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The Influence of Community Services on the Body Mass Index on Youths Living in a Rural Community

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***Abstract*-** The focus of this study was to investigate the influence of community services on the Body Mass Index (BMI) on youths living in a rural community. This study explored/investigated The Expanded Obesity Research Paradigm framework supported the community assessment and intervention model employed in this study. AACORN's Expanded Obesity Research Paradigm was used as a conceptual lens of data analysis in this study. The researchers calculated BMI from the measured heights and weights of participants using the following equation: BMI=(weight in kg)/(height in m^2) where kg = kilograms and m = meters. A Likert-type scale was also implemented in the study. A total of 84 youths participated in the study; 53 out of 84 or 63% were boys and 31 out of 84 or 37% were girls. The study found that only 16.40% of the 420 African American students completing the Texas Youth Risk Behavior Survey were at or above the 95th percentile for BMI. The study also found that 18% of participants living in the rural community of this study were obese. The implication of this study was to underscore and to educate the youths, parents, adults the health care leaderships about the importance of participating in available communities' services as public health modalities; which could eventually bring some "positive social changes" to the community in particular and possibly other in general.

***Keywords*-** *Youths, Rural Community, Body Mass Index(BMI), Obesity, AACORN, Intervention Methods*

I. INTRODUCTION

Obesity is a widely recognized and growing epidemic in the United States that carries increased subsequent risk of morbidity and associated mortality (Mackay et al., 2015). For children and adolescents aged 2-19 years the prevalence of obesity has remained fairly stable at the about 17% and affects about 12.7 million children and adolescents. Obesity was higher among Hispanics 21.9% and non-Hispanic blacks 19.5% than among non-Hispanic whites 14.7%. Obesity is lower in non-Hispanic Asian youth 8.6% than in youth who were non-Hispanic white, black, or Hispanic (Childhood Obesity Facts , 2015). Body mass index (BMI) is measure used to determine childhood overweight and obesity.

Overweight is defined as a BMI at or above the 85th percentile and below the 95th percentile for children and teens of the same age and sex. Obesity is defined as a BMI at or above the 95th percentile for children and teen of the same age and sex (Defining Childhood Obesity , 2015). Childhood obesity is a complex health issue; a child is well above the normal or healthy weight for his or her age and height. This causes an excess weight again in young people are similar to those adults, including factors such a person's behavior and genetics (Childhood Obesilty Causes & Consquences , 2016). "Obesity is more prevalent among African Americans and other racial and ethnic minority populations than among whites. The behaviors that determine weight status are embedded in the core social and cultural processes and environments of day-to-day life in these populations" (p. 1). Obesity is prevalence in 21 states and Guan was no less than 35%. Alabama, Louisiana, Mississippi, and West Virginia has an obesity rate of 35% and greater. In Texas, the state of the community in this study, African Americans have a higher prevalence of diabetes than any other population in the state with a rate of 16.5% (Texas Department of State Health Services, 2012).

Childhood obesity can have a harmful effect on youth in a variety of ways. Being overweight during childhood and adolescence increases the risk of developing high cholesterol, hypertension, respiratory ailments, dyslipidemia, left ventricular hypertrophy, atherosclerosis, metabolic syndrome, sleep disorders, non-alcoholic fatty liver disease orthopedic problems, depression, stigmatization, discrimination, emotional trauma and type 2 diabetes as a youth. One disease of particular concern is Type 2 diabetes, which is linked to overweight and obesity and has increased dramatically in children and adolescents, particularly in the African American population (CDC, 2012a; Vinall, 2013; Kumanyika et al., 2007)

Childhood obesity also substantially increases the risk of being a corpulent adult (Freedman, Mei, Srinivasan, Berenson,

& Dietz, 2007; Windle et al., 2010; Wang et al., 2006; Mattingly, & Stransky, 2010). In addition, adults who are obese during childhood have higher risk of developing hypertension, dyslipidemia, metabolic syndrome, diabetes, and coronary heart disease than those who are not. Above all, the relationship between mental and physical health is a complex one. The presence of a physical condition and a concomitant mental condition complicates this relationship and is usually associated with poorer health outcomes than just when one condition is present. Doherty and Gaughran (2014) argued that individuals with mental health condition have a higher risk of developing physical illness. And, so did Tevie and Shaya (2015) about the association between obesity and other mental health and physical health implications.

Mental health problems are not uncommon about 25% of all individuals experience a mental health illness during their lifetime. A few studies have been devoted to uncovering this linkage in younger populations. Halfon found that obese children had significantly higher odds of having poorer mental health than children who are not obese (Tevie & Shaya, 2015) . As a motivating example, we examine the association between mental health and comorbid obesity and hypertension among younger population in the United States. Poor mental health is a general term used in this paper to include symptoms of depression and anxiety. Females are at risk of developing anxiety and depressive disorders. Research anxiety disorder and more likely to be depressed gender differences in the prevalence of mental disorder id they do exist are insignificant in childhood years, but may accelerate with age. The focus of this study was to investigate the influence of community services on the Body Mass Index (BMI) on youths living in a rural community.

II. Conceptual Framework

AACORN (2012) asserts "The paradigm suggests that weight-control interventions must be informed by a broader knowledge base about life in African American communities and framed more holistically to consider other relevant social and health priorities and adaptations to adverse life circumstances" (p. 1). Working with community-based agencies to collect research on obesogenic factors will improve the health conditions of African American communities. The Expanded Obesity Research Paradigm framework supported the community assessment and intervention model was employed in this study. As a result, AACORN's Expanded Obesity Research Paradigm was used as a conceptual lens of analysis in this study.

III. Methodology of the Study

During the spring semester of 2012, the lead researcher obtained a grant from the Jack and Jill of America Foundation to study childhood obesity of African Americans in target communities and subsequently educate these communities on the need for healthy living. To address one of the primary funding priorities of the grantor, i.e. educating communities to improve social and cultural conditions of children, the researchers examined body mass index (BMI) and childhood obesity among African-American children in a rural area of Texas as well as the availability of community options to support healthy living in children. This research initiative supported the grantor's funding premise "The ultimate goal of every Foundation grant dollar is to empower young people to make the right life choices" (Jack & Jill of America, 2012, p. 2).

A total of 84 children and adolescents between the ages of 4 and 16 years old residing in a rural area of Texas participated in the study. The researchers recruited participants from a community center with the target population employing a non-probability convenience sampling approach. This approach was commensurate with the expectations of the grantor to study the target population. The researchers have sought additional funding and intend to expand the study at the site.

Data from the 2010 U. S. Census show the city of the study as having a total population of 4,702 residents (U. S. Census Bureau, 2010a). In the community of the study, 44.27% of the residents earn $35,000 or less (Sperling, 2011). The percentage of families in the town of the study living in poverty is 32.1%. The percentage of families in the town of the study living in poverty with children below the age of 18 is 46.2%. The percentage of families living in poverty with children under the age of five is 36.6% (U. S. Census Bureau, 2010b).

This site was selected based on the availability of the target population of the grant as it contained large numbers of African-American children participating and or involved in the community center. The researchers selected participants employing a convenience sampling approach through usage of four recruitment strategies: (a) posting flyers within the surrounding area of the community center, (b) posting flyers at the community center, (c) disseminating flyers to the children at the community center, and (d) advertisement in the local community newspapers.

IV. Procedures and Measurements

BMI is a measure used to determine if an individual is overweight or obese. The researchers calculated BMI from the measured heights and weights of participants using the following equation: BMI=(weight in kg)/ (height in m^2) where kg=kilograms, and m=meters. The researchers used the Centers for Disease Control BMI charts (CDC, 2012; CDC, 2002) to determine percentiles and taking into account gender and birth date. The researchers calibrated equipment on site before conducting measurements at the center. To assess the effectiveness of health and wellness components of the community center, the researchers collected data using the CDC (2010) Community Health Assessment and Group Evaluation (CHANGE) Action Guide: Building a Foundation of Knowledge to Prioritize Community Health Needs resource.

V. Data Analysis

The participants' data were entered in Stata statistical software (SSS). The researchers conducted frequency and percentage analyses on the outcome variable and on all categorical demographic variables. The demographic variables

were age and gender. All tests were considered to be statistically significant if $p<0.05$. The narrative data from Community Health Assessment and Group Evaluation were imputed in a word processing system and coded for relevant themes.

VI. Results of the Study

The African American Collaborative Research Network's (AACORN; 2007) Expanded Obesity Research Paradigm undergirded the research in this study (see Figure 1).

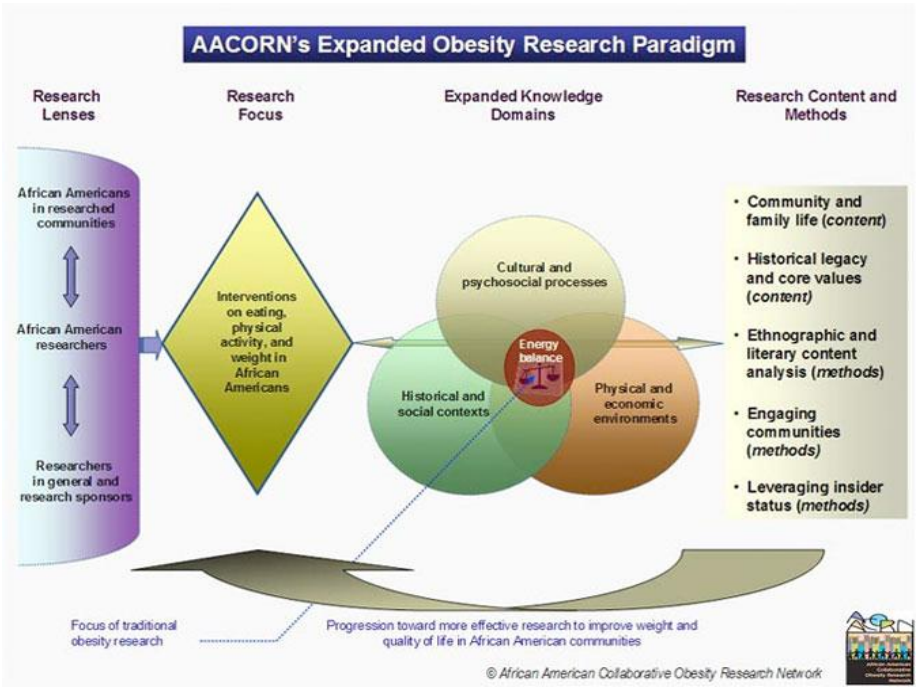

Figure 1. AACORN's Expanded Obesity Research Paradigm (AACORN, 2007)

The majority (60%) of the participants in the study were between the ages of 8-15. Most (61%) of the participants in the study self-reported "male" as their gender.

VII. Body and Weight Measurement Findings

A total of 50 (60%) of the 84 participants in the study were identified by the researchers to be in the healthy range for their BMI. Table 1 below describes these data from participants by gender. Even though more males participated in the study than females, the female population (63%) accounted for majority of the healthy range compared to males (53%).

Three children or 3% were underweight. Sixteen or 19% of the participants in the study were overweight and 15 or 18% of the youth were obese. The majority (60%) of the participants in the study were between the ages of 8-15. Table 1 below describes the participants by gender including BMI across by area of the weight of the youth: (a) underweight; (b) healthy, (c) overweight, and (d) obese.

Table 2 describes the participants BMI by area of the weight of the youth: (a) underweight; (b) healthy, (c) overweight, and (d) obese by age and gender. The majority (55%) of the girls participating in the study were identified as being unhealthy (underweight, overweight and obese) with the concentrations varying by age group. The only group with underweight girls was the age's 4-7 group. Forty five percent of the female participants had healthy BMI measurements. In contrast, most of the male participants (68%) were identified as being healthy. Thirty two percent of the male participants were unhealthy (underweight, overweight and obese).

TABLE I. BMI by Gender

Gender	Underweight	Healthy	Overweight	Obese	Total
Girls	2 (6%)	14 (45%)	7 (23%)	8 (26%)	31
Boys	1 (2%)	36 (68%)	9 (17%)	7 (13%)	53
Total	3 (3%)	50 (60%)	16 (19%)	15 (18%)	84

TABLE II. BMI BY AGE AND GENDER

Age	Gender		Underweight		Healthy		Overweight		Obese		Total
	Girls	Boys	Girls	Boys	Girls	Boys	Girls	Boys	Girls	Boys	
4-7	8(26%)	13(25%)	2(100%)	1 (100%)	4(29%)	7(20%)	1(14%)	2 (22%)	1(12.5%)	3(42%)	21
8-11	18(58%)	17(32%)	0 (0%)	0(0%)	9(64%)	13(36%)	5(72%)	2(22%)	4(50%)	2(29%)	35
12-15	4 (13%)	21(40%)	0(0%)	0(0%)	1(1%)	15(42%)	1(14%)	4(44%)	2(25%)	2(29%)	25
16-17	1(3%)	2(4%)	0(0%)	0(0%)	0(7%)	1 (2%)	0(0%)	1(12%)	1(12.5%)	0(0%)	3
Total	31	53	2	1	14	36	7	9	8	7	84

VIII. COMMUNITY HEALTH ASSESSMENT AND GROUP EVALUATION FINDINGS

The researchers used the Community Health Assessment and Group Evaluation to assess the level of healthy living support mechanisms for youth at the community center of the study. The CHANGE tool is a publicly-accessible, open use data-collection tool and planning resource for community members who want to make their community a healthier one" (CDC 2010, p. 1). The CHANGE tool is designed "for all communities interested in creating social and built environments that support healthy living" (CDC 2010, p. 1). Table 3 includes the CHANGE tool demographic profile information about the selected community center.

TABLE III. CHANGE TOOL DEMOGRAPHIC DATA

Demographic	Classification
Best description of the community setting: rural, suburban, urban	Rural
Median household income in the community: < $25,000, $25,000 – $34,999, $35,000 – $49,999, $50,000 – $74,999 ≥ $75,000	44.27% of 35,0000 families earn below poverty line
Sector type: private, public	Public
Profit type: for-profit, not-for-profit	Non-profit
Target population: children/youth* (ages: <18), adults (ages: 18-64), seniors/older adults (ages: 65+), other. *If serving children/youth, what grades are being served: preschool, elementary school, middle school, high school	Children/youth* (ages: <18)

Additionally, the researchers completed the components of the Community Institution/Organization- Sector section of the CHANGE tool. In addition to the demographic information, the researchers evaluated four out of five components under this section of the tool, specifically Physical Activity, Nutrition, Chronic Disease Management, and Leadership. The researchers did not complete the tobacco assessment component since smoking is not allowed therefore the responses would be by default (see figure 3, Tobacco sub-section). The researchers added a Likert-type scale with five categories to the instrument components with a range of 1 (strongly disagree) to 5 (strongly agree).

The community center was located in a low socioeconomic area that was primarily African-American. The community center had limited resources for the participants and the majority of its equipment was outdated or unserviceable. The bulk of the physical activities for the participants required minimum equipment. The community center does not possess any resources for educating the participants about healthy nutritional habits.

The researchers evaluated the level of physical activity opportunities, structures, and resources of the community center. The two areas where the community center received the highest ratings were for the areas of "provide opportunity for unstructured play or leisure-time physical activity" and "provide a changing room or locker room with showers." These two areas were rated with a four i.e. agree and seven areas received a rating of one or strongly disagree (see Figure 2).

The researchers evaluated the level of nutrition support of the community center. Most areas were rated with a one or strongly disagree. One area received a rating of two i.e. disagree. The researchers scored the community center with a very low rating in terms of including nutritional components to support the youth (see Figure 3). These nutritional focuses were very limited at the facility.

The researchers evaluated the level of Chronic Disease Management influence of the community center. The researchers gave all areas a score of one or strongly disagree (see Figure 4).

The researchers evaluated the leadership of the community center for the CHANGE guidelines. The researchers rated five areas with a score of one or strongly disagree and five areas with a score of two i.e. agree (see Figure 5).

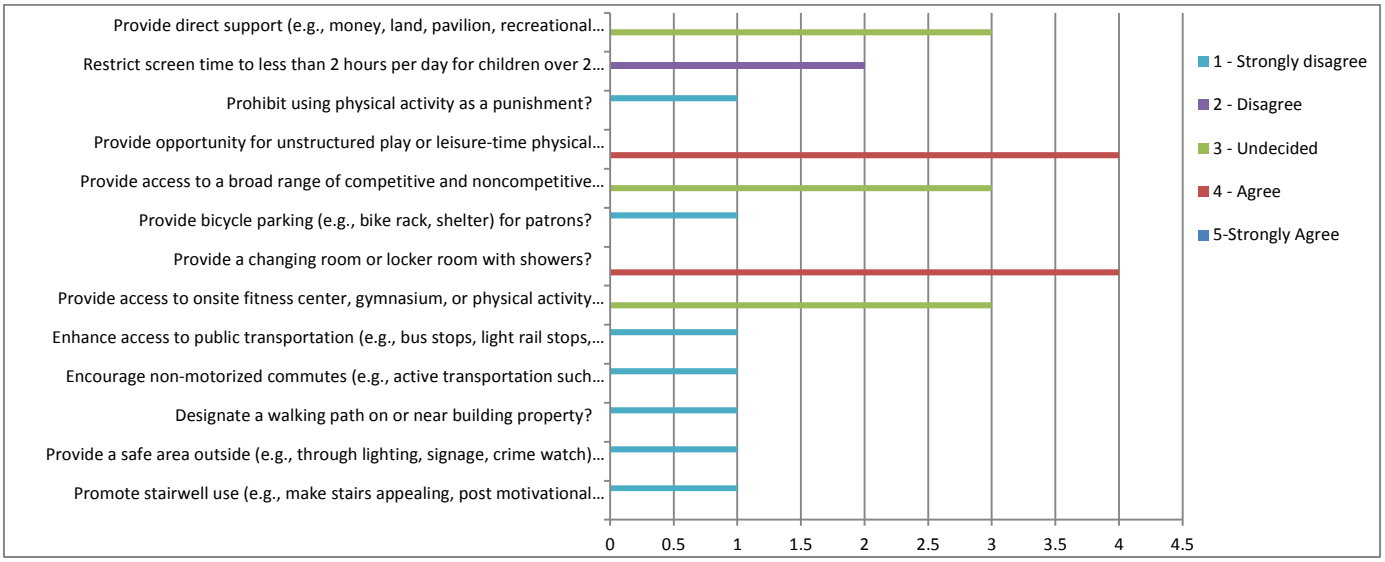

Figure 2. Researchers' Evaluation of the Physical Activity Component of the Community Institution/Organization- Sector Section of the CHANGE Tool

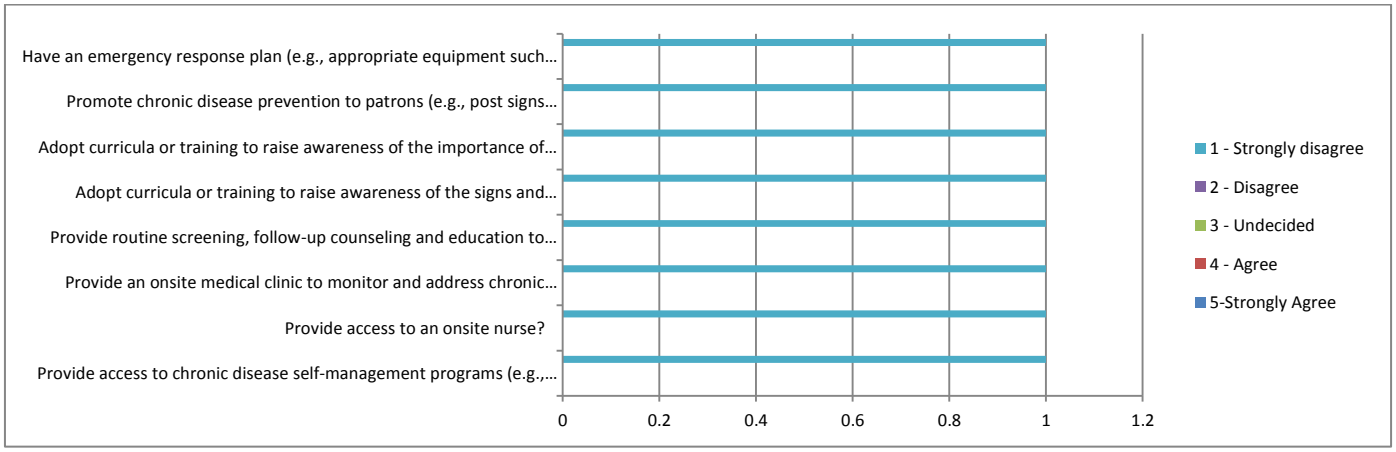

Figure 3. Researchers' Evaluation of the Nutrition Component of the Community Institution/Organization- Sector Section of the CHANGE Tool

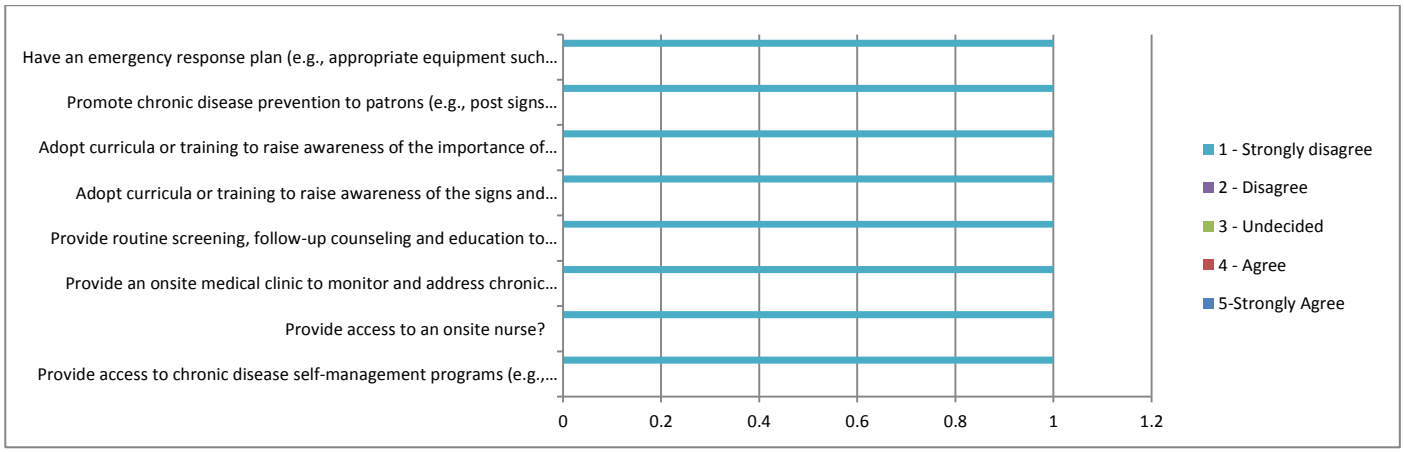

Figure 4. Researchers' Evaluation of the Chronic Disease Management Component of the Community Institution/Organization- Sector Section of the CHANGE Tool

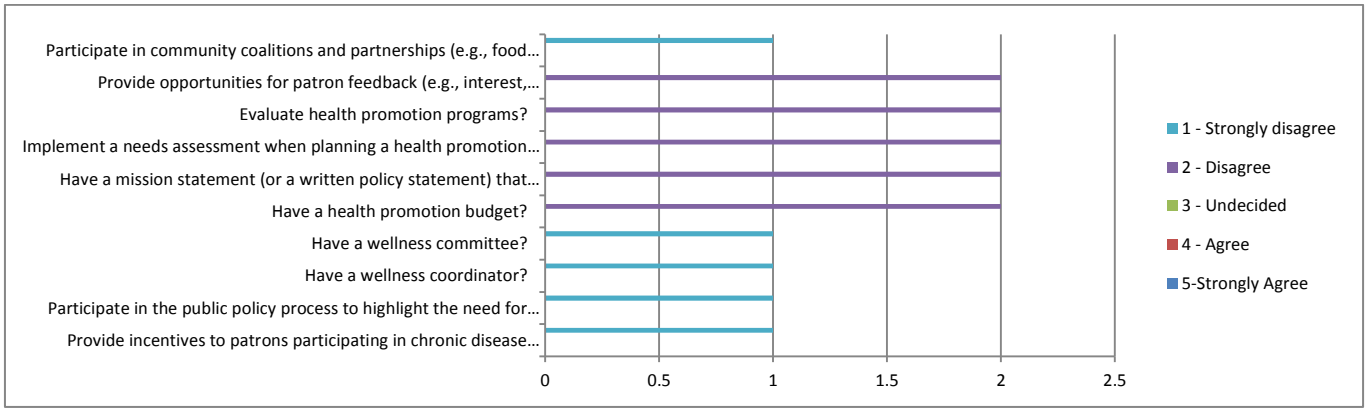

Figure 5. Researchers' Evaluation of the Leadership Component of the Community Institution/Organization- Sector Section of the CHANGE Tool

IX. Limitations of the Study

A limitation of this study was researchers only measured obesity by BMI and not by body fat percentage. Initially, the researchers had limited funding and were unable to collect data based on body fat percentage. In Phase 2 of the study, the researchers will conduct BMI as well as skin-fold measurements. Skin-fold test (body fat percentage) is used to estimate fat-to-muscle ratio among the participants. Body fat percentage is used to determine the amount of essential body fat and storage body fat in an individual. CDC (2010) reported that BMI does not measure body fat directly, but it is a reasonable indicator of body fatness for most children and teens. Another limitation was the small sample size that was used for data analysis. In Phase 2 of this study, the researchers will expand the size of the sample to larger sample size.

The second limitation of the study included the sample selection to collect data from one geographic location without randomly sampling participants. The sampling frame of the population did not allow for probability sampling to generalize the study results given the size of the target population as well as the funding parameters of the grant and expectations of the grantor. However, the researchers selected a site that increased the likelihood of potential participants being representative of various locations within the county, by selecting a community center where outreach activities involved inclusions from all feeder areas. Creswell (2012) states that;

In convenience sampling the researcher selects participants because they are willing and available to be studied. In this case, the researcher cannot say with confidence that the individuals are representative of the population. However, the sample can provide useful information for answering questions and hypotheses. (pp. 145-146).

Another limitation was the limited implementation of the CHANGE tool to evaluate all components of the community. The CHANGE tool is a comprehensive tool that involves establishing a committee of community stakeholders and developing an action plan. The key stakeholders are targeted and all must complete sections of the CHANGE tool. Since the concepts of health and wellness involvement and prevention were new to the community center during the time of the study, the researchers want to provide more time to work with the center to conduct a full evaluation. CDC (2010) recommends a data collection timeframe of three to five months, but acknowledges the timeframe could be shorter if a key stakeholder is designated. The researchers are seeking sponsored funding to identify and hire a part-time health and wellness coordinator to work with the center and collect data.

X. Discussion and Conclusion

The aim of this study was to assess BMI among African-American children in a rural area in Texas as well as evaluate the effectiveness of a local community center to promote healthy living of students and families. The participants BMI showed an increase in overweight and obesity cases. The data from this study is constant with previous research (CDC, 2012; U. S. Department of Health and Human Services, 2010; & Freedman et al., 2007) as it relates to the trend of childhood obesity.

The findings from this study emphasize the importance of obtaining and assessing data on youth from rural populations. As where only 16.40% of the 420 African American students completing the Texas Youth Risk Behavior Survey were at or above the 95th percentile for BMI (labeled as obese; Texas Department of State Health Services, 2012a), 18% of participants living in the rural community of this study were obese. Additionally, 17.8% of the 420 African American students completing the Texas Youth Risk Behavior Survey were 85th percentile but below the 95th percentile for BMI (labeled as overweight; Texas Department of State Health Services, 2012b). In this study, 19% of the participants living in the respective rural community were overweight. These data may suggest that students living in rural communities may have a greater risk of being overweight or obese, but additional research is needed to support this assertion. This study also disaggregates the data by both race and gender. The Texas Youth Risk Behavior Survey results only provided data by race or gender, not both collectively.

The Expanded Obesity Research Paradigm provided a strong model for structuring the work of the researchers as well as future endeavors at the community center in the rural area of this study. The employees of the community center were involved and active in all physical and nutritional activities provided during the study. They were also receptive to implementing and executing the new physical and nutritional lifestyle changes. The majority of the employees possessed at least a high school diploma. The employees were friendly and open to discussing the needs of the community center. The employees were also willing to learn how to continue educating the target population after the grant has ended. However, they were concerned about the community center increasing their workload without financial compensation.

However, due to the limited resources of the community center, the researchers have sought and will continue to acquire additional grant resources to the support the center. The lead researcher has already purchased recreational equipment and supplies for the students and has sponsored a health living and wellness workshop and festival for the families, youth, and community center in the rural town. Again, a key method of the Expanded Obesity Research Paradigm (AACORN, 2007) is engaging communities. Generally, from a public health policy standpoint, obesity is a severe public health issue in the US; that needs to be addressed holistically across the board. Even more disturbing, addressing it effectively, efficiently, and proficiently in many rural communities is even more challenging to achieve than urban communities. In light is the pinpointed possible setbacks and in summary, the findings/results of this study shed some significant lights on the implications of the influence of community services on the Body Mass Index (BMI) on youths living in a rural community; which could eventually bring some positive social changes on the rural community in the state of Texas; and possibly beyond in the future to come.

XI. Recommendations of the Study

This study concluded with several recommendations for the leaderships, youths, parents, and the adult residence of the rural community to undertake certain plans, goals, and objectives.

These recommendations are as followed;

1. Leadership should continue to support the influences of rural community services as to eventually improve the Body Mass Index (BMI) of youths in the rural communities.
2. Youths, parents, and adult citizens within the rural community should be collectively proactive in participating in the available community services as to enhance their overall BMI eventually.
3. Both the youths, parents, and adult in the rural community should and must be collective supportive in participating in the community's services.
4. Regardless of the statistical significant differences of the study's findings between males and females, they should continue to utilize the community services collectively; instead of gender biases' approaches.
5. The leadership, parents, and adults in the rural community should continue to educate every citizen in the community about the importance of participating in the available community services.
6. Finally, the youths, parents, and adults should regularly take their BMI measurements, as to be aware of their possibly mental health and physical conditions at all time; as to prevent the resurfacing of preventable health diseases systematically or even symmetrically.

XII. ACKNOWLEDGMENT

We want to use this opportunity to thank "Prairie View A&M University Prairie View, TX, USA" research collaborative teams; due to their unequivocal assistances in completing this social scientific research study successfully.

XIII. CONFLICT OF INTEREST

We shared no conflict of interests in this study; because it was collectively, collaboratively, and financially self-supported by the researchers.

References

[1] African American Collaborative Research Network. (2007). AACORN's Expanded Obesity Research Paradigm. Philadelphia, PA: University of Pennsylvania Perelman School of Medicine Center for Clinical Epidemiology & Biostatistics; 2007. Available at http://aacorn.org/AbouExpa-1781.html. Accessed 4/21/13.

[2] African American Collaborative Research Network. (2012). AACORN's Expanded Obesity Research Paradigm. Philadelphia, PA: University of Pennsylvania Perelman School of Medicine Center for Clinical Epidemiology & Biostatistics; 2012. Available at http://aacorn.org/AbouExpa-1781.html. Accessed 4/21/13.

[3] Bennett, G., & Wolin, K. (2006). Satisfied or unaware? Racial differences in perceived weight Status; 2006. International J of Behavioral Nutrition and Physical Activity, 3(40), 1-5.

[4] Centers for Disease Control Prevention (CDC). (2013). Fact sheet; 2012a. Available at http://www.cdc.gov/obesity/data/facts.html. Accessed 06-06-2013.

[5] Centers for Disease Control and Prevention. (CDC), (2012). Division of Nutrition, Physical Activity and Obesity, National Center for Chronic Disease Prevention and Health Promotion.

[6] Overweight and Obese – Texas. Atlanta, GA: Centers for Disease Control and Prevention. 2012b, January. Available at

[7] http://www.cdc.gov/obesity/stateprograms/fundedstates/texas.html. Accessed 04-8-2013.

[8] National Diabetes Fact Sheet: national estimates and general information on diabetes and prediabetes in the United States, 2011. Atlanta, GA: U.S. Department of Health and Human Services, Centers for Disease Control and Prevention; 2011.

[9] Centers for Disease Control and Prevention. (CDC). (2010). Community Health Assessment and Group Evaluation (CHANGE) Action Guide: Building a Foundation of Knowledge to Prioritize Community Needs. Atlanta: U.S. Department of Health and Human Services; 2010. Available at

http://www.cdc.gov/healthycommunitiesprogram/tools/change/pdf/changeactionguide.pdf. Accessed 04-22-2012.

[10] Childhood Obesilty Causes & Consquences. (2016, December 15). Retrieved May 31, 2017, from Center of Disease Conrol and Prevention.

[11] Childhood Obesity Facts . (2015). Retrieved May 31, 2017, from Center for Disease Control and Prevention .

[12] Creswell, R. (2012). Educational research: Planning, conducting, evaluating, quantitative and qualitative research (4th ed). Boston, MA: Pearson Education, Inc; 2012.

[13] Defining Childhood Obesity . (2015, June 19). Retrieved May 31, 2017, from Center of Disease Control anf Prevention .

[14] Doherty, A.M. & Gaughran, F.(2014). The interface of physical and mental health. Social Psychiatry and Psychiatric Epidemiology May 2014, Volume 49, Issue 5, pp673–682 doi: 10.1007/s00127-014-0847-7

[15] Freedman, D.S., Mei, Z, Srinivasan, S.R., Berenson, G.S., Dietz, W.H. (2007). Cardiovascular risk factors and excess adiposity among overweight children and adolescents: the Bogalusa Heart Study. Journal of Pediatrics. 2007; 150(1): 12-17.

[16] Harris, J. L. & Graff, S. K. (2011). Protecting children from harmful food marketing: options for local government to make a difference. Preventing Chronic Disease: Public Health Research, Practice, and Policy. 2011; 8(5): 1-5.

[17] Institute of Medicine. (2012). Preventing childhood obesity. Washington, D.C: National Academy Press; 2005. Jack and Jill of America. Jack and Jill of America foundation. Washington, D. C.: Jack and Jill of America; 2012. Available at http://jackandjillinc.org/?page_id=243. Accessed 06-02-2013.

[18] Kersh, R., Stroup, D.F., & Taylor, W.C. (2013). Childhood obesity: A framework for policy approaches and ethical considerations. Preventing Chronic Disease: Public Health Research, Practice, and Policy. 2011; 8(5):A93. Available at http://www.cdc.gov/pcd/issues/2011/sep/10_0273.htm. Accessed 04-21-2013.

[19] Kumanyika et al. (2007). Expanding the obesity research paradigm to reach African American communities. Preventing Chronic Disease: Public Health Research, Practice, and Policy. 2007; 4(4): 1-22.

[20] Mattingly, M. J. & Stransky, M. L. (2010). Young child poverty in 2009: Rural poverty rate jumps to nearly 29 percent in second year of recession. Durham, NH: University of New Hampshire Carey Institute. 2010. Sperling B. Estimated households by household income. 2001. Available at http://www.bestplaces.net/economy/city/texas/. Accessed 04-12-2016.

[21] Mackey et al. (2015). The Feasibility of an E-mail- Deliviered Intervention to Improve Nutrition and Physcial Activity Behaviors in African American College Students . Journal of American College Health , 109-113.

[22] Texas Department of State Health Services. (2012). Texas diabetes prevention and control program: Diabetes status in Texas, 2012. Texas Behavioral Risk Factor Surveillance System. Austin, TX: Texas Department of State Health Services Texas Diabetes Program Council; 2012.

[23] Texas Department of State Health Services Center for Health Statistics. (2011a). Body weight: Students who are obese. Texas Behavioral Risk Factor Surveillance System. Austin, TX: Texas Department of State Health Services; 2011a . Available at http://www.dshs.state.tx.us/Layouts/ContentPageNoNav.aspx?pageid=36131. Accessed 04-10-2013.

[24] Texas Department of State Health Services Center for Health Statistics. (2011b). Body weight: Students who are overweight. Texas Behavioral Risk Factor Surveillance System. 2011b. Austin, TX: Texas Department of State Health Services. Available at http://www.dshs.state.tx.us/Layouts/ContentPageNoNav.aspx?pageid=36131. Accessed 04-10-2013.

[25] Tevie, J., & Shaya, F. T. (2015). Association between mental health and comorbid obesity and hypertension among children and adolescents in the US . Cross Mark , 497-502.

[26] U. S. Census Bureau. (2010). Profile of general population and housing characteristics: 2010 demographic profile data. Washington, DC: U. S. Census Bureau; 2010a.

[27] U. S. Census Bureau. (2006-2010). Selected economic characteristics: 2006-2010 American community survey 5-year estimates. Washington, DC: U. S. Census Bureau; 2010b.

[28] U. S. Department of Health and Human Services. (2010). Childhood obesity; 2010. Available at http://aspe.hhs.gov/health/reports/child_obesity. Accessed 04-10-2013.

[29] U.S. Department of Health and Human Services, Public Health Service. (2001). The Surgeon General's call to action to prevent and decrease overweight and obesity. Rockville, MD: Office of the Surgeon General; 2001. Available at www.surgeongeneral.gov/topics/obesity. Accessed 04-10-2013.

[30] Vinall, P. (2013). Obesity Among Children and Adolescents in America. American Socity for Nutrition , 21-23.

[31] Wang Y, Tussing L, Odoms-Young A, Braunschweig C, Flay B, Hedeker D, & Hellison D. (2006). Obesity prevention in low socioeconomic status urban African-American adolescents: study design and preliminary findings of the HEALTH-KIDS Study. European J of Clinical Nutrition, 2006; 60: 92–103. doi:10.1038/sj.ejcn.1602272.

[32] Windle, M., Brener, N., Cuccaro, P., Dittus, P., Kanouse, D., Mttay, N., Wallander, M., & Schuster, M. (2010). Parenting predictors of early-adolescents' health behaviors: Simultaneous group comparisons across sex and ethnic groups. J of Youth Adolescence; 2010, 39: 594–606.