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Determinants of Obesity: Racial Differences

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DETERMINANTS OF OBESITY: RACIAL DIFFERNCES

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ABSTRACT

BACKGROUND: Obesity is a major public health problem. Studies have shown that there are racial and ethnic differences in the prevalence of obesity. However, there is limited research that examines the effects of sedentary and poor lifestyle behaviors and obesity among different racial and ethnic groups. Furthermore, most studies focus on the problem of obesity among children. This study was conducted to examine racial differences in determinants of obesity in adults in the United States.

METHODS: Data from the 2005 Behavioral Risk Factor Surveillance System was used for this analysis. Demographics, lifestyle behaviors, and existence of chronic diseases were assessed. Data was stratified by race and multiple logistic regression analysis was conducted to examine determinants of obesity by race.

RESULTS: The majority of the study participants (59%) were overweight or obese (BMI $\geq$2500). The following determinants were found to have a significant association with risk of obesity in whites, blacks and Hispanics: age, marital status, consumption of dietary recommendations of fruits and vegetables, smoking status, and alcohol consumption. For whites, education and income level did not show a statistically significant association with obesity. For African Americans, sex, physical activity, and income levels did not have statistically significant associations with obesity. Income did show a statistically significant association with obesity in Hispanics.

CONCLUSION: Overall, it was found that the determinants of obesity vary with ethnic groups. In order to effectively combat obesity, smoking cessation must also be paired with a healthy diet and regular exercise. In addition, interventions must be made in correlation with the needs of the community.

INTRODUCTION

Obesity has become a major problem in the United States, becoming the second leading cause of preventable death. In a study conducted to estimate the number of deaths, annually, attributable to obesity among US adults, David Allison, reports a staggering 325,000 deaths.[1] Healthy People 2010 identified obesity as one of the ten leading health indicators[2]. It has been described as a complex, chronic disease affected by environmental, genetic, physiologic, metabolic, behavioral and psychological factors[3].

Over the past 20 years there has been a dramatic increase in obesity in the United States. Close to 60 percent of adults and 17 percent of children and teens are overweight or clinically obese, which is defined as having a body mass index of 30 or higher[4]. In addition to creating behaviors that further invigorate the problem, such as physical inactivity and poor eating habits, obesity invokes risk for developing many of the chronic diseases that are leading causes of death in the U.S. such as heart disease, high blood pressure, Type 2 diabetes and some cancers, including breast and colon. According to the American Medical Association, obesity costs the nation an estimated $117 billion a year in medical costs from related illnesses. Obesity may soon overtake tobacco use as the leading cause of preventable death in the U.S.

There have been numerous studies conducted to analyze specific factors and trends in obesity. One of the main factors attributable to risk of obesity has been sedentary behaviors. In his study on sedentary behaviors and obesity in women, Frank Hu reports that, television watching is one of the foremost sedentary activities in the United States. Like other sedentary activities such as driving a car, playing board games, or reading, television watching causes a decrease in metabolic rate.[5] A low metabolic rate causes the body to burn calories more slowly, leading to wait gain if the

caloric intake does not decrease in conjunction with the metabolic rate. Hu's findings further reports that independent of levels of physical activity, these sedentary behaviors alone significantly increased the risk of obesity, and even light to moderate physical activity made a difference in lowering that risk.[4]

Metabolic syndrome is a combination of medical disorders that increase one's risk for cardiovascular disease and diabetes, and is directly associated with obesity. In his study conducted on sedentary behavior, physical activity and the metabolic syndrome, Ford reports that the study participants who did not engage in any physical activity (moderate or vigorous) were twice as likely to have metabolic syndrome. He later concluded from his findings that sedentary behavior is a "potential determinant" and any efforts to lessen prolonged amounts of inactivity, especially if coupled with an increase in physical exercise, could substantially decrease the risk and prevalence of metabolic syndrome and obesity.[6]

Along with the mentioned sedentary behaviors, lifestyle behaviors such as cigarette smoking and heavy alcohol consumption also have a significant impact on obesity. Smoking and alcohol consumption are two behaviors that are long known to be associated with each other—as if a person is engaged in one of activities, they are more likely to also be engaged in the other. However, there are a number of studies that have shown links between smoking and obesity. It is well known that smoking cessation is associated with subsequent weight gain or obesity as supported in a study which analyzed smoking cessation and severity which found that major weight gain was strongly related to smoking cessation[7]. In another study, the obesity resulting from smoking cessation was observed in the patients within a period of 5 to 7 years after the subjects stopped smoking[8]. Although a terrible habit, smoking affects a person's metabolism and burns up to 200 calories in a heavy smoker. Cigarettes also act as appetite suppressants. As a result, current smokers are often

discouraged from quitting to avoid the possibility of weight gain that comes from the increased appetite and need for oral fixation from smoking cessation. Some may even consider beginning smoking to lose weight.

Much like any other chronic disease, obesity has effects and trends unique to different factions of people. One of the main trends analyzed in studies on obesity has been on its effects on different ethnic groups. Once such study proposed to report current estimates of the prevalence and trends of obesity in adults. It was reported that, "Approximately 30% of non-Hispanic white adults were obese as were 45.0% of non-Hispanic black adults and 36.8% of Mexican Americans."[9] Another study reporting on extreme obesity in the United States stated that obesity has increased such that it now affects almost 1 in 20 Americans. Donald Hensrud goes further in this study to report the prevalence of extreme obesity is greater among blacks than among non-Hispanic whites or Hispanics[10].

An overwhelming majority of studies conducted on obesity, even those comparing its effects on ethnicities, have been conducted on children but not on adults. However, it has been proven that parental influence is a major determinant of childhood obesity. Parents control what the child eats, in what frequency, and in what quantity. One major factor in the parent's discretion of the child's diet is the parent's own health status. Parental obesity more than doubles the risk of adult obesity among both obese and non-obese children.[11] In the Framingham children's study, a six year cohort study reporting on parental dietary disregard is associated with greater increases in body fatness[12] Simply put, parents who are at risk for obesity and encourage similar lifestyle behaviors in their children will have heavier children who are at higher risk for obesity. It seems the best way to prevent the obesity epidemic from growing any further is to control the source of the problem—overweight and obese adults.

Though conclusive and relevant in nature, many studies on adult obesity are conducted outside of the United States. This leaves much to be desired for comparability to Americans. Conditions that can become factors for obesity vary from country to country. These factors also determine how big of a problem obesity is in that particular nation. Judging from the factors in the United States such as heightened societal and marketing pressures, to speak of obesity as merely an issue would be a gross understatement. The World Health Organization makes mention of America's high ranking obesity epidemic in comparison to other industrialized nations. In addition to the ill health effects, obesity affects the economic state of a nation. In a study conducted to assess the economic costs of obesity in the United States, it was found that the direct costs of factors leading to obesity, and obesity itself account for almost 10% of the national health care expenditures[13].

Although several studies have reported the major determinants of obesity, there is limited research on the impact of race and ethnicity. This study is designed to examine the association between determinants of obesity and race and ethnicity.

METHODS

This study was conducted using the 2005 Behavioral Risk Factor Surveillance System (BRFSS) data. The data was obtained from the Centers for Disease Control and Prevention (CDC). The data was downloaded into the computer software SPSS version 13.0. All analyses were also conducted using this software. The BRFSS is a joint endeavor of the Centers for CDC and U.S. states and territories. The BRFSS is a data collection program via telephone designed to assess behavioral risk factors in the adult population (18 years of age or older) living in households (n=356,112). The main goal of the BRFSS is to collect data on preventive health practices and risk

behaviors associated with chronic diseases, injuries, and preventable infectious diseases in the adult population. Using a computer generated list of randomly selected telephone numbers, 53 states used a -assisted telephone interviewing (CATI) or state health personnel or contractors to conduct the interviews. Telephone interviewing was conducted during each calendar month, and calls were made seven days per week, during both daytime and evening hours. After the data is collected and sent to the CDC data conversion tables are then developed to read the survey data from the entry module where any missing and refused variables are coded, and the data is weighted to allow for adjustment for non-coverage and non-response which makes the total number of cases equal to the population estimates for each geographic region.

The data was reviewed and variables of interest were selected based on evidence from existing literature for further analysis. The variables were divided into three categories: Demographic Variables, Lifestyle Behaviors, and Chronic Diseases/Conditions. The following demographic variables were selected for analysis: gender, age (divided into 6 age groups: 18-24, 25-34, 35-44, 45-54, 55-64, and 64+), race/ethnicity (classified as white non-hispanic, black non-hispanic, Hispanic, and other non-hispanic), current marital status (married, not married, never married), level of education completed (did not finish high school, high school graduate, some college/technical school, college graduate), current employment status (employed or not employed) and current annual income (divided into 6 groups: 0-$14999, $15K-$24999, $25K-$34999, $35K-$49999, $50K-$74999, and $75K and above). The lifestyle behavior variables selected were: daily consumption of dietary recommendation of fruits and vegetables (divided dichotomously into whether or not the study participant consumed at least 5 servings of fruits and vegetables daily), any regular physical activity within the past 30 days (30 minutes a day 3 time a week) current smoking status (divided into 4 groups: current smoker—smokes everyday, current smoker—smokes

sometimes, former smoker, never smoked), and heavy alcohol consumption in the past 30 days (2 or more alcoholic drinks per day). The chronic disease/conditions variables selected were all dichotomous divided into whether or not the subject had ever been diagnosed with the following 7 chronic diseases/conditions: diabetes, coronary heart disease, stroke, high blood pressure, high cholesterol, arthritis and asthma. The outcome variable selected was body mass index (BMI), which was calculated based on participant self reports of height and weight, using the formula:

$$\left(weight(lbs) \Big/ height(in)^2 \right) * 703$$

After calculating the BMI, it was dichotomized as NOT OBESE or NORMAL/UNDERWEIGHT (0-2499) and OBESE/OVERWEIGHT (2500-9998). All missing and refused entries were coded as "system missing" and were excluded from all analyses except frequencies. Descriptive analysis was conducted to understand the distribution of the study population. Data was stratified by race and crude analysis was done to calculate OR and 95%CI . Variables that showed statistical association in the crude analysis and those that are proven to be confounders were considered for regression analysis. Multiple logisitic regression was used to examine association between the independent variables and obesity after adjusting for potential confounders

RESULTS

Table 1 shows the frequency distribution of the study population. The mean age of the study population was 51.6 years (SD 17.06), the majority being aged 65 and older. Nearly 80% of the study population were white, and close to 60% were married. The highest level of education reached by a majority of the respondents was college/technical school graduate (32%), and over half of respondents reported they were currently employed. Of the lifestyle behavior variables, almost 75% of respondents did not consume the daily dietary recommendation of fruits and vegetables, yet reported they were physically active. Slightly over half of the population never smoked but close to 30% reported being former smokers. Most respondents reported no history of chronic disease (diabetes 89.7%, coronary heart disease 93.6%, stroke 96.3%, asthma 90.9%). However, there were higher percentages of respondents with a history of high blood pressure (31.6%), high cholesterol (32.1%), and obesity (59%).

The crude analysis showed that there was a statistically significant association between obesity and age, race/ethnicity, marital status, education, income, employment status, consumption of fruits and vegetables, physical activity, smoking, alcohol consumption, and chronic diseases. (Table 2). Compared to those aged 18-24, those who were 55-64 were nearly 3 times more likely to be obese (OR 2.94, CI 2.84, 3.01). Compared to whites, black were almost twice as likely to be obese (OR 1.82, CI 1.76, 1.87), and Hispanics had 22% greater odds than whites (OR 1.23, CI 1.20, 1.27). When compared to married respondents, those who were not married (OR 0.89 CI 0.87, 0.90) or never married (OR 0.76, CI 0.75, 0.78) were at lower risk. High school graduates were at a lower risk compared to those who did not graduate high school (OR 0.94, CI 0.92, 0.97), and those who attended and graduated from college/technical school reported similar reduced risk. Those who consumed the dietary recommendations of fruits and vegetables were a lower risk compared to

those who did not (OR 0.76, CI 0.74, 0.77), and those who were physically active were at lower risk compared to those who were not (OR 0.69, CI 0.68, 0.70). Former smokers were almost twice as likely to be obese compared to current smokers who smoke everyday (OR 1.58, CI 1.54, 1.61), and those who never smoked were at 21% greater risk (OR 1.21, CI 1.19, 1.24). Compared to those with no reported history of high blood pressure, those who did had almost 2.5 time higher risk of obesity (OR 2.40, CI 2.35, 2.42), and those who did have high cholesterol were at 78% higher risk than those who didn't (OR 1.78, CI 1.76, 1.81).

The adjusted analysis showed that there was a statistically significant association between obesity and age, race/ethnicity, marital status, employment status, consumption of fruits and vegetables, physical activity, smoking, alcohol consumption, and chronic diseases (Table 3). As compared to those aged 18 to 24, those aged 35-44 were almost twice as likely to be at risk for obesity (OR 1.78, 95% CI 1.67, 1.89) , yet the 65+ age group had an non-significant association (OR 0.98, 95 CI 0.92, 1.05). The risk of obesity increased with increasing age up to the age of 64. Compared to whites, blacks were at higher odds for risk of obesity (OR 1.76 95% CI 1.69, 1.83). Hispanics had only slightly higher risk than whites (OR 1.21, 95% CI 1.16, 1.26). Compared to those who reported not being currently employed, those who were had 20% higher risk.

Compared to those with an annual income of $75,000 or more, those with a reported income of $35-$49,000 were almost 1.3 times more likely to be at risk (OR 1.27, 95%CI 1.24, 1.31). Compared to current smokers that smoked everyday, former smokers had a 70% higher risk of obesity (OR 1.68, 95%CI 1.63, 1.73). Those who never smoked, after adjusting, had a 60% greater risk as compared to current smokers who smoked everyday (Adjusted OR 1.603 CI 1.558, 1.650. Each of the chronic disease variables higher associations for presence of chronic disease as compared to absence.

When racially stratified, there were differences in statistical significance (Table 4). For whites, statistical significance was found between obesity and gender, age, marital status, physical activity, smoking status and alcohol consumption. White females were at lower risk compared to white males (OR 0.43 CI 0.42, 0.44). Compared to whites aged 18-24, whites aged 35-44 were at almost 2 times higher risk. Whites who were employed were at higher risk than those where unemployed (OR 1.22 CI 1.19, 1.26). Whites who were physically active were at almost 30% lower risk than whites who were not. Compared to current smokers, whites who were former smokers were almost twice as likely to be at risk.

For blacks, there was statistical significance was found between obesity and age, marital status, education, employment, smoking status and alcohol consumption. Like whites, blacks aged 35-44 were at almost 2 times higher risk than blacks aged 18-24. Compared to those who were married, blacks who were never married were at a slightly lower risk (OR 0.90, 95%CI 0.81, 0.99). Blacks who had not graduated high school and those who had were both at 18% higher risk than black college graduates. Those who were employed were at higher risk than those where unemployed (OR 1.20, CI 1.09, 1.32). Compared to current smokers, blacks who were former smokers were almost twice as likely to be at risk. For blacks, physical activity, sex, and income levels did not have statistically significant associations.

For Hispanics, significant associations were found between obesity and gender, age, marital status, education, income, smoking status, and physical activity. Hispanic females were at lower risk of obesity compared to Hispanic males (OR 0.48 CI 0.44, 0.52). Hispanics aged 35-44 were at 2 times higher risk compared to those aged 18-24. Compared to Hispanics who were college graduates, Hispanics who did not finish high school had almost 70% higher risk (OR 1.65, CI 1.44, 1.89). Compared to Hispanics who reported an annual income of $75,000 or more, those who

reported an annual income of $50,000 to $74,999 were at lower risk, while those who reported an annual income of $35,000 to $49,999 were at 24% higher risk. Those who were physically active were at lower risk than those who were. Hispanics who former smokers were at almost 40% higher risk than those who where current smokers. Employment status was not found to be statistically significant in Hispanics. Regardless of race, those with presence of chronic disease were at higher risk of obesity compared to those did not have a chronic disease.

DISCUSSION

In the crude analysis, a dose-response relationship was found between obesity age, education and income. As age group increased so did risk of obesity, and as education level increased risk of obesity decreased. These findings were expected, and are supported by results from previous studies.[14,15] An inverse dose-response relationship was expected and observed between obesity and income where risk for obesity decreased as income level increased because of previous studies and news reports of those of lower income levels being at higher risk for obesity. The reason for this is because people find it more costly to maintain a healthier diet, whereas food higher in fats and sugars (such as potato chips, cookies, soft drinks) are cheaper and more easily accessible[16]. Those of income level $0-$14,000 were at higher risk compared to those with an annual income of $75,000 or higher, and as income level increased after $14,000, the risk of obesity decreased.

The adjusted analysis altered some associations that were stronger in the crude analysis. The dose-response relationship observed in the crude analysis between age and obesity changed, and there was an inverse J-shaped relationship was observed. In comparison to 18-24 age group, risk for obesity increased with age up to the 35-44 age group. From the 45-54 to 65+ age group, risk for obesity decreased with increased age. Education was not found to have a significant association.

When compared to annual income of $75,000 or more, those with an income up to $14,000 were at higher risk, but, unlike the crude analysis, a direct relationship was found between increasing income status and risk of obesity. As supported in other literature, former smokers were at higher risk for obesity than other smoking history groups in both the crude and adjusted models of the analysis.

When racially stratified, each race/ethnic group had marked difference in the determinants of obesity. Income did not have a statistically significant association with obesity in blacks or whites. Most deviant of expectations was the non-significant association between physical activity and risk of obesity in blacks. It was expected that regardless of race, those who did not report regular physical activity would be at higher risk of obesity. When considering this deviation, one must take into consideration the diet of most black households consists of dense foods that are higher in fats, cholesterol, salts, and sugars. As compared to a household where such foods are not part of the regular diet, those who do consume those foods must drastically increase physical activity to compensate for the diet. A number of studies have assessed the relationship between a healthy diet and BMI, and all report similar findings. In a comparative analysis fruit and vegetable consumption and body mass index, there was a positive relationship between mean BMI and consumption of fruits and vegetables[17]. The findings of this were supported by these results, regardless of race/ethnicity, those who reported regular consumption of dietary recommendations of fruits and vegetables were at lower risk of obesity. For some variables, significant associations were only found in two of the three analyzed racial/ethnic groups. Sex was significantly associated with obesity in whites and Hispanics, education was significant in black and Hispanics, employment was significantly associated in blacks and whites, and physical activity was significantly associated in whites and Hispanics.

Overall, it was found that the determinants for obesity vary with ethnic groups. Another study which examined rising trend in obesity among Mexican Americans and non-Hispanic whites found similar results[18]. The findings are similar to previous studies that report an overall association with certain determinants and increased risk of obesity. When presence of chronic disease is factored in, there is a still higher association. In order to effectively combat obesity, smoking cessation must also be paired with a healthy diet and regular exercise. In addition, interventions must be made in correlation with the needs of the community. For example, in low income communities, establishing food banks that provide healthier dietary alternatives that are more cost efficient.

Currently, the majority of studies conducted on obesity and its determinants have been done with children. Few studies exist with adults as the study population, and of those the studies have either been conducted outside of the United States, have not adjusted for ethnicity, used obesity as an intermediate variable, or used chronic disease onset as the outcome variable. This study has illustrated associations not previously examined. In this study a random sample of adults in the United States were analyzed over 19 variables ranging from demographics to diseases and conditions.

A cross-sectional study such as this made it possible to examine multiple etiologic factors for a single outcome, providing a "snapshot" of the frequency and characteristics of a disease in a population at a particular point in time. This type of data can be used to assess the prevalence of acute or chronic conditions in a population or to provide insight for needs assessment and interventions for a community. Other strengths include useful baseline assessment, generalizable results if using a population based sample, immediate outcome assessment, no loss to follow-up, and being more cost efficient. Though more time and cost efficient, cross-sectional studies have a

number of limitations. Since exposure and disease status are measured at the same point in time, it may not always be possible to distinguish whether the exposure proceeded or followed the disease. To truly test for differences in risk of obesity, one would need to monitor people from these populations over time. Cross sectional studies are impractical for rare diseases if using a population based sample, prone to and recall bias (often cases are asked to reflect on previous activities and behaviors, and may give inaccurate answers).

CONCLUSIONS/RECOMMENDATIONS

The findings of this study were analogous to others previously performed. As a whole, Americans are similarly affected by obesity--without considering negative lifestyle behaviors or chronic diseases.[4, 10] However, when specific determinants are considered, this study proves that the associations change respective to race/ethnic group. The stratified analysis showed differences in determinanats for race. Future studies should look into performing longitudinal analysis on a cohort, or including more demographic and lifestyle variables to be analyzed such as family history of chronic disease, geographic location, As previously stated, in order to effectively combat obesity, smoking cessation must also be paired with a healthy diet and regular exercise. In addition, interventions must be made in correlation with the needs of the community.

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TABLE OF APPENDICES

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RECODE
  EXERANY2
  (1=1)  (2=2)  (ELSE=SYSMIS)  INTO  ANY_EXERCISE .
VARIABLE LABELS ANY_EXERCISE 'ANY EXERCISE IN PAST 30
DAYS'.
EXECUTE .
FREQUENCIES
  VARIABLES=GENDER AGE RACE_ETHNICITY
MARITAL_STATUS EDUCATION INCOME_LEVELS
EMPLOYMENT CONSUME_5FV EXERANY2 SMOKER_LEVELS
  SMOKER_CURNT HEAVY_CONSUMPTION DIABETES
HAVE_CHD HAD_STROKE HAVE_HIBP HAVE_HICHOL
HAVE_ARTH HAVE_ASTHMA BMI_STAT
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****ADJUSTED****

LOGISTIC REGRESSION  BMI_STAT
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EMPLOYMENT CONSUME_5FV ANY_EXERCISE
  SMOKER_LEVELS SMOKER_CURNT HEAVY_CONSUMPTION
DIABETES HAVE_CHD HAD_STROKE HAVE_HIBP
HAVE_HICHOL HAVE_ARTH HAVE_ASTHMA
  /CONTRAST (GENDER)=Indicator(1)  /CONTRAST
(AGE)=Indicator(1)  /CONTRAST (RACE_ETHNICITY)=Indicator(1)
/CONTRAST
```

```
  (MARITAL_STATUS)=Indicator(1)  /CONTRAST
(EDUCATION)=Indicator(1)  /CONTRAST
(INCOME_LEVELS)=Indicator(1)  /CONTRAST
  (EMPLOYMENT)=Indicator(1)  /CONTRAST
(CONSUME_5FV)=Indicator(1)  /CONTRAST
(ANY_EXERCISE)=Indicator(1)  /CONTRAST
  (SMOKER_LEVELS)=Indicator(1)  /CONTRAST
(SMOKER_CURNT)=Indicator(1)  /CONTRAST
(HEAVY_CONSUMPTION)=Indicator(1)  /CONTRAST
  (DIABETES)=Indicator(1)  /CONTRAST (HAVE_CHD)=Indicator(1)
/CONTRAST (HAD_STROKE)=Indicator(1)  /CONTRAST
  (HAVE_HIBP)=Indicator(1)  /CONTRAST
(HAVE_HICHOL)=Indicator(1)  /CONTRAST
(HAVE_ARTH)=Indicator(1)  /CONTRAST
  (HAVE_ASTHMA)=Indicator(1)
  /PRINT = CI(95)
  /CRITERIA = PIN(.05) POUT(.10) ITERATE(20) CUT(.5) .

****CHECK FOR INTERACTION/ASSOCIATION****

LOGISTIC REGRESSION  BMI_STAT
  /METHOD = ENTER RACE_ETHNICITY SMOKER_LEVELS
RACE_ETHNICITY*SMOKER_LEVELS
  /CONTRAST (RACE_ETHNICITY)=Indicator(1)  /CONTRAST
(SMOKER_LEVELS)=Indicator(1)
  /PRINT = CI(95)
  /CRITERIA = PIN(.05) POUT(.10) ITERATE(20) CUT(.5) .


****STRATISFY BY RACE****


LOGISTIC REGRESSION  BMI_STAT
  /METHOD = ENTER GENDER AGE RACE_ETHNICITY
MARITAL_STATUS EDUCATION INCOME_LEVELS
EMPLOYMENT CONSUME_5FV ANY_EXERCISE
  SMOKER_LEVELS SMOKER_CURNT HEAVY_CONSUMPTION
DIABETES HAVE_CHD HAD_STROKE HAVE_HIBP
HAVE_HICHOL HAVE_ARTH HAVE_ASTHMA
```

```
  /CONTRAST (GENDER)=Indicator(1)  /CONTRAST
(AGE)=Indicator(1)  /CONTRAST (RACE_ETHNICITY)=Indicator(1)
/CONTRAST
  (MARITAL_STATUS)=Indicator(1)  /CONTRAST
(EDUCATION)=Indicator(1)  /CONTRAST
(INCOME_LEVELS)=Indicator(1)  /CONTRAST
  (EMPLOYMENT)=Indicator(1)  /CONTRAST
(CONSUME_5FV)=Indicator(1)  /CONTRAST
(ANY_EXERCISE)=Indicator(1)  /CONTRAST
  (SMOKER_LEVELS)=Indicator(1)  /CONTRAST
(SMOKER_CURNT)=Indicator(1)  /CONTRAST
(HEAVY_CONSUMPTION)=Indicator(1)  /CONTRAST
  (DIABETES)=Indicator(1)  /CONTRAST (HAVE_CHD)=Indicator(1)
/CONTRAST (HAD_STROKE)=Indicator(1)  /CONTRAST
  (HAVE_HIBP)=Indicator(1)  /CONTRAST
(HAVE_HICHOL)=Indicator(1)  /CONTRAST
(HAVE_ARTH)=Indicator(1)  /CONTRAST
  (HAVE_ASTHMA)=Indicator(1)
  /PRINT = CI(95)
  /CRITERIA = PIN(.05) POUT(.10) ITERATE(20) CUT(.5) .

USE ALL.
COMPUTE filter_$=(RACE_ETHNICITY = 4).
VARIABLE LABEL filter_$ 'RACE_ETHNICITY = 4 (FILTER)'.
VALUE LABELS filter_$  0 'Not Selected' 1 'Selected'.
FORMAT filter_$ (f1.0).
FILTER BY filter_$.
EXECUTE .
```

TABLE 1: FREQUENCIES

Variable description	Mean	SE	Min	Max
SELF REPORTED AGE VALUES	51.6	0.029	18	99

Variable Description	Grouping	N	%
IMPUTED AGE IN SIX GROUPS			
	AGE 18 TO 24	18290	5.14
	AGE 25 TO 34	46613	13.09
	AGE 35 TO 44	63530	17.84
	AGE 45 TO 54	75536	21.21
	AGE 55 TO 64	64792	18.19
	AGE 65 OR OLDER	87351	24.53
SEX			
	MALE	136201	38.25
	FEMALE	219911	61.75
RACIAL AND ETHNIC GROUPS			
	WHITE (NON-HISPANIC)	278672	78.25
	BLACK (NON-HISPANIC)	27735	7.79
	HISPANIC	25539	7.17
	OTHER (NON-HISPANIC)	20750	5.83
CURRENT MARITAL STATUS			
	YES (MARRIED)	204613	57.46
	NO (NOT MARRIED)	102338	28.74
	NEVER MARRIED	47888	13.45
LEVEL OF EDUCATION COMPLETED			
	DID NOT GRADUATE HS	38202	10.73
	HS GRADUATE	109830	30.84
	SOME COLLEGE/TECHNICAL SCHOOL	93228	26.18
	COLLEGE/TECH SCHOOL GRADUATE	113944	32.00
ANNUAL INCOME LEVELS			
	0 TO $14999	38028	10.68
	$15K TO $24999	56549	15.88
	$25K TO $34999	42117	11.83
	$35K TO $49999	51996	14.60
	$50K TO $74999	51896	14.57
	$75K OR MORE	66780	18.75
CURRENT EMPLOYMENT STATUS			
	NO (NOT CURRENTLY EMPLOYED)	154363	43.35
	YES (CURRENTLY EMPLOYED)	200795	56.39
CONSUMED 5 SERV OF FRUITS AND VEGS DAILY			
	NO (CONSUMED <5 SERVINGS)	262027	73.58
	YES (CONSUMED >=5 SERVINGS)	87124	24.47
EXERCISE IN PAST 30 DAYS			
	NO (NOT PHYSICALLY ACTIVE)	93451	26.24
	YES (PHYSICALLY ACTIVE)	262284	73.65
CURRENT SMOKER STATUS LEVELS			
	CURRENT SMOKER (SMOKE EVERYDAY)	52303	14.69
	CURRENT SMOKER (SMOKES SOME DAYS)	17135	4.81
	FORMER SMOKER	99209	27.86
	NEVER SMOKED	185935	52.21
HEAVY ALCOHOL CONSUMPTION			
	NO (NO HEAVY DRINKING)	334060	93.81
	YES (HEAVY DRINKING)	15845	4.45

EVER TOLD HAD DIABETES			
	NO	319452	89.71
	YES	36306	10.20
DIAGNOSED WITH CHD			
	YES	19610	5.51
	NO	333378	93.62
DIAGNOSED WITH STROKE			
	NO	343051	96.33
	YES	12079	3.39
TOLD HAVE HIGH BLOOD PRESSURE			
	NO	242804	68.18
	YES	112687	31.64
TOLD HAVE HIGH CHOLESTEROL			
	NO	175448	49.27
	YES	114166	32.06
TOLD HAVE ARTHRITIS			
	NO	230651	64.77
	YES	119485	33.55
CURRENT ASTHMA STATUS			
	NO	323702	90.90
	YES	30323	8.52
BMI GROUPS			
(DICHOTOMOUS 1-2499 NO, 2500-9998 YES)	NO (NOT OBESE/NORMAL OR UNDERWEIGHT)	129513	36.37
	YES (OBESE/OVERWEIGHT)	210155	59.01

TABLE 2: CRUDE ANALYSIS

(REFERENCE GROUP ITALICIZED)

VARIABLE	OR	95% CI	
SEX *MALE*	1.00		
FEMALE	0.52	0.52	0.53
AGE *AGE 18 TO 24*	1.00		
AGE 25 TO 34	1.74	1.68	1.81
AGE 35 TO 44	2.16	2.08	2.23
AGE 45 TO 54	2.51	2.43	2.60
AGE 55 TO 64	2.94	2.84	3.05
AGE 65 OR OLDER	2.10	2.03	2.17
RACE_ETHNICITY *WHITE*	1.00		
BLACK	1.81	1.76	1.87
HISPANIC	1.23	1.20	1.27
OTHER	0.91	0.88	0.93
MARITAL_STATUS *MARRIED*	1.00		
NOT MARRIED	0.89	0.87	0.90
NEVER MARRIED	0.76	0.75	0.78
EDUCATION *COLLEGE/TECH SCHOOL GRAD*	1.00		
DID NOT GRAD HS	1.55	1.51	1.59
HS GRADUATE	1.46	1.43	1.48
SOME COLLGE/TECH SCHOOL	1.36	1.33	1.38
INCOME_LEVELS *$75K OR MORE*	1.00		
$0 TO $149999	1.34	1.30	1.37
$15K TO $24999	1.27	1.24	1.30
$25K TO $34999	1.27	1.24	1.30
$35K TO $49999	1.29	1.26	1.32
$50K TO $74999	1.23	1.20	1.26
NO (NOT CURRENTLY EMPLOYED)	1.00		
YES (CURRENTLY EMPLOYED)	1.06	1.05	1.08
NO (CONSUMED <5 SERVINGS)	1.00		
YES (CONSUMED >=5 SERVINGS)	0.76	0.74	0.77
NO (NOT PHYSICALLY ACTIVE)	1.00		
YES (PHYSICALLY ACTIVE)	0.69	0.68	0.70
CURRENT SMOKER (SMOKE EVERYDAY)	1.00		
CURRENT SMOKER (SMOKES SOME DAYS)	1.05	1.01	1.09
FORMER SMOKER	1.58	1.54	1.61
NEVER SMOKED	1.21	1.19	1.24
NO (NO HEAVY DRINKING)	1.00		
YES (HEAVY DRINKING)	0.72	0.69	0.74

NO (NO DIABETES)	1.00		
YES (HAVE DIABETES)	3.00	2.92	3.09
NO (NO CHD)	1.00		
YES (HAVE CORONARY HEART DISEASE)	1.63	1.58	1.68
NO (NOT DIAGNOSED W/STROKE)	1.00		
YES (BEEN DIAGNOSED W/STROKE)	1.20	1.16	1.25
NO (NOT TOLD HAVE HI BP)	1.00		
YES (TOLD HAVE HI BP)	2.39	2.35	2.43
NO (NOT TOLD HAVE HI CHOL)	1.00		
YES (TOLD HAVE HI CHOL)	1.78	1.75	1.81
NO (NOT TOLD HAVE ARTHRITIS)	1.00		
YES (TOLD HAVE ARTHRITIS)	1.65	1.63	1.68
NO (DO NOT HAVE ASTHMA)	1.00		
YES (HAVE ASTHMA)	0.73	0.71	0.75

TABLE 3: ADJUSTED ANALYSIS

VARIABLES	OR	95% CI	
SEX *MALE*	1.00		
FEMALE	0.46	0.45	0.47
AGE *AGE 18 TO 24*	1.00		
AGE 25 TO 34	1.64	1.54	1.75
AGE 35 TO 44	1.78	1.67	1.89
AGE 45 TO 54	1.72	1.62	1.84
AGE 55 TO 64	1.61	1.51	1.72
AGE 65 OR OLDER	0.99	0.92	1.05
RACE_ETHNICITY *WHITE*	1.00		
BLACK	1.76	1.70	1.83
HISPANIC	1.21	1.16	1.27
OTHER	0.87	0.84	0.90
MARITAL_STATUS *MARRIED*	1.00		
NOT MARRIED	0.86	0.84	0.88
NEVER MARRIED	0.91	0.88	0.94
EDUCATION *COLLEGE/TECH SCHOOL GRAD*	1.00		
DID NOT GRAD HS	1.03	0.99	1.07
HS GRADUATE	1.01	0.97	1.05
COLLEGE/TECH SCHOOL GRADUATE	0.73	0.70	0.76
INCOME_LEVELS *$75K OR MORE*	1.00		
$0 TO $149999	1.24	1.19	1.29
$15K TO $24999	1.23	1.19	1.28
$25K TO $34999	1.25	1.21	1.29
$35K TO $49999	1.28	1.24	1.31
$50K TO $74999	1.22	1.18	1.25
NO (NOT CURRENTLY EMPLOYED)	1.00		
YES (CURRENTLY EMPLOYED)	1.21	1.18	1.24
NO (CONSUMED <5 SERVINGS)	1.00		
YES (CONSUMED >=5 SERVINGS)	0.84	0.82	0.86
NO (NOT PHYSICALLY ACTIVE)	1.00		
YES (PHYSICALLY ACTIVE)	0.75	0.74	0.77
CURRENT SMOKER (SMOKE EVERYDAY)	1.00		
CURRENT SMOKER (SMOKES SOME DAYS)	1.16	1.11	1.22
FORMER SMOKER	1.68	1.63	1.73
NEVER SMOKED	1.60	1.56	1.65
NO (NO HEAVY DRINKING)	1.00		
YES (HEAVY DRINKING)	0.75	0.72	0.78

NO (NO DIABETES)	1.00		
YES (HAVE DIABETES)	2.23	2.15	2.31
NO (NO CHD)	1.00		
YES (HAVE CORONARY HEART DISEASE)	0.90	0.87	0.94
NO (NOT DIAGNOSED W/STROKE)	1.00		
YES (BEEN DIAGNOSED W/STROKE)	0.77	0.73	0.81
NO (NOT TOLD HAVE HI BP)	1.00		
YES (TOLD HAVE HI BP)	2.06	2.01	2.11
NO (NOT TOLD HAVE HI CHOL)	1.00		
YES (TOLD HAVE HI CHOL)	1.47	1.44	1.50
NO (NOT TOLD HAVE ARTHRITIS)	1.00		
YES (TOLD HAVE ARTHRITIS)	1.51	1.47	1.54
NO (DO NOT HAVE ASTHMA)	1.00		
YES (HAVE ASTHMA)	0.75	0.72	0.78

TABLE 4: RACE STRATIFICATION (REFERENCE GROUPS IN ITALICS)

	WHITE			BLACK			HISPANIC		
	OR	95% CI		OR	95% CI		OR	95% CI	
MALE									
FEMALE	0.43	0.42	0.44	0.97	0.89	1.05	0.49	0.44	0.53
AGE *AGE 18 TO 24*									
AGE 25 TO 34	1.69	1.56	1.83	1.54	1.28	1.85	1.53	1.27	1.85
AGE 35 TO 44	1.79	1.66	1.93	1.90	1.58	2.28	2.00	1.65	2.42
AGE 45 TO 54	1.76	1.63	1.90	1.78	1.47	2.15	1.85	1.52	2.25
AGE 55 TO 64	1.68	1.56	1.82	1.38	1.13	1.69	1.58	1.28	1.95
AGE 65 OR OLDER	1.03	0.95	1.11	0.88	0.71	1.08	0.94	0.76	1.16
MARITAL_STATUS *MARRIED*									
NOT MARRIED	0.84	0.82	0.86	0.92	0.83	1.01	0.95	0.87	1.05
NEVER MARRIED	0.90	0.87	0.94	0.90	0.81	0.99	0.87	0.77	0.99
EDUCATION *COLLEGE/TECH SCHOOL GRAD*									
DID NOT GRAD HS	1.03	0.98	1.08	1.18	1.04	1.34	1.65	1.44	1.89
HS GRADUATE	1.01	0.96	1.06	1.18	1.03	1.35	1.51	1.35	1.69
SOME COLLEGE/TECH SCHOOL	0.73	0.70	0.77	0.88	0.76	1.02	1.32	1.18	1.48
INCOME_LEVELS *$75K OR MORE*									
$0 TO $149999	0.98	0.94	1.03	1.06	0.94	1.19	1.09	0.97	1.23
$15K TO $24999	0.99	0.94	1.04	1.05	0.91	1.20	1.21	1.05	1.40
$25K TO $34999	1.02	0.97	1.07	0.98	0.85	1.13	1.20	1.03	1.39
$35K TO $49999	0.96	0.92	1.01	1.12	0.96	1.31	1.24	1.05	1.46
$50K TO $74999	0.79	0.75	0.83	1.04	0.88	1.23	0.91	0.77	1.07
NO (NOT CURRENTLY EMPLOYED)									
YES (CURRENTLY EMPLOYED)	1.22	1.19	1.26	1.20	1.09	1.32	1.07	0.97	1.17
NO (CONSUMED <5 SERVINGS)									
YES (CONSUMED >=5 SERVINGS)	0.84	0.82	0.86	0.89	0.82	0.97	0.85	0.77	0.93
NO (NOT PHYSICALLY ACTIVE)									
YES (PHYSICALLY ACTIVE)	0.72	0.70	0.74	0.96	0.88	1.04	0.89	0.82	0.98

	WHITE			BLACK			HISPANIC		
	OR	95% CI		OR	95% CI		OR	95% CI	
CURRENT SMOKER (SMOKE EVERYDAY)									
CURRENT SMOKER (SMOKES SOME DAYS)	1.17	1.10	1.23	1.06	0.90	1.25	1.14	0.93	1.40
FORMER SMOKER	1.70	1.65	1.76	1.84	1.61	2.10	1.38	1.18	1.61
NEVER SMOKED	1.65	1.60	1.70	1.61	1.44	1.80	1.37	1.20	1.57
NO (NO HEAVY DRINKING)									
YES (HEAVY DRINKING)	*0.75*	*0.71*	*0.78*	0.66	0.53	0.81	0.80	0.65	0.98
NO (NO DIABETES)									
YES (HAVE DIABETES)	2.29	2.19	2.38	1.85	1.64	2.10	1.89	1.65	2.17
NO (NO CHD)									
YES (HAVE CORONARY HEART DISEASE)	0.88	0.84	0.92	0.98	0.81	1.19	0.94	0.77	1.14
NO (NOT DIAGNOSED W/STROKE)									
YES (BEEN DIAGNOSED W/STROKE)	0.75	0.71	0.80	0.74	0.61	0.89	0.96	0.73	1.28
NO (NOT TOLD HAVE HI BP)									
YES (TOLD HAVE HI BP)	2.09	2.04	2.14	1.90	1.74	2.08	2.11	1.90	2.34
NO (NOT TOLD HAVE HI CHOL)									
YES (TOLD HAVE HI CHOL)	1.52	1.48	1.55	1.29	1.19	1.41	1.18	1.08	1.29
NO (NOT TOLD HAVE ARTHRITIS)									
YES (TOLD HAVE ARTHRITIS)	1.48	1.45	1.52	1.77	1.62	1.94	1.50	1.35	1.66
NO (DO NOT HAVE ASTHMA)									
YES (HAVE ASTHMA)	0.76	0.73	0.78	0.75	0.65	0.86	0.72	0.62	0.84