Sociology and Psychology Research Journals
ISSN: 2997-3635 |
Volume 11 Issue 1, January-March, 2023
Journal Homepage: https://ethanpub.online/Journals/index.php/E10
Official Journal of Ethan Publication

EVALUATING CARDIOVASCULAR HEALTH: AN EXAMINATION OF PARTICIPANTS IN THE DALLAS HEART WALK

[1]Emma Roberts, [2]Dr. Andrew Wilson, and [3]Dr. Rachel Thompson
1Associate Professor, Department of Public Health, University of Canterbury, New Zealand
2Associate Professor, Department of Sociology, University of Auckland, New Zealand
3Associate Professor and Director of Social Work Program, Victoria University of Wellington, New Zealand

Abstract:
This study examines the impact of self-reported health behaviors and the health belief theory on participants in heart-healthy events, such as the Dallas Heart Walk, which supports the American Heart Association's mission to reduce cardiovascular disease and stroke. The American Heart Association developed Life's Simple 7® to assess cardiovascular health through seven metrics, including blood glucose, blood pressure, cholesterol, diet, weight, physical activity, and smoking status. Heart disease and stroke are leading causes of death in the United States, and the AHA's goal is to improve cardiovascular health and reduce deaths by 20% by 2020. The study aims to understand how participants' health beliefs and behaviors align with these goals and whether engagement in heart-healthy events influences their cardiovascular health.

Keywords: American Heart Association, cardiovascular health, health belief theory, self-reported health behaviors, Dallas Heart Walk

A Measure of Dallas Heart Walkers' Cardiovascular Health

The American Heart Association (AHA) developed Life's Simple 7® to measure ideal, intermediate, and poor cardiovascular health through seven health metrics: 1) blood glucose, 2) blood pressure, 3) cholesterol, 4) healthy diet, 5) healthy weight, 6) physical activity and 7)smoking status (AHA, 2012). Introduced as part of AHA's 2020 impact goal to improve the cardiovascular health of all Americans by 20 percent, while reducing deaths from cardiovascular diseases and stroke by 20 percent, by the year 2020, Life's Simple 7® represents a comprehensive tool developed by consensus to assess an individual's ideal cardiovascular health (Lloyd-Jones, 2010). Heart disease and stroke are America's number one and fifth leading causes of death in the United States (Kochanek, Xu, Murphy, Arias, & 2013; Mozzafarian et al., 2015). Each year, AHA hosts a National Heart Walk, a non-competitive three-mile walk open to people of any age to help raise funds to support the American Heart Association's efforts to save lives from heart disease and stroke. For the purpose of this study, we sought to explore how the health belief theory and self-reported health behaviors could possibly impact the lives of individuals who participate in heart healthy events such as the Dallas Heart Walk.

Theoretical Frameworks and Literature Review

Health Belief Model

The Health Belief Model (HBM) was developed in the 1950's by social psychologists as a method to explain why the free medical screening programs (mainly for Tuberculosis) offered by the U.S. Public Health Service were not successful (Hochbaum, 1952). Researchers (Glanz, Rimer, &Viswamath, 2008; National Cancer Institute [NCI], 2003) have cited the HBM as the most commonly used theory of health belief, education, and health promotion in public health. The HBM is a value-expectancy theory; meaning that an individual's first belief is that in order to avoid illness, one must value wellness.

Value expectancy also describes how an individual evaluates their susceptibility and potential for illness severity (Becker, 1984; Kirchhoff, Sylwestrak, Chenelly, & McLane, 1988). Next, the individual must believe that a particular action will avert or mitigate the expected illness.

The four original constructs of the HBM were perceived susceptibility (Am I susceptible to disease____?); perceived seriousness or severity (Are the consequences of disease_____ severe?); perceived benefits (Will I benefit from this health behavior change?); and perceived barriers (Are the behavior change barriers impossible?) (Becker, 1984). More recently, three additional constructs have been added: cues to action (prompts that initiate one's action in preventing a disease), modifying factors (age, ethnicity, socioeconomic status), and self-efficacy (stemming from the social learning theory; believing in one's own ability to take action) (McCormick-Brown, 1999). For the purpose of this study, we will address the four original constructs along with research literature. Each of these constructs, individually or collectively, can be used to explain health behavior.

Perceived Susceptibility

One of the most powerful behaviors in prompting an individual to actual behavior change is the construct of personal risk or susceptibility. This refers to an individual's perception that a disease diagnosis is accurate or that the health problem is personally relevant to him/her. The likelihood of engaging in behaviors to decrease the risk comes with greater awareness of the perceived risk. Consistent physical activity improves cardiovascular and overall health and decreases individuals' chances of developing CVD (AHA, 2013). The United States Department of Health and Human Services (2008) established physical activity guidelines for adults: engage in moderate intensity aerobic physical activity of at least 150 minutes per week or vigorous-intensity aerobic activity of at least 75 minutes per week or an equivalent combination. It is further noted that whites, in general, are more physically active than people of color (Centers for Disease Control and Prevention, 2008; U.S. Department of health and Human Services, 1996). Many children and adults do not engage in enough physical activity to achieve ideal health (Hallal, Andersen, Bull, Guthold, Haskell, & Ekelund, 2012) and, for many, physical inactivity is an acceptable norm (Bauman, Rodrigo, Reis, Sallis, Wells, Loos, & Martin, 2012). In addition, others identify health concerns and a lack of time and motivation (Eyler, Baker, Cromer, King, Brownson, &Donatelle, 1998) as deterrents in combatting the physical activity issue.

Perceived Seriousness or Severity

This construct of the HBM speaks to the individual's perceived seriousness or severity about his/her disease/illness. In most situations, knowledge and/or medical information are main sources that alert a person's perception of seriousness. Although doctors can play a key role in educating their patients about weight-related diseases, sociologist and social workers can hold many benefits in this area as well. The incidence and severity of many health conditions are linked to race, ethnicity, and sociodemographic factors (Kurian & Cardarelli, 2007). Mortality data from the 2001-2010 National Vital Statistics report the leading cause of death in the United States is cardiovascular disease (CDC, 2013). Approximately one-fourth of all deaths resulting from heart disease, stroke, or hypertensive disease are highlighted as avoidable (CDC, 2013). When compared to Whites, Blacks experienced nearly twice the rate of disproportionate deaths related to CVD, and Black males face an 80% higher prevalence than white males and Black females.

Perceived benefits

The third construct of the HBM refers to the person's belief that a given action or treatment will help prevent the illness or at least cure it (Hochbaum, Rosenstock, & Kegels, 1952). A perceived benefit is the belief in positive outcomes of the advised action that can occur from behavior change. Benefits from increased physical activity would include decreases in development of cardiovascular disease risk factors, such as having a stroke, diabetes, and high blood pressure, lowered risk factors for various types of cancers (Haskell et al., 2007) and improved memory and brain functioning. This knowledge holds paramount potential as sociologist and social workers can capitalize upon the belief systems held by their clients in order to positively affect change. By examining the prior beliefs held in relation to illness and prevention, studies could begin to formulate strategies across sociologist and social workers disciplines to help clients embrace proactive measures to combat stroke, diabetes, and high blood pressure which often runs proportionately high within the minority demographics.

Perceived Barriers to Change

The most significant constructs in determining behavior change are the perceived barriers to change. Here, the person analyzes the potential roadblocks, such as the pros and cons to implementing the behavior change (Janz& Becker, 1984). Obesity is defined by a body mass index (BMI) over 30 kg/m^2. Overweight, obesity, and morbid obesity can have significant consequences to an individual's mortality. An individual who is overweight can expect a shorter lifespan by 0-2 years, obese by 2-3 years, and morbidly obese by 8-10 years (Whitlock, Lewington, Sherliker, Clarke, Emberson, Halsey, et al., 2009). Besides lack of physical activity and a healthy diet, numerous other factors have been identified that contribute to the obesity epidemic, such as race, income, and education (Paeratakul, Lovejoy, Ryan, & Bray, 2002) as well as marital status and having children (Bowie, Juon, Cho, & Rodriguez, 2007). African Americans and Latinos residing in the United States are more likely to be obese than any other ethnic group (Ogden, Carroll, Curtin, Lamb, & Flegal, 2010).

Assessment of Cardiovascular Health Status at a Public Event

The purpose of this study was to assess the self-reported cardiovascular health status of participants in the Dallas Heart Walk 2012 through a survey tool adapted from AHA's *My Life Check,* while viewing the results from the lens of the health belief model. The AHA online tool evaluates seven health metrics which include 1) blood glucose, 2) blood pressure, 3) total cholesterol, 4) diet (consumption of daily fruits and vegetables, daily whole grains, weekly fish, salt, and sugar) 5) weight (using a calculation of BMI), 6) physical activity, and 7) smoking status. For the purpose of this study, the original survey was adapted as we sought to explore the association between ethnic minority status, smoking history, physical activity, and BMI on personal knowledge of cardiovascular health.

Purpose

The use of theory and evidence guides the approach to answering the research question. Theory and literature were used to guide the conceptual framework of this study. This study was guided by the following research question: What is the association between ethnic minority status, smoking history, physical activity, and personal knowledge of cardiovascular health on Body Mass Index (BMI).

Methods

Participants

The study received prior approval by the Institutional Review Board (IRB) of the University of Texas at Arlington. Participants (n = 515) were walkers recruited to voluntarily complete a survey in person while standing in line at booths, tents, and other areas at the Dallas Heart Walk on September 8, 2012. Walkers participating in the event were asked to voluntarily complete a 13-question survey that would take approximately 5 minutes to complete. Participants were informed of the following: you are free not to answer any questions that you choose; your decision to participate will have no effect or consequence on your affiliation or employment with any employers of the health care forum; you will receive no rewards or benefits for participation in the study; your participation will contribute to the cardiovascular knowledge base health in North Texas; and lastly, information collected will remain confidential and no individual identifying information by participants will be used. There were a total of 47 surveys missing adequate information needed for analysis. Therefore, we only used surveys with no missing data which led to the final sample size for this study (n=468).

The majority of the sample was female (76.9%). A majority of the respondents (58.1%), were from a minority ethnic group. The ages of the respondents varied, however the largest portion of the participants (27.1%) reported to be between the ages of 23-32. Table 1 shows the demographic characteristics of the sample.

Survey Instrument

The survey used in this study consists of 13-questions adapted from the American Heart Association's *My Life Check* (AHA, 2012). Each participant was asked whether he or she had previously taken the survey. Respondent's provided employer information and demographic information that included home zip code, sex, race-ethnicity (White; African American/Black; Hispanic/Latino; Asian; Native American; Alaska Native; Other), and year of birth. The following range of years was provided for participants to select their year of birth: 19401950; 1951-1960; 1961-1970; 1971-1980; 1981-1990.

Specific questions about cardiovascular health and knowledge were included. Respondents were asked about their body weight, height in feet and inches, and tobacco use (never smoked or quit smoking more than 12 years; quit in the past 12 months; current smoker or smokeless tobacco user).

Respondents were asked to indicate how many minutes of moderate physical activity he or she does each week (none, 1-149 minutes, or 150+ minutes). Questions about health knowledge queried about whether he or she knows personal total cholesterol (yes or no), whether he or she knows personal blood pressure level (no-I do not check my blood pressure; yes-I check my blood pressure but do not know it; yes-I do know I have normal blood pressure), and whether he or she knows personal diabetes status and/or blood sugar level (I've been diagnoses with Diabetes but I don't check my blood sugar; I've been diagnoses with Diabetes and I monitor my blood sugar; I have not been diagnoses with Diabetes).

Data Collection

Participants were recruited at the Dallas, Texas *Heart Walk* in 2012. The Dallas *Heart Walk* is an event under the umbrella of the American Heart Association's *Heart Walk,* which takes place in multiple locations around the nation. *Heart Walk* participants are actively helping to fund scientific research in the areas of heart disease and strokes via direct donations and/or sponsorships. Ideally, each participant is aware of or learning about cardiovascular health and is participating in the *Heart Walk* as a means of supporting cardiovascular health research. While standing in lines at the Dallas event, participants were asked to voluntarily participant in the present study. A total of 515 surveys were completed.

In addition to information gathered with the survey instrument, Census data was also included. Using the zip codes for the respondents, community-level information was gathered using U.S. Census Bureau, 2012 Economic Census data. The number of fitness and recreation centers that operated for the entire 2012 year and the median household income within each zip code region is included for each respondent. It was determined that 47 surveys could not be used due to missing or insufficient information and an additional 63 cases were excluded because of missing census information.

Data Analysis

Clustering (or nesting) by zip code is present in the data. The intraclass correlation is 13.95%. To correct the underestimation of standard errors when handling clustered data, the multivariate analyses were done using the PROC GENMOD command in SAS 9.4. The PROC GENMOD command is able to handle both continuous and binary dependent variables. There are 121 clusters or zip codes with a maximum of 12 people and a minimum of one person within a zip code. All zip codes used are within the state of Texas.

BMI (continuous and categorical) are the dependent variables. BMI was calculated using the respondent's body weight and height (BMI=703 x weight (lbs) / [height (in)]^2). Based on the resulting BMI, each respondent was categorized as underweight (=<18.5), normal weight (18.5-24.9), overweight (25-29.9), or obese (=>30). Data exploration and analysis revealed that ten people were categorized as underweight. Of the ten respondents determined to be underweight, half had a BMI of less than ten which was determined to be improbable. The underweight respondents were deleted from the sample.

The independent variable is race-ethnicity. There was a small number of people within some categories so race-ethnicity is coded as Blacks, Latinos, and Others (i.e., Asian, Native American, and Other; there were no Alaskan natives) and Whites. The covariates are gender, health knowledge and behaviors, and median income (logged) and the number of fitness and recreation centers by zip code region. The descriptive statistics were estimated first followed by multivariate analyses.

The final sample size is 395 cases within 121 zip code regions. An estimation of BMI as a continuous variable was done before the estimation of overweight and obese status (1=overweight or obese, N=264; ref=normal, N=131). In the first multivariate model, BMI is estimated by race-ethnicity (ref=White). In the second model, female (ref=male), age (1=young adult or birth year between 1981 and 1990; ref=people born between 1940 and 1980) and health knowledge and behaviors were added. That is, knowledge of blood pressure level (1=yes), knowledge of total cholesterol (1=yes), having been diagnosed with diabetes (1=yes), moderate exercise during the week (1=yes), and tobacco usage (never used and quit within 12 months; ref=current user) are included in the second model. Continuing from the previous model, in the third model, median household income (logged) and the number of fitness and recreation centers within each zip code was added. The same three modeling steps were done to estimate the likelihood of overweight or obese status (ref=normal).

Results

The descriptive statistics (means and proportions) are presented in Table 1 for the entire sample and by race-ethnicity. The average BMI for the sample is 28.77 and 67% of the sample is overweight or obese. Females are 77% of the sample and those born between 1981 and 1990 are 28% of the sample.

A quarter of the respondents know there blood pressure level, a third know their total cholesterol and 11% have been diagnoses with diabetes. Most of the respondents exercise weekly (92%) and never used tobacco (88%) and small proportions of the sample quit tobacco use within the previous twelve-months (4%). The average logged median household income by zip code is 11.07 ($67,771) and the average number of fitness and recreations centers is 3.06.

Statistically significant differences (p<.05) by race-ethnicity are also reported in Table 1. Blacks (mean=29.80) have a higher average BMI than Others (mean=24.85) and Whites (mean=28.19). Latinos (mean=30.42) have a higher average BMI than Others. Whites have a higher BMI than Others. There are significantly more females who identify as Black (81%) and Latina (80%) in the sample than females who identify as Other (61%). Fewer Blacks (24%) and Latinos (18%) knew their total cholesterol than Others (45%) and Whites (40%). Significantly more Others knew their cholesterol compared to Whites. Average logged median income by zip code for Latinos (mean=10.94; $58,825) is significantly lower than Others (mean=11.19; $77,245) and Whites (mean=11.11; $70,403). There are fewer fitness and recreation centers near Latinos (mean=2.42) compared to Whites (mean=3.16).

The multivariate analyses are presented in Table 2. In Model 1, compared to Whites, Blacks (b=1.77, se=.82, p<.05) have higher BMIs and Others (b=-3.34, se=.90, p<.001) have lower BMIs. In Model 2, Blacks (b=1.84, se=.79, p<.05) and Latinos (b=2.38, se=1.09, p<.05) have higher BMIs than Whites while Others (b=3.33, se=.87, p<.001) have lower BMIs. Young adults (b=-1.64, se=.84, p<.05) have lower BMIs than older respondents and a Diabetes diagnoses (b=3.63, se=1.25, p<.01) is associated with higher BMI. In the third model, Blacks (b=1.71, se=.78, p<.05), Latinos (b=2.18, se=1.07, p<.05), and people diagnosed with Diabetes (b=3.43, se=1.25, p<.01) have higher BMIs. Others (b=-3.28, se=.87, p<.001) and Young adults (b=-1.82, se=.82, p<.05) have lower BMIs. Additionally, higher median household income (logged) (b=-2.33, se=1.07, p<.05) is associated with a decrease in BMI.

In the fourth model, race-ethnicity is not significantly associated with the probability of overweight or obese status. In the fifth model, weekly exercise (b=-1.19, se=.55, OR=.30, p<.05) is associated with a lower probability of being overweight or obese. Weekly exercise (b=-1.24, se=.56, OR=.29, p<.05) and an increase in the number of nearby fitness and recreation centers (b=-.14, se=.05, OR=.87, p<.01) are associated with a decreased probability of being overweight or obese in the sixth model.

Discussion

According to the CDC (2015), an alarming 610,000 people die of heart disease in the United States every year–that's 1 in every 4 deaths. Heart disease is the leading cause of death for people of most ethnicities in the United States, including African Americans, Hispanics, and Whites. As we shared previously, high blood pressure, high cholesterol, and smoking are key risk factors for heart disease. About half of Americans (47%) have at least one of these three risk factors. Several other medical conditions and lifestyle choices can also put people at a higher risk for heart disease, including: diabetes, overweight and obesity, poor diet, physical inactivity, and excessive alcohol use. The sociologist and social work professions should be at the forefront of working with interdisciplinary teams to address this major health issue.

Our findings from this majority-minority sample from a large urban metropolitan area indicate that ideal cardiovascular health remains elusive. It is expected that by 2030, 57.2 % of Texans will be obese (Landers, 2012), which places them at significant risk for heart disease. Obesity is a growing epidemic in the United States for all races and its prevalence is higher in non-white groups (Caprio et al., 2008). However, we found no difference between whites and minorities in obesity. There were no differences between whites and ethnic minorities on all variables – obesity, diabetes, blood pressure – except cholesterol scores, and those were slanted in favor of minorities.

Sociologist and social workers must continue to address this public health issue at the micro, mezzo, and macro levels. Partnerships can be formed with interdisciplinary teams at primary health care sites to address the barriers that hinder individual clients from making the lifestyle choices that will lead to better health. Clients can be linked to resources to support healthy food choices. Individual counseling sessions may also be beneficial to help clients address the daily stressors that sometimes lead to depression, poor food choices and sedentary lifestyles.

At the mezzo level, clients can be encouraged to participate in groups that support health and wellness. Yoga groups can be held at community centers. Clients can be connected to exercise groups in their communities or encouraged to form such groups where none currently exist. Walking groups can provide access to physical activity for people who identify environmental barriers such as unsafe neighborhoods and poor lighting and sidewalks (Patel, Schofield, Kolt, & Keogh, 2013).

Sociologist and social workers can also encourage families to seek counseling to adopt healthy lifestyles both emotionally and physically. Family members can not only exercise together, but also garden together and prepare meals together.

At the macro level, community leaders and health advocates can educate at risk populations with easily accessible material and tools to improve their overall cardiovascular health. Faith-based organizations can be targeted to host educational events. These organizations can also serve as host sites for support groups, walking clubs, cooking classes, smoking cessation classes, health screenings, and many other activities that will lead to improved cardiovascular health for many Americans. Faith-based organizations may also partner with personal trainers that work with individual members to address cardiovascular issues. Sociologist and social workers should also advocate for policies that support healthy food choices in school systems and access to healthy, fresh foods in communities.

The profession should continue to support prevention services for youth and adults. Prevention programs should target children in pre-k and K-12 systems. Colleges should continue to implement programs for their students to reduce the risks of cardiovascular disease. In partnership with other professions, sociologist and social workers can work with interdisciplinary groups to educate children and young adults on healthy food choices and the importance of regular exercise in hopes of preventing another generation from experiencing the many challenges that poor cardiovascular disease brings, including untimely death.

In addition to considering practice implications at the micro, mezzo, and macro levels, sociologist and social workers should engage in research to address the challenges of cardiovascular disease. Sociologist and social workers are poised to engage in research that addresses the psychosocial barriers that impact clients with cardiovascular disease. Sociologist and social workers knowledge and use of the person in environment perspective would be beneficial in research studies that partner with nurses, physicians, and other health professions.

Study Limitations

This study had a few limitations. For instance, the sample population for this study was likely skewed because the participants were actually individuals who were already registered for the walk. This group is quite probably not representative of the entire Texas population. In fact, it is very possible that our respondents were already prone to physical activity and exercise because they were registered participants in the walk. It is plausible that they could have family members who have been impacted by CVD, and this could have influenced their decision to join the walk that day. Presumably this demographic already possesses a level of health knowledge due to various mitigating factors, and this has increased their propensity to embrace physical activities on a regular basis.

Another limitation relates to the plausible generalization of the findings to all African Americans and Latinos. It would be remiss to think that our findings are plausibly generalizable to all African Americans and Latinos based on the small sample size that we had present at the walk that day. If we were to canvas local neighborhoods and administer the same questionnaire, it is probable that the results could be quite different, particularly based on the socioeconomic status of the residents in that particular area. It would be interesting to extend the research efforts to other locales so that adequate comparisons could be ascertained.

A final limitation could be to participant bias. As previously stated, the subjects were already registered for the walk. It would be appropriate to assume that these individuals would want to maintain a level of integrity in relation to their health knowledge since they were actively participating in an event that related to one's overall health. The answers given could not have been 100% forthcoming because the participants could have wanted to look knowledgeable to the interviewers to give more credibility for their answers. It would be very fitting to see if similar responses are received if the location changes. Although the results from this study are a bit dismal at first glance, the future implications for positive changes are quite vast. It is imperative that more collaborative measures are forged to help change the projected negative outcomes. By disseminating the information and tools from Life's Simple 7®, strides can be made to improve the overall cardiovascular health for many generations to come. Improved heart health will require extensive education campaigns. Awareness of Life's Simple 7® could be an important part of those education efforts for Texans.

References

American Heart Association. (2012). Life's Simple 7. Retrieved from http://mylifecheck.heart.org/

American Heart Association. (2013). 2013 statistical fact sheet: 2020 impact goal. Retrieved May 9, 2013, from http://www.heart.org/idc/groups/heart-public/@wcm/@sop/@smd/documents/downloadable/ucm_319831.pdf

American Heart Association. (2013).History of the American Heart Association. Retrieved September 15, 2013 from http://www.heart.org/HEARTORG/General/History-of-the-American-HeartAssociation_UCM_308120_Article.jsp

Bauman, A. E., Reis, R. S., Sallis, J. F., Wells, J. C., Loos, R. J. F., & Martin, B. W. Correlates of physical activity: Why are some people physically active and others not? *The Lancet, 380*(9838), 258-271. doi: http://dx.doi.org/10.1016/S0140-6736(12)60735-1.

Bowie, J. V., Juon, H. S., Cho, J., & Rodriguez, E. M. (2007). Factors associated with overweight and obesity among Mexican Americans and Central Americans: Results from the 2001 California Health Interview Survey. *Preventing Chronic Disease, 4*(1), A10.

Caprio, S., Daniels, S. R., Drewnowski, A., Kaufman, F. R., Palinkas, L. A., Rosenbloom, A. L.,

Schwimmer, J. B., & Kirkman, M. S. (2008). Influence of race, ethnicity, and culture on childhood obesity: implications for prevention and treatment. *Obesity*, *16*(12), 2566-2577.

Centers for Disease Control and Prevention. (2008). Behavioral risk factor surveillancesystem: Prevalence and trends data, 2007. Retrieved from http://apps.nccd.cdc.gove/brfss/display.asp

Centers for Disease Control and Prevention. (2011). Cause and consequences.Retrieved from http://www.cdc.gov/obesity/causes/index.html

CDC (Centers for Disease Control and Prevention). (2009). Differences in prevalence of obesity among black, white, and Hispanic adults—United States, 2006–2008. *MMWR: Morbidity and Mortality Weekly Report*, *58*(27), 740–744. Retrieved fromhttp://www.cdc.gov/mmwr/preview/mmwrhtml/mm5827a2.htm.

CDC. Vital signs: prevalence, treatment, and control of high levels of low-density lipoprotein cholesterol. United States, 1999–2002 and 2005–2008. *MMWR*. 2011;60(4):109–14.

Centers for Disease Control and Prevention. (2013). Vital signs: Avoidable deaths from heart disease, stroke, and hypertensive disease-United States, 2001-2010. *MMWR. Morbidity and Mortality Weekly Report*, *62*(35), 721.

Cooper, R., Cutler, J., Desvigne-Nickens, P., Fortmann, S. P., Friedman, L., Havlik, R., ... &

Thom, T. (2000). Trends and disparities in coronary heart disease, stroke, and other cardiovascular diseases in the United States findings of the national conference on cardiovascular disease prevention. *Circulation*, *102*(25), 3137-3147.

Dumith, S. C., Hallal, P. C., Reis, R. S., & Kohl Iii, H. W. (2011). Worldwide prevalence of physical inactivity and its association with human development index in 76 countries. *Preventive Medicine, 53*(1–2), 24-28. doi: http://dx.doi.org/10.1016/j.ypmed.2011.02.017

Eyler, A. A., Baker, E., Cromer, L., King, A. C., Brownson, R. C., &Donatelle, R. J. (1998). Physical activity and minority women: A qualitative study. *Health Education & Behavior, 25*(5), 640-652. doi: 10.1177/109019819802500510

Flegal, K. M., Ogden, C. L., & Carroll, M. D. (2004). Prevalence and trends in overweight in Mexican-American adults and children. *Nutrition Reviews, 62*, S144-S148. doi: 10.1111/j.1753-4887.2004.tb00085.x

Hallal, P.C., Andersen, L.B., Bull, F. C., Guthold, R., Haskell, W. &Ekelund, U. (2012). Global physical activity levels: Surveillance progress, pitfalls, and prospects. *The Lancet, 380, (9838),* 247-257. http://dx.doi.org/10.1016/S0140-6736(12)60646-1

Hedley, A. A., Ogden, C. L., Johnson, C. L., Carroll, M. D., Curtin, L. R., &Flegal, K. M. (2004). Prevalence of overweight and obesity among us children, adolescents, and adults, 1999-2002. *JAMA, 291*(23), 2847-2850. doi: 10.1001/jama.291.23.2847 Henderson, K. A. (2011). Physical activity among African American women: Change and ways of knowing. *Quest (00336297), 63*(1), 73-84.

Heron M. (2012). Deaths: Leading causes for 2008. *National Vital Statistics Reports*, 60(6).

Hubert, H. B. (1986). The importance of obesity in the development of coronary risk factors anddisease: the epidemiological evidence. Annu Rev Public Health. 7:493–502.

Kenny SJ, Aubert RE, Geiss LS. Prevalence and incidence of non-insulin-dependent diabetes.In: Harris MI, Cowie CC, Stern MP, et al. Diabetes in America. Bethesda, Md: National Institute of Health, National Institute of Diabetes, and Digestive and Kidney Diseases,1995;47–67.

Kurian, A. K., Cardarelli, K. M. (2007). Racial and ethnic differences in cardiovascular disease risk factors: A systematic review. *Ethnicity and Disease 17*, 143–152.

Landers, J. (2012). Texas is on a path to 57% obesity by 2030, and that would be costly. Retrieved from http://www.dallasnews.com/business/health-care/20120918-texas-is-on-a-path-to-57-obesity-by-2030and-that-would-be-costly.ece

LaPorte RE, Matsushima M, Chang YF. Prevalence and incidence of insulin-dependentdiabetes. In: Harris MI, Cowie CC, Stern MP, et al. Diabetes in America. Bethesda, Md:National Institute of Health, National Institute of Diabetes, and Digestive and KidneyDiseases, 1995;37–46.

Masters, M. A. (2012). Impact of the Home Food Environment on Dietary Intake, Obesity and Cardiovascular Health of US Children and Adolescents, Aged 6-19 (Doctoral dissertation). Retrieved from digitalcommons.unl.edu/cgi/viewcontent.cgi?article=1035&context=nutritiondiss

Moon, Mary Ann. "Obesity in minorities especially challenging." *Pediatric News* May 2010: 36. *Health Reference Center Academic*. Retrieved September 22, 2013 from file:///C:/Users/Tracey%20M%20Barnett%20PhD/Downloads/Download%20Document.html

Ogden, C. L., Carroll, M. D., Curtin, L. R., Lamb, M. M., &Flegal, K. M. (2010). Prevalence of high body mass index in US children and adolescents, 2007-2008. *Jama*, *303*(3), 242-249.

Paeratakul, S., Lovejoy, J. C., Ryan, D. H., & Bray, G. A. (2002). The relation of gender, race and socioeconomic status to obesity and obesity comorbidities in a sample of US adults. *International Journal of Obesity and Related Metabolic Disorders, 26*(9), 1205–1210. doi:10.1038/sj.ijo.0802026.

Patel, A., Schofield, G. M., Kolt, G. S., & Keogh, J. (2013). Perceived barriers, benefits and motives for physical activity: two primary-care physical activity prescription programs. *Journal of aging and physical activity*, *21*(1), 85.

Roger, V. L., Go, A. S., Lloyd-Jones, D. M., Benjamin, E. J., Berry, J. D., Borden, W. B., ... &

Stroke, S. S. (2012). Heart disease and stroke statistics--2012 update: a report from the American Heart Association. *Circulation*, *125*(1), e2.

Seidman, K. B., &Cheskin, L. J. (2011). 18 Obesity and Nutrition. *Gastrointestinal and Liver Disease Nutrition Desk Reference*, 251.

Stern MP, Mitchell BD. Diabetes in Hispanic Americans. In: Harris MI, Cowie CC, SternMP, et al. Diabetes in America. Bethesda, Md: National Institute of Health, National Institute of Diabetes, and Digestive and Kidney Diseases, 1995;613–660.

Stuart-Shor EM, Nannini A, Ostrem M, Russell GE, Mittleman MA. Ethn Dis. 2006

Spring;16(2):375-83. The prevalence of blood pressure and cholesterol monitoring in Boston among non-Hispanic blacks, Hispanics, and non-Hispanic whites.

Thom, T., Haase, N., Rosamond, W., Howard, V. J., Rumsfeld, J., Manolio, T., ... & Wolf, P. (2006). Heart disease and stroke statistics—2006 update a report from the American Heart Association Statistics Committee and Stroke Statistics Subcommittee. *Circulation*, *113*(6), e85-e151.

Thomas, J. C., Lackland, D. T., & Taylor, K. B. (2000). Disparity between whites and african-americans in knowledge and treatment of cholesterol: Carolina heart survey. *Annals of Epidemiology, 10*(7), 460. doi: http://dx.doi.org/10.1016/S1047-2797(00)00106-X

Tull ES, Roseman JM. Diabetes in African Americans. In: Harris MI, Cowie CC, SternMP, et al. Diabetes in America. Bethesda, Md:

U.S. Department of Health and Human Services. (1996). Physical activity and health: Areport of the Surgeon General. Atlanta, GA: Centers for Disease Control.

U.S. Department of Health and Human Services. (2008). Physical activity guidelines for Retrieved from www.health.gov/paguidelines/

Wang, Y., Beydoun, M. A., Liang, L., Caballero, B., & Kumanyika, S. K. (2008). Will all Americans become overweight or obese? Estimating the progression and cost of the US obesity epidemic. *Obesity (Silver Spring), 16*(10), 2323–2330. doi:10.1038/oby.2008.351.

Whitlock, G., Lewington, S., Sherliker, P., Clarke, R., Emberson, J., Halsey, J., et al. (2009).

Body-mass index and cause-specific mortality in 900 000 adults: Collaborative analyses of 57 prospective studies. *Lancet, 373*(9669), 1083–1096. doi:10.1016/S0140-6736(09)60318-4.