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Solving the Obesity Problem One Bite at a Time: A Review of Interventions

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SOLVING THE OBESITY PROBLEM ONE BITE AT A TIME

The University of Southern Mississippi

Solving the Obesity Problem One Bite at a Time:

A Review of Interventions

by

Sally Catherine Davis

A Thesis

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SOLVING THE OBESITY PROBLEM ONE BITE AT A TIME

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SOLVING THE OBESITY PROBLEM ONE BITE AT A TIME

Abstract

Resource limitations contribute to obesity in southern rural populations. An examination of published research provides evidence related to factors that lead to obesity and to related health consequences. Resource limitations in southern rural areas include a lack of access to healthy foods, a lack of safe areas to exercise or fitness equipment, and a lack of funding to promote the hiring of adequate numbers of healthcare workers to implement prevention programs and treat obesity related diseases. An investigation of obesity rates in Mississippi and Louisiana demonstrate that high rates of obesity exist. Through an exploration of published interventions in both states, many types of obesity focused interventions have been found that address the resource limitations of these areas. Mississippi and Louisiana were used as the study areas in this investigation. Statistics related to rural obesity used in this study were obtained from the Centers for Disease Control and Prevention to determine obesity prevalence in these states. In addition, intervention strategies published in the targeted states in the past ten years were analyzed on their ability to meet resource limitations.

Key Words: Obesity, Rural, Mississippi, Louisiana, Interventions

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Table of Contents

List of Tables and Figures.....	vii
Chapter 1: Introduction	1
Hypothesis	3
Chapter 2: Review of Literature.....	5
Increased Caloric Intake.....	5
Physical Inactivity.....	6
Socioeconomic Status Factors	6
Childhood Obesity.....	7
Elder Obesity	7
Interventions for Obesity.....	8
Interventions to Prevent Childhood Obesity	9
Health Related Concerns Associated with Obesity.....	9
Heart Disease	9
Diabetes	10
Summary	11
Chapter 3: Methods	12
Chapter 4: Research Findings.....	13
Interventions:.....	15
Chapter 5: Discussion.....	22
Chapter 6: Conclusions	28
Resources.....	30

List of Tables and Figures

Table 1: Louisiana and Mississippi Obesity Percentiles From 1990-2010.....13

Chapter 1: Introduction

In the United States, diet management is a large profit earning industry. According to The U.S. Weight Loss and Diet Control Market (2011), American consumers spent \$61 billion on diet products in 2011. Even though the amount of money spent on diet management in America is high, obesity remains prevalent throughout the nation. Obesity is defined as a body mass index (BMI) value of greater than 30% (Defining Overweight and Obesity, n.d.). The body mass index is a measurement of body fat based on height and weight. The primary reasons for expanding waistlines among the American populace are high caloric diets and sedentary lifestyles. Recent research indicates that a strong correlation between an individual's environment and developing obesity also exists. Kegler, Swan, Alcantara, Feldman, and Glanz (2014) state that high obesity rates are linked with rural locations. Galambos (2005) reports that the 50 million people living in rural areas across the nation struggle with health disparities related to obesity. A health disparity according to the National Institute of Health is a significant increase in the frequency of diagnosis in a sample population for a given disease than in the general population (HSRIC, n.d.).

Obesity is concerning in rural populations because of the risk for developing a health disparity. Two of the health disparities most commonly associated with an individual's weight are heart disease and diabetes (Galambos, 2005). One factor affecting the obesity problem in southern rural locations is the lack of funding which affects the level of care provided. Graves (2010) says that communities that lack resources such as funding cannot afford nor attract primary healthcare providers (p. 4). The lack of

SOLVING THE OBESITY PROBLEM ONE BITE AT A TIME

healthcare providers and financial resources in the rural south has led to a reduction in medical care and in measures to prevent obesity in these communities (Graves, 2010). These circumstances create a set of conditions that influence each other and make positive change difficult. Rosenblatt and Hart (1999) conclude that twenty-percent of Americans live in rural areas but a large portion of that citizenry is underserved by a primary healthcare provider because less than ten-percent of physicians serve in rural areas (p. 33). An important step in decreasing health disparities and obesity in rural communities is to provide better healthcare.

Other factors that attribute to the high rates of obesity in southern rural areas are limited access to affordable foods and limited access to safe facilities to exercise. The marketing and promotion of fresh produce and nutritious food choices in poor rural communities is limited. This limitation results in a greater intake of high-caloric, low-nutrient foods. Rural communities also have limited access to safe physical exercise facilities and opportunities. Rural residents, in order to make changes in obesity rates, require interventions that improve access to healthy foods and safe locations for exercise.

Many different approaches exist to reduce the obesity problem. In two sources, Kumanyika, Parker, and Sim's study (2010) and Pearce and Witten's book (2010), they suggest that the increase in the number of overweight adults and youth has caused a shift in how interventions are approached (p.17 and p.28). Interventions are programs designed to prevent or address factors related to obesity. According to Lee (2007), poor nutrition occurs in all income level families, but due to each income level's limitations, each income level requires different tactics for interventions (p. 82). Patterson, Moore, Probst, and Shinogle (2006) show that physical inactivity and obesity are correlated and that their

SOLVING THE OBESITY PROBLEM ONE BITE AT A TIME

findings are “unique to rural America [and] could be used in designing effective intervention programs for rural residents” (p. 158). Pearce and Witten (2010) suggest some successful interventions to address the obesity epidemic and prevent future health problems. They believe that in order for an intervention to be successful it will “require concerted efforts at a range of scales, but with a particular emphasis on modifying the environments in which individual-level decisions are made,” or in other words, the intervention needs to recognize all social, physical, and cultural matters in the environment (p. 32). Also, Kumanyika et al. (2010) discuss that solutions for rural obesity will be complex because the problem is complex (p. 197). The authors show new challenges facing interventionists are promoting solutions that emphasize the population and that create urgency for action (p. 197).

The rural south faces resource limitations, such as limited access to healthy foods, limited access to safe exercise facilities and limited funding to provide necessary medical care and prevention programming, which contribute towards increasing obesity. An examination of research reveals a clear association between these limitations and the presence of obesity; therefore interventions should address these limitations in order to decrease the rates of obesity. This study examines statistical data of obesity rates in Mississippi and Louisiana provided by the Centers for Disease Control and Prevention (CDC) and evaluates published intervention strategies on how they have met the resource limitations of the communities in which they serve.

Hypothesis

Resource limitations of rural areas include limited access to healthy foods, physical exercise, and necessary funding. These resource limitations have been well documented

SOLVING THE OBESITY PROBLEM ONE BITE AT A TIME

for their contribution to obesity and obesity related diseases in these areas. Therefore, in order to promote lifestyle changes in individuals, interventions must address the resources limitations in the communities in which they have been implemented.

The hypothesis suggests this study seek answers to the following questions:

1. How have published interventions addressed the limited availability of resources such as funding, access to healthy foods, and physical activity in Mississippi and Louisiana?
2. Did interventions help change participants' lifestyles to address obesity related factors?
3. What resource limitation was most often targeted by implemented interventions?

Chapter 2: Review of Literature

Rising rates of obesity in southern rural populations are caused by several factors. According to Forrest, Hannam, and Leeds (2011), obesity in the United States is significantly more common and has increased more rapidly in rural populations than in urban populations (p.12). According to Tai-Seale and Chandler (2010), the reasons why living in rural areas increases the likelihood of being obese are because of the demographic population, the lack of disease prevention, the further distances to travel to healthcare, and the cultural challenges present. Prevention of obesity in southern rural communities is important in order to avoid increased rates of related diseases and the coinciding increased healthcare costs. For the purposes of this study, the factors examined are increased levels of caloric intake, lower physical activity, and low socioeconomic populations because of their prevalence in Mississippi and Louisiana. Also examined in this study are childhood and elderly obesity, intervention strategies, and obesity associated health problems.

Increased Caloric Intake

Kumanyika et al. (2010) state that change in available food types and the amount of physical activity available in a community leads to an increase in that community's weight. The types of foods targeted at these communities are non-nutritious foods that are cheap, heavily advertised, and readily available (p. 18). Foods that are high in calories but not high in nutrient content would be considered non-nutritious foods. Forrest et al. (2011) say that the majority of rural adults do not meet the recommended nutritional requirements due to lifestyle choices such as drinking sweetened beverages and eating while watching television (p.10-12).

SOLVING THE OBESITY PROBLEM ONE BITE AT A TIME

Grafova, Freedman, Kumar, and Rogowski (2008) report neighborhood environments influence obesity as well. The neighborhood can affect increased caloric intake through its influence on food availability and opportunities for exercise. “For example, the presence of supermarkets in the neighborhood is associated with higher fruit and vegetable intake, whereas eating at fast-food restaurants is associated with high-fat diets and higher body mass indexes.” Increased portion sizes and readily available non-nutritious foods contribute to obesity.

Physical Inactivity

Patterson et al. (2006) claim low income residents and rural residents are less likely to meet recommended physical activity levels. Their study indicates that rural adults are more likely than urban adults to be physically inactive (p.152- 154). Lutfiyya, Lipsky, Wisdom-Behounek, and Inpanbutr-Martinkus (2007) state that rural children are less likely to be physically active than urban children because of “limited access to parks, exercise facilities, fewer sidewalks, lack of public transportation, and limited physical education classes” (p. 2353).

Socioeconomic Status Factors

Grafova et al. (2008) suggest that socioeconomic factors influence obesity (p. 2065). Low socioeconomic status has shown a strong correlation to obesity rates. According to Black (2002), poor health among lower socioeconomic groups is attributed to several causes including a poor diet, weight, smoking and alcohol consumption, high levels of stress, and limited access to healthcare (p. 545). Socioeconomic status also affects children. Rowland and Wallace (2009) refer to a Brazilian study that found that

SOLVING THE OBESITY PROBLEM ONE BITE AT A TIME

children born in the lowest socioeconomic classes had higher BMI measurements than children who were born in the highest socioeconomic classes (p. 384).

Childhood Obesity

The Centers for Disease Control and Prevention defines obesity in children as “weight-for-length greater than the 95th percentile for children of the same sex and age” (Obesity and Overweight for Professionals: Childhood, n.d.). Babey, Hastert, Wolstein and Diamant (2010) report that childhood obesity has “risen dramatically over the past 30 years, increasing from 6% to 17% among those aged 12 to 19 years [old]” (p. 2149). Lutfiyya et al. (2007) also find the increase concerning and report that more youth in the United States are overweight today than ever before (p. 2353). They state that a risk factor for childhood obesity is rural residency. Rural children are at an even greater risk for obesity if other factors such as poverty, lack of health insurance, and lack of physical activity are present as well (p. 2353). Increases in childhood obesity are concerning because of the health risks associated with obesity and because of the potential for these health risks to develop into lifelong illnesses.

Elder Obesity

The increase in obesity among the elderly has not been documented to the same extent as adult and childhood obesity. However, this increase is of equal concern. Forrest et al. (2011) note that senior citizens who live in rural areas are poorer and less healthy than in other areas of the nation (p. 10). According to Visscher and Seidell (2001), the elderly are an important age group in healthcare, because of their steady increase in number. Additionally, since disabilities are higher among the elderly than any other age group, obesity can exacerbate these disabilities and cause a decrease in the elderly’s

SOLVING THE OBESITY PROBLEM ONE BITE AT A TIME

quality of life (p. 369). Grafova et al. (2008) include in their study that obesity has risen among all age groups, but that in “2001 to 2002 in the United States, about 1 in 3 adults 60 years or older [were] obese” (p. 2065). “Obesity and the Ability to Carry out Daily Activities” (2011) echoed the previous study, stating that “older persons should be aware that being overweight or obese may result in the loss of the ability to carry out normal daily activities” (p. 1-28). Therefore, interventions that reduce elderly obesity promote a higher quality of life for them.

Interventions for Obesity

According to Lee (2007), poor nutrition occurs in all income level families, but its causes vary among income levels; therefore, different interventions are required (p. 82). Patterson et al. (2006) show that physical inactivity and obesity are correlated. They found that this correlation facing rural America is “unique to rural America [and] could be used in designing effective intervention programs for rural residents” (p. 158).

Obesity may be prevented in several ways. Pearce and Witten (2010) provide intervention ideas to address obesity and prevent further health problems. They hypothesize that a successful intervention “requires concerted efforts at a range of scales, but with a particular emphasis on modifying the environments of individuals to produce lifestyle changes.” In other words, the intervention needs to recognize resource limitations in the individual’s environment and not just the behaviors of the individual needing the intervention (p. 32). Kumanyika et al. (2010) suggests that techniques for interventions must be complex because the problem is complex (p. 197). Patterson et al. (2006) recommends that the limited physical activity in rural areas is best addressed through lifestyle modifications (p. 158). Therefore, to reduce obesity in southern rural

SOLVING THE OBESITY PROBLEM ONE BITE AT A TIME

communities, resource limitations need to be addressed by interventions to promote lifestyle changes that encourage healthy nutrition and adequate exercise.

Interventions to Prevent Childhood Obesity

Patterson et al. (2006) discuss that interventions for children require alternative methods because many rural children are poor, uninsured, and do not have ready access to medical care. Lee (2007) states “despite the publicity about increasing childhood obesity, healthcare providers may [still] be underdiagnosing, under- investigating, and undertreating childhood obesity.” He argues that children should be screened and treated for weight problems starting at birth (p. 81). He notes that interventions for childhood obesity should consider any negative self-worth effects the child may feel and establish emotional support systems (p. 82). An example of a support system is reassurance from the child’s family members or guardians of their self-worth. Based on this research, childhood obesity requires strategies that focus on lowering BMI, but also focus on promoting a healthy self-image.

Health Related Concerns Associated with Obesity

Obesity is a high risk factor for health disparities including heart disease and diabetes. According to “Health Consequences of Obesity” (2011), “there is clear evidence that poor diet and obesity are the major causes of the worldwide epidemic of non-communicable diseases” (p. 20).

Heart Disease

Heart disease is a prominent concern in rural areas. According to Forrest et al. (2011), rural residents have higher rates of heart disease than their urban counterparts (p.

SOLVING THE OBESITY PROBLEM ONE BITE AT A TIME

12). Wright et al. (as cited by Coward, Davis, & Gold, 2005), also state that rural residents experience more chronic illnesses and have higher death rates because of cardiovascular disease (p. 32). They also note that higher rates of cardiovascular disease occur in southern states, such as South Carolina, Mississippi, West Virginia, Louisiana, and Georgia, than in the rest of the nation (p.33). Zuniga, Alexander, and Anderson (n.d.) report that high rates of mortality for premature coronary heart disease occur in African Americans and Caucasians in rural areas than in any other geographic area.

Stansfeld and Marmot (2002) discuss the relationship between rural populations and heart disease. They also state that sudden cardiac death is not evenly and equally distributed in society. In their study, they show that depression and low socioeconomic status have an impact on myocardial infarctions (p. 201). They discovered that the effects of socioeconomic status and psychosocial factors caused medial thickening in the hearts of their subjects indicating heart disease (p. 214). Markers that consistently show an inverse relationship with cardiac death are lower education levels and lower income status which are both frequently found in the rural south (p. 221).

Diabetes

Another disease closely tied to obesity is diabetes. Forrest et al. (2011) state that “two major risk factors for diabetes, as shown by the Third National Health and Nutrition Examination Survey, are being a rural resident and being a minority race” (p. 12).

Dabney and Gosschalk (2010) state that “diabetes is a crucial health issue that affects 180 million people worldwide including 23.6 million people residing in the United States.” They discovered that diabetics living in rural populations tended to have later diagnoses and received substandard care. Massey, Appel, Buchanan, and Cherrington

SOLVING THE OBESITY PROBLEM ONE BITE AT A TIME

(2010) report diabetes in rural communities is worsened by the higher incidences of obesity and sedentary lifestyles. Therefore, based on these findings obesity, rural residency, low socioeconomic status, and other factors in southern rural populations lead to obesity related health problems.

Summary

Due to the rising rates of obesity and the magnitude of its effects upon America's southern rural populations, a significant amount of research has been done to investigate the reasons and risks associated with the increase. In general, southern rural communities are at risk, but within these communities, the children and the elderly, in particular, are at high risk for these factors and their consequences. The primary concern about obesity is not an individual's weight but rather the health risks associated with increases in weight such as developing heart disease and diabetes. Factors affecting this increase include low socioeconomic status and lifestyle choices such as increased caloric intake and decreased physical activity. This thesis focuses on the resource limitations associated with these obesity factors. Due to the high rates of obesity in Mississippi and Louisiana, published reports of interventions in these targeted states were examined for whether resource limitations were addressed.

Chapter 3: Methods

This thesis investigates interventions in Mississippi and Louisiana. The obesity percentages related to populations in Mississippi and Louisiana are examined. Mississippi and Louisiana's populations are majority rural (Census of Populations, 2010). Data from 1990-2010 has been collected by the Centers for Disease Control and Prevention on the rates of obesity in Mississippi and Louisiana. The statistics found and presented in Table 1 show changes in obesity rates in five-percent increments that occurred over the twenty year period. These statistics were recorded and inspected for the prevalence of obesity in these states.

Next, an examination of published interventions developed in Mississippi and Louisiana within the past ten years was conducted to determine if interventions have met resource limitations. For this study, the limited resources of interest that interventions needed to address were either the limited provision of safe facilities for exercise or equipment, the limited provision of access to healthy nutritious foods, or the limited provision of necessary funding. Through meeting these limitations lifestyle changes in participants should occur. The most targeted resource limitation addressed by interventions was also noted.

Chapter 4: Research Findings

Looking at Table 1, the results from the U.S. Centers for Disease Control and Prevention's (CDC) statistics indicate obesity's prevalence in Mississippi and Louisiana over the twenty-year time period (Obesity and Overweight for Professionals: Data and Statistics, n.d.). In 1990, both states had 10-14% of their adult populations classified as obese. Louisiana showed a decrease in rates from 2006 to 2008. However, both states showed an increase up to 30% or greater by the conclusion of the twenty-year time period.

In concurrence with the CDC data, the Healthy Americans study in 2010 (F as in Fat, 2010) examined the state by state adult obesity rankings. Mississippi was ranked number one in America with a 33.8% population obesity ranking, and Louisiana was ranked number five with a 31.2% population obesity ranking. Colorado in comparison ranked last in the nation with a 19.1% population obesity ranking. The difference between the lowest state for obesity (Colorado) and the highest states for obesity (Mississippi and Louisiana) was around 12.1% population obesity, indicating the prevalence of obesity in these states.

Table 1: Louisiana and Mississippi Obesity Percentages from 1990-2010

The percentages indicate the percent of citizens with a BMI greater than 30.

Year	Louisiana	Mississippi
1990	10-14%	10-14%
1991	15-19%	15-19%
1992	15-19%	15-19%

SOLVING THE OBESITY PROBLEM ONE BITE AT A TIME

Table 1 (continued)

Year	Louisiana	Mississippi
1993	15-19%	15-19%
1994	15-19%	15-19%
1995	15-19%	15-19%
1996	15-19%	15-19%
1997	15-19%	20-24%
1998	20-24%	20-24%
1999	20-24%	20-24%
2000	20-24%	20-24%
2001	20-24%	25-29%
2002	20-24%	25-29%
2003	20-24%	25-29%
2004	25-29%	25-29%
2005	>30%	>30%
2006	25-29%	>30%
2007	25-29%	>30%
2008	25-29%	>30%
2009	>30%	>30%
2010	>30%	>30%

Interventions:

Louisiana is making strides to combat their obesity problem by providing a variety of intervention programs designed to lower the rates of obesity in their state. Hanchey (2008) reported that Louisiana's initial decrease in obesity rates in 2006 to 2008 was attributed to "the collaborative efforts between many public and private organizations." Some of the programs implemented to assist in the decrease of the high incidence of obesity were "Lighten Up, Louisiana," the "Governor's Games," and the "Elementary Fitness Meet."

"Lighten Up, Louisiana" is a competitive online program that promotes healthy eating and regular exercise. Through the program, individuals join teams and each team member logs their daily caloric intake and exercise, as well as their weight. Their data is then combined with the other team members. The full team competes against other teams from across the state on total weight lost. Some of the other functions of the "Lighten Up, Louisiana" website were to allow the individuals to keep track of their body mass index, and water intake as well. According to Hanchey (2008), in 2007, around 10,000 kids and 25,000 adults participated in "Lighten Up, Louisiana." During this time, Louisiana recorded lowered obesity rates across the state. This program requires participants to have access to a safe area for exercise and access to the internet to log their progress.

"Lighten Up, Louisiana" addressed the issues of communities having limited resources by providing a low cost program that emphasized increasing physical activity without requiring any monetary contributions like membership to a fitness center. The program's tactics to combat obesity were twofold: to increase energy output in

SOLVING THE OBESITY PROBLEM ONE BITE AT A TIME

participants through physical activity and to decrease overall energy gains through caloric intake. This intervention's goal was to change the tendency to not participate in regular exercise by providing a fun organized team experience and accountability in the participant's diet.

The "Governor's Games," also noted by Hanchey (2008), is a seven-month, statewide, Olympic-style, amateur, sporting event. Anyone age eight to eighty years old is allowed to compete. A selection of some of the competitive sports included in the event is as follows: volleyball, basketball, baseball, soccer, boxing, tennis, swimming, and karate. By offering a variety of sports, the program appeals to a broad range of individuals. The necessary equipment needed to participate such as balls, bats, or rackets is also provided by the program.

By providing the equipment, the participants are able to join without worry of monetary obstacles that might otherwise have prevented their participation. This intervention's objective was to get the public engaged in physical activity to mitigate caloric intakes. The "Governor's Games" also employed the use of fun team based activities to attract their targeted audience. This program, much like "Lighten Up, Louisiana," is geared toward changing an individual's lifestyle by encouraging them to engage in more exercise. The "Governor's Games" addressed the limited resources of their participants by providing the necessary resources for participation such as location and equipment.

Also, Hanchey (2008) discussed the "Elementary Fitness Meet," which has occurred over the past thirteen years. The goal of the "Elementary Fitness Meet" is to combat obesity in elementary aged school children compared to the previous programs

SOLVING THE OBESITY PROBLEM ONE BITE AT A TIME

which were geared towards a wider age group. The “Elementary Fitness Meet” was modeled after the President’s Physical Fitness Challenge (Hanchey, 2008). The target age for this school program is 7-11 years old. The students compete in seven fitness events including a 50-yard Dash, “Sit and Reaches”, Pull-ups, the “Shuttle Run”, Curl-ups (sit-ups), Standing Long Jump, and the 600-Yard Run (Governor's Council, n.d.). More than 200,000 students train and compete against each other, progressing from best in school to best in parish to finally winning the championship. The winner of the championship receives an individual trophy, a medal, a trip to Baton Rouge to be congratulated by the governor, and their parish receives a plaque (Governor's Council, n.d.). According to Hanchey (2008), the supervisors of the program reported that the program “...does a great deal for [the students’] self-esteem.” The program promoted healthy activities and focused on school systems where children spend the majority of their time. The program is helpful for those families who cannot afford to place their children in extracurricular physical activities.

By providing resources at school, this intervention addresses the limited abilities of some families to provide these types of activities for their children at home. The objectives used during this program were meant to increase the amount of activity these school aged children received, as well as increase the children’s feelings of self- worth. The importance of targeting school-aged children was to develop healthier habits in order to prevent the onset of obesity and obesity related diseases in their adult lives.

Mississippi has other interventions implemented to combat obesity. Fitness programs influenced by the First Lady Michelle Obama’s “Let’s Move” Campaign (2010) have occurred all over the state. Governor Haley Barbour’s proclamation on

SOLVING THE OBESITY PROBLEM ONE BITE AT A TIME

March 7, 2007, regarding Mississippi's "Let's Go Walkin' Day" jump started this movement. According to the state sponsored website Project Vote Smart (n.d.), the program promoted participation in walking and running clubs around the state. Other examples of programs similar to "Let's Move" include Jackson, Mississippi's Mayor Harvey Johnson Junior's implementation of an optional ten week walking campaign for Jackson city employees called, "Let's Go Jackson." The city of Jackson's Employee Wellness Committee partnered with Blue Cross Blue Shield of Mississippi in 2011 to create this program which encourages participants to walk daily. The program's aim was to reduce its participants' cholesterol and blood pressure, improve their productivity, increase strength in bone and muscle, and attain a healthy weight. During the program, employees kept a record of the distance they walked each day, any health benefits experienced, as well as any notable weight loss.

In the article, "DuPree Offers Chance to Win Mountain Bike in Miss. Mayor's 'Let's Play Challenge'" reported by the *Hattiesburg Americana* (2013), Hattiesburg, Mississippi's Mayor Johnny Dupree challenged Hattiesburg residents to participate in the "Let's Play" challenge. In the challenge, participants spent one hour a day outside in play. The reward for completing the challenge was a chance to win a mountain bike.

Inspired by the First Lady's campaign, these interventions address the limited resources of Mississippi's citizens by presenting opportunities for healthier lifestyles during residents' daily activities. The program addressed the needs of residents with limited monetary means by not requiring a monetary commitment to join and not requiring special equipment to participate and in some cases, like the "Let's Play" challenge, a healthy incentive was offered to peak interest. The objectives these

SOLVING THE OBESITY PROBLEM ONE BITE AT A TIME

interventions used were to promote physical exercise and engage individuals in some type of cardiovascular activity as a weight control method. By including more daily physical activity, these programs offered attainable lifestyle changes.

The programs based on these published interventions in Mississippi and Louisiana addressed limitations for physical exercise most often. Increased physical activity decreases the overall energy balance of an individual provided that the individual does not increase their caloric consumption beyond the amount of physical activity conducted. Weight reduction occurs when calories expended are greater than caloric intake. Thus, a focus on nutritional interventions is necessary as well to ensure that a negative balance is maintained for weight loss.

In Mississippi, programs to improve the diets of their participants are listed in an article by the Hartford Courant, entitled “Hartford can learn from Mississippi on Obesity” (2013). In the northern part of Mississippi (Tupelo, MS), a program called “Health on a Shelf,” asked convenience stores to offer fresh produce such as fruit cups and yogurt parfaits as an alternative to the calorie dense convenience foods usually offered. One store owner reported to the *Daily Journal* that the fruit cups, on the first day, sold out quickly which made him believe that there was definitely a demand for the offering (Parsons, 2011). By offering fresh produce at convenience stores, healthy foods are easier to access for purchase. Hank Boerner the co-chairman of the Healthy Tupelo task force also commented in the *Daily Journal* that “this is the biggest thing this task force has done to get people on the right track to healthier lifestyles...weight loss challenges and billboards and 5K races will come and go, but this is a long-term, year-round thing.”

SOLVING THE OBESITY PROBLEM ONE BITE AT A TIME

The healthy task force in the rural town of Itta Bena, Mississippi has also addressed the limited access to healthy foods by creating public classes which offer residents the opportunity to learn about healthier cooking options. These classes provide citizens with the knowledge and hands on experience to create healthier meals for themselves and their families. Also in Itta Bena, Mississippi other organizations have joined to help combat the obesity problem including Samuel Chapel United Methodist Church. Led by Reverend Maxine Bolden, the church has helped to provide fresh vegetables to the Itta Bena community and performed community outreach programs such as offering diabetes education classes and health screenings (Mississippi Delta, 2012).

These programs present citizens with resources that had once not been there. These resources include education and the availability of healthy foods. Both of which are needed to make healthier nutritional choices. The program “Health on a Shelf” was implemented in convenient locations frequented by the city’s citizens. “Health on a Shelf” and Samuel Chapel United Methodist Church’s vegetable garden provide greater access to healthier foods. The public cooking lessons created lifestyle changes by increasing knowledge of how to prepare healthier foods. Teaching others to prepare healthier foods is an important strategy because the participants will feed healthy meals to their families influencing their lifestyles which in turn will help increase community health. The programs on diabetes education ensure that citizens who have this disease are well-educated on a proper diabetic diet, as well as the health screenings provided are a preventive measure against developing an obesity related disease. However, even though nutrition is of equal importance in combating obesity to physical exercise in

SOLVING THE OBESITY PROBLEM ONE BITE AT A TIME

maintaining energy balance, the implementation of nutrition focused interventions has not been well-published.

The city of Tupelo, Mississippi received \$25,000 from the Blue Cross Blue Shield of Mississippi Foundation for being the “Healthiest Hometown” in Mississippi in the population category of 15,000 or more (Blue Cross, 2010). The “Healthy Hometowns” are chosen based on the city’s strides to create healthier communities. The awarded money is intended to help continue to promote healthier lifestyles in the communities and maintain programs such as “Health on a Shelf” (Blue Cross, 2010). Other notable interventions in the state of Mississippi include the Mississippi Health Department’s receipt of \$8.5 million over five years, according to the article “Mississippi Gets Funds for Anti-Obesity Program” in the *Clarion Ledger* (2013). The money received will be used to implement programs focused on reducing the rates of obesity around the state. The programs employed through this funding are expected to help reduce obesity rates. Also, Todd Vineyard (2013) reported that Delta State University’s School of Nursing obtained \$524,000 in funding. The School of Nursing plans to help the rural areas around the university by providing programs to help prevent obesity and its related diseases. This funding provides obesity prevention programs and salaries for more healthcare workers in the region. Most programs to combat obesity do require money to implement and maintain. These monetary interventions address the limited funds available in these areas.

The tactics used in the aforementioned programs include the receipt of funding to support the prevention of obesity and to raise public awareness of obesity and its correlated diseases. These interventions have the potential to have wider impacts on

addressing resource limitations than the other mentioned interventions because funding is able to provide for more healthcare workers and needed program supplies like exercise equipment and safe locations. These provisions can help change the lifestyles of the public being served and thus reduce obesity rates.

Chapter 5: Discussion

Lifestyle choices affect the type of diet and the amount of exercise an individual receives which in turn affects obesity rates and the health of a community. An obstacle facing poorer rural families which prevents their engagement in adequate exercise is reduced access to safe equipment and facilities for physical activity. Patterson et al. (2006) state that the findings in their study indicate lower activity levels leads to high incidences of obesity. They say this correlation, then, should be used to design effective interventions in at risk communities (p. 158). In another study by Lee (2007), the findings show that poor nutrition in lower income families creates obstacles that intervention approaches must overcome (p.82). The obstacles that poor families face in obtaining good nutrition are availability and cost. Higher-calorie, low-nutrient foods are less expensive and more easily accessible than lower-calorie, high-nutrient foods, indicating a need for interventions to address this limitation (Kumanyika et al., 2010). Therefore, interventions must focus on lifestyle choice limitations such as the lack of available healthy foods, and the lack of exercise facilities and equipment as well as the lack of money in these communities to combat obesity.

Most of the published interventions evaluated in this study focused on promoting lifestyle changes in their participants. One such intervention that has focused on lifestyle

SOLVING THE OBESITY PROBLEM ONE BITE AT A TIME

changes is the program “Lighten Up, Louisiana.” This intervention, through tracking the participants’ online log of food intake and exercise, promoted healthy caloric intake and expenditure (Hanchey, 2008). This intervention, however, did not focus on possible limited resources of its participants as the participants were required to find safe areas to exercise, as well as find internet access to log their progress. Other published interventions that addressed the limited availability of healthy resources in Mississippi and Louisiana did so in the following ways: they provided locations and equipment for exercise, they provided convenient access to healthy foods, and they provided necessary funding to hire adequate healthcare staff.

The first way that these interventions addressed the limited availability of resources is that they provided the necessary means for exercise such as the “Let’s Walk” campaigns in Jackson, Mississippi. Both, Governor Haley Barbour’s annual “Let’s Go Walkin’ Day” and Jackson city’s “Let’s Go Jackson” program promoted walking as an easily incorporated means for exercise. These programs did not require additional equipment to join or a particular facility. The participants only needed an area to walk. Similarly, Mayor Dupree’s program, “Let’s Play,” also did not require any special equipment but only required participants to spend an hour everyday outside in play. In this way, these programs addressed participants’ limited resources for safe facilities and limited access to equipment.

The “Elementary Fitness Meet” which encouraged children to develop healthy lifestyles provided the location as well as the equipment for children to participate. The program also addressed the children’s feelings of self-worth by providing them with positive feedback. One adult supervisor of the program reported that “[the program] does

SOLVING THE OBESITY PROBLEM ONE BITE AT A TIME

a great deal for [the students'] self-esteem" (Hanchey, 2008). The "Elementary Fitness Meet" then utilized the tactic recommended by Lee (2007) to aim childhood-obesity related interventions at improving the child's feelings of self-worth, as well as at increasing the child's amount of physical exercise.

According to the report by *Annals of Internal Medicine* "Obesity and the Ability to Carry out Daily Activities" (2011), obesity's impact on older adults limits their ability to perform normal daily activities and can decrease their quality of life (p. 1-28). One example of a decreased quality of life is the loss of autonomy. Programs like the "Governor's Games," which allow ages up to eighty years old to participate, promote continued autonomy. The "Governor's Games" also provided a location and equipment for all participants. None of the programs mentioned require special equipment or facilities to participate and did not require payment to join. In this way, these programs addressed the low socioeconomic status issue in these southern rural areas, as well as childhood and elderly obesity.

The second way limited resources are addressed is through the provision of accessible healthy foods and knowledge of nutrition. Four published interventions that have considered these limitations are Itta Bena, Mississippi's public cooking lessons, diabetic education, and vegetable garden, as well as the "Health on a Shelf" program in Tupelo, Mississippi. Itta Bena, Mississippi's public cooking lessons teach the participants how to prepare healthy meals for their families. Teaching these healthy cooking skills not only promotes healthy nutrition in the participating individual's life but their family's life as well. Samuel Chapel United Methodist Church's vegetable garden allows citizens who might not otherwise have the opportunity to access fresh produce the chance. The

SOLVING THE OBESITY PROBLEM ONE BITE AT A TIME

diabetic education classes also offered by the church help to increase knowledge of the importance of proper diet when living with diabetes. These interventions help to raise awareness of the importance of proper nutrition as well as address limited resources of the area. “Health on a Shelf” provided citizens with fresh produce at convenience stores as an option instead of non-nutritious foods. Providing healthier foods in convenient locations modifies citizens’ environments to promote healthier lifestyles without requiring the citizens to change their shopping patterns. Environmental modification is supported by Pearce and Witten (2010) as a way to create successful lifestyle changing interventions (p. 32).

Other interventions that looked at modifying the participants’ environments are the “Elementary Fitness Meet” and the “Let’s Go Jackson” program. The “Elementary Fitness Meet” created more physical activity at school. The participating children were at the school before the implementation of the intervention so the intervention merely adapted the school environment to expose the children to more exercise. Another intervention that changed the environment to promote exercise is the “Let’s Go Jackson” program which encouraged working adults to walk daily. The adults participating were able to add walking into their daily work schedules thus creating a lifestyle change.

The third way that limited resources are addressed is through the provision of funding. The city of Tupelo, Mississippi received \$25,000 to continue promoting healthier lifestyles and to maintain their current programs like “Health on the Shelf”. Likewise, the Mississippi Department of Health received \$8.5 million to create and fund interventions geared towards obesity prevention. Delta State University’s School of Nursing received \$525,000 to go towards interventions promoting obesity prevention, as

SOLVING THE OBESITY PROBLEM ONE BITE AT A TIME

well as towards seeing patients in underserved rural areas. Funds to help maintain current programs and funds to implement prevention interventions help decrease obesity rates, because they focus on stopping the rise of obesity in the future. Funds providing for healthcare workers to serve in rural areas make treatment available for those with obesity related health problems. Targeting funds to improve access to healthcare and to provide needed programming is another means of addressing limited resources in these areas.

The most targeted resource limitation, based on these published interventions, is the lack of opportunities for physical exercise. Interventions promoting physical activity are most used because the creation of a program that allows or requires daily activity is easier to implement than an intervention that addresses or changes an individual's diet. Every individual has different preferences and concerns for their diet which makes it difficult to tailor programs designed especially for each individual that will address all of their needs. Physical activity based interventions are easier to implement because the majority of programs encourage walking which can be accomplished with varying degrees of exertion.

The hypothesis, based on this research, is accepted because the interventions implemented to combat obesity targeted the resource limitations of the communities they served. The published interventions reviewed focused on lifestyle changes in diet, exercise, and on addressing the limited resources of available healthy foods, means for exercise, and funding for healthcare programs and professionals. Therefore, because the resource limitations that prevent lifestyle changes needed to reduce obesity are known, interventions implemented in areas with these resource limitations must address those limitations because improvements in those areas should result in decreased obesity rates.

SOLVING THE OBESITY PROBLEM ONE BITE AT A TIME

Based on the idea that treating known factors that contribute to obesity will lead to a decrease in obesity rates, recommendations for Mississippi and Louisiana are to continue to provide support and facilitation of increased physical exercise to promote calorie expenditure and to help maintain healthy body weight. Strategies, focusing on nutritional changes, have broader effects on these areas because more people are indirectly affected. For instance, continued education and construction by qualified nutritionists on how to prepare healthy meals would generate a greater impact on the communities' health because more lifestyles would be changed through healthier family meals. Also, increased access to healthy foods makes it easier for citizens to purchase and consume them. Strategies should continue to fund outreach programs so that more healthcare professionals are available in rural areas who can affect improvements in rates of obesity and, therefore, obesity related diseases. More publicly published results of interventions should be generated because such information could produce greater participation in future programs and thus, have an even greater effect on reducing obesity rates in these states.

Chapter 6: Conclusions

Mississippi and Louisiana exhibit high rates of obesity due to the close association between an individual's environment and their weight. These areas have several markers that contribute towards obesity. Such markers include socioeconomic status and lifestyle factors (Grafova et al., 2008). Due to low socioeconomic standings, these rural areas have fewer resources to attract and hire adequate numbers of healthcare workers to serve these areas. The lack in healthcare workers affects these rural residents because they need prevention programs to help decrease obesity, but also, to treat the high rates of obesity related diseases.

Resource limited populations in Mississippi and Louisiana, also, have less access to healthy foods or exercise facilities. These obstacles present difficulties for citizens to engage in healthier lifestyles to prevent or reverse obesity. High caloric foods without enough exercise create a positive energy balance and contribute to obesity. As reported in the study by Kumanyika et al. (2010), obesity is an energy balance problem. To prevent obesity, the energy in and the energy out should be equal to maintain weight. The study, by Patterson et al. (2006), recommends that limited physical activity is best addressed through lifestyle modifications, but that these types of solutions “may be more difficult to implement in rural areas.” One reason for this difficulty is that lifestyles are complex and therefore, in order to make interventions to change lifestyles, those interventions will need to be complex (Kumanyika et al., 2010, p. 197). Therefore, interventions, in order to treat obesity, need to consider the limitations and complexities of the communities in which they serve.

SOLVING THE OBESITY PROBLEM ONE BITE AT A TIME

Future research should investigate how regularly interventions are continued and if these programs' numbers of participants are growing. Data, from this type of research, would indicate how successful these interventions are at integrating into these communities and creating lasting lifestyle changes. Also a post-intervention lifestyle survey of participants would be relevant to include by providing quantitative data to determine an intervention's effectiveness more thoroughly. Furthermore, a long term study is warranted to determine whether the rates of obesity in a community change based on the implementation of an intervention addressing resource limitations in the rural south.

Based on the twenty- year time period of data collected on obesity rates in Mississippi and Louisiana, the frequency in obesity has increased from 14% to more than 30%. The southern rural population exhibits predominantly low socioeconomic classes that limit resource availability. These limitations include access to healthy food, access to equipment and facilities to exercise, and access to healthcare workers and prevention programs due to deficits in funds. Preventing obesity is necessary to improve long term quality of life and to limit the prevalence of diseases such as heart disease and diabetes. In conclusion, interventions addressing these limitations help to reduce the high obesity rates affecting the southern rural populace.

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