community together to try, learn, work, exercise, and grow through clinic-led weekly or bi-weekly greenspace activities to reduce stress.

Community farmers markets are not only a way to acquire produce but also an opportunity for cooking displays, recipe exchanges, and mental health boosting activities. This can create an environment to allow families to participate in activities with minimal risk of negative stigma due to socioeconomic status. Ensuring that all vendors or the majority of vendors accept SNAP, or the local program, is vital to ensuring the maximum amount of community inclusion. Community events can be used to disseminate important local public health information to reduce the risk of chronic illnesses within the community and distribute information on community and household level disease prevention practices. These events collectively work towards reducing FIS, decreasing the risk of negative mental health effects, eliminating socioeconomic stigma of using supplemental benefits, and providing affordable, quality, nutrition to families. This should be supported by local governments and services to promote the destruction of any form of food apartheid system that may exist with the community's food delivery system.

Food insecurity without intervention causes an increased risk of negative mental health outcomes such as anxiety, depression, and SMIs. Food Apartheid creates a barrier of distrust within the community and the local government offices. It's intentionally malnourishing a group and increasing the community's changes of SMIs, chronic diseases, and increasing the risk for the presence of substance abuse, violence, and or unhealthy coping mechanisms with long term effects including an increased risk of dementia. FIS isn't a local problem, it is a multifaceted global problem affecting us physically (biological pathways), systemically (food apartheid), and identifying the most vulnerable group (single mothers).

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