



Article

Barriers to Food Security and Community Stress in an Urban Food Desert

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Abstract: By analyzing data from focus groups in a poor, mostly African American neighborhood in a large U.S. city, we describe how residents in urban food deserts access food, the barriers they experience in accessing nutritious, affordable food, and how community food insecurity exacerbates prior social, built, and economic stressors. Provided the unwillingness of supermarkets and supercenters to locate to poor urban areas and the need for nutritious, affordable food, it may be more efficient and equitable for government programs to financially partner with ethnic markets and smaller locally-owned grocery stores to increase the distribution and marketing of healthy foods rather than to spend resources trying to entice a large supermarket to locate to the neighborhood. By focusing on improving the conditions of the neighborhood and making smaller grocery stores and markets more affordable and produce more attractive to residents, the social, built, and economic stressors experienced by residents will be reduced, thereby possibly improving overall mental and physical health.

Keywords: food security; food desert; racial segregation

1. Introduction

In a number of recent studies, researchers document that food insecurity and hunger are a substantial and persistent problem in the United States [1,2]. In 2010, 14.5% of American households were food insecure at some point during the year, and 5.4% had very low food security—meaning that the “food intake of one or more household members was reduced and their eating patterns were disrupted at times during the year because the household lacked money and other resources for food” [1]. In addition to household food insecurity, community food insecurity is also prevalent in the United States, particularly in the most rural and urban areas of the country. Community food security takes into consideration how accessible food is to residents as well as how adequate (e.g., nutritious) food is in the community [3]. Over the past six decades, grocery retailers have abandoned the inner city for suburban and exurban locations, thus limiting food accessibility in urban neighborhoods. Retailers can build larger stores and large parking lots in the suburbs because there is more land available. Additionally, these suburban locations are convenient to highways and access roads, making it easier to load and unload trucks [4].

Researchers who examined how the lack of grocery stores (often referred to as food deserts) affect residents found that urban residents typically pay more for groceries, spend more time traveling to distant supermarkets, and incur other costs related to poor food habits [5,6]. According to the “Food Access Research Atlas” constructed by the USDA [7], low access to healthy food is defined as being far from a large grocery store or supermarket. For urban areas, the Atlas tracks low-income census tracts (tracts with poverty rate of 20% or greater) as either being a half mile or one mile from

the nearest supermarket or large grocery store. While researchers linked food deserts to lower fruit and vegetable consumption [8,9] as well as higher child obesity rates [10], fewer scientists examined the physiological effects of food desert created stressors. Researchers show that locating a large grocery retailer in a prior food desert has a minimal effect on residents' fruit and vegetable intake [11]. Because of this, it is important to look at health from a holistic viewpoint. This includes the effect that stress has on residents' physical and mental health and how food deserts exacerbate prior social and economic stressors. We address this gap in research by focusing on the following questions: (a) What are the barriers to accessing nutritious affordable food in an urban food desert? (b) How does community food insecurity exacerbate prior social, built, and economic stressors? By analyzing data from focus groups in a poor, mostly African American neighborhood in a large U.S. city, we describe how residents in urban food deserts access food, the barriers they experience in accessing nutritious, affordable food, and how community food insecurity exacerbates prior social, built, and economic stressors. Thus, in this article we speak to academics, policy makers, and community organizations alike who are concerned with the effects of food deserts on health.

2. Racial Segregation and the Rise of American Suburbs

American cities saw remarkable changes in the 20th century. As early as the late 1800s, transportation advances allowed for the rise of suburban communities. This continued through the early 20th century as the middle class took advantage of the park-like setting of the new suburban neighborhoods but—with the use of train, trolley, or automobile—still had easy access to the city for work and recreation. Suburban growth exploded after WWII, when federal policies such as the Servicemen's Readjustment Act of 1944 (G.I. Bill) and the Federal-Aid Highway Act of 1956 allowed veterans and their growing families to access low interest loans to purchase new homes in the growing suburbs.

The rise of accessible suburbs led to a separation by race and by class as only middle and upper class whites were allowed to move to the new suburbs. Federal policy encouraged racial segregation through redlining practices. Neighborhoods with even a small African American population were coded as 'red' and were deemed to be too risky for banks to provide federally insured home loans. Without the ability to receive mortgages due to being a racial minority, African Americans found it very hard to leave the city. Racially restrictive covenants were also instituted in the early 20th century to prevent racial minorities from purchasing homes in white communities. Such covenants were contractual agreements that banned the purchase, lease, or occupation of property by a specific group, most commonly African Americans. These were mutual agreements between property owners in a neighborhood to not sell to certain people and were enforced through neighborhood associations and real estate boards. Racial covenants became common after the 1926 U.S. Supreme Court decision, *Corrigan v. Buckley*, which legalized their use. The practice was so wide-used that by 1940, 80% of property in Chicago and Los Angeles had covenants restricting African Americans [12]. Both redlining by banks and the use of racial covenants existed until the passage of the Federal Fair Housing Act of 1968 that deemed both practices to be illegal.

While no longer a legally sanctioned practice, housing discrimination still occurs today through other means. For instance, through the use of experimental testing, the Fair Housing Center of Greater Boston [12] found that African Americans and Latinos were shown fewer homes, steered to other communities, required to provide longer notices before viewing houses, and quoted higher loan rates than white testers. In addition, mortgage lending discrimination still occurs. For instance, the Massachusetts Community Banking Council found that upper- and middle-income African Americans and Latinos were 10 times more likely to have high interest loans than low income whites. In addition, high-risk lenders were 3.7 times more likely to be in minority neighborhoods than in white neighborhoods [13]. Combined, past and present racial discrimination has led to the continuation of racial and ethnic segregation. High-poverty neighborhoods continue to be disproportionately composed of black residents (37.4%) and Latino residents (30.2%) [14].

3. The Rise of Suburbs, Supermarket Redlining and Urban Food Deserts

The development and expansion of suburbs are directly tied to the history of grocery store locations. As white middle class families left the city for the newer suburbs, the grocery stores followed. Just as the new suburbanites and government were creating communities, supermarkets were also transforming in these new spaces [15]. Suburbs, with their residents with higher buying power, were attractive to chain supermarkets for both their markets and locations [4,16]. Improvements in supply chain logistics, computerized scanning and inventories, and other technological advancements led to the creation of a big-box format targeted towards an auto-dependent society. Chain grocery stores turned to increasingly larger formats to capture even more of the ever growing suburban grocery demand. Mergers and leveraged buy-outs in the 1980s intensified the trend toward fewer, bigger stores outside of the city. For example, in a six-year period between 1978 and 1984, Safeway closed over 600 stores in inner city neighborhoods [15]. At the same time, urban grocery stores, with their much smaller square feet design, were frequently not associated with the large chain stores. They were part of a local chain or independent grocery stores [4].

According to industry representatives, urban neighborhoods presented other challenges not present in suburban markets. Sites to accommodate large big-box stores were, and continue to be, hard to find. Barriers to building in urban communities encompassed costs associated with environmental cleanup, demolition of existing structures, and other site preparation costs along with the building's cost and delays. Other factors that kept large grocery stores out of urban neighbors included depopulating neighborhoods, demanding regulations, and the presence of urban crime [4]. Ultimately, the general attitude with the grocery industry has been that profits come more easily in the suburbs so it does not make financial sense to serve distressed urban areas [15].

This attitude held by the grocery industry has been termed by some as "supermarket redlining" [17,18]. As with residential redlining, decisions about investing in particular neighborhoods are based on stereotypes of gross income, race, and reputation of a neighborhood. This perception of "urban obstacles" has led to a gap in supermarkets in central-city neighborhoods compared to suburban neighborhoods [16,19]. According to Cotterill and Franklin, [19] fewer and smaller grocery stores are located in poorer zip codes than in wealthier zip codes. They found a negative relationship with the percent of people on public assistance and the number and size of grocery stores in an area. Cotterill and Franklin indicated that the poorest zip codes in 21 of the nation's largest metropolitan areas had a little over half (55%) of the grocery square footage that existed in wealthier zip codes [19].

Supermarket redlining can lead to a central-city gap in grocery stores even when there is a market demand. The Initiative for a Competitive Inner City [20] found that there may be as much as a 25% gap between existing demand for food and availability of food in the inner cities. The U.S. Department of Housing and Urban Development [21] calculated an untapped demand of \$8.7 billion for the 48 cities that had a retail gap. HUD estimated that if Chicago developed 28 new supermarkets in its economically distressed neighborhoods it could capture just 14% of the untapped retail demand [4].

Pothukuchi [4] indicated that despite local government knowledge of the absence of grocery stores in low-income neighborhoods, city planning and development agencies took a laissez faire approach by tending to wait for proposals for grocery stores to be initiated by developers. Planners tended to not take a proactive role in filling the grocery retail gap and instead were happy that their agencies did not provide additional barriers to development. Thus, if developers did not want to expand into inner city neighborhoods, city planners felt that it must be because market conditions were unsuitable, rather than it being due to discrimination based on perceptions of urban obstacles. This notion is contrary to the studies cited above, which indicated great market demand for retail and grocery stores in many low-income minority neighborhoods in cities across the United States.

4. Effects of Urban Food Deserts

4.1. Physical Effects

Over the past 20 years, several researchers examined the impact of community food insecurity on eating patterns and subsequent diet related health. Scientists that investigated neighborhood effects on diet reported lower fruit and vegetable intakes in poor areas as well as independent relationships between food deserts and reduced fruit and vegetable intake [8,9]. Additionally, researchers reported that nutritious foods are less available and more expensive in deprived neighborhoods compared to their wealthier counterparts [22,23]. Researchers thus theorized that this lack of availability of healthy food in poorer inner-city neighborhoods has contributed to increases in diet related disease within these areas. The U.S. Department of Agriculture (USDA) linked food deserts to an increasing weight problem in the United States with childhood obesity tripling since 1980. The annual cost of treating obesity is nearly \$150 million [24].

With respect to racial minorities, studies show that fast food restaurants are more likely to target African American and Latino neighborhoods than white neighborhoods [25]. Urban Black and Latino neighborhoods often represent the characteristics of food deserts, where “it is easier to get fried chicken than a fresh apple” [26]. The prevalence of fast food in racial and ethnic minority urban neighborhoods combined with a lack of large grocery stores may partly explain the higher obesity rates for racial minorities. According to the Center for Disease Control, non-Hispanic blacks have the highest age-adjusted rates of obesity (48.1%) followed by Latinos (42.5%) [27].

Despite the popularity of the “obesogenic environment” thesis [28,29] that claims that people are obese because of easy access to fast food that is cheap and nutritionally inferior coupled with a built environment that deters exercise, results are mixed when researchers evaluate the effect new large grocery stores have on food consumption patterns in food deserts. Wrigley, Warm, Margetts, and Whelan [30], using an uncontrolled before/after experimental design, reported a mean increase in fruit and vegetable consumption of between 0.01 and 0.47 portions per day among shoppers who began shopping at the new local grocery store. The greatest increase in fruit and vegetable consumption occurred amongst shoppers who had the lowest intake per day (two or less portions) as their baseline. While Wrigley et al. [30] showed a significant increase in fruit and vegetable consumption for those that had the lowest baseline measures, their natural experiment did not include a control group for comparison. When comparing a food deprived community that had recently acquired a large supermarket to a comparison community that did not receive a grocery store, Cummins et al. [11] did not find a significant relationship between the acquisition of the new supermarket and daily fruit and vegetable consumption and self-reported health.

With little evidence that community-based retail intervention improves diet and by extension health in the community, solutions to physical health that are framed as bringing nutritious “good” food to others might not work. As Guthman [31] points out, it is easier for public officials to focus on solutions that change the built environment, such as building supermarkets or bike paths, than trying to find solutions that address class and racial inequality, class and race-related stresses, or the pervasiveness of toxins in our environment. Thus, it is important to examine stressors, particularly class and race-related stressors, as they relate to food insecurity.

4.2. Stress and Physiological Effects

The stress process model leads to the hypothesis that social environment and social organization are core factors in the occurrence of mental health disorders and disease. Researchers who adhered to this model suggested that stress is a process that goes through three stages: stress exposure, stress resistance, and stress outcomes. The sources of stress fall under three main categories: negative life events such as a death in the family or divorce; chronic strains, such as gender or racial discrimination; and daily hassles, such as role strain [32–34]. How an individual responds to stressors plays a role in the stress outcome [35,36].

Williams et al. [36] found that high stress levels contribute to negative health outcomes, both mental and physical. They further indicated that general stress, such as financial stress and life events, were positively associated with (a) self-reported ill health, (b) the number of days a person could not work or carry out normal activities because of poor physical health, and (c) emotional distress. They also found that general stress and race-related stress from discrimination led to a decline in well-being and an increase in psychological distress.

While Williams et al. [36] emphasized how stress can lead to both poor physical and mental health, they found stress affected Blacks differently than Whites. Although Blacks are identified to be more exposed to adverse risk factors that lead to stress, these factors have a larger impact on the mental health of Whites than that of Blacks. This is partially due to greater access to coping resources used by Blacks, such as church groups. However, while Blacks have effective coping strategies that lessen the psychological impact of stress, Williams et al. [36] explained that the cumulative effects of being highly exposed to stressors led to more physical health threats and left them more vulnerable to a variety of physical ailments.

With respect to the relationship between food insecurity and stress, several researchers—e.g., [34,37,38]—affirmed that food insecurity was a chronic source of stress that increased stress levels, especially among economically and socially vulnerable populations. Whiting and Ward [38] asserted that food acquisition strategies served as direct sources of stress. They discussed that as economically vulnerable households utilized more diverse and less stable sources of food, stress levels increased. Wu and Schimmele [34] theorized that food insecurity was a source of anxiety that could increase vulnerability to depression. They found that food insufficiency had an independent effect on depression and that it was a better indicator of depression than conventional socioeconomic variables.

In addition to the stress associated with acquiring food, racial minorities also experience higher levels of discrimination when shopping for food, which can also heighten stress and anxiety. Zenk et al. [39] compared unfair treatment when shopping outside of one's neighborhood among African Americans, Latinos, and Whites. They found that African Americans were significantly more likely to report unfair treatment at grocery stores than the other two groups, regardless of the distance the store was from home. While African Americans experience more discrimination than other races or ethnicities while shopping, the level of discrimination may increase the further away they shop from home. Researchers show that when African Americans grocery shop outside of their neighborhoods, the likelihood for them to encounter discrimination (e.g., being watched, followed, or treated with less respect than others while shopping) increases. For example, in one study of shopping behaviors of African-Americans in New York and Philadelphia, researchers found that participants reported higher levels of discrimination while shopping in mostly white neighborhoods than when they shopped in their own predominately African-American neighborhoods [40].

5. Cultural Context of Community Members: Urban Neighborhood

Because living in an urban food desert can pose several sources of stress for residents and stress can lead to other health problems, we believe it is important to explore the nuanced ways that racial minorities in an urban food desert navigate economic, social, and built barriers to access food. To answer the research questions posed at the beginning of this analysis, we conducted focus groups of residents of a poor, mostly Black neighborhood in the southern sector of Dallas, Texas. As shown in Table 1, between 2000 and 2010, the population for the census tract that includes the neighborhood declined by 10% from 2754 residents to 2462 residents. Over the same period, there was a significant increase in the percentage of residents that identified as ethnically Hispanic, from 19.2% in 2000 to 31.6% in 2010. Simultaneously, the number of residents in the tract that identified as Black decreased from 79.6% in 2000 to 67.2% in 2010. The percentage of non-Hispanic white residents remained low at under 1% for the past two censuses [41].

Table 1. Demographic, Economic, and Social Indicators of Neighborhood for 2000 and 2010.

	2000	2010
Total Population	2754	2462
Percent Black	79.6	67.2
Percent Latino	19.2	31.6
Percent non-Hispanic White	<1.0	<1.0
Percent of residents over 25 with <9th grade education	15.0	30.0 ^a
Percent of residents over 25 with at least some college	6.2	19.0 ^a
Median household income	\$21,563	\$24,865 ^a
Percent of residents who paid 35% or more of gross income in rent	14.0	75.0 ^a
Percent of respondents satisfied or very satisfied with the neighborhood		52.0 ^b
Percent of respondents who felt strongly connected to the neighborhood		39.0 ^b

Note: ^a Data comes from 2006–2010 American Community Survey five-year estimates; ^b Data comes from 2012 survey of neighborhood residents conducted by the local Habitat for Humanity.

5.1. Economic Characteristics

The median household income increased from \$21,563 annually in 2000 to \$24,865 annually in 2010. Although this appears to be a significant increase, when calculated as a percentage of the area median household income (calculated based on the county median household income) the median household income for this neighborhood only increased slightly. In 2000, the census tract's median household income was 49.8% of the area median income. In 2010, the census tract's median household income was 51.8% of the area median income—a 2 percentage point increase. The census tract median income is still significantly lower than the city's 2010 median income of \$41,682 [42].

Over 17% of residents in the census tract received aid from the Supplemental Nutrition Assistance Program in 2010 compared to the national average of 12.9% [43]. In that same year, 51.4% of the residents were in the labor force; of those, 5.5% were unemployed. According to the data, the majority of residents in this area reported working in the construction, manufacturing, retail sales, or social services (healthcare, education) industries. Only 5.7% of working residents reported using public transportation to commute to these jobs, but 22.1% of the residents in that year reported not having any access to a vehicle. Over one-third (36.7%) of the occupied homes in the neighborhood were occupied by renters in 2010. Of the renter-occupied homes in 2010, nearly three-quarters of the households paid 35% or more of their gross income in rent. This amount is staggering compared to just 14% of residents who paid 35% or more of their gross income in rent in 2000 [42].

5.2. Social Characteristics

In spring of 2012, the local Habitat for Humanity conducted a survey in the neighborhood to measure community satisfaction and attachment. Habitat for Humanity reported 52% of respondents were satisfied or very satisfied overall with their community. The top three favorite aspects of living in the neighborhood, according to respondents, were their house, affordable housing, and their neighbors. The three least favorite aspects of the community were concerns about safety, lack of job opportunities, and poor amenities. Sense of neighborliness was strongly correlated with sense of safety among respondents with those who felt more a part of the neighborhood feeling the safest in their home and neighborhood. Overall, 39% of residents felt strongly connected to the neighborhood [44].

With respect to crime, South Dallas, which is where the community is located has a higher than average rate of both violent and property crime. In 2016, the estimated violent crime rate was 1138 incidents per 100,000 people. This was much higher than for the city of Dallas (762 per 100,000 people) and the nation (386 per 100,000 people). The estimated property crime rate was 5076 incidents per 100,000 people. Again, this was much higher than for the city of Dallas (3400 incidents per 100,000 people) and the nation (2451 per 100,000 people). South Dallas is safer than only 13% of the cities in Texas and there is a 1 in 17 chance of becoming a victim of any crime [45].

5.3. Built Environment Characteristics

According to the USDA's definition of a food desert, the neighborhood qualifies as an urban food desert. The neighborhood is a low income neighborhood and the nearest supermarket is over one mile away. The two closest large chain supermarkets are Wal-Mart at 2.5 miles away and Kroger at 3.5 miles away. Within the neighborhood, there are two small locally-owned food stores and one small local chain store. There are also three locally-owned convenience stores and two 7-Eleven stores. In addition to convenience and small grocers there are three chain fast food restaurants within the neighborhood.

At the time of the study, public transportation in the community was dominated by a public bus route. The bus routes were either local and did not go a large grocery store or led to a transit center in which one had to make several transfers to arrive at a large grocery store or supermarket. Although the city of Dallas had a light rail system at the time, it did not have any nearby stops. Since the time of the study, the city of Dallas built a new light rail line that has a stop on the outer edge of the neighborhood. With respect to walkability, the community has a walk score of 28, which means that the community is dependent on cars and most errands will require a car [44].

6. Method

We selected focus groups as the methodology to gain a comprehensive understanding of issues of major concern for the residents including concerns centered on accessibility of food, barriers to food security, as well as how barriers to food security exacerbate community stress. A team consisting of members from a local university and two non-profit organizations developed recruitment protocols, designed the focus group structure, brainstormed research questions, and strategized methods to ensure safety, inclusion, voice, respect, and confidentiality. We sought to maximize participation and to provide a space where people would feel respected and valued for their contributions.

6.1. Recruiting Participants

We held focus groups in the evening at a local church to accommodate participants' work schedules. A local coordinator from one of the nonprofit agencies created and distributed flyers about the meeting, recruited participants, and reminded them on the day of each focus group. To ensure participation, we provided dinner for participants and one adult member per household received a \$20 gift card to Wal-Mart in exchange for his or her participation in the session. We also offered transportation and on-site child care. Security officers were present during each focus group to assist participants, researchers, and students to and from their vehicle and to watch after the church parking lot during the focus groups.

Most participants were residents of the neighborhood; however, a few lived outside of the neighborhood but attended church in the neighborhood. Twenty-two participants attended the first focus group while 17 participants attended the second focus group. Three participants from the first focus group and two participants from the second focus group were Habitat for Humanity homeowners. The majority of participants in both groups were Black (97%), with 16 women and 6 men participating in the first group and 15 women and 2 men participating in the second group.

6.2. Focus Groups

We conducted two focus groups in September 2012 with neighborhood residents and non-residents vested in the community. At the beginning of each session, we provided dinner, with an opening prayer and welcome from the church minister. By having the approval of the local minister, a gatekeeper in the neighborhood, he let it be known to the group that he approved of the research with his welcoming introduction. Following the minister's introduction and dinner, a team member from a local nonprofit, who was familiar with the participants, opened the session by providing a brief overview of the project, its goals, expected outcomes, and introduction of all team members. We then passed out, reviewed, and collected consent forms.

Following the introduction, a facilitator asked participants questions about food accessibility, barriers to food security, safety in the neighborhood, as well as hopes and goals of community residents. The facilitator asked each group to comment on six key topics. Areas of inquiry included: (a) food accessibility and factors influencing where a person acquires food, (b) foods that are difficult to acquire, (c) changes in the community that would make it easier to access food, (d) access to different modes of transportation and barriers to public transportation and walking, (e) concerns about safety in the neighborhood, and (f) positive characteristics about the community and hopes for the future of the community. We constructed questions based on results of a prior homeowner survey conducted in the neighborhood during the spring of 2012 in combination with our interest in food security. The facilitator had previously been trained in leading focus groups, which included the importance of remaining neutral, establishing ground rules, explaining questions, repeating answers for clarification, and managing time.

During the focus groups, students collected data. When seating was available, students sat next to a community member. Students took detailed notes using laptops, video recorded the presentation, and wrote down major themes to display on the wall for community members to view. In order to prepare students for collecting data during focus groups, we introduced 'Participant Observation' as defined by Spradley [46]. During their observations, students included descriptions of the place as well as noting any significant objects, actions, actors, and implicit goals [46]. Students used these cues to guide note-taking.

We designated the remaining team members as "floaters". They could step into the facilitation role in the event that the facilitator needed a break. While floaters never stepped into the facilitator role, the facilitator was assured by their presence. Floaters moved around the room, acted as timekeepers, helped to tape flip chart sheets to the walls of the meeting room, and helped to answer questions after the sessions.

Each session was approximately two hours. After the official end of each session, team members informed participants about the project's next steps and stayed for picture taking and informal conversations with participants.

We transcribed all audio and video recordings. After viewing and listening carefully to the audio and video recordings, a team of two researchers pulled out major themes that participants expressed. We then constructed a coding matrix with the following overarching themes: accessibility of food, barriers to food security, and community stressors. Next, based on the responses, we broke down each overarching theme into several components (e.g., food outlets, available foods, safety stressors). We coded responses for themes and summarized, while using quotes to provide for clarification and support. We compile and report information gained from the analyses in the next section.

7. Results

7.1. Accessibility of Food

With respect to obtaining food, most participants shopped at grocery stores, although sometimes residents shopped at convenience stores on an emergency basis. A few participants mentioned purchasing certain food items at local dollar stores, farmers markets, and local food pantries. Residents did not mention accessing food through meals on wheels, community supported agriculture, or other types of food outlets. However, there was an expressed interest for a community garden and home gardens, but participants expressed a need for training and assistance with the upstart cost.

Participants identified two local grocery stores located within walking distance of the neighborhood. Up until the early 1990s, only a few grocery stores existed in the southern part of the city, with none larger than 20,000 square feet. In 1990, the city of Dallas approached all major supermarket operators that already served the metropolitan area without any success in persuading them to locate in the southern part of the city. The only chain that responded was a smaller grocery store that catered to mixed-income and ethnic minority communities. The city negotiated a comprehensive

package of incentives with the small grocery chain that resulted in three grocery stores being built in the southern sector. The package of incentives also attracted a second grocery store chain, and by 2005 three stores of the local chain were located in the southern part of the city, one of which is located in our study's neighborhood [4].

While a few focus group participants shopped at these local stores, most shopped outside of the community because prices at the local grocery stores were higher, and some claimed the quality of fresh produce was worse than produce in stores further away. Of those that shopped at the local grocery stores, many waited for sales or shopped late at night when prices on some food were reduced. As one participant noted, "to shop at [local grocery store] you have to wait for a real good sale. I only shopped there once or twice. On a motor scooter it took me an hour to get to [local grocery store] and its one mile and a half away." This particular resident was disabled and drove a motorized scooter chair for mobility. Another participant stated, "Let me tell you the secret about [local grocery store]. If you go after 9 o'clock, you get better deals and better meat. That's a secret. You get better quality of meat, better cuts and cheaper prices."

Despite two small grocery stores in the neighborhood, certain types and quality of food were unavailable locally. Residents had the most difficulty accessing fresh meats, fruits, and vegetables, including organic produce. Residents had to leave the community to buy organic produce. The nearest grocery store that offered a good selection of organic produce was a 30-min drive, 45-min train ride, or 2.5-h bus ride from the community. The city's farmers market was a 45-min bus ride. However, only one participant admitted to going to the farmers market to shop for food. Fresh meat was available at one local grocery store, but one had to shop after 9 p.m. because that was when it was made available. According to one resident, the meat the next day at one of the local grocery stores was what did not sell from the previous night. As one participant claimed, "You can't trust [local grocery store's] meat. They keep a lot of meat in the freezer and it gets freezer burnt. With the condition I have, I have to have fresh meat." One resident mentioned buying meat in the northern part of the city because it looked better and was priced better. As one participant noted, "When I am over in North Dallas with my son, I will buy meat because I know that they will change the meat and will bring it over to the Black neighborhood." A clear desire for quality meat existed amongst the participants and the perception was overwhelmingly negative with respect to the quality of meat offered at the local grocery store.

7.2. Barriers to Food Security

7.2.1. Transportation Stressors

Because respondents believed that higher quality and more affordable food were further away, transportation was often a barrier. The less expensive grocery stores were between 10 and 15 miles away. They were located in the suburbs or, in the case of one, on the other side of the city. These stores were a 20-min drive by car. One person even mentioned driving to the northern suburbs, 40 min away, to grocery shop because of better selections and prices. Because it was fastest to travel by car, if one did not own a car, a common strategy was to pay someone \$5 to drive them to the grocery store. However, this strategy required knowing someone who had a vehicle and was willing to take them to the store—a luxury that not everyone had.

While most participants traveled to the grocery store by car, several rode the city bus to get groceries. However, it was a much longer ride by bus to these grocery stores—anywhere between two and three hours one way due to a transfer that was needed in the center of the city. For the case of one grocery store outside of the community, it took 1 h and 31 min to get there by bus, despite being seven miles away, due to two transfers that were needed. Participants were limited to where they could shop when traveling by bus. For instance, participants could not shop at membership warehouses like Costco and Sam's Club because one must buy in bulk. This becomes too cumbersome to manage when getting on and off the bus. Some of the older or less abled participants reported having friends drive them to the store. One participant even noted taking a taxi to the store because she did not own a car,

could not walk to the local grocery stores, and was threatened by taking the bus. “I take a cab, if my daughter can’t bring me. It’s hard to move around on a scooter (motorized chair), because of the hill. It’s not safe at all.”

Finally, walking or biking in the neighborhood was difficult as there were either no sidewalks or sidewalks in disrepair. Furthermore, it was noted that traffic was heavy in the neighborhood and that people often drove fast. These conditions coupled with the lack of bike lanes made it risky to walk or bike to the store.

7.2.2. Safety Stressors

When shopping locally, conditions outside of the local convenience stores put community members’ safety at risk. Participants noted that they were often intimidated by young people hanging outside of the local convenience stores. These people would sometimes beg for money and harass customers as they entered and exited the store. This led some community members to not want to shop at these local stores. However, some did if it was for a couple of items and if they did not have the time to shop at the more distant grocery stores. One participant did not like to be gone long at night for fear of her house being burglarized. On several occasions, someone had busted her outside light while she was gone. This placed limits on where and when to grocery shop.

Several barriers existed to accessing food outside of the neighborhood that also put community members’ safety at risk. Participants expressed concerns over safety when traveling by public transportation. Some residents thought that riding the bus to the grocery stores in the suburbs as well as to downtown was dangerous because of threats posed by other riders of public transportation. Others expressed concern about safety with respect to going to the bus stop after dark. While some residents had not personally experienced threats to their safety, others had experienced being bullied by younger individuals and chose not to travel after dark.

Interviewer (I): How long have you been living here?

Participant (P): I’ve been living in this neighborhood for two years.

I: For two years, and the very first time you rode the bus was this last Thursday. Now what kept you from taking a bus prior to that?

P: Um, my condition, standing up too long, getting back in time before the sun set because of what you might run into.

I: Write that down! What do you mean by what you might run into?

P: The children, the bad children. The one who pull tricks on you. The one who knock you down because they see you with a cane or they want to push you down. The activities that go on in the neighborhood. You might not see what we see, so you want to distance yourself from that.

Another safety barrier that respondents expressed limited riding public transportation was the number of stray dogs in the community. According to participants, the city does little to combat the problem of stray dogs, so many roam freely. These stray dogs, many of which were Pitbull or Pitbull mixes, sometimes hovered around the bus stop. Because they could be aggressive and bite when approached, it led some residents who relied on public transportation going back home, thus delaying their food shopping. According to one participant.

Participant: Ya’ll know we have a lot of stray dogs in the neighborhood. Everybody knows that. But I step out of my house in the morning at about 6:30 or 7:00 a.m. and they are all congregated near where the bus stop is, and I go back home [because] I’m not fighting a pack of dogs. So that has really stopped me from getting on the bus to go handle whatever it is that I need to do.

This safety barrier was exacerbated because of the buses sometimes not showing up on schedule. They were supposed to run every 15 to 30 min. During the weekdays, residents noted that they ran close to schedule but on the weekends they were not as reliable. This made the amount of time exposed at the bus stops longer than necessary. In addition to stray dogs around the bus stop, the residents stated that weather conditions often determined whether they were able to get groceries. Because the bus stops

did not have cover, inclement weather made waiting at the bus stop a challenge. By standing at the bus stop during rain and high winds, community residents had to risk getting sick in order to shop for groceries. Other physical barriers in the neighborhood that posed risks to safety, when trying to walk or ride the bus to the grocery store, included the lack of sidewalks, poor street lighting, and bus stops with no seats or broken seats. Additionally, participants reported that many of the streets were in disrepair, and it took a considerably long time to get stop signs and speed bumps installed.

7.2.3. Economic Stressors

The two grocery stores in the neighborhood had higher prices than grocery stores that were some distance away. As one participant noted, “You have to spend an extra \$35 or more to have the convenience of shopping close.” The local convenience stores in the neighborhood had even higher prices. Residents indicated that an increasing number of convenience stores in the neighborhood had not led to a decrease in their prices. The price of a loaf of bread at the convenience store was double the price at a supermarket outside of the neighborhood. Residents could get some food, such as canned goods, microwavable food, and milk at a Family Dollar nearby. However, the milk was expensive—almost \$4.00. This was \$2.00 higher than at an Aldi store. For families with children who drank a lot of milk, the difference in price added up quickly. For residents without personal vehicles, this forced them to choose between risking the safety barriers noted above with public transportation or paying the higher prices at the local grocery stores.

Because of the high prices of food at the local grocery stores and convenience stores, participants noted several strategies they employed to navigate the cost of travel, time, and cost of food. Some participants indicated that they generally would go shopping during a particular time in the month—around the 15th of the month or whenever their benefits arrived in the mail. Others mentioned that because they had to drive such a long distance, they would shop only once or twice a month. This strategy of fewer trips minimized cost of travel and time, but it led some to miss out on deals advertised during other weeks. Some chose to minimize the cost of food by driving to many stores (some mentioned upwards of five stores) to get the cheapest prices and sale prices for items such as canned goods and produce but traveling to a further grocery store to buy higher quality meat. With a car, this would take over half a day and use more gas, but the community member would save money on food prices.

7.3. Barriers to Food Security and Community Stress

Because multiple safety barriers to accessing food existed in the neighborhood, this put a mental strain on several residents. Several participants discussed the hardships involved with trying to remove the stray dogs. According to participants, the city would not remove the dogs, but they would supply, for free, a dog trap that one could use to catch the dog. However, if the dog causing concern was owned by someone, the city would not supply a dog trap. In consideration of the dogs, the city would only supply dog traps for day use and in good weather. Because of these restrictions, few dogs were removed. Therefore, residents continued to spend time figuring out how to deal with the dogs so that they could carry out their daily activities, including grocery shopping.

By constantly thinking about stressors that could put their lives at risk, some residents have had to adapt their food shopping routines to minimize such stressors. For instance, participants reported choosing to “take public transportation in the early hours to prevent running into danger in the evenings”. When asked if they felt safe riding public transportation at night, all but one participant said, “no”. Some residents expressed concerns about “people watching my schedule, watching everyday activity.” In these cases, participants were concerned that when they left to go grocery shopping, their houses would be broken into by those people watching. In response to several house burglaries that occurred while people were out during the day, several respondents noted that they were constantly watching the neighborhood for potential robbers. One woman noted that she had confronted men in trucks that were watching empty houses, telling them to “move on”. Participants noted that the police would not

come to the neighborhood with just a single phone call. They agreed that it took multiple phone calls, in some cases, over a period of weeks to get the authorities to act on criminal behavior in the community. Several participants noted that they had to call the tip line “over and over again” to keep harassing the police until they responded.

To minimize economic stressors, most residents left the community to do their grocery shopping. To buy more affordable food, many residents expressed that they shopped at Wal-Mart. Even though it was outside of the community and took some time to get there by bus, residents noted that the store policy was to match prices of other stores, and residents could do all of their shopping (food and other) there. Participants overwhelmingly agreed that bringing a Wal-Mart to the community would make things a lot easier and reduce the amount of stress associated with accessing food. They felt that Wal-Mart had better quality meats than the local grocery stores and they could get more food for the price.

8. Discussion

Implications of Findings

Since the 1990s, small grocery chains are more receptive toward locating in urban areas, as illustrated by the two local smaller chain stores built during the late 1990s and early 2000s in the neighborhood used for this study [4]. As the saturation of the suburban grocery market continues, grocery retailers look for new markets to continue growth. Inner cities represent a new frontier for these chain stores to expand, considering the minimal or nonexistent competition in the urban grocery retail sector [4,47]. Researchers also point to the emerging strengths of inner-city markets as places with high spending power per acre [48]. We confirm the demand for high quality, affordable grocery retail stores in urban neighborhoods. Despite having two local grocery chains nearby, most participants claimed to travel much farther to shop at the larger chain grocery stores. This was because they perceived the larger grocery retail chains to provide better quality produce at a less expensive price. Thus, quality and quantity of food were both important when deciding where to shop.

Although participants mentioned both the quality and the amount of food they could buy for a given allowance, they expressed different types of concerns depending on the food item. The only food items that participants expressed a desire for high quality were meat products. Participants wanted fresh meat and were willing to drive long distances or shop at less desirable hours to obtain fresh meat. Whereas participants would drive long distances for fresh meat, only one participant noted shopping at the city’s farmer’s market for fresh, locally grown fruits and vegetables. In the case of fruits and vegetables, it appears that participants sought quantity over quality. In other words, they were more concerned with how much their food allowance could buy rather than the quality of the fruits and vegetables.

Participants overwhelmingly expressed a demand for a large grocery retailer in the community as they perceived the larger chain retailers as having better quality food and as being less expensive. The demand for more supermarkets to operate in underserved areas, has not gone unnoticed by local and state government officials. In fact, for some states, there have been recent attempts of state officials partnering with local business leaders to provide more fresh, affordable food to low-income and underserved areas. For instance, in Ohio, the Healthy Food for Ohio program was launched in 2016 that provides grants and loans to grocers to encourage them to open new stores in underserved areas. Through this program, grants of up to \$250,000 and loans up to \$5 million over 10 years are available to grocers to develop in food deserts [49]. According to Ohio Grocers Association’s website, “The funding is designed to incentivize the construction of grocery stores by offering financing for costs like land acquisition, construction and equipment that might otherwise be too expensive for a company to consider entering an underserved market” [49].

While these types of programs are encouraging, they need to focus more on providing assistance for smaller markets to provide nutritious, high-quality, yet affordable food to locate to underserved areas instead of trying to target large supercenters and supermarkets. In 2016, the city of Dallas

extended at least \$3 million to any grocery store willing to sell fresh produce and healthy food in a “southern Dallas food desert” [50]. They had hoped for a large grocery store chain to open a 25,000-square-foot or greater store in south Dallas, with a preference for one to serve as an anchor for a larger mixed-use development. Despite the seven-figure price tag, there were no takers. Industry representatives cited countless reasons, many matching with supermarket redlining, as to why they would not consider locating in south Dallas. These reasons included demographics, customers’ buying patterns, and customer theft [50].

Given the battle of attracting large retailers to poor urban areas coupled with the negative effects that large retailers such as Wal-Mart can have on the vitality of local economies and small businesses [51], more innovative solutions are needed in providing high quality low cost food to residents. For instance, research shows that ethnic markets can have a positive impact in low-income urban neighborhoods [52]. Joassart-Marcelli, Rossiter, and Bosco, in their analysis of ethnic food markets in San Diego, find that ethnic markets can play a large role in providing residents with nutritious, affordable, and culturally acceptable food—thereby contributing to community food security. Provided the unwillingness of supermarkets and supercenters to locate to poor urban areas and the need for nutritious, affordable food, they argue that it may be more efficient and equitable for government programs to financially assist ethnic markets and smaller locally-owned grocery stores to increase the distribution and marketing of healthy foods rather than to spend resources trying to entice a large supermarket to locate to underserved areas [52]. Given the recent failure of the city of Dallas to partner with a large supermarket to open a branch in south Dallas, we agree with this sentiment.

While funding local markets can increase the quality and quantity of food within the community, other stressors must be reduced to make the neighborhood safer and more walkable. For instance, the city and non-profit organizations should invest in creating free or low-cost clinics that spay and neuter dogs and cats as well as increase the number of no-kill animal shelters in the region. Capturing the stray dogs, spaying and neutering them, and housing them in a no-kill shelter can help reduce the number of strays in the short-term. While offering free or low-cost clinics to residents in the area to spay or neuter their pets will cut down on the number of unwanted litters and thus reduce the number of stray animals in the long-term. The city also needs to invest in making the neighborhood more walkable and bike friendly. Repairing sidewalks, creating bike lanes, and adding speed bumps in residential areas can encourage walking and biking while slowing down cars. In addition to making the city more foot and bike friendly, implementing a bike-sharing program can assist able-bodied residents who do not have access to a car to get to the store. A person can leisurely bike to a store two miles away in 12 min. This is much faster than a 1–2 h bus commute. With bike-sharing, one has options as to how to return home. One could either bike back (if one does not have much to carry), or take the bus, a taxi, or a ride-sharing service back home. Making the city more foot and bike friendly has several advantages over the current bus system. Not only is it quicker to bike short distances than to take the bus, but it is better for the environment, and serves as a source of exercise. Nevertheless, the city can also make efforts to improve the bus system by providing shelters over bus stops and offering a route that takes residents of the neighborhood directly to the nearest supermarket or Wal-Mart.

Solutions to reduce overall crime are beyond the scope of this paper. However, it is important to note that continued efforts by the city to invest in the economy of the southern sector of Dallas as well as the education of the residents will lead to lower crime rates. Studies show that when young men have living wage jobs, the overall crime rate decreases [53–55]. Because many private companies choose not to invest in the neighborhood for a variety of reasons previously discussed, the public sector should make a concerted effort to hire and train more disenfranchised workers, including racial and ethnic minorities, ex-convicts, and those in poverty. Indeed, a new economic movement is on the horizon. Several high-profile politicians, such as Senator Bernie Sanders and those endorsed by him, are in favor of an economic bill of rights in which a living-wage job is guaranteed for every person who is able to work [56]. While such a plan is highly controversial and untested in the United States, many argue

that while it may have some negative side-effects, those side-effects can be dealt with and are better than the status quo of rising inequality, concentrated poverty, and high incarceration rates.

By reducing many of the barriers to community food security with the implementation of innovative solutions like those suggested above, several stressors would also be reduced. By reducing these stressors, overall health may increase. According to Williams et al. [36] although African Americans have less psychological distress than other racial groups, “the cumulative effects of high exposure to stress may take a heavy physical toll and leave them more vulnerable to a broad range of physical ailments” (p. 348). Thus, by making it easier to access nutritious, affordable food, mental and physical health may improve. In the future, researchers can investigate the relationship between community-level stressors and individual health problems.

9. Conclusions

We provide insight into how residents of a food desert access food, and how barriers to accessing food can be related to increasing stress and decreasing overall health. By conducting multiple focus groups in a poor, less educated, African American and Latino urban food desert, we were able to gain a comprehensive understanding of these issues as they relate to a very specific demographic. In doing so, it is important to point out that the theoretical contributions can only be generalized to neighborhoods with similar features to the one used in our study. Additionally, we use qualitative analysis in this study relying upon social stress theory to provide an interpretation of the data. Future research with a quantitative approach is needed to test specific hypotheses as they relate to the effect of food deserts on social, built, and economic stressors and mental and physical health. Surveys that quantify shopping behavior and the economic, social, and physical barriers that residents face can enhance the qualitative focus group data. In addition, experimental designs can be performed that test the effect of public private partnerships that assist smaller grocers and ethnic markets in deprived neighborhoods and the reduction of social and economic stressors and increase in overall health.

Food security will continue to be of interest to academics, policy makers, and community practitioners. It will be through continued studies, using both quantitative and qualitative methods focusing on both urban and rural areas, that academics and practitioners gain a greater understanding of the relationship between food accessibility and physical and mental health. By doing so, academics will gain a greater understanding for the various contexts by which theories work and allow policy makers to diverge from ad hoc policy making and one size fits all approaches.

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