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Baseline Health Assessment of a Rural Delta Community

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BASELINE HEALTH ASSESMENT OF A RURAL DELTA COMMUNITY

by
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A thesis submitted to the faculty of The University of Mississippi in partial fulfillment of the requirements of the Sally McDonnell Barksdale Honors 19 College.

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ABSTRACT

SYDNEY CAROLINE MITCHELL: Baseline Health Assessment
of a Rural Delta Community
(Under the direction of Dr. Georgianna Mann)

The Lower Mississippi Delta is characterized by poverty, chronic health issues, health disparities, and food insecurity. The rural Delta communities are primarily African American, experiencing disproportionately higher rates of poverty, job loss, and chronic health problems. Historically, chronic health issues have persisted in these areas over time, including obesity, hypertension, and diabetes, which have only seemed to increase in this region. The food environment in this rural region tends to assist in the creation of the largely obesogenic population which, in turn, contributes to the increased prevalence of diabetes and hypertension and a lower quality of life. Many residents in the study community do not have access to clinics to maintain their health.

This study was conducted in order to provide a foundational baseline of health measurements for this rural Delta community for future research, provide health information to the community members, and also raise awareness for health education. Participants were given the opportunity to have their blood pressure, blood glucose, and body mass index (BMI) measured and assessed as optimal or at-risk categories, which were not diagnostic. Furthermore, this research study provided feedback pertaining to living a healthy lifestyle, and local resources, all of which were provided by the University of Mississippi Medical Center Community Health Advocates Program. Most participants were overweight or obese adults, usually accompanied by high blood glucose or elevated blood pressure levels. Recommendations from the research assistants

contained information from the MyPlate plan, and it also provided resources to the Aaron E. Henry Community Health Services Centers that were in the surrounding areas.

This study strives to raise awareness for the increased prevalence rates of chronic health issues within the region and incite a call to action for future research. The collection and analysis of this data provides the necessary data for the need for more intensive research initiatives for the Lower Mississippi Delta area.

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LIST OF ABBREVIATIONS

BMI	Body Mass Index
CDC	Centers for Disease Control and Prevention
FPL	Federal Poverty Line
LMD	Lower Mississippi Delta
MS	Mississippi
QOL	Quality of Life

INTRODUCTION

The Mississippi Delta, a largely river-dominated and agricultural 11,000 square miles of land, historically remains shrouded in poverty, health disparities, and insecurities, contributing to the persisting prevalence of chronic diseases, such as cardiovascular disease, diabetes, and obesity. The 18-county Mississippi Delta region located in the northwest part of the state of Mississippi between the Mississippi and Yazoo rivers experiences a declining population and increasing incidence of health problems within the largely obesogenic communities (Mendy, 2014). While obesity dominates the populations in this region, there are also other chronic diseases that correlate and possibly stem from this complex disease (Lower Mississippi Delta Nutrition Intervention Research Consortium, 2004). Obesity is a medical problem that increases the risk for other diseases and health problems, specifically problems relating to cardiovascular disease and diabetes (Jiang, 2016). The Lower Mississippi Delta region experiences much higher prevalence rates compared to the nation and, more specifically, the state of Mississippi due to the persistent barriers present within the community (Fontenot, 2010).

Residents in the Lower Mississippi Delta are at a higher risk for health problems, and since these communities are not well represented in national health surveys, their current health status is poorly understood. Therefore, not much attention is brought to this distinct population, allowing historically persistent barriers and issues within the region to remain. Based off recent studies, high cholesterol, diabetes, and hypertension were significantly higher within the lower Delta region than in the national sample (Lower Mississippi Delta Nutrition Intervention Research Consortium, 2004). Additionally, obesity appeared to be strikingly high in the sample taken from this region (33.9% versus 17.3%) for Delta adults, but most specifically obesity rates were much higher in Delta children (27.9% versus 16.2%) compared to the national percentages

(Lower Mississippi Delta Nutrition Intervention Research Consortium, 2004). From recent data analysis that was collected in this research study, hypertension/cardiovascular disease, diabetes, and obesity appear to be some of the most rampant and uncontrolled disease within the region of the Mississippi Delta.

Obesity, a worldwide epidemic, is the result of an imbalance between energy intake and expenditure, causing an abnormal accumulation of greater than 20 percent body fat over the individual's ideal body weight. The maximal health value for an individual is calculated by measuring the weight in relation to the height of an individual, determining the body mass index. This index is used to diagnose the stage of overweight or obesity, giving a value of 25.9-29 BMI to the category of overweight and 30 or greater to the category of obesity (Jiang, 2016). Obesity can result in serious health issues that are potentially life threatening, including hypertension, type II diabetes mellitus, and heart failure. Hypertension is a major contributing factor to cardiovascular diseases, indicating blood pressure levels that are too high and damaging the inner lining of blood vessels (Centers for Disease Control and Prevention, 2020). Normal blood pressure in healthy adults is a reading below 120 systolic and 80 diastolic, yet new guidelines from the American Heart Association have lowered the numbers for the diagnosis of hypertension to 130/80 millimeters of mercury ("Reading the new blood pressure guidelines," 2018). Diabetes, another chronic disease with higher than normal prevalence rates in the Mississippi Delta, is most commonly found in the form of type II diabetes mellitus, commonly referred to as adult-onset diabetes. However, more children are recently being diagnosed with the disease, most likely due to the recent rise in childhood obesity (Gamble, 2012). Diabetes results in a buildup of glucose in the blood, causing high blood glucose, which is also known as hyperglycemia. Blood glucose can be checked in several ways, yet a prick from the fingertip

offers the quickest results, indicating that levels of blood glucose above 180 can lead to major health concerns such as diabetes (United States Department of Health and Human Services, 2016).

Within the Lower Mississippi Delta, many barriers impede community members' access to adequate health care and health education. For example, these barriers range from a lack a transportation, a lack of access to healthy food options (i.e. grocery stores), saturation of too many fast food options, food insecurity, job insecurity, lack of proper education, and many more (Cooksey-Stowers, 2017). However, there also remains a sense of distrust among many of the members in Delta communities, rooted deep in the historical context of racism and discrimination. As a result, residents experience a lack of engagement with health care providers and physicians, lowering the amount of contact members have with medical professionals and the amount of health education that they are exposed to. This being said, these health disparities in the Delta region are disproportionately affecting the African American population. Even more, there is a stigma associated with members of the community that seek help from health care professionals, and there is even a stigma attached to the diseases once an individual is diagnosed (Mississippi State Department of Health, 2016). For these reasons, the prevalence of chronic diseases and health disparities is much higher than the state average.

The purpose of this research study was to provide a baseline of health measurements from a specific community within the Mississippi Delta region to provide an indication of the current health status of residents and to spread awareness in the community. This study was able to provide data to community members in order to educate them and encourage them to take action. Even more, this study was able to provide resources to members about where and how to seek professional medical care. Lastly, these measurements will serve as a basis for future

research within this part of the state, highlighting the need for more research, more resources, and more initiatives to this community.

CHAPTER 1: LITERATURE REVIEW

1.1 The Environment of the Mississippi Delta

The Mississippi Delta is a region located between the northwest of the state of Mississippi between the Yazoo and Mississippi rivers, defined by increased poverty rates, a lack of jobs, areas of great food scarcity, poor education, and chronic health issues (Lower Mississippi Delta Nutrition Intervention Research Consortium, 2004). This region of the Mississippi Delta is predominantly rural, and minorities (primarily African American) split 37% of the population. Even more, 20-26% of the region's population have incomes that are below the federal poverty level, in which 56% of these African American households are below the line of poverty, showing that African Americans are unequally affected by higher poverty rates. (Smith,1999). Furthermore, adults and children in this rural setting are at a greater risk for developing health problems than those located in urban settings. In 2018, the United Health Foundation ranked Mississippi 47th or lower for its four composite health measures: outcomes, behaviors, clinical care, and community and environment. In the South, there is a negative trend for several commonly tracked health outcomes, including obesity, diabetes, and infant mortality, producing higher death rates in the region. In reference to clinical care, African Americans experience a lower engagement with health care system providers, due to social and historical events such as segregation and racism. Even more, there is a widespread shortage of health care professionals in the Mississippi Delta as well. Two of the four composite health factors, behaviors and community, refer to the possible fear of stigma that community members associate with having a disease or seeking help, lack of social support, and fear of providers breaking confidentiality (Connell, 2019). Many of these health disparities are associated with social context; groups with lower education levels, lower income, and racial and ethnic minority status

have more health risk factors than their counterparts and are at increased risk for health conditions, impairment in physical and mental functioning, and higher mortality rates than the non-Hispanic white population in the United States (Lower Mississippi Delta Nutrition Intervention Research Consortium, 2004). These factors that are magnified within the area of the Mississippi Delta lead to major, chronic health problems, most specifically cardiovascular disease (hypertension), diabetes, and obesity. Many of these disparities arise from the type of barriers that residents in the Delta region experience; these barriers include both structural and interpersonal factors as operative in limiting health care access and utilization. For example, structural barriers include poverty, lack of transportation, lack of insurance, anticipated cost of services, and also the limited availability of health care. Additionally, interpersonal barriers are defined as medical distrust and discrimination/racism (Connell, 2019). There are many barriers within this rural region that restrict residents from adequate health education and access to medical care as well, all of these barriers which hinge upon the relatively bounded nature of poor rural communities. While many approaches deem poverty prevalent due to the racism, sexism, uneven distribution of opportunities and resources, and the corrupt structure of the economy, there is another view that is centered upon the idea that one must view this rural Delta region from a historical perspective in order to understand this concept of persistent poverty. These rural social relations are anchored in the political economy of this region, and they are maintained through memory and tradition, reputation and history. It is understood that these long-term residents have an historical sense of place, knowing their roles, strengths, and weaknesses within the community (Duncan, 1996). While there are several approaches to the poverty that exists greatly within the Mississippi Delta region, it is evident that this poverty

creates boundaries and barriers that correlate to the increased amount of health disparities in rural communities.

1. 2 Education

The lack of health education is a major determining factor in the increased rates of chronic diseases, including diabetes and hypertension, and also an obesogenic population. In a 2011 study, researchers examined the associations of household food insecurity and its relationship with poor physical health and frequent mental distress. Within this study, three variables were identified that resulted in increased odds for all health-related quality of life outcomes, specifically in a rural setting. These variables were 1.) having less than 12 years of education, 2.) not being employed full-time, and 3.) being household food insecure (Sharkey, 2011). According to the Centers for Disease Control and Prevention, a lack of education, including education on the topic of health, is a top contributing factor for poor health-related outcomes. Even more, the lack of education attainment and limited health-promoting resources have contributed to a largely obesogenic environment in rural Mississippi (Gordon, 2019). However, health behavior not only depends on the objective environment, but it also depends on how a person perceives that environment. This is why health education within these rural communities is essential in order to change the way residents view their environment. In a recent study, many children of the Lower Mississippi Delta displayed an overall lack of knowledge of and saw little value in healthy eating and physical activity as well. The informational resources within the community were listed as gym and health class in school, parents, sports coaches, television, and the grocery stores. However, gym and health class were mostly mentioned in the topic of promoting physical activity, not healthy eating. In the community, a lack of maintained sidewalks and fitness centers were mentioned as a barrier to carrying out a healthy lifestyle,

regardless of proper education (Gordon, 2019). The lack of education, most specifically health education, creates of community of uninformed residents, which corresponds significantly in the health disparities of the Mississippi Delta region.

1.3 Food Environment

Food security, defined as having consistent, dependable access to enough food for active, healthy living, is essential to the overall mental and physical health of any community (United States Department of Agriculture, 2019). This term can also be defined as a set of circumstances in which households compromise quality of diet or amount of food as a result of insufficient household resources and/or obstacles to food acquisition (Sharkey, 2011). In recent studies, 21% of the Lower Delta households were classified as food insecure, which is greater than the 15% nationwide rate of food insecurity. Based on the data from the United States Department of Agriculture (2019), Mississippi ranks as the third highest state with reports of extremely low food security, showing that communities with minimal education and increased unemployment rates make up the largest percentage of the households that are food insecure. The groups within the Delta regions with the highest reporting of food insecurity were that of households with an income below $15,000, African American households, and households with children. In most instances, when children are food insecure, the adults in the household are also food insecure (United States Department of Agriculture, 2019). The prevalence of hunger in Delta households with white children was 3.2% and in households with African American children was 11.0%, compared to nationwide estimates of 0.3% and 1.6% (National Center for Biotechnology Information, 2017). It is evident that households in the Mississippi Delta are largely characterized by food insecurity and hunger. When food insecurity is high, households have the

tendency to purchase more nutrient-poor, energy-dense foods and fewer nutrient-dense foods such as fruits and vegetables, milk, and meat. In a study, supermarkets carried an average of 96% of items that compose the Thrifty Food Plan, small/medium stores carried 50%, and convenience stores carried only 28% of these items. However, even though supermarkets carried a large majority of these items, the number of supermarkets in this region of the Mississippi Delta are extremely scarce and limited (Connell, 2007). The lack of transportation in this area is a factor that greatly contributes to the high percentage of food insecurity. Furthermore, when these items are available at the supermarkets, residents do not have the tendency to purchase these nutrient packed items, including fruits and vegetables. Limited availability and perceived costs of these healthy items in the Lower Mississippi Delta negatively influence purchasing behaviors (McGee, 2011).

1.4 Cardiovascular Disease in the Mississippi Delta

The Delta is well known for its perennial poor health outcomes, and even more, it has some of the most profound disparities in deaths related to cardiovascular health in the state and the nation as well. Even more, cardiovascular disease is the leading cause of death in the region of the Mississippi Delta, disproportionately affecting African Americans, as it is the largest cause of lower life expectancy in African Americans. In this Delta region, heart disease (244.4 deaths per 100,000 population) and stroke (49.0 deaths per 100,000 population) were the first and sixth leading causes of death in the Mississippi Delta, respectively (Mendy, 2015). The major risk factors of cardiovascular disease include high blood pressure, high cholesterol, diabetes, obesity, physical inactivity, and smoking. In order to diagnose any type of cardiovascular disease, blood pressure, the pressure of blood pushing against the walls of arteries, plays a large role. High

blood pressure, also referred to as hypertension, is a main indicator of cardiovascular disease, and it can damage the heart, leading to more health problems if it remains high. Those with a history of hypertension experience a higher risk for heart disease and stroke (Centers for Disease Control and Prevention, 2020). This being said, these factors predominate in the rural, Delta region of Mississippi as compared to that of the non-rural regions of Mississippi. There are many factors as to why this rate is strikingly high, including the decreased access to health professionals in the Delta area, a lack of education on the treatment and control of chronic disease, and also the inability to exercise and change diets. Following a trend, rates of high blood pressure vary by sex, race, and geography. High blood pressure is more common in non-Hispanic black adults (54%) than in non-Hispanic white adults (46%) (Centers for Disease Control and Prevention, 2020). This factor is a main indicator for the increased rates of hypertension prevalent within the Mississippi Delta, a population consisting largely of African American residents. The primary treatment for high blood pressure is hypertensive drug therapy; however, medication alone, even when patient adherence is high, has frequently not proved sufficient to manage chronic disease. In a population-based survey of hypertensive adults and their self-care activities, those individuals who reported taking medication without engaging in dietary changes or physical activity had no higher rates of controlled disease than those who were committed to diet and exercise but who reported less adherence to medication (Warren-Findlow, 2011).

1.5 Prevalence of Obesity in the Mississippi Delta

In comparison to the increased rates of hypertension in the rural, Delta region of Mississippi, which overall can lead to cardiovascular disease, obesity rates mirror these statistics

similarly within this region of the state. This relationship between hypertension and obesity is well established in both children and adults. Statistics between these two health issues are similar, because cardiovascular diseases, particularly hypertension, and diabetes are the main illnesses associated with obesity (National Center for Biotechnology Information, 2016). Obesity, defined as excessively overweight, remains among the most neglected public health issues worldwide. The rates of obesity within the state of Mississippi have been historically high in comparison to other states; however, Mississippi Delta adults and youth report obesity rates far exceeding those of the states and the nation as well. Body Mass Index (BMI) consists of a person's weight in kilograms, divided by the square of height in meters, and it is used as an indicator of high body fatness. While BMI is not a direct measure of body fat, research has shown that BMI is moderately correlated with more direct measures of body fat obtained from skinfold thickness measurements, bioelectrical impedance, and underwater weighing. Furthermore, BMI has been shown to strongly correlate with various adverse health outcomes consistent with direct measures of body fat (Centers for Disease Control and Prevention, 2020). The prevalence of overweight and obesity (BMI > 85^{th} percentile) was 47.1% (18.3% overweight and 28.8% obese), while it is also reported that predominately African American communities score higher on each of these measures (Gamble, 2012). In many studies, it is also determined that the quality of life (QOL) for obese individuals is significantly lower. Recently, the rate of obesity in children has risen greatly within these rural Delta regions. Obese children are more likely to become obese adults and develop weight-related chronic diseases. Primary prevention of obesity, especially in childhood, is an important strategy for combating and reversing the obesity epidemic. This ultimately includes a proper health education and awareness for the community. Although parents may be the primary gatekeepers influencing their children's

health, children ultimately are the ones who engage (or not) in healthy eating and physical activity behaviors (McGee, 2017). This engagement is based on how children perceive the environment in which they live, the resources that they have available to them, and also the social context in which they grow up in, including family members, educational mentors, and also their peers.

1.6 Diabetes in the Mississippi Delta

Diabetes, in addition to cardiovascular disease and obesity, is a chronic disease that many residents in the Mississippi Delta suffer from greatly, quite more than the national and state averages. Due to the high prevalence rates of diabetes within the state, Mississippi ranks second in the United States for overall diabetes prevalence among adults, a large percentage coming from the region of the Mississippi Delta. According to the University of Mississippi Medical Center, diabetes in the past 20 years has risen to become one of America's most prevalent chronic diseases, and its link to obesity is undeniable, driving the rate of type 2 diabetes to new heights (Short, 2014). According to the CDC's national pre-diabetes estimate, the actual pre-diabetes prevalence in Mississippi could be above 30%, positioning over 600,000-700,000 Mississippians on the path to develop diabetes (Centers for Disease Control and Prevention, 2020). These obesity rates have reached epidemic levels in the largely rural Lower Mississippi Delta region of Mississippi, an area where, once again, African Americans are disproportionately affected by this chronic disease. In 2011, LMD African American adults demonstrated a higher prevalence for diabetes compared to their white counterparts, consisting of 15% of the African American population (Tussing-Humphreys, 2011). These rates are directly proportional to the levels of poverty, food insecurity, and lack of health education that persists within the

community. Poor diet quality and low levels of physical activity are likely factors that contribute to the high disease prevalence in the region due to the fact that diet quality among LMD community members are significantly lower than the general United States population. Due to societal standards in this geographic region, cultural norms dictate larger portion sizes and also consumption of fried, energy-dense and nutrient-poor foods (Tussing-Humphreys, 2011). The data from the Mississippi State Department of Health indicate that African Americans have higher rates of diabetes, specifically African American females. It is also shown in the data table from the State Department of Health that with increasing poverty levels and decreasing education levels the prevalence of diabetes will increase accordingly. The prevalence of diabetes was 2.5 times higher among adults living within 0-99% Federal Poverty Level (FPL) compared to adults living at >300% FPL (Short, 2014). These variations in prevalence rates of diabetes due to race/ethnicity, education level, and poverty level offer insight for the significantly increased rates within the Mississippi Delta in comparison to the state of Mississippi overall. Cases of diabetes also appeared higher in LMD residents who get little to no exercise, which correlated with increased levels of blood glucose. High blood glucose levels are the main indicator for diabetes, cascading into other various health problems in the future, including heart disease, stroke, kidney disease, nerve damage, poor oral health, and vision problems as well (Centers for Disease Control and Prevention, 2020).

1.7 Current Research and Overall Importance

The county that this study was conducted in is dominated by 400 square miles of rich alluvial agricultural resources, situated within the Mississippi and Yazoo delta region in the northwestern portion of the state of Mississippi. Since 2010, the population estimates have

decreased significantly. In April 2010, the county consisted of 8,222 members, yet in April 2018, the population had decreased to 7,05l. Furthermore, the most recent estimate from the United States Census Bureau, states the current population to be estimated at 6,792 members. Within the county, African Americans make up 71.3% of the entire population (United States Census Bureau, 2019). As it is shown, poverty levels and education levels play an important role in determining the impact of health disparities on certain populations within the Mississippi Delta region. While 70.6% of the county population obtained a high school degree or higher, only a mere 11.4% of the population received a Bachelor's degree or higher. Additionally, in 2018, the median household income was $25,510, correlating to the 37.6% of residents who live in poverty (United States Census Bureau, 2018). The level of children in poverty is extremely high, and a total of 55% of children in the county live in poverty. The QOL ranking for this community ranks second to last out of the total counties within the state of Mississippi. Even more, 36% of members are classified with poor or fair health, largely due to the health behaviors within the community, the lack of proper clinical care, and the social and economic factors that have persisted in the community historically. Health behaviors that negatively affect health outcomes within the community consist of adult smoking (26%), adult obesity (42%), physical inactivity (41%), access to exercise opportunities (17%), excessive drinking (10%), and alcohol-impaired driving deaths (38%). In relation to proper clinical care, there is one primary care physician for every 7,270 residents, one dentist for every 7,050 residents, and one mental health provider for every 2,350 residents (Short, 2014).

The specific community that was investigated for this research study has a declining population of 1,473 members with paralleling estimates and statistics to the county as a whole. Barriers to living a healthy life within the community are extremely prevalent, with few feasible

and realistic solutions in sight. Community members note transportation, poverty, lack of jobs, lack of insurance, cost of services, lack of grocery stores, and distrust of health care providers as barriers within the community.

This research project serves as a baseline of health measurements for the community within the Mississippi Delta in order to raise awareness of ongoing health issues and disparities within the region. Even more, these anthropometric measurements serve as a reference point for future studies and research projects within this area of the Lower Mississippi Delta. The data attempts to show the need for future research within these communities, attempting to shine a light on this portion of the state of Mississippi.

CHAPTER 2: METHODS

2.1 Recruitment and Participation

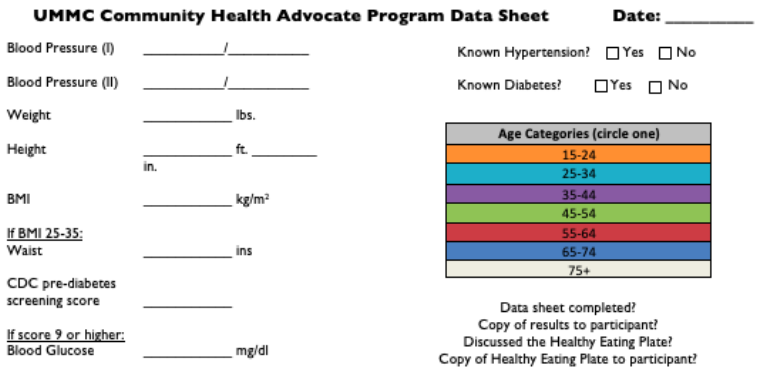
Participants were recruited in the local food pantry of a Mississippi Delta community where food supplies are distributed once every other month to families. The food pantry, which opened in 2014, is referred to as one of the town's most important resources, serving as the community's center for numerous activities. While the rural Delta's community center is supported by many organizations, they are able to provide food for approximately 800 underserved community members. Furthermore, at least 100 new families apply for service at the pantry each year. A large majority of residents who benefit from this service are senior citizens who worked for many years with a job that offered no benefits. Food pantry patrons were recruited to participate in the opportunity to have their measurements taken, including BMI, blood glucose, and blood pressure, once they completed the check-in process at the pantry. There were no advertisements sent out or placed around town before this study began; participants learned about this study as they entered the food pantry where they could elect to participate. While the members of the Delta community waited in the lobby of the community center for their food, the research team passed out informational handouts stating the purpose of our study. The handouts stated that this study offered a free service, with no insurance required, in order to provide health measurements for BMI, blood pressure, and blood glucose. Participants were offered to have all three measurements taken, or could choose to have only certain measurements taken that they were comfortable with. Only participants age 18 years or above were allowed to participate in the study. In order to maintain confidentiality, no names were written down, yet a brief survey of their predisposed health factors were recorded. Each measurement was taken in a

separate and private room in order to offer privacy to the participants. This study was approved by the University of Mississippi Institutional Review Board (19-021).

2.2 Procedure

There was a total of 8 sessions at the food pantry during this study, with a range of 15-25 participants for each visit, resulting in 129 participants in total. The study was conducted during the times that the pantry was open in the summer, which was biweekly, every other week, and every other month. Therefore, four visits happened in the month and May, and the other four took place in July. Community members visited the food pantry once every other month, so researchers were aware of this fact and made sure not to record participant readings more than once in order to not affect the overall data. However, if the participants wished to have their measurements taken, researchers would perform the tests and simply not record the data. Participants were encouraged to bring back other family members and friends when they visited the food pantry the following month in order to have their anthropometric measurements taken as well, resulting in a spike of participants in the second month of this study. This group of participants is representative of a large portion of the community that experiences food insecurity. Participants were allowed to have one of the three measurements taken or just two of the three, yet all three of the measurements were encouraged. Therefore, the data does not include the points for BMI, blood glucose, and blood pressure. The measurements were conducted in private office spaces that were connected to the main lobby of the food pantry where community members waited for their box of food. Three research assistants were stationed in each of the three private rooms to allow for participant privacy, specifically for BMI, blood pressure, and blood glucose measurements. Once participants agreed to complete the study, they

entered the office, and the door was closed to prevent others from hearing health data results. In order to begin, the consent form was signed, and a quick survey of the participant's age and predisposed health factors was taken. In order to understand the participant's risk for predisposed health factors participants were asked if they had a history of diabetes and/or hypertension.



UMMC Community Health Advocate Program Data Sheet **Date: _____**

Blood Pressure (I) _____/_____

Blood Pressure (II) _____/_____

Weight _____ lbs.

Height _____ ft. _____ in.

BMI _____ kg/m²

If BMI 25-35:
Waist _____ ins

CDC pre-diabetes screening score _____

If score 9 or higher:
Blood Glucose _____ mg/dl

Known Hypertension? ☐ Yes ☐ No

Known Diabetes? ☐ Yes ☐ No

Age Categories (circle one)
15-24
25-34
35-44
45-54
55-64
65-74
75+

Data sheet completed?
Copy of results to participant?
Discussed the Healthy Eating Plate?
Copy of Healthy Eating Plate to participant?

FIGURE 1. University of Mississippi Medical Center Community Health Advocate Program Data Sheet to Collect Health Measurements from Participants in a Rural Mississippi Delta Food Pantry.

Within the private office spaces, the measurements were taken according to Community Health Advocate training guidelines (Jones, 2015). BMI was measured with an electronic scale with a maximum weight of 700 pounds, and a stadiometer in order to determine the participant's height. Using a BMI calculator on the research assistant's phone and an available chart, the participant's BMI was calculated and explained to the participant. Participants were informed of their category (overweight, obese), a healthy category to work towards, helpful tips on how to lower their BMI, and resources to seek out if the research assistant deemed it necessary. The United States Department of Agriculture MyPlate guidelines were followed and offered to participants as well. In order to measure blood pressure levels, multiple blood pressure cuffs were readily available in order to cater to all participants. For the most accurate readings, participants were encouraged to place their fleet flat on the ground, place their arm at chest height, and refrain from talking during the reading; blood pressure levels were also taken twice

in order to provide an average reading. Once the measurement was taken, participants were made aware of their blood pressure level and the category that they fell under (hypertensive crisis, hypertension stage 2, hypertension stage 1, elevated, and normal).

BLOOD PRESSURE CATEGORY	SYSTOLIC mm Hg (upper number)		DIASTOLIC mm Hg (lower number)
NORMAL	LESS THAN 120	and	LESS THAN 80
ELEVATED	120 – 129	and	LESS THAN 80
HIGH BLOOD PRESSURE (HYPERTENSION) STAGE 1	130 – 139	or	80 – 89
HIGH BLOOD PRESSURE (HYPERTENSION) STAGE 2	140 OR HIGHER	or	90 OR HIGHER
HYPERTENSIVE CRISIS (consult your doctor immediately)	HIGHER THAN 180	and/or	HIGHER THAN 120

FIGURE 2. Blood Pressure Categories, based off American Heart Association Guidelines, used to Categorize Blood Pressure Levels of Mississippi Delta Participants.

Participants with high blood pressure were made aware of local resources for medical professionals, and they were also provided with information about living a healthy lifestyle if they wanted. For the blood glucose reading, participants were able to pick which finger was pricked, and it was cleaned thoroughly with an alcohol swab. Then a lancet was used in order to prick the participant's finger, and the blood was drawn into a test strip and inserted into a monitor. Once again, the participant was informed of the blood glucose measurement and the category into which this number fell under, based on the time in which they last ate a meal. Resources and information were provided to the participant at the end of the reading. At each station, participants were given informational handouts with helpful tips to live a healthy lifestyle and also their measurements were recorded from each station, in comparison to normal ranges. These handouts could be taken home and reviewed for later use. Participants were reminded that

these data were not diagnostic, but only to be used as a screening tool which might encourage participants to seek professional medical advice. The data was recorded for research purposes with a small slip of paper that participants took with them to each station and then left it at their final station. These slips of paper were collected at the end of each day for data analysis.

2.3 Data Analysis

First of all, using the previously calculated BMI from the time of active data collection, the percentage of obese and overweight individuals were calculated. Similarly, blood pressure levels were analyzed and categorized into ranges set forth by the American Heart Association; specifically, systolic pressure and diastolic pressures were analyzed independently of each other and evaluated in the same manner. Blood glucose levels are categorized according to their ranges. Common trends that were investigated included participants with histories of chronic disease, the factor that age played on the prevalence rates of these studied chronic diseases, and also the link that obesity has to other disease, in this case, hypertension and diabetes.

The qualitative and quantitative data was initially recorded on paper slips during the time that the measurements were taken in the food pantry. Until all visits were completed, the data was organized in a file folder by date of visit to the food pantry. Once all the visits to the food pantry were complete, the data was transferred using Microsoft Excel (version 16.16.20). The following data was analyzed in order to identify trends and patterns in health disparities among the rural Mississippi Delta community. Microsoft Excel was used in order to turn the data into charts in order to display the common trends from the data. The percentage of participants with a BMI in the range of overweight and obese was recorded from the data, the percentage of participants with blood glucose in unhealthy ranges was calculated, and the percentage of

participants with levels of high blood pressure was also recorded. The data for the graphs identified trends in obesity as a link to high blood pressure and high blood sugar. Even more, the data for each measurement was analyzed according to age categories and also known risk due to past medical history.

The data during the time of active data collection was recorded by a team of 3 research assistants, in addition to the student principal investigator who supervised all activities and ensured the participants were able to have all the measurements recorded. Researchers were trained by a certified Community Health Advocate trainer prior to the time of data collection. The data was transferred to Microsoft Excel and analyzed independently by the lead researcher in order to identify the main themes among the data. Results from the data analysis will be combined and reported in order to show the common health disparities within the region and raise awareness to this prevalent problem with the Mississippi Delta region. The data will be able to serve as foundational work for future studies that seek to improve the health and overall quality of life for community members in the Lower Mississippi Delta.

CHAPTER 3: RESULTS

Over a span of 3 months, consisting of 8 visits to the community food pantry in order to gather data, there were a total of 129 participants who agreed to take part in the study, having at least one of their measurements taken, including BMI, blood pressure, and blood glucose. This allowed for a more well-rounded group of participants to ensure a better representation of the community as a whole. Age and known risk were recorded for each of the participants, yet name and gender were excluded from this study in order to ensure confidentiality. Additionally, ages were categorized into age groups as well, and a large majority of the participants were categorized into ranges over the age of 45. From the analysis of the collected data, trends were identified in order to highlight the important aspects of the data and elucidate the current situation in this Mississippi Delta community.

3.1 Analysis of Body Mass Index

Based upon analysis of the data, obesity appeared to produce significant results for participants in this rural Delta community, matching the overall trends of the Lower Mississippi Delta prevalence rates. The data points for the BMI of the participants who agreed to have this measurement taken totaled to 116 entries for this portion of the study (n = 116). The average for the entire set of data points for recorded BMI was 30.56. The average BMI for all participants was over 30, indicating the average was in the obese category. In order to see the overall prevalence rates within this group of community members, the figure below portrays how obesity dominates the population in this region (Figure 3). Based off of this graph, 67 members from this data set were categorized as obese, 24 categorized as overweight, 24 categorized as optimal, and only 1 in the underweight category. For this sample, the number of BMI's within

the obese category are more than double the number of BMI's within the range of optimal weight. Even though BMI is classified as an indirect measurement of body fat, the trend of obesity within this sample is evident, and it lines up with the previously identified trends that have been historically noted within the northwest portion of the Mississippi state.

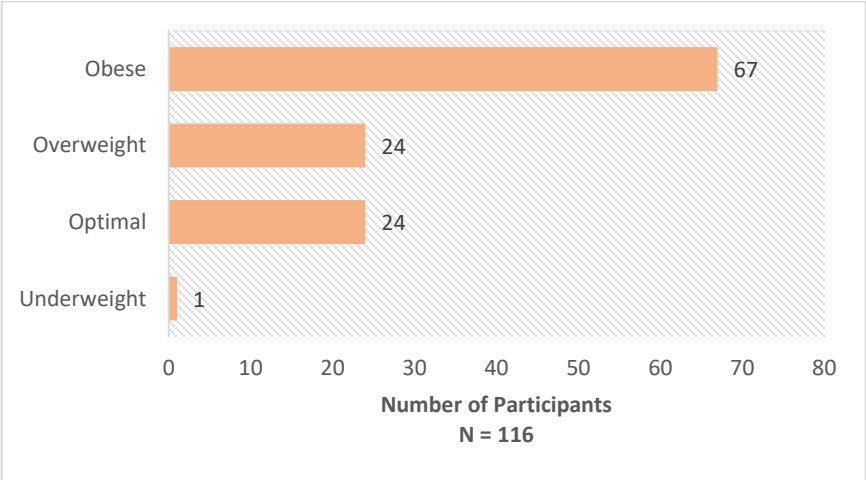


FIGURE 3. Body Mass Index Categories for Participants in a Rural Mississippi Delta Community Food Pantry, Measurements Collected May 2019 – July 2019.

In continuation, the following chart offers a breakdown of percentages for each specific BMI category (Figure 4). A BMI over the optimal range, which is a score over 29.5, is considered unhealthy, specifically the categories for overweight (BMI of 25.9-29) and for obese (BMI of 30 or greater). As shown in the pie charts, unhealthy BMI scores make up a total of 79% of this sample in comparison to the optimal range (20%) (Figure 2). Within this percentage, obesity makes up the largest percentage (58%) and overweight is the second highest (21%). The average BMI score of participants within the obese category was calculated to be 35, a value much higher than the minimal BMI score for obesity.

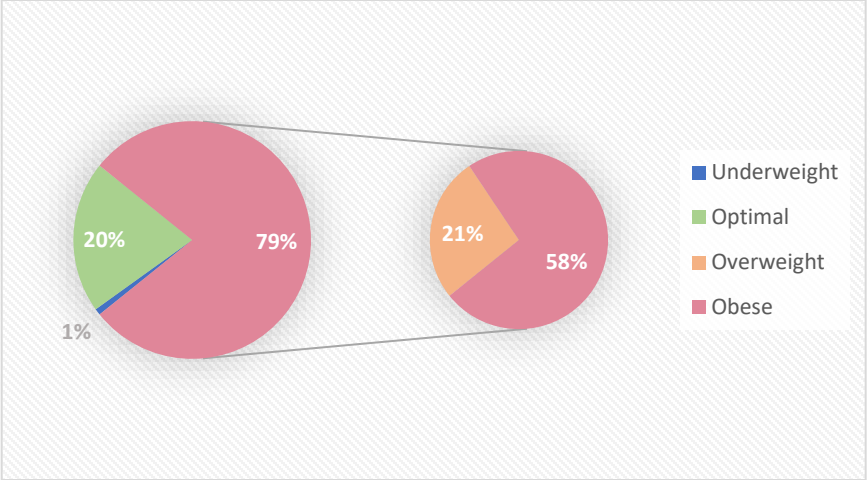


FIGURE 4. Percentage Participants with and Obese and Overweight BMI, Measurements Obtained from Participants in a Rural Mississippi Delta Food Pantry from May 2019 to July 2019.

3.2 Analysis of Blood Pressure Levels

The measured levels of hypertension within this sample correlates with the given statistics for the general population of the Mississippi Delta. In the sample of data, blood pressure was measured twice for a total of 75 participants, and an average of these two measurements was taken into consideration for both systolic and diastolic pressures in the final data analysis. By measuring blood pressure levels twice, measurements could produce a more accurate representation of the population. The categories for each blood pressure level were taken from the American Heart Association guidelines in order to provide the most up to date information. As seen in the figure below, a large majority of participants scored within the ranges for stage 2 hypertension (Figure 5). From the overall sample, participants (n = 117) agreed to have their blood pressure measurements taken, resulting in 14% of participants to be categorized in the range of stage 1 hypertension, 42% of participants in the range of stage 2 hypertension, and 3% of participants in the range of a hypertensive crisis. Furthermore, 62% of all participants have a blood pressure level within a range classified by high blood pressure, whether stage 1 hypertension, stage 2 hypertension, or hypertensive crisis.

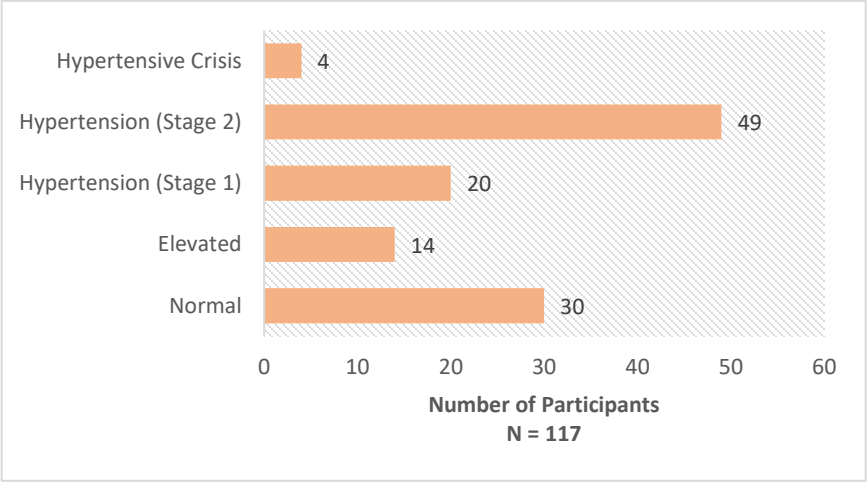


FIGURE 5. Range of Blood Pressure Levels for Participants in a Rural Mississippi Delta Food Pantry, Collected May 2019 – July 2019.

3.3 Analysis of Blood Glucose Levels

The levels of measured blood glucose were categorized into ranges of increasing intensity. The closer to the range colored in red (200-450) the greater chance of being or becoming a diabetic. For this measurement, participants (n = 111) agreed to have their finger pricked in order for their blood glucose levels to be recorded. In the figure below, data measurements are divided quite evenly throughout, showing a slightly larger percentage in the optimal range than in the diabetic range (Figure 6). However, no trend is necessarily extracted from this data. While it is important to consider the large number that fall into the elevated and dangerous ranges within this sample. In the range from 200-450, colored in red, 16 participants had extremely elevated blood glucose levels. Even more, in the range of 126-175, 28 participants were placed into this category. Approximately 15% of participants were in the range of 200-450 for blood glucose levels, and 25% of participants fell into the range of 126-175 blood glucose values.

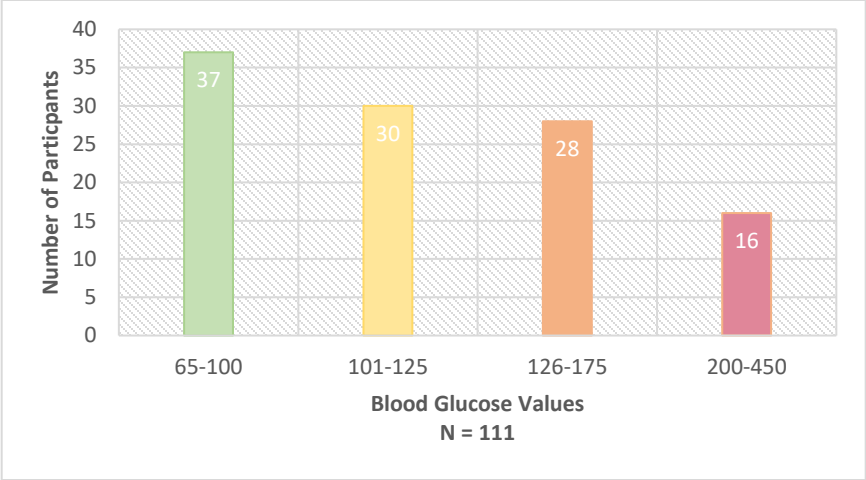


FIGURE 6. Range of Blood Glucose Levels of All Participants in a Rural Mississippi Delta Food Pantry, Collected May 2019 – July 2019.

3.4 Known Risk

One of the trends that were analyzed in this study was the prevalence of known chronic health issues within the region. For this figure below, participants (n=125) were asked if they had a prior history with hypertension (Figure 7). Most participants responded "yes" that they had known hypertension prior to their visit to the food pantry that day. Of the 82 participants that responded "yes" to a prior history of hypertension, 52 of these participants actually had a hypertensive blood level reading during the time of the research study, showing that 63% of the 82 hypertensive participants had a blood pressure reading in the hypertensive range during the time that they came into the food pantry to collect their food. Additionally, 22% of participants responded "no," and 13% of the participants were unsure in their response to this question.

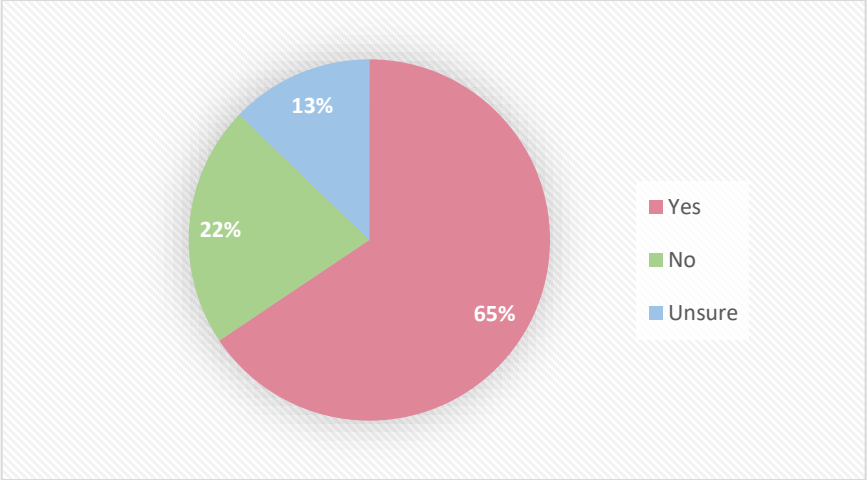


FIGURE 7. Percentage of all Participants in a Rural Mississippi Delta Food Pantry with Known Hypertension, Collected May 2019 – July 2019.

Participants we also asked about a prior history with diabetes (n=125) throughout their lifetime (Figure 8). For this graph, the majority was held by participants that responded "no" to the question pertaining to known diabetes, consisting of 50% of participants.

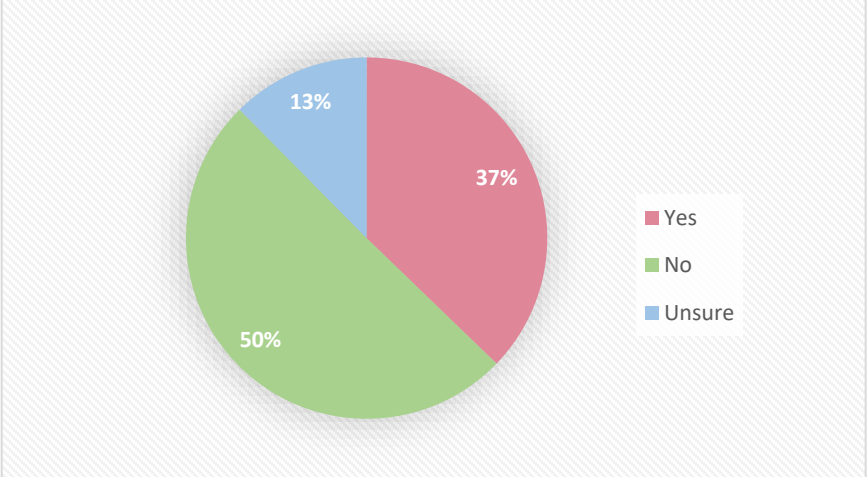


FIGURE 8. Percentage of all Participants in a Rural Mississippi Delta Food Pantry with Known Diabetes, Collected May 2019 – July 2019.

3.5 Age

In order to insure anonymity, ages were divided into ranges for participants to choose from. Ages were categorized form 25-34, 35-44, 45-54, 55-64, 65-74, and 75+. For each age group, other than the 75+ category, a BMI in the obese category made up the majority of the data

points. However, the largest indications of obesity showed clearly in the 55-64 age group and the 65-74 age group, indicating the role of age in the prevalence rates of chronic illnesses (Figure 9). Also, even though the number of participants was lower for the age groups 25-34 and 35-44, the prevalence of obesity in these categories is very high in comparison to those who are overweight and optimal. Even more, both of these age categories had the largest percentages of an overweight BMI as well. It is also shown that most of the data points came from participants in the ages range from 45-54, 55-64, and 65-74. Even more, the BMI measurements in this age group are nothing compared to the dominating percentage of participants with a BMI in the obese category. However, this figure also demonstrates the comparison of the rate of an obese BMI to the rate of an optimal BMI, regardless of the how many participants were in each age group. It is clearly shown that the population is a largely obesogenic one.

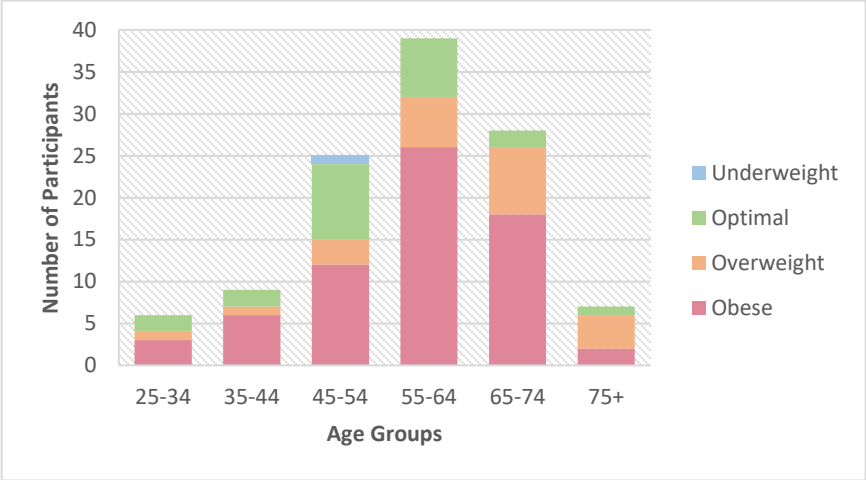


FIGURE 9. Prevalence of Obesity within Age Categories of all Participants in the Food Pantry within a Rural Mississippi Delta Community, Collected May 2019 – July 2019.

3.6 Connections to Obesity

As stated before, obesity is a proven link to many other chronic diseases. Therefore, the data was analyzed in a way to compare the BMI of participants to the levels of blood pressure as well, indicating the link between obesity and hypertension. For this data analysis, only the BMI

of participants that responded “yes” to the question pertaining to known hypertension was used. Furthermore, the BMI of these hypertensive participants was used in order to construct the figure below (Figure 10). Of the 78 previously hypertensive participants, 52 had a BMI in the obese category, 15 had a BMI in the overweight category, and only 11 had a BMI in the optimal range. Therefore, the largest percentage of participants fell into the range of obesity, resulting into a sum of 67%. Additionally, 19% of participants recorded an overweight BMI, and only 14% of participants had an optimal BMI.

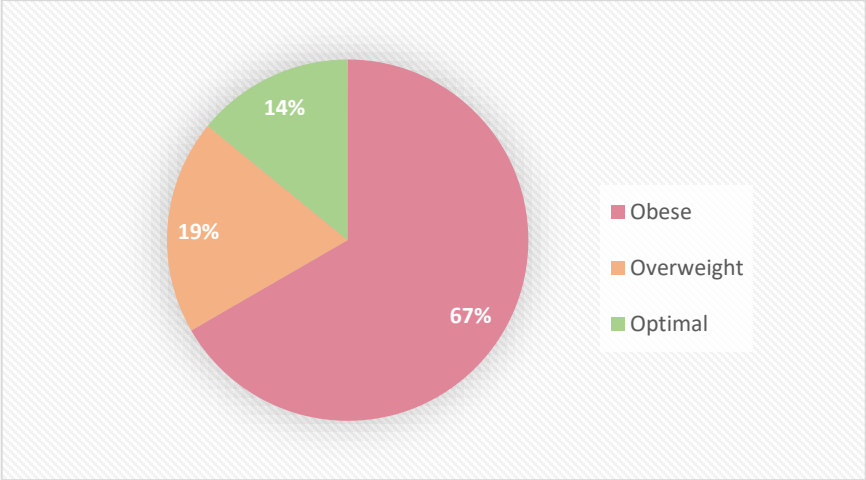


FIGURE 10. The Connection to Obesity and Hypertension, using the BMI Measurements of All Participants in a Rural Mississippi Delta Food Pantry with known Hypertension, Collected May 2019 – July 2019.

In the same way, the BMI of only the participants that responded “yes” to a previous history of diabetes was analyzed for this discussion pertaining to the link between obesity and other chronic diseases, specifically, in this case, diabetes. The BMI of participants that responded “no” or “unsure” to this portion of the survey were not included for the analysis of this link. The figure below was constructed from the 48 diabetic participants who agreed to this study upon their visit to the food pantry (Figure 11). A breakdown of the BMI for each participant produced 32 obese BMI, 9 overweight BMI, and only 7 optimal BMI. Similarly, the dominating percentage for this figure was characterized by a BMI in the range of obesity, supporting the link

to diabetes and obesity. As shown below, 67% of participants fell into the obese category, 19% in the overweight category, and 14% in the optimal category.

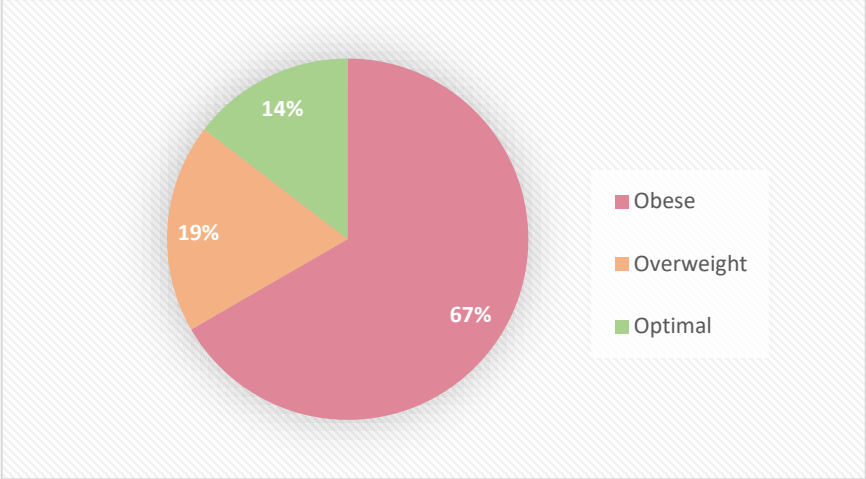


FIGURE 11. The Connection to Obesity and Diabetes, using the BMI Measurements of All Participants in a Rural Mississippi Delta Food Pantry with known Diabetes, Collected May 2019 – July 2019.

CHAPTER 4: DISCUSSION

The purpose of this study was to identify trends in a rural Mississippi Delta population, pertaining specifically to the prevalence rates of obesity, hypertension, and diabetes. This is due to the fact that the prevalence of chronic conditions is often used as a measure of the overall health of a population. Even more, this research is to serve as the foundational work for future research studies in these types of communities, providing the necessary data and evidence in order to demonstrate the great need for health-related interventions. This collection of data addresses the higher than average prevalence rates of chronic diseases compared to national and state averages, a pattern that has persisted all throughout the history of the Lower Mississippi Delta (Joulaei, 2012). These rates of disease, poverty, and insecurity this communities faces daily is not only higher than the Mississippi state average, it is much higher than the national averages as well, building a case for further independent research within rural communities as opposed to urban ones due to the significantly smaller sample sizes (Lower Mississippi Delta Nutrition Intervention Research Consortium, 2004). In continuation, these rates will only begin to improve through proper health education, raising awareness of the importance of living a healthy lifestyle, through the provision of reliable resources, and through the creation of realistic and feasible wellness initiatives.

The focus of this study was centered around the collection of BMI measurements, blood pressure levels, and blood glucose levels in order to draw a conclusion about the prevalence rates of chronic diseases in the Mississippi Delta. Based on the analysis of the data collected, trends were identified for this sample in order to relate to the overall community. The data for each of the three measurements was also evaluated based on the age categories of the participants to understand the factor in which age plays on chronic diseases. Even more, participants were

screened prior to having their measurements taken to determine the percentage of the population who had a known chronic disease. Additionally, the BMI of these participants was used to show the possible connection that obesity has with other chronic diseases. While there were limitations to the measurements used for the support of this study, the overall trends are alarming.

4.1 Analysis of Body Mass Index

As stated, the Mississippi Delta represents one of the greatest concentrations of rural persistent poverty in the United States, presenting a complex issue due to a variety of factors. For example, high unemployment, high food insecurity, higher rates of obesity and diabetes, and low access to healthy, affordable food largely characterize this entire rural area (Hossfeld, 2019). Due to these factors, the Mississippi Delta consistently presents the highest obesity rates within the state, specifically due to the presence of food deserts that dominate this 18-county rural region (Brown, 2011). Even more, of the 82 counties in the state of Mississippi, 63 (77%) are classified as food deserts, areas that have limited access to healthy and affordable food. It has been found that limited amounts of enough food and poverty contribute to health issues such obesity, diabetes, and heart disease (Hossfeld, 2018). It has also been found that food swamps, areas with a high density of establishments that sell high-calorie fast food or junk food, are even stronger indicators for obesity than food deserts. Even more, food swamps have a positive, statistically significant effect on adult obesity (Cooksey-Stowers, 2017). However, obesity is not simply determined by weight, a simple number read from the scale, but it is impacted by many other factors such as genetics, race, ethnicity, class, and socioeconomic status. Furthermore, communities that experience food insecurity due to food deserts, lower qualities of life, and poorer health outcomes are primarily in lower-income communities, which are

disproportionately, but not exclusively, populated by African Americans, Hispanics, and other marginalized racial and ethnic groups (Hossfeld, 2018). This is a direct representation of the Mississippi Delta and the population that makes up these communities; therefore, it is clear as to why obesity rates are extremely high in these regions. Another factor that contributes to the obesity epidemic in the Lower Mississippi Delta is the consistent lack of physical activity. In other words, the proportion of adults who report being physically active more than 150 minutes per week was significantly lower than the national average, most likely due to the lack of facilities in the surrounding areas (Harrington, 2014).

In 2015, about 1.2 million adults in Mississippi were overweight or obese, which places a large proportion of the Mississippi population in the 2 highest-risk BMI categories, specifically those residents in rural, poor regions (Mendy, 2017). Trends in obesity rates, according to BMI, from past studies match the data trends extracted from this study as well. In a study that evaluated prevalence rates of overweight, obesity, extreme obesity in Mississippi residents, there was an observed significant decrease in overweight prevalence from 2001 to 2010, both among men, white and African American, but not among women. Furthermore, the overall prevalence of both obesity and extreme obesity increased significantly, occurring in all subgroups. From the years 2011 to 2015, the only significant change was an increase in the prevalence of extreme obesity among whites (Mendy, 2017). While this study is representative of the Mississippi state level population, it warrants urgent community and clinical obesity interventions in order to promote prevention, treatment, and control programs that include diet and physical activity that are needed to address the obesity epidemic. A possible intervention to address the lack of awareness and availability in the community revolve around the utilization of mobile clinics for community members While these results can be paralleled to the data from this study, there are

also past studies that have been conducted specifically on the Mississippi Delta population that reflect the data extracted from this experiment also. In a study on the self-reported health of residents of the Mississippi Delta, obesity prevalence rates were unmatched. For instance, the percentage of respondents who were obese were nearly twice as high in the Delta (33.9%) as in the nation (17.3%), offering a difference that is statistically significant ($p < 0.001$). In this study, it was expected that there would be a higher prevalence overall in this region, the magnitude of the problems in some population subgroups was not anticipated. The prevalence of obesity in the Delta was particularly striking: 35.4% of women, 38.8% of African Americans, and 35.3% of person with higher incomes were obese; however, the prevalence of obesity was significantly higher in the Delta regardless of gender, race, household income, or age (Lower Mississippi Delta Nutrition Intervention Research Consortium, 2004). Furthermore, the study based off the self-reporting of residents, shows a noticeable increasing prevalence obesity until 65 years of age, and after this age there is a decline among both African Americans and whites. However, the most startling finding is the prevalence of obesity not only in young children living in the confines of the Mississippi Delta, but also in the United States; childhood obesity has more than tripled in the last three decades, resulting in an even high prevalence for the children in the Mississippi Delta (Gray, 2016). Since childhood obesity is not only associated with risk of adult obesity and chronic illnesses but also with health, social, and psychological risks during childhood, this serves as a possible area for future research and focus for new initiatives.

For this specific study, 79% of participants had a BMI within the highest risk BMI categories, including overweight and obese. Therefore, only 21% of participants remained in an optimal weight range based on BMI. In comparison to other studies, these statistics reflect the population accurately, where they are higher than state and national averages for obesity and

overweight prevalence rates. However, BMI have various deficiencies as a measure of obesity, resulting in limitations to this measurement. BMI is an indirect measure of body fat, which is not as accurate as more direct approaches such as bioelectrical impedance. Even more, BMI does not necessarily reflect the changes that occur with age or between men and women (Rothman, 2008). However, this data analysis for this study is supported by previous research studies, and the measurements were obtained and reported by trained research assistants, not self-reported by residents, resulting in a more valid and accurate analysis of the population as a whole.

4.2 Analysis of Blood Pressure Levels

Over 15 years of research in the Mississippi Delta, this region has continually documented a population which experiences increased rates of chronic disease and excessive mortalities that are related to these diseases. Two of the most significant chronic diseases that burden this population most significantly are hypertension and diabetes, largely in part due to the scarcity of both individual and health system resources in the region. This lack of resources poses as a barrier to effective chronic disease management (Ginn, 1999). Due to the lack of medical professionals in the region and also the lack of awareness and education of major modifiable cardiovascular disease risk factors, the Mississippi Delta has some of the most profound disparities in cardiovascular health in the state and in the nation, making cardiovascular disease the leading cause of death in the Mississippi Delta (Mendy, 2015). Cardiovascular disease with a mortality rate strongly dictated by strokes, is not caused by just one single cardiovascular risk factor, but yet a mixture of several factors. Not only is hypertension (high blood pressure) a major modifiable risk factor for this disease, but also high levels of blood lipids, obesity, physical inactivity, smoking, glucose intolerance/diabetes, and age also pose as

major risk factors as well. However, this disease is multifactorial, and genetic factors play an important role as well, in addition to the environmental factors such as stress, smoking, alcohol intake, and sedentary lifestyles. In the year 2000, it was estimated that nearly one billion people (26% of the adult population) had hypertension; however, this number increases every year, expecting to rise to 29% of the worldwide population by the year 2025 (Sawicka, 2011).

Hypertension, often labeled as the "silent killer," due to the fact that it shows no early symptoms, and it is also an independent predisposing factor for heart failure, coronary artery disease, stroke, renal disease, and peripheral arterial disease. Even though hypertension displays an asymptomatic tendency, it is a condition that can be easily identified and treated effectively (Moore, 2005). The rate of mortality related with cardiovascular disease is so prevalent not only worldwide, but it is specifically evident in rural communities like the Mississippi Delta for many reasons. For example, residents do not have the privilege of accessible and affordable health care in this rural region, presenting the persistent obstacle that poverty creates in these communities (Abrokwa, 2009). Barriers to accessing proper health care are transportation, job insecurity, lack of insurance, and also a lack of medical professionals in the area. Therefore, it is no surprise that prevalence rates of cardiovascular disease, as well as other chronic diseases, in the disadvantaged region of the Mississippi Delta are much higher than the state and national averages. There is a lack of health access in the area and no feasible and realistic way for residents to treat this disease, only adding to the imposing threat that the "silent killer," hypertension, creates in the community. Poverty creates disproportionate health disparities that residents are unable to overcome without intervention.

In a recent study to provide similar baseline data to describe the nutritional and health status of the Delta population, demographic groups who were at a greater risk to have chronic

health issues, including hypertension, were identified (Lower Mississippi Delta Nutrition Intervention Research Consortium, 2004). In order to analyze these trends, it was noted that 51% of the population was African American and 35% of the populations lives below the poverty line. The prevalence of hypertension among low-income Delta residents was 43.3%, strikingly greater than the national 29.2%. Even more, in the older age groups, the prevalence of self-reported hypertension was approximately 60%, compared the 46% of the national population. Furthermore, the prevalence hypertension and high cholesterol was significantly higher in the Delta regardless of gender, race, household income, or age. To conclude the study, it was determined that hypertension rates were significantly higher among women than men, African Americans than whites, and persons with incomes below $15,000 compared with person with higher incomes (Lower Mississippi Delta Nutrition Intervention Research Consortium, 2004). In another study, the fact that African Americans have almost a 2-fold increased risk of cardiovascular disease was analyzed further, and the level of awareness for risk factors associated with this disease was also investigated. In this study, 17% of participants were unable to identify any risk factors for cardiovascular disease, and it was also noted that hypertension was not a well-known risk factor in this region. Additionally, lifestyle factors and their role in cardiovascular diseases, including strokes, were not known to respondents. Specifically, 52.7%, 56.4%, 53.2%, 38.3%, and 28.7% failed to mention lack of physical activity, excessive alcohol consumption, diabetes, smoking, and high cholesterol, respectively as factors that contribute to cardiovascular related deaths, specifically a stroke (Sallar, 2010). Therefore, it is evident that knowledge of cardiovascular diseases, risk reduction, and appropriate management should be a future area for research.

Furthermore, the data collected from the participants at the food pantry greatly reflects the results from previous research studies that have been conducted in the surrounding areas. As shown in the graphs, the majority of participants (62%) were categorized as hypertensive, a large number in stage 2 hypertension (42%). Therefore, providing support to the image of an at-risk population with a higher than average rate of prevalence for cardiovascular disease. While the data analyzed from this experiment mirrors the statistics for these rural Mississippi Delta regions, the measurement of blood pressure in order to predict the number of hypertensive patients in the communities has limitations. While blood pressure machines are able to eliminate several observer errors and avoid the problem of observer bias and digit preference, there is also a number of mistakes that can be made such as cuffing mistakes, an incorrectly sized cuff, or a moving and talking participants. Even more, blood pressure readings may be higher if the participant is nervous or anxious (Palatini, 2012). However, steps were taken in order to ensure validity. For example, there were multiple cuff sizes present, participants were ordered to remain still and restrain from talking during the reading. Lastly, measurements were taken at least twice and averaged out so that the data would represent that population of the community as accurately as possible.

4.3 Analysis of Blood Glucose Levels

Much like the intensity in the prevalence rates of obesity and hypertension, diabetes parallels these rates and disproportionately affects poor and impoverished communities like the Mississippi Delta that lack the funds and the resources in order to treat this chronic disease. In 2016, the County Health Rankings and Roadmaps Website reported 13% of Mississippi's population was diagnosed with diabetes. Even more, the Mississippi State Department of Health

(2016) ranked Mississippi as the first highest in the United States for diabetes prevalence, consisting of over 308,295 (13.6%) adult Mississippians living with diabetes. Diabetes accounted for 1,083 deaths in Mississippi in the year 2016 (Mississippi State Department of Health, 2016). The largest threat that diabetes imposes upon the economy, communities, and individuals as well is the direct and indirect costs. In 2012 alone, the American Diabetes Association reported that these costs amassed to over $2.74 in just the states of Mississippi, which is equivalent to $10,402 per Mississippian with diabetes. Some of the direct costs include hospital admissions, medications, diabetes supplies, and the use of health care. Even more, diabetics spend over three billion days in the hospital, which is considered another example of a direct cost of diabetes. Indirect costs include individual's absenteeism from work due to diabetes, loss of productivity from mortality and morbidity, and the quality of life among individuals and their family members who cared for them. As shown in other trends as well, diabetes negatively affects minority groups. The percentage for different ethnic groups diagnosed with diabetes included the following: Non-Hispanic Whites 7.1%, Asian Americans 8.4%, Non-Hispanic African Americans 12.6%, Hispanics 11.8%, Hispanic Cubans 7.6%, Mexican Americans 13.3%, and Puerto Ricans 13.8% (Williams, 2014). This being said, time and money are some of the biggest obstacles that diabetes within the Mississippi Delta face in the diagnosis and treatment of diabetes, especially in the case of a majority of African Americans.

From the same study, in which Delta residents self-reported health, diabetes followed the same trends as hypertension. For instance, the prevalence of diabetes was significantly higher in the Delta for both men and women; African Americans and whites; for persons living in low-income households; and for persons between 35 and 74 years of age compared to those of state and national average. Furthermore, between 19.8% to 25.7% of persons 55-74 years age of were

told by a health professional that they had diabetes, compared to their counterparts which resulted in 10.7% to 15.7%. Lastly, while this study included the fact that prevalence rates of diabetes for African Americans were nearly twice that of the rates for whites, adding that these reports were worsened in combination with an overweight or obese BMI (Lower Mississippi Delta Nutrition Intervention Research Consortium, 2004). In a recent study that was conducted in Bolivar County, a rural region located in the Mississippi Delta with a population of 36,766 individuals, quite similar to the community in which this research study was centered, 5,147 individuals (14%) were diagnosed with diabetes. According to the data extracted from Bolivar County for this study, 483 patients were diagnosed with diabetes. Of this number, 97.9% had type II diabetes and 97.3% were African American. From this total of 483, females represented 64.2% (Williams, 2014).

In continuation, the results from the Bolivar County study support and highlight many of the trends noted in this study, specifically in the prevalence rates of diabetes. For example, 37% of the participants in this research study responded "yes" to the question pertaining to known diabetes, indicating a population with high prevalence rates of diabetes. However, the specific blood glucose measurements for each participant varied greatly, partially in fact due to the timing and the limitations surrounding this type of measurement. Many participants were unable to accurately determine the correct time in which their last meal was eaten, skewing the results partially. Like any test, using the blood from a quick finger prick has its limitations. Even though these digital meters for testing glucose have eliminated much guesswork, these machines are not always consistent, creating variations from meter to meter. Also, potential errors such as applying insufficient blood to the strip and using strips that are out of date or exposed to excess

moisture or humidity. However, this does not offer enough proof to discredit the readings from these meters for data interpretation (Olansky, 2010).

4.4 Known Risk

From the data gathered in this study and based off the conclusions from past research studies, the prevalence rate of chronic diseases in these rural Delta communities is rising steadily, showing no sign of plateauing or slacking off. For this study, 65% of participants responded “yes” to a previous history of hypertension, 13% responded “no”, and 22% were unsure of their answer. This same question was asked to participants about diabetes, and, surprisingly, 50% of the participants responded “no,” 37% responded “yes,” and 13% were unsure in their response to the question during the survey. Furthermore, the analysis led to an investigation of the participants that reported a history of both hypertension and diabetes, alluding to the role that chronic diseases have on one another and the ability to lower the quality of life. Of the total 82 participants that reported having hypertension, 44 of these participants also reported having diabetes as well, while only 38 of the participants suffered from hypertension alone. This is an indicator of the prevalence of chronic diseases in this community and the role in which they build upon one another. While many residents in this small urban community know of their disease, they have no realistic way to monitor or treat it regularly. Due to the large percentage of poverty in the area, residents have no way to buy their own devices to monitor their blood pressure levels, blood glucose levels, or weight. Even more, the lack of health care professionals in the area is shocking. In a recent study that focused on the insufficient availability of medical care in all Mississippi Delta communities, it was noted that most communities’ members must travel out of county for their visits with health care professionals.

This study concluded that availability and quality were the most significant reason that Mississippi Delta residents traveled out of county for their medical care, and it was also seen that familiarity, convenience, and cost were not driving factors as to why residents traveled out of the county (Wynveen, 2009). Insufficient availability of medical care could possibly be rectified through grants or other funding sources, using these funds in order to purchase new technologically advanced equipment or hiring additional staff. However, for this specific Delta county and many other small counties like it, a small population is insufficient to support these envisioned facility expansions; therefore, it is imperative to offer a reliable transportation service to the nearest facility. These proposed solutions may offer ways in order to regulate and manage current chronic diseases and prevent the occurrence of others.

4.5 Age

For this study, prevalence rates of chronic diseases by age was examined. Cases of obesity and hypertension were shown to exist largely in older populations, ranging from 44-74. Even more, most of the emergency cases pertaining to chronic illness and mortality are experience more often in elder patients rather than their younger counterparts (Mochmann, 2014). Obesity has the most significant connection to ageing and the related consequences that follow along as well, which can have an extreme impact on quality of life. At this moment in time, ageing remains the single largest risk factor for heart attacks, stroke, cancers, diabetes, and most chronic illnesses (Jura, 2016). Obesity becomes such a prevalent issue in the elderly because the elderly are the fastest growing portion of the population, and it is proposed that by 2050, there will be two billion people over the age of 60, outnumbering children. Currently, both gender and all racial groups at all ages are dealing with obesity, yet it is asymmetrical, dominated

by the elderly population. While it is known that ageing is associated with an increase in abdominal white adipose tissue, there are also factors such as socio-economic conditions, environmental conditions, and genetics that play a significant role as well (Jura, 2016).

In addition to these previously stated factors, the lack of physical activity plays a large role as well in the accumulation of body fat. In this specific community where research was conducted, the availability of gymnasiums and work out spaces are extremely limited. This being said, most residents discussed that they enjoy walking. However, a large majority of the community admit to not having any type of physical activity. In the same study that was conducted within the region of the Mississippi Delta, in which residents self-reported their health, it was found that diabetes, hypertension, and high cholesterol increased with age, peaking in those in the age category of 65-74 years of age. Specifically, in terms of obesity, increasing prevalence of obesity, for both whites and African Americans, occurred until 65 years of age, and then after this time there was a constant decline among both racial groups. However, it is shown that in surveys that the prevalence in African Americans in higher than whites at all ages (Lower Mississippi Delta Nutrition Intervention Research Consortium, 2004).

For the measurements collected from the food pantry, the BMI of the participants was measured along with their associated age category. In the data collection, it was shown that the largest prevalence rates for obesity in the participants occurred in the age categories of 45-54 years of age, 55-64 years of age, and 65-74 years of age. The great peak in obesity prevalence is found in the category of 55-64 years of age, and after this point, it decreases significantly. Furthermore, even though the prevalence of obesity is quite high in the ages from 65-74, it is an evident decline, and in the age group of 75+ it tends to decline even more. In addition, the prevalence of obesity increases constantly over time until it peaks at the age of 64. The data

points collected from this research study in the food pantry reflect the study in which residents self-reported their own health. It also follows the trends of increasing and decreasing obesity that are found in previous studies (Lower Mississippi Delta Nutrition Intervention Research Consortium, 2004).

4.6 Connections to Obesity

Obesity, currently at epidemic proportions throughout the entire United States, poses as a significant risk factor for many other chronic illnesses that significantly impact the remainder of one's life. Obesity has been deemed a major risk factor for and contributor to increased morbidity and mortality, most importantly from cardiovascular disease and diabetes, but even from cancer, osteoarthritis, depression, sleep apnea, and many other chronic diseases (Pi-Sunyer, 2010). Shockingly, excessive overweight remains among the most neglected public health issues worldwide, yet it is strongly associated with increasing risks of disability, illness, and death for Americans (Jiang, 2016). This being said, the mechanisms underlying obesity-associated hypertension or other associated metabolic diseases has not been deeply researched and serve as a possible area for future research, specifically in rural regions like the Mississippi Delta that have an underserved and disadvantaged population.

From the research gathered in this rural Delta community, the role that obesity plays as a risk factor for hypertension and diabetes is evident. For example, a large majority of participants who reported as hypertensive or diabetic had an overweight or obese BMI. Of the 78 participants who reported as hypertensive, 52 had an obese BMI (67%) 15 had an overweight BMI (19%), and only 11 had an optimal BMI (14%). In the case of the diabetic participants, there was a total of 48 who responded "yes." From this total, 32 diabetics had an obese BMI (67%), 9 diabetics

had an overweight BMI (19%), and 7 diabetics had an optimal BMI (14%). This reflects the role that obesity has in relation to other chronic disease, specifically hypertension and diabetes.

CONCLUSION

Community members who reside in the rural Mississippi Delta face many obstacles that prevent the practice of a healthy lifestyle. Prevalence rates of chronic health issues, including obesity, hypertension, and diabetes, significantly affect this population, specifically African Americans, who make up a large majority of the population in this area. The health disparities in this region disproportionally affect the residents of the Mississippi Delta due to the extreme poverty levels, the lack of education and awareness in terms of health and general education, the high unemployment rates, the lack of medical professionals, and the prevalence of food insecurity in the area. If there is no action to help provide the community with vital resources, these chronic health issues will continue to persist and increase over time. This research study serves as a call to action for this community and many other communities in the Delta like it. However, insight into the social, cultural, and environmental factors that create the inequity within these Delta communities must be understood and acknowledged in order to mediate these rampant health disparities in the region. There is a great need for specific independent research in rural communities, like those in the Delta, as many studies cannot be generalized to the Delta. However, there is much work to be done in the community in order to provide adequate access and resources to community members, but first the community must be fully understood and experienced in order to create meaningful and long-lasting change.

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APPENDICES

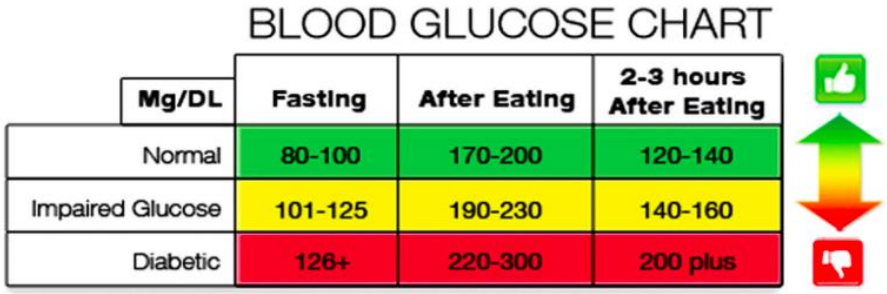
APPENDIX A: Community Health Screening Handout

Community Health Screening Handout

1. Blood Pressure Levels

BLOOD PRESSURE CATEGORY	SYSTOLIC mm Hg (upper number)		DIASTOLIC mm Hg (lower number)
NORMAL	LESS THAN 120	and	LESS THAN 80
ELEVATED	120 – 129	and	LESS THAN 80
HIGH BLOOD PRESSURE (HYPERTENSION) STAGE 1	130 – 139	or	80 – 89
HIGH BLOOD PRESSURE (HYPERTENSION) STAGE 2	140 OR HIGHER	or	90 OR HIGHER
HYPERTENSIVE CRISIS (consult your doctor immediately)	HIGHER THAN 180	and/or	HIGHER THAN 120

2. Blood Sugar Levels



3. Body Mass Index (BMI)

BMI	Category
Lower than 18.5	Underweight
18.5 up to 25	Optimal
25 up to 30	Overweight
30 upwards	Obese

Available Resources:

Aaron E. Henry Community Health Services Center, Inc.
Quitman School Base Clinic
1362 Martin Luther King Drive, Marks, MS
(662) 483-1327
Hours of Operation: M-F 7:30 AM to 4:30 PM

Batesville Clinic
216 Highway 51, Batesville, MS
(662) 563-1858
Hours of Operation: Monday 8:00 AM to 7:00 PM, Tuesday-Friday 8:00 AM to 5:00 PM

Clarksdale Clinic
800 Ohio Avenue, Clarksdale, MS
(662) 624-2504
Hours of Operation: Monday, Tuesday, Thursday, Friday 8:00 AM to 5:00 PM, Wednesday 8:00 AM to 7:00 PM

APPENDIX B: Data Collection Sheet

UMMC Community Health Advocate Program Data Sheet **Date: _____**

Blood Pressure (I) _____/_____

Blood Pressure (II) _____/_____

Weight _____ lbs.

Height _____ ft. _____ in.

BMI _____ kg/m²

If BMI 25-35:
Waist _____ ins

CDC pre-diabetes screening score _____

If score 9 or higher:
Blood Glucose _____ mg/dl

Known Hypertension? ☐ Yes ☐ No

Known Diabetes? ☐ Yes ☐ No

Age Categories (circle one)
15-24
25-34
35-44
45-54
55-64
65-74
75+

Data sheet completed?
Copy of results to participant?
Discussed the Healthy Eating Plate?
Copy of Healthy Eating Plate to participant?

APPENDIX C: Participant Take-Home Data Sheet

UMMC Community Health Advocate Program – *"Know Your Numbers"*

Blood Pressure	First Reading	Second Reading
Systolic (upper #) in mm Hg		
Diastolic (lower #) in mm Hg		

Weight _____ lbs

BMI (Body Mass Index)			

Waist _____ inches

CDC pre-diabetes screening score _____

Random Blood Glucose _____ mg/dl Date: _____

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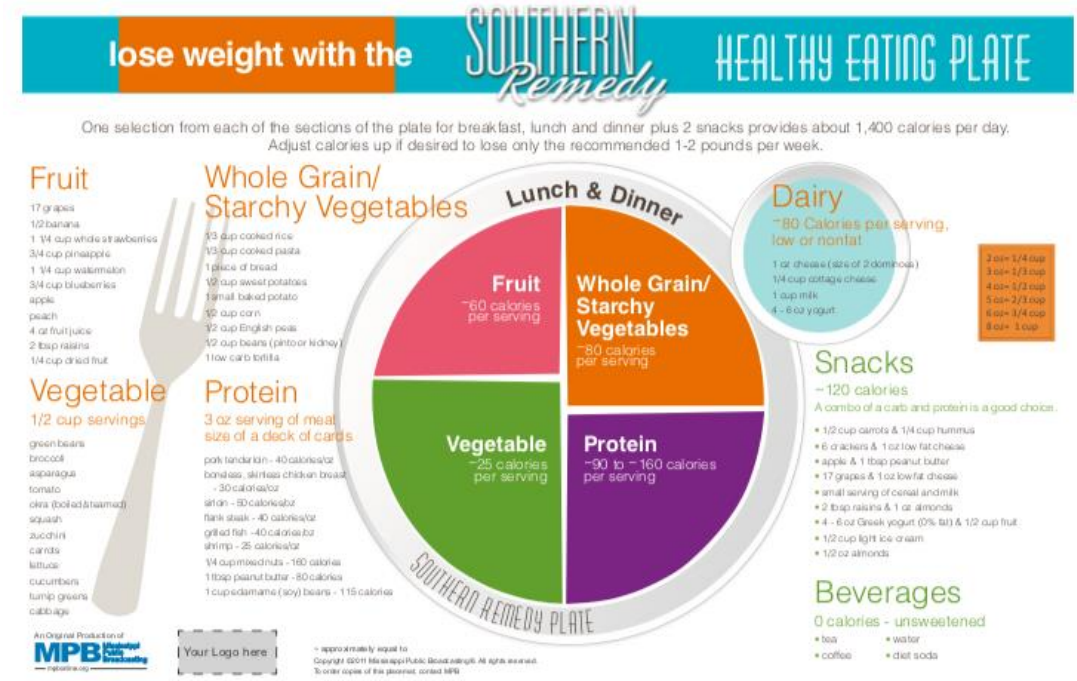
APPENDIX D: Information Flyer Handout

APPENDIX E: Southern Remedy Health Eating Plate



APPENDIX F: BMI Calculation Chart

Body Mass Index Chart

Normal Range Overweight Obese

Your Weight	HEALTHY RANGE						OVERWEIGHT					OBESE		
4'10"	91	96	100	105	110	115	119	124	129	134	138	143	167	191
4'11"	94	99	104	109	114	119	124	128	133	138	143	148	173	198
5'0"	97	102	107	112	118	123	128	133	138	143	148	153	179	204
5'1"	100	106	11	116	122	127	132	137	143	148	153	158	185	211
5'2"	104	109	115	120	126	131	136	142	147	153	158	164	191	218
5'3"	107	113	118	124	130	135	141	146	152	158	163	169	197	225
5'4"	114	120	126	132	138	144	150	156	162	168	174	180	210	240
5'5"	114	120	126	132	138	144	150	156	162	168	174	180	210	240
5'6"	118	124	130	136	142	148	155	161	167	173	178	186	216	247
5'7"	121	127	134	140	146	153	159	166	172	178	185	191	223	255
5'8"	125	131	138	144	151	158	164	171	177	184	190	197	230	262
5'9"	128	135	142	149	155	162	169	176	182	189	196	203	236	270
5'10"	132	139	146	153	160	167	174	181	188	195	202	207	243	278
5'11"	136	143	150	157	165	172	179	183	193	200	208	215	250	286
6'0"	140	147	154	162	169	177	184	191	199	206	216	221	258	294
6'1"	144	151	159	166	174	182	189	197	204	212	219	227	265	302
6'2"	148	155	163	171	179	186	194	202	210	218	225	233	272	311
6'3"	152	160	168	176	184	192	200	208	216	224	232	246	287	319
6'4"	156	164	172	180	189	197	205	213	221	230	238	246	287	328
BMI	19	20	21	22	23	24	25	26	27	28	29	30	25	40