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THE UTILITY OF HEALTH BELIEF MODEL CONSTRUCTS
IN PREDICTING DIETARY BEHAVIORS AMONG
FEMALE UNIVERSITY STUDENTS:
A PILOT INVESTIGATION

by

VANESSA EMILY ANDERSON

(Under the Direction of Anthony V. Parrillo)

ABSTRACT

This study examined the relationship between Health Belief Model constructs as they related to dietary behaviors in a sample of university women 18-to-25 years of age ($n = 182$). A cross-sectional, non-experimental design was utilized. Independent sample t -tests compared the mean of body mass indices (BMI) to dietary risk and race. Odds ratios assessed relationships between race and healthy food choices. Nearly one-third (32.4%) of participants were either overweight or obese. Black females had significantly higher BMI than white females, however, dietary risk from less-than-adequate fruit and vegetable consumption and consumption of high-fat foods were not related to race. Focus group participants ($n = 9$) were not concerned about their risks of obesity and its sequelae, or appeared only somewhat concerned. However, all felt obesity-related illnesses were severe. None perceived a direct threat; although several admitted friends and family members might be at-risk, ultimately resulting in a behavior change.

INDEX WORDS: Health Belief Model, Dietary risk behaviors, Race, Body Mass Index

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VANESSA EMILY ANDERSON
B.S.H.S., Georgia Southern University, 2004

A Thesis Submitted to the Graduate Faculty of Georgia Southern University in Partial
Fulfillment of the Requirements for the Degree

MASTER OF PUBLIC HEALTH

STATESBORO, GEORGIA

2006

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DEDICATION

In recognition of the continuous support, encouragement, and help throughout my thesis project, I hereby dedicate this thesis to my family and two best friends: My parents, L.R. and Linda Anderson, and my friends, Mary C. Ball and Douglas C. Wright.

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TABLE OF CONTENTS

	Page
ACKNOWLEDGEMENTS.....	6
LIST OF TABLES.....	9
CHAPTER	
1. INTRODUCTION	10
The Epidemic of Obesity.....	12
College Students and Obesity.....	13
College Students and Dietary Behaviors.....	14
Why These Differences Appear.....	15
The Health Belief Model.....	16
Purpose of the Study.....	18
2. METHODS AND DATA ANALYSIS.....	19
3. RESULTS.....	23
Demographic Profile of All Participants.....	23
Analysis of the 15-Item Questionnaire on Nutrition Behaviors.....	25
Hypothesis #1: Association between Body Mass Index (BMI) and dietary risk.....	25
Hypothesis #2: Association between Body Mass Index and race.....	26
Hypothesis #3: Association between race and healthy food choices.....	27
Focus Group: Opening Activities.....	30
Students' Perceived Susceptibility of the Health Consequences of a Poor Diet.....	33

Students' Perceived Severity of Their Risk.....	35
Cues to Action from Family History, Mass Media Campaigns, Health Information, and Advice Received	38
Students' Perception of Their Threat of Obesity	44
4. DISCUSSION.....	47
REFERENCES.....	54
APPENDICES	
A. HYPOTHESES, SIGNIFICANCE OF THE STUDY, DELIMITATIONS, LIMITATIONS, ASSUMPTIONS, AND DEFINITION OF TERMS.....	59
B. EXTENDED REVIEW OF LITERATURE.	68
C. INSTRUMENTATION: HEALTH BELIEF MODEL RUBRIC	97
D. INSTRUMENTATION: DIETARY AND WEIGHT MANAGEMENT SURVEY	99

LIST OF TABLES

	Page
Table 1: Demographic Profile of All Participants ($n = 182$).....	24
Table 2: Association Between Body Mass Index and Dietary Risk ($n = 175$).....	26
Table 3: Association Between Body Mass Index and Race ($n = 174$)	27
Table 4: Association Between Race and Healthy Dietary Consumption ($n = 178$).....	29

CHAPTER 1

INTRODUCTION

For the first time in their lives, college students experience independence and freedom from parental supervision (Rozmus, Evans, Wysochansky, & Mixon, 2005). In this new environment, different settings may cause a questioning of parental values as learned in childhood and early adolescence. Rozmus et al. (2005) suggest different views and lifestyles will be molded and shaped by the series of new environmental, social, personal, and financial stressors in these surroundings. In 2005, the vast majority (57%) of Americans aged 18-to-24 attended post-secondary institutions, either part-time or full-time (Racette, Deusinger, Strube, Highstein, & Deusinger, 2005). A college environment presents an opportunity to educate and promote healthy lifestyle behaviors among college students.

When young adults enter college, they gain an increased amount of control over their diet and weight management behaviors (Dinger & Waigandt, 1997). Studies suggest that the majority of college students do not consume healthy diets; recommendations for a healthy diet include consuming five-or-more high fruit/vegetables per day and two-or-fewer servings of foods typically high in fat (U.S. Department of Health and Human Services [USDHHS], 2005). Poor dietary and weight management behaviors can lead to poor health conditions; conditions that currently cause morbidity and early mortality among all ages. One particular dietary issue gaining much attention is obesity. Obesity is a chronic disease that causes many health problems. It has been linked to cardiovascular disease, type-2 diabetes, cancer, high blood pressure, and high cholesterol (Siewe, 1999). More than 20.5% of surveyed college students were classified as

overweight or obese, based on findings from the National College Health Risk Behavioral Survey [NCHRBS] (Centers for Disease Control and Prevention [CDC], 1997). This suggests that young adults, as well as aging adults have poor health habits that increase their chances of morbidity and early mortality. Specifically, poor dietary behaviors and a lack of physical activity have been deemed partly responsible for this increase. The diets of college and university students are low in minerals, vitamins, nutrients, fiber, and vitamins, and high in fat; the college atmosphere often fosters poor lifestyle habits, such as increasingly skipped meals, consumption of large amounts of high-fat and high-calorie foods, the increased consumption of alcohol, and the adoption of unsound weight loss techniques (Grzywacz & Marks, 1999). The NCHRBS found that more than only one-in-four students met recommendations regarding daily fruit and vegetable intake at the time of the survey; greater than three-in-four (78.2%) reported eating two-or-fewer servings on the day preceding the survey (CDC, 1997). Findings from the NCHRBS show that white students (79.1%) are significantly more likely than black students (69.3%) to have eaten two-or-fewer servings of foods typically high in fat.

Obesity does not discriminate based on gender, race, or socioeconomic status. Ironically it disproportionately affects minority populations, especially black females, who perceive their bodies more positively than their white counterparts, and appear less concerned with dieting and fatness (Abrams, Allen, & Gray, 1993; Rucker & Cash, 1992; Siewe, 1999). White females, on the other hand, express greater concern for dietary intake, body fatness, and body image (Rucker & Cash, 1992). Nonetheless, black females are significantly more likely than white females to be overweight (CDC, 1997). In a mid-sized university in the southeast, black females had an average body mass index

of 25.3 (overweight), while white females had an average BMI of 22.7 (normal) (Tedders, Parrillo, & Carter, 2004); the evidence may be indicative of differences among the dietary and weight management habits of these two populations.

The Epidemic of Obesity

Obesity has reached epidemic proportions globally, with more than one billion adults overweight – at least 300 million of these classified as clinically obese – and is a major contributor to the global burden of chronic disease and disability. Obesity is a complex condition, with serious social and psychological dimensions, affecting virtually all ages and socio-economic groups (World Health Organization [WHO], 2003). When defining the “fatness” of an individual, the most commonly used measurement for large groups of people is body mass index (BMI), or weight distribution as compared to height. For purposes of definition, a person is “overweight” when his/her BMI is between 25.0 and 29.9; a person is obese when his/her BMI is greater than 30.0 (U.S. Department of Health & Human Services [USDHHS], 1998). Researchers believe the significant increases in overweight and obesity within our nation are due to increased consumption of more energy-dense, nutrient-poor foods with high levels of refined sugar and saturated fat, combined with reduced physical activity (WHO, 2003). Overweight and obesity problems can be divided into two categories: non-fatal, but debilitating to health; and life threatening. Non-fatal health problems associated with overweight and obese individuals include respiratory difficulties, chronic musculoskeletal problems, skin problems, and infertility. The more life-threatening problems fall into four main areas: cardiovascular disease; conditions associated with insulin resistance, such as type-2 diabetes; certain types of cancers, especially the hormonally related and large-bowel cancers; and

gallbladder disease. The likelihood of developing type-2 diabetes and hypertension rises steeply with increasing body fatness (WHO, 2003).

With the rise of this chronic health problem – now referred to as “globesity” (global obesity) – researchers have increased concerns about the potential for adverse health outcomes and their associated economic consequences (Wee, Phillips, Legedza, Davis, Soukup, Colditz, & Hamel, 2005; WHO, 2003). In 2000, expenditures due to the epidemic proportions of obese individuals climbed to \$117 billion (National Institute of Diabetes and Digestive and Kidney Diseases (NIDDK), (2005). Of the \$117 billion spent in 2000, direct costs were \$61 billion and indirect cost \$56 billion (NIKKD, 2005). According to a study of national costs attributed to both overweight and obesity, medical expenses accounted for 9.1% of total expenditures in the United States in 1998, and may have reached as high as \$78.5 billion (CDC, 2005a); U.S. Taxpayers will absorb half these cost through Medicare and Medicaid.

College Students and Obesity

Approximately one-in-three young adults aged 18-to-24 are enrolled in college. Previous studies have reported the diets of college students to be unhealthy, leading to unwanted weight gain during freshman year (Shankar, Dilworth, & Cone, 2004). These transitional years provide an opportunity for the establishment of healthful lifestyle behaviors (DeBate, Topping, & Sargent, 2001). Data from the NCHRBS (CDC, 1997) and the NHANES (NCHS, 2005) suggest that lifestyle behaviors such as poor nutritional intake put college students at-risk for developing serious health problems. Among students participating in the NCHRBS, 46.4% attempted weight loss; females (59.8%) were significantly more likely than males (29.6%) to have attempted weight loss. Among

students surveyed, 30.8% had dieted, 53.6% had exercised, 2.6% had vomited to lose weight or to keep from gaining weight, and 4.3% had taken diet pills for similar purposes (Douglas & Collins, 1997). Examination of subgroups furthered showed that white females (61.5%) were significantly more likely than black females (53.5%) to have attempted weight loss and more likely to have used exercise and vomiting as weight loss prevention techniques (CDC, 1997).

Research suggests that race and gender may be factors. Black females appear to be at greater risk for developing obesity than white females (Spear & Reinold, 1999). An examination of subgroups from the NCHRBS reveals that black students (33.5%) were significantly more likely than white students (19.5%) and Hispanics (20.8%) to be overweight. When examined further by gender, black females (35.8%) were significantly more likely than white females (18.5%) to be overweight. In addition, female students attending two-year institutions (25.3%) were significantly more likely than those attending four-year institutions (15.6%) to be overweight (CDC, 1997).

College Students and Dietary Behaviors

Findings from epidemiological and clinical research suggest that consuming diets high in energy, total and saturated fat, and cholesterol and low in fiber increases the risk of coronary heart disease, stroke, diabetes, hypertension, and certain forms of cancer (McArthur, Rosenberg, Grady, & Howard, 2002). With the issuance of dietary guidelines from governmental and nongovernmental agencies available since the 1970s, three leading causes of death among men and women in this country today – coronary heart disease, certain types of cancer, and stroke – are still diet-related (McArthur et al., 2002). According to the NCHRBS, more than one-in-four students met recommendations regarding daily fruit and vegetable intake at the time the survey was

administered (CDC, 1997), and no significant differences emerged between black and white females in consumption of fruits and vegetables. More than three-in-four students (78.2%) had eaten two-or-fewer servings of high-fat foods during the day preceding the survey (CDC, 1997). In an examination of subgroups by race at dietary risk, findings from the NCHRBS show that white (79.1%) students were significantly more likely than black students (69.3%) to have eaten two-or-fewer servings of foods typically high in fat. Among females, white students (86.4%) were more likely than black students (75.1%) to eat two-or-fewer servings high in fat foods (CDC, 1997). In a study conducted by Shankar, Dilworth, and Cone (2004), black college females consumed significantly more fat and cholesterol than their white counterparts. This same study also revealed that black females more frequently purchased regular foods (not low calorie/low fat) while white females more often purchased low fat or fat-free foods.

Why These Differences Appear

According to Hoyt and Kogan (2001), there is a universal preoccupation with body image among young women that has intensified over the past few decades. Body-image development clearly occurs in a cultural context; cultures purvey gender-specific standards for physical attractiveness, body weight, and body shape (Fallon, 1990). If individually internalized and utilized in “goodness of fit” self-evaluations, cultural standards shape the individual’s body-image experiences and his/her adjustive behaviors (e.g., dieting, exercising, grooming,... etc.) to manage these body-image experiences (Rucker & Cash, 1992). White women have higher body dissatisfaction scores as compared to black women (Henriques & Calhoun, 1999), while black females possess less disparaging body-image attitudes and evaluate their overall appearance more positively (Rucker & Cash, 1992). Within the black culture, there is not such intense

pressure to be thin; the culture is more tolerant of larger women (Shankar, Dilworth, & Cone, 2004). Conversely, white females indicate more frequent behaviors to conceal their body size, experienced more distress while being weighed, and maintained a stronger drive to be thin (Rucker & Cash, 1992). White women tend to impose these harsh weight issues on themselves, assuming that prospective mates want them to be thin (Shankar, Dilworth, & Cone, 2004).

The Health Belief Model

The Health Belief Model (HBM) was among the first models that adapted theory from the behavioral sciences directly to health problems; it remains one of the most widely recognized conceptual frameworks of health behavior (Glanz & Rimer, 1997). The Health Belief Model was developed initially in the 1950s by a group of social psychologists in the U.S. Public Health Service to explain the widespread failure of people to participate in programs to prevent and detect disease (Hochbaum, 1958; Rosenstock, 1974). Later, the model was extended to include people's responses to symptoms (Kirscht, 1974), and to their behaviors in response to diagnosed illness, particularly related to adherence to medical regimens (Becker, 1974).

The Health Belief Model consists of five constructs. *Perceived Susceptibility* relates to a person's perception of contracting an illness. Related to a medically established illness, this dimension includes one's acceptance of the diagnosis, personal estimates of getting a disease again, and susceptibility to illness in general. *Perceived Severity* is one's belief of how serious a condition and its sequelae are; it specifies consequences of the risk and the conditions. Individuals inherently weigh their susceptibility to disease in combination with their perception of its severity to arrive at *Perceived Threat*.

A person's acceptance of personal risk and susceptibility is an important factor leading to health-promoting behavior. Nonetheless, an individual's course of action often depends on that person's perceptions of the benefits and barriers related to health behavior. *Perceived Benefits* are one's beliefs in the efficacy of a particular action to reduce the risk or seriousness of disease; such perceptions often define the action to be taken and clarify the positive effects that may be expected. *Perceived Barriers* are one's beliefs about the tangible and psychological costs of a particular action (e.g., expense, danger, and pain). A non-conscious cost-benefit analysis occurs; individuals weigh the benefits minus the barriers to action. Combined levels of susceptibility and severity provide the impetus to act, and the perceptions of benefits (less barriers) provide a clear path of action (Rosenstock, 1974).

Cues to Action are strategies that activate one's readiness; they provide how-to information, promote awareness, and employ a system of reminders for those interested in changing behavior. A diverse set of demographic, socio-psychological, and structural variables may affect a person's perceptions, thereby potentially influencing health-related behavior. Modified versions of the Health Belief Model contain additional measures (Steers, Elliott, Nemiro, Ditman, & Oskamp, 1996). A recent addition is the concept of *Self-Efficacy* (Bandura, 1977a; 1977b), or one's personal confidence in his/her ability to successfully perform an action. Added by Rosenstock and others in 1988, self-efficacy as a construct allows the HBM to better fit the challenges of changing habitual unhealthy behaviors, such as being sedentary, smoking, or overeating (Glanz, Rimer, & Lewis, 2002).

Purpose of the Study

The purpose of this study was to examine the relationship between Health Belief Model constructs as they relate to dietary behaviors in a sample of university women 18-to-25 years of age. Specifically, the following variables were included: perceived susceptibility, perceived severity, and perceived threat of obesity and its sequelae; cues to action, including the effects of mass media, advice from others, receipt of health education materials, and family history; and consumption of fruits and vegetables, consumption of foods typically high in fat content, and attempted weight loss (i.e., the likelihood of one's taking action).

In this study, selected constructs of the HBM were used to investigate dietary behavior in white and black females. The study will directly investigate whether: 1) students' perceptions of how nutrition-conscious they are actually match their nutrition behavior; 2) students who claim they eat healthy have better body mass indices than those who do not eat healthy; and 3) there are racial/ethnic differences in dietary behavior.

CHAPTER 2

METHODS AND DATA ANALYSIS

In this study, selected constructs of the Health Belief Model were used to investigate dietary behaviors in white and black females. The study examined whether students' perceptions of how nutrition-conscious they are actually match their dietary behaviors. The underlying premises posit that students who claim they eat healthy have lower body mass indices than those who do not eat healthy; and that there are racial differences in dietary behaviors.

For this study, the researcher: 1) constructed a fifteen-item questionnaire based on items from the National College Youth Risk Behavioral Survey (CDC, 1997); and 2) developed approved focus group questions to investigate Health Belief Model constructs as they related to students' impressions of their susceptibility to obesity, how serious they perceive obesity to be in their lives, what possible influences their peers might have had on their own beliefs about obesity and its sequelae, and cues to action they may have received that may have influenced their beliefs and actions related to obesity. After survey administration, focus groups were conducted to collect more in-depth information on the diet and weight management behaviors of college females. Participation in this study was voluntarily; recruits had the choice to terminate their participation at any time.

Females 18-to-25 years of age at Georgia Southern University were recruited to participate in this study. Classes were selected from the master list during the Spring Semester of 2006. For sampling purposes, Healthful Living courses (HLTH 1520) were used to recruit volunteers. Of the nine HLTH 1520 sections offered at Georgia Southern during Spring 2006, only seven were used in the study. Two classes were omitted from

the study. The primary investigator instructed one of the two sections; therefore it was not used as part of the study due to the instructor/student relationship. The dietary and weight management surveys were not administered to the second section because the class did not meet during the week of data collection.

After classes were selected from a master list of classes offered during Spring Semester of 2006, the primary investigator contacted the instructor of each class and requested permission to recruit participants for the study. Rosters for each of the seven classes were obtained from the instructors. An estimated 530 females were registered within the seven sections. During the week of April 17th thru April 21st, the investigator recruited volunteers for the focus groups, a total of 217 dietary and weight management surveys were administered. In all, 215 surveys were returned (99.1% response).

HLTH 1520 is a core health class, often taken during a student's first year of college. Due to the high volume of freshman entering the university, each section allows is registered to hold between 150 and 300 students. There is no attendance policy for this course. Because there is not an attendance policy, HLTH 1520 generally has a poor attendance rate toward the middle and end of the semester. Data for this study were collected two weeks prior to the week of finals on campus. Of the females registered for seven sections, only 40.9% were surveyed because very few students attended class the date and time surveys were distributed. Of the 215 surveys returned, only 83 participants (38.6%) reported interest in and contact information for participation in the focus group. Returned surveys were used to recruit volunteers for the focus groups based on whether: 1) the student expressed interest in participating in the second part of the study; and 2) contact information was given on the returned survey. It was advised to secure at least

ten potential participants for each focus group, expecting only six-to-eight would attend (Morgan, 1997).

At the end of week one, the primary investigator reviewed paperwork submitted by potential recruits and began to contact students for participation in focus groups. Participants were given the option to choose which focus group was more convenient for them to attend – Tuesday, April 25 (Group 1) or Thursday, April 27 (Group 2). Participants, who volunteered their time for participation in the study, were then notified of the time and location of the sessions. Calls were continued until ten females were secured for each group. After all potential recruits were contacted, Tuesday's focus group had a potential roster of 10 participants; Thursday's focus group had a potential roster of eleven. Focus group sessions were held April 25th (n = 6) and April 27th (n = 3). Tuesday's focus group had a 60% response rate based on the list of interested participants; Thursday's focus group had a 27.3% participation rate. For this study, the participation rates for focus group sessions were considered low.

During week two, focus group sessions were conducted. Each focus group consisted of a: 1) brief introduction given by the researcher; and 2) discussion of the Health Belief Model questions on the rubric.

In phase one, *Statistical Package for the Social Sciences – Version 12.0* (SPSS, INC., 2004) was used to analyze the associations between independent --weight and height-- and dependent --dietary risk groups-- variables reported on the dietary and weight management survey. For the purpose of assessing BMI, it was calculated using pounds and inches (commonly denoted as the English system): $\text{weight in pounds} \div (\text{height in inches})^2 \times 703$ (Centers for Disease Control and Prevention [CDC], 2005b). For the

purpose of assessing dietary risk, participants were categorized as either “at-risk” or “not at risk” based on their food consumption patterns on the previous day. Specifically, for fruit and vegetable consumption, participants were classified as not “at-risk” if they reported eating five-or-more servings of fruit and vegetables on the previous day; participants were classified as “at-risk” if they reported eating four-or-fewer servings of fruits and vegetables on the previous day (USDHHS, 2005). For risk associated with high-fat foods, participants were classified as “not at-risk” if they reported eating two-or-fewer servings of fatty foods the previous day, and “at-risk” if they reported eating three-or-more servings of high-fat foods on the previous day (USDHHS, 2005).

Independent Samples *t*-tests were used to compare the mean BMI to race and dietary risk. A Chi-Square Test of Independence and odds ratios were used for statistical analysis of race and dietary risk. Descriptive statistics were generated by race, age, and BMI. All test were performed using $\alpha = .05$ as the level of significance.

In phase two, data from the tape-recorded conversations of each focus group session were transcribed and coded. From the codes, trends were identified and organized around Health Belief Model constructs to determine relationships that existed to link each construct.

CHAPTER 3

RESULTS

The purpose of this study was to examine the relationship between Health Belief Model constructs as they relate to dietary behaviors in a sample of university women 18-to-25 years of age.

The result section presents data in the following areas: 1) a demographic profile of all participants; 2) analysis of the 15-item questionnaire on nutrition behavior; 3) focus group opening activities; 4) students' perceived susceptibility of the health consequences of a poor diet; 5) students' perceived severity of their risk; 6) cues to action from family history, mass media campaigns, health information, and advice from others they may have received; and 7) students' perception of their threat of obesity.

Demographic Profile of All Participants

A demographic profile of all study participants is presented in Table 1. The sample included more white females (65.4 %) than black females (32.4 %); 2.2% of respondents did not report their race. The average age of sample participants was 19.0 years with a standard deviation of 1.07 years. The mean body mass index (BMI) was 24.1 (normal) with a standard deviation of 4.72. The minimum and maximum BMI calculated was 17.2 (underweight) and 41.5 (obese), respectively. White females had a lower mean BMI (23.4 - normal) with a standard deviation of 4.26, whereas black females had a higher mean BMI (25.6 - overweight) with a standard deviation of 5.32.

Table 1

Demographic Profile of All Participants ($n = 182$)

Demographic Characteristic	Frequency	Percent
<i>Race</i>		
White	119	65.4
Black	59	32.4
Missing	4	2.2
<i>Age (Mean = 19.0 years old)</i>		
18	49	26.9
19	93	51.1
20	24	13.2
21	7	3.8
22	2	1.1
23	0	0.0
24	2	1.1
25	1	0.5
Missing	4	2.2
<i>Body Mass Index (Mean = 24.1)</i>		
Underweight (< 18.5)	6	3.3
Normal (18.5 – 24.9)	110	60.4
Overweight (25.0 – 29.9)	37	20.3
Obese (> 30)	22	12.1
Missing	7	3.8

Analysis of the 15-Item Questionnaire on Nutrition Behaviors

Hypotheses #1: Association between body mass index (BMI) and dietary risk.

The null hypothesis, or H_0 , was that no association would be found between body mass index (BMI) and dietary risk. Conversely, the alternative hypothesis, or H_1 , stated that a positive association would be found between BMI and dietary risk. Specifically, low-BMI would be associated with healthy food choices (i.e., low dietary risk), and high-BMI would be associated with unhealthy food choices (i.e., high dietary risk).

The association between BMI and dietary risk is presented in Table 2 ($n = 175$). An Independent Samples t -Test was used to compare the mean for BMI by dietary risk groups for poor fruit/vegetable consumption ($n = 175$). The mean BMI for those classified “not at-risk” of poor fruit/vegetable consumption was 23.4 (normal), while the mean BMI for those “at-risk” of poor fruit/vegetable consumption was 24.3 (normal). No statistically significant difference was detected in mean BMI between fruit and vegetable risk groups ($p = 0.270$). We fail to reject H_0 , concluding that any difference found between dietary risk groups with respect to body mass index is due to chance. The data also reveal a 95% confidence interval (CI) of (-2.61, 0.74), lending further support to the “fail to reject” decision of the null hypothesis (Glass & Hopkins, 1984, p. 236).

Results for dietary risk from high-fat consumption are also reported in Table 2 ($n = 175$). Similarly, an Independent Samples t -Test was used to compare means for BMI by dietary risk groups from high fat-consumption. The mean BMI for those “not at-risk” was 24.5 (normal), while the average BMI for those “at-risk” was 23.1 (normal). No significant difference was detected between dietary risk groups ($p = 0.100$). We fail to reject H_0 , concluding that any difference found between dietary risk groups with respect

to body mass index is due to chance. The data also reveal a 95% confidence interval (CI) of (-0.26, 3.04), lending further support to the “fail to reject” decision (Glass & Hopkins, 1984, p. 236).

Table 2

Association Between Body Mass Index and Dietary Risk ($n = 175$)

	Mean BMI	<i>p</i> -Value	Mean Difference	Standard Error	95% CI
<i>Fruit & Vegetable Consumption*</i>					
▶ ≥ 5 Servings	23.4	--	--	--	--
▶ ≤ 4 Servings	24.3	--	--	--	--
BMI <i>t</i> -Test		0.27	-0.94	0.85	(-2.61, 0.74)
<i>High-Fat Consumption*</i>					
▶ ≤ 2 Servings	24.5	--	--	--	--
▶ ≥ 3 Servings	23.1	--	--	--	--
BMI <i>t</i> -Test		0.10	1.39	0.84	(-0.26, 3.04)

* On the Previous Day

Hypotheses #2: Association between body mass index and race.

The null hypothesis (H_0) stated that no association would be detected between BMI and race; that is, the mean BMI would be statistically the same for both white and black females. The alternative hypothesis (H_1) stated that a relationship would exist between

BMI and race. Specifically, it was hypothesized that black participants would be more likely to have a higher BMI than would white participants.

The association between BMI and race is presented in Table 3 ($n = 174$); an Independent Samples t -Test was used to conduct the test. The mean BMI for white females was 23.4 (normal), while the mean BMI for black females was 25.6 (overweight). Black females had a significantly higher BMI than white females ($p = 0.004$). Table 3 also reveals further support for the decision to reject H_0 , since the 95% (CI) of (-3.65, -0.70) for the difference in the mean does not include zero (Glass & Hopkins, 1984, p. 236)

Table 3

Association Between Body Mass Index and Race ($n = 174$)

	Mean BMI	p -Value	Mean Difference	Standard Error	95% CI
▶ White	23.4	--	--	--	--
▶ Black	25.6	--	--	--	--
BMI t -Test		0.004	-2.17	0.75	(-3.65, -0.70)

Hypotheses #3: Association between race and healthy food choices.

The null hypothesis (H_0) stated that no association would be found between race and dietary risk. The alternative hypothesis (H_1) stated that white females would be more likely than black females to report making healthy food choices

The association between race and healthy food consumption is presented in Table 4 ($n = 178$). Using the same dietary risk groups previously defined for fruit/vegetable consumption and fatty foods, odds ratios as well as chi-square tests of independence were conducted to determine whether relationships existed between race and healthy dietary consumption.

Dietary risk of fruit and vegetable consumption and race were independent. The odds of white females meeting the recommended daily intake of fruits and vegetables (five-or-more servings per day) were 0.94 times that of black females. Thus, black females were slightly more likely, though not significantly more likely, to meet the recommended daily intake of fruits and vegetables. Using the chi-square test of independence, we would fail to reject H_0 because the p -value (0.880) was greater than 0.05 (level of significance), indicating no association between race and fruit/vegetable consumption. Table 4 also reveals further support for the decision to reject H_0 , since the 95% (CI) for the odds ratio (0.45, 1.97) includes the value of one.

Consumption of high-fat foods and race were independent as well. The odds of black females consuming three-or-more servings of high-fat foods (“at-risk”) were 1.96 times that of white females. Thus, white females were more likely, although not statistically significant, to meet the recommended daily intake of high-fat foods (two-or-fewer per day). Using the chi-square test of independence, we would fail to reject H_0 because the p -value (0.150) was greater than 0.05 (level of significance), indicating no association between race and fatty food consumption. Table 4 also reveals further support for the decision to reject H_0 , since the 95% (CI) for the odds ratio (0.82, 3.49) includes the value of one.

Table 4

Association Between Race and Healthy Dietary Consumption ($n = 178$)

Dietary Behaviors	OR	95% CI	p-Value
Consumed five-or-more servings of fruits/vegetables (yes/no)* <ul style="list-style-type: none"> ▸ Race: White/Black 	0.94	(0.45, 1.97)	0.88
Consumed two-or-fewer servings of high-fat foods (yes/no)* <ul style="list-style-type: none"> ▸ Race: White/Black 	1.69	(0.82, 3.49)	0.15

* On the Previous Day

Two focus group *sessions were conducted after the administration of the dietary and weight management survey. Group one was held on April 25 ($n = 6$) and group two was held on April 27 ($n = 3$). Group one consisted of four black females and two white females; group two consisted of one black female and two white females. The instrumentation used for this data collection technique can be found in Appendix C. The following hypotheses are addressed in the focus group discussion below.

First, are students who perceive themselves “at-risk” for obesity more likely than those who do not perceive themselves “at-risk” to report healthy dietary behaviors

(consuming five-or-more fruits and vegetables per day and two-or-fewer servings of high fat foods per day)?

Second, are black females less likely than white females to perceive themselves “at-risk” for obesity from unhealthy food choices?

Third, are white females more likely than black females to perceive themselves “at-risk” for obesity?

Focus Groups: Opening Activities

For each focus group, healthy finger foods and drinks were provided at the beginning of each session; these items were used as an incentive for participation in the focus group. Finger foods included fruit and vegetable trays, raisin boxes, trail mix bars, bottled water, and apple juice. These food items were used to stimulate discussion on students' personal dietary habits and the dietary habits of friends and family. The participants were asked to talk a little about their normal dinner meal plans and what foods they typically choose to eat. All participants agreed the selected finger foods for the focus group were good, but varied significantly from what they considered a normal dinner meal. All but two participants lived on campus and five utilized EAGLEXPRESS[®] and the purchase of meal plans. EAGLEXPRESS[®] is a stored value account. Students are able to deposit funds into an account and use this debit card to make purchases on or off campus. When a purchase is made, the amount of the transaction is automatically deducted from the account balance (Georgia Southern University [GSU] Food Services, 2006).

Students can also purchase meal plans for campus restaurants and eating facilities. Different plans exist (e.g., two meals per day-five days per week, one meal per day-five

* Both focus groups one and two had dominant personalities, which emerged during discussion sessions.

days per week, etc.). Seven students reported using their meal plans and monetary debits for those food establishments that accept EAGLEXPRESS[®] for the majority of their meals. On campus, participants reported food choices for lunch and dinner such as such as chicken fingers, French fries, frozen foods, chips and dip, pastas, wraps, breads, etc. One student said that, when eating off campus, she only chose places that accepted EAGLEXPRESS[®] (such as Wendy's, Arby's, Pizza Hut, Captain D's, Baskin Robbins, Dairy Queen, etc.); she also expressed enjoyment in eating out weekly with her parents (when she visited home) and with her friends (while at school).

"...hamburgers and fries from the Landrum. I have a meal plan, so I eat on-campus normally...if I don't, I go to like Wendy's or Arby's because they all accept Eagle Express..."

For students who reported using meal plans on campus, they had several concerns. First, students noted during discussion that they grew tiresome of eating the unhealthy meal choices offered by campus food services. However, with meal plans, they are purchased on a "use it or lose it" basis, that is, if they are not used, they do not "roll-over" and accumulate for later use. Therefore, this appeared to be a deciding factor in dietary choices. Second, students who reported an interest in cooking or preparing meals noted that the store on campus (Pickle Barrel) had prohibitively higher prices on food products as compared to stores in-town such as Wal-Mart. Most of the focus group participants did not have access to off campus stores, such as Wal-Mart[®], to purchase food and meal items at affordable prices. Therefore, the best intentions to cook in the dorm rooms resulted in a different behavior for these students: choosing a campus meal plan or EAGLEXPRESS[®] for their meals.

“I can get Hamburger Helper at the Pickle Barrel for \$2.50 and it’s like \$1.19 at Wal-Mart...I mean, that’s a lot when you’re in college.”

Georgia Southern University has on-campus housing for those students who elect to reside on university property. As mentioned previously, all but two focus group participants reported living in a residence hall. During group discussion, participants expressed concern for limited food storage and meal preparation in their dorm room. One participant reported that she attempted to keep healthy dietary snacks and beverages in her room; however, faulty equipment would either cause her fruits, vegetables, and milk to spoil or freeze.

“I got really discouraged first semester because I could not keep anything in my refrigerator. It’s like if I cannot keep strawberries, like what do I do? I eat out.”

Other participants reported problems with the age of the residence halls in relation to the building floor plans and the inconvenience of accessing the kitchenette. In older halls on campus, the kitchenette is located on the first floor. Two participants reported living on the second and third floors. In order to prepare a meal, they have to carry all their food, bowls, and utensils down the stairs because there is no elevator in the building, or there is no kitchenette on their floor.

Participants reported that friends and family influenced their own meal choices. For example, one student discussed differences between her extremely health-conscious friend and another friend who really doesn’t care what she eats. She stated that her eating behavior is influenced by which friend she is around at the time of her meal.

“So, like, sometimes she’ll have apples and other times she’ll have chips...so I think if she eat healthier, I would tend to snack healthier off of her food, and if she had chips ‘n’ dip I would be eating chips ‘n’ dip...”

Throughout the opening discussion, participants commonly expressed that their food choices and eating habits were influenced by family dynamics, their parents’ jobs, and any health problems that might have existed in the family. From discussion, it seemed as though participants’ current dietary habits and food choices were extensions of childhood traditions. For example, the first focus group included two participants who were sisters. They reported eating out very rarely as children, with parents who always cooked meals for breakfast, lunch, and dinner. Their current dietary habits reflect that of their childhood: each admitted that they currently cook their meals. Another participant reported that her family ate out at restaurants for almost every meal due to the occupation of her parents; similarly another participant grew up in a single-parent household where cooked meals were not a regular occurrence. Other participants expressed family diet and current food choices were somewhat modified due to parental illnesses such as high cholesterol and high blood pressure, both of which are problems linked to obesity in the literature.

Students’ Perceived Susceptibility of the Health Consequences of a Poor Diet

Participants were next questioned about their perceived susceptibility to certain diseases and conditions related to overweight and obesity. When asked if they ever thought about getting obesity-related illnesses such as high blood pressure, high cholesterol, cancer (especially types linked to obesity), cardiovascular disease (CVD), or type-2 diabetes, all focus group participants reported they were either unconcerned, or

appeared only somewhat concerned. Answers were based upon their own perceptions of their weight (i.e., if they felt they were about the right weight, overweight, or had actually experienced obesity through family and friends); a majority of participants reported feeling no susceptibility.

“I mean I don’t think about like cholesterol or everything. I think about gaining weight. I don’t really think about cholesterol, I guess.”

“...I know that’s bad, but not really. Not right now.”

When participants reported a “slight” concern, it seemed to be due to direct contact with a weight-related disease through a parent or family member. The most commonly mentioned illnesses were high blood pressure, high cholesterol, cardiovascular disease, and type-2 diabetes. In particular, five participants reported a “slight” concern. Two participants reported a mother with high cholesterol, two reported a mother with type-2 diabetes and high blood pressure, and one reported a family member (sibling) that was overweight. One participant reported a clear and conscious effort to make a dietary change, although she felt she was too young to worry about this chronic illness, particularly high cholesterol.

“....and so, because cholesterol is like a heredity thing, I also started worrying, like... I know I am kinda too young and don’t have to worry about getting cholesterol...”

Two participants in one of the groups were sisters, whose mother was diagnosed with type-2 diabetes and cardiovascular disease. One of the sisters reported becoming very diet-conscious when her mother was diagnosed. Nonetheless, as she aged she worried

less and less about herself because she felt her mother was able to function and live a somewhat normal life with her condition. Another attendee appeared worried that she might become overweight; however, she noted during the discussion session that these concerns were due to prescription medications taken for a current medical illness, and not due to personal dietary and weight management habits.

“When she first found out I thought about it a little...like the diet the doctor put her on certain things. I was like there with her at first but as I got older I didn’t worry about it as much because she lives with it, and she is fine...and everything is good.”

“...she’s not just sitting around saying ‘Hey, I’m diabetic.’ She says: I’m diabetic but I’m gonna keep doing what I want and eating what I want because I can do that.’”

Students’ Perceived Severity of Their Risk

Participants were questioned about how severe high blood pressure, high cholesterol, obesity, cancer (especially types linked to obesity), CVD, and type-2 diabetes were. As discussed in the previous section, answers were based upon participants’ perceptions of their own weight (i.e., whether they felt they were about the right weight, overweight, or had experienced obesity through family/friends). All participants expressed feelings that the aforementioned diseases were severe in nature. One participant even went as far as to equate chronic diseases and their relation to obesity as being as severe as sexually transmitted diseases (STD); on the other hand, that same individual inasmuch admitted that severity is last on her memory. She knows that there are risks associated with driving, yet doesn’t buckle her seat belt, and risks associated with eating poor foods, and yet makes poor choices related to her diet.

“I do [feel chronic diseases are severe]... simply because so many people are dying from them every day... and they really are just as severe to me as, like, an STD. Just like I have to think about buckling my seat belt when I get into the car, I should – but I don’t necessarily – think about bucklin’ my seat belt in the car... eating the right thing when I’m going out to a restaurant and making the right choice.”

Lack of perception with regard to severity of chronic diseases was mentioned several times. All participants reported less pressure to consciously make good decisions about eating healthy and managing weight because it was more of a long-term lifestyle, not an immediate issue. One participant stated that healthy dietary behaviors were not discussed in school or by parents as heavily in comparison to other issues such as drunk driving, marijuana use, and biking safety; specifically, she felt dietary issues during youth were not discussed by parents because it was assumed that it would be covered in school. With less pressure (direct and indirect) to meet dietary intake requirements, all focus group participants stated that more pressing issues exist in their present day lives that, by far, take both priority and precedence over chronic diseases and the worry of dietary intake. When asked to elaborate on what issues they thought were more paramount than their dietary habits, answers such as daily activities, friends, family, problems, and other life issues were given.

“Just like... school, family, friends... things that come up... arguments that could be... just makin’ sure you get from Point A to Point B on-time... somebody runs a little over... somebody gets out early... and filling in that time frame... just everyday things.”

With the issues that participants felt were more relevant because they occurred on a daily basis, chronic or long-term illnesses were not really viewed as a threat or taken

seriously. Although participants did not report much worry about chronic disease, one participant did mention that her father took notice of her poor eating habits.

“Yeah...you have to change eating habits, and like my dad told me before... you’re gonna die when you’re 30 because of all the junk food I eat and I’m, like, thanks daddy.”

Although this parent showed concern about poor eating habits, the participant thought she was receiving contradictory messages from her dad. For example, she mentioned that her father fixed her a care package to take home with her when she visited on the weekends. Although she said Dole[®] fruit cups were inside, she also told the group that he gave her six boxes of pop-tarts, as well as candy.

“...Well over spring break...he made me a care package. There was some fruit in it, like some little Dole cups but then again.... He sent me a bunch of candy and like pop-tarts...”

Overall, all focus group participants expressed a general understanding of the detriment these diseases can have on the human body, as well as the problems they cause for society as a whole. Two participants even went as far to rate the severity of the above-mentioned chronic diseases as a four or a five (on a scale of one-to-five with one being “not at all” and five being “very certain”). However, at this point in their lives, they simply do not think there is a need to worry about eating habits as they relate to chronic diseases.

With regard to legislation, one participant compared dietary habits to buckling the seatbelt in her car. “Buckling seatbelts is a big issue that receives a lot of attention:

everyone makes sure whoever is riding in their car buckles up...” However, this person felt that the importance of healthy dietary behaviors were not really discussed and stressed: “...but nobody, when you really sit down, says, ‘Okay, you guys, make sure that you have this, this, and this somewhere in your meal.’”

Cues to Action from Family History, Mass Media Campaigns, Health Information, and Advice Received

Participants were asked about several cues to action for a healthy diet, including family history, mass media campaigns, health education, and advice from others. When questioned about family history, participants were specifically asked if they considered anyone in their family to be obese. Five participants shared their perceptions about a family member (or members) whom they considered to be overweight, but not obese. One described her mother as being six feet four inches tall, weighing almost 400 pounds. Ironically, this participant, whose sister also attended the focus group session, reported in an earlier discussion that the majority of meals eaten during her youth and into adulthood were prepared at home. The family very rarely ate out in restaurants, but consumed foods high in sugar content. Three participants discussed other family members, such as their grandmothers, aunts, and cousins who were overweight. In the view of these attendees, their family members were used to preparing foods by pan frying and using grease as part of the process to season food and give it flavor; one attendee simply stated that her family members were all “...big eaters.” Finally, one participant reported that her stepfather was overweight.

“...my grandmother...she cooks all the time and everything she cooks has grease in it. Like she puts grease in her grits and other things.”

A family history of chronic diseases such as high blood pressure, high cholesterol, obesity, cancer (especially the types linked to obesity), cardiovascular disease, and type-2 diabetes were discussed here as well. Eight-out-of-nine focus group participants had some history of one or more of these chronic diseases in their family. Two participants had family members with high cholesterol, two participants (sisters) had a mother with type-2 diabetes and heart disease, and one mentioned a stepfather with high blood pressure. Ironically, in one case, one participant's mother was diagnosed with high cholesterol, even though she made a conscious effort to cook healthy and exercise. Another participant mentioned that her mother and father had high cholesterol. However, each of these individuals chose to manage their condition with a medication, and not necessarily to modify their diet.

During their childhood years, all participants reported their parents stressing, either somewhat or strongly, the importance of eating healthy. Only one reported eating a lot of junk food (potato chips, soft drinks, etc.) as a child. For example, after being picked up at school, her dad would take her to his convenience store where she would get a candy bar or other high-sugar foods for an afternoon snack. Four participants recalled creative ways that their parents enticed them to eat healthy. For example, one participant told her story of Christmas and Santa Claus. Her mother told her that Santa Claus was lactose intolerant and wanted fruit for a snack instead of cookies. This same participant also reported that her backyard contained a wide variety of fruit trees. Therefore, she and her sister often snacked on different fruits. Her family did not eat out a lot; all meals were cooked at home. The set of sisters in the focus group reported that they still cook meals just as their mother did when they were growing up, and keep soda and potato chips in

the cabinets at their house only for guests. Another participant explained that her mother would hang clusters of bananas in the bottom branches of a tree. In order for her brother and her to get the bananas, they pretended they were monkeys and climbed the tree. As they climbed the tree to eat the bananas, the perceptions that they were real monkeys lead them to request more bananas to eat because real monkeys need to eat more bananas.

As they began to get older, all participants noted their eating behaviors changed for the worse. They reported having more freedom to eat as they chose, with much less parental guidance affecting their dietary choices. Eight participants mentioned cooking at home as children and eating most meals with their families. However three reported that when visiting home now, they eat out a lot in restaurants. One participant reported that because she doesn't come home a lot now, the family eats out when she visits.

"...Friday night we got Taco Bell. Saturday morning we ate at the Cracker Barrel with my step-dad and that night we got Taco Bell again. Sunday morning before I left, we had Taco Bell again with my dad."

Participants were asked to recall what they've seen, heard, and read related to food through the television, radio, and/or magazines. Participants mentioned a wide variety of topics. Two in the group reported watching a lot of food preparation shows and reading a lot of cookbooks. Three participants mentioned Paula Dean, famous cook and owner of *Lady and Sons* restaurant in Savannah. Both said they loved reading her books, watching her show, and eating at her restaurant. One participant uses Dean's book to bake cookies with her sister. This same participant also reported watching another food show on TV: *Unwrapped*. However, she only watches it when they cook different types of candy.

Four participants interpreted the question regarding media influences in a different way than intended. During discussion, they focused on celebrity body images, magazine ads for diet pills, and television shows/movies that contained many idolized individuals. Famous celebrities mentioned included individuals such as Jessica Simpson, Queen Latifah, Tyra Banks, and Oprah; movies and television programs mentioned included the *Dukes of Hazzard*, *America's Next Top Model*, *Law and Order*, and *American Idol*.

"I think one of the things that encourages my weight loss or eating or whatever is that there is so many celebrities out there...so many stars who are like stick skinny and absolutely beautiful..."

One participant discussed her own perceptions of Simpson's body as it compared to other famous movie stars and models such as Queen Latifah and Tyra Banks, respectively. According to this participant, Jessica Simpson's beauty was based on her thin figure. This participant also mentioned how her boyfriend appeared to be obsessed with Jessica Simpson. She even went as far as to say "...she is like my role model..." However three participants noted that Queen Latifah and Tyra Banks were beautiful because they appeared to be what they would like women in the "real" world to be.

"...a lot of people like Queen Latifah's image because, you know... she is one of the big girls. She is classy. They've got her on Covergirl and everything and that's just a whole new image for people out there."

Reality television has become a big hit in the past five years. *America's Next Top Model*, hosted by Tyra Banks, and *American Idol* are two television shows that are popular with Americans. *America's Next Top Model* chronicles the weekly battles and challenges that occur as girls compete for a modeling contract. *American Idol* is a show

that, each week, provides an elimination tournament format as contestants live for what is viewed as the ultimate prize: a recording contract. Both shows include a judging panel, usually made up of past celebrities; they are responsible for giving opinions and making suggestions to participants. As it relates to obesity issues, three participants said they like the shows because they select girls who do not look as though they skip meals, or look overly anorexic. Due to one particular judge on this show, one participant was very vocal in her dislike of *American Idol*.

“...it’s not like I’m opposed to American Idol, but I don’t like Simon because the five minutes I watched this girl got on and sang and she was horrible, she was pretty bad. He said something like ‘not only do you suck at singing, but you’re fat too.’”

All participants could not recall many sources from which they received information on dietary behaviors, obesity, or both from the Georgia Southern University campus. Participants reported receiving no information from GSU’s Health Services with regard to either dietary behaviors or obesity.

“Unless you come to them, they don’t go to you.”

Participants noted that certain food establishments on campus provide information on the dietary content of their food, but not much information on dietary behavior. Three participants mentioned during discussion that places like Chik-Fil-A[®] and the smoothie booth at the Lakeside Café, as well as the new Subway[®] on campus, have nutrition information available, such as grams of fat, calorie content, percent of nutrients, etc.

Healthful Living and Physical Activity courses were noted as the largest source of information to which students have access with regard to receipt of dietary behaviors and obesity. Depending on the instructor, the helpfulness of class materials discussed in the Healthful Living classes was given both positive and negative feedback. For example, one participant noted that she really learned a lot from her class this semester. She felt like her instructor covered a wide variety of topics (i.e., sex, health problems, wellness, etc.) and make the effort to have good demonstrations and class participation. She also reported that she felt her instructor actually practiced what she taught in class.

“I like my healthful living class and I think she does a really good job. I mean I don’t always apply it after class is over but I ...”

However two participants from another Healthful Living class felt they did not learn a whole lot, in regards to weight-management and chronic diseases as a result of poor dietary habits. Two participants were registered for the web-based class held on-line; they felt the discussion questions were more opinion-based as opposed to knowledge-based. This same student reported keeping up with chapter readings, although the syllabus did not match with current chapters of study at the time.

“Our syllabi didn’t match suddenly so I don’t even know what chapters were suppose to read for like the past three months.”

Two participants mentioned receiving information on dietary behaviors and obesity in a physical activity course. One noted she was enrolled in a weight lifting class; the other said she was enrolled in intermediate volleyball. The participant in the weight lifting class remembered taking it in high school; she reported “you just really went to class and lifted

weights.” However, in the Georgia Southern University class there were written exams, requiring study from the course text, which contained information on dietary behavior. She said that she learned more about dietary behaviors from the weight lifting class than in Healthful Living.

“Yeah...I learned more in that than I did in my health class. I barely read my book for health.”

The second participant was currently enrolled in Intermediate Volleyball. Although this question dealt with receiving information on dietary behaviors, her answer focused on the opportunity provided to engage in physical activity; the class was a good way to get in her workout and she learned how to work out correctly (i.e., stretching before and after the workout, stretching all parts of the body, etc.).

None had been recently advised to lose weight or make dietary changes. When asked if they would be willing to make changes if so recommended by a doctor, all agreed that they would comply.

“Yeah...I mean I exercise, but not as much as I should. I do some sit-ups and yoga. But, if the doctor told me I should, I would try harder.”

All participants agreed they would be more likely to attempt dietary and weight management changes if a doctor made the recommendation for them to do so.

Students' Perception of Their Threat of Obesity

To close each session, and to ascertain participants' perceptions of individual threat, they were asked to rate their risk of obesity on a scale of one-to-five (with one being “not at all” and five being “very certain”). Only five-out-of-nine participants gave a numeric

ranking, but among those who did, three ranked their risk as a “2” (little risk) and two people perceived a moderate risk (they ranked their risk at “2”). One participant -- who rated her risk at “2” -- stated that she really did not think she would become obese, although people had suggested just that to her -- this was the same person who revealed earlier in the discussion that her mother was overweight and suffered from two chronic diseases. A second person -- who also rated her risk at “2” -- stated that she only worried because she did not exercise as much as she would like to. She said that her rating of risk was based more on how she felt when she exercised and ate healthy, as opposed to any worry she may have associated with an arbitrary number on some scale. Participant three rated her risk as a “2” and noted during the discussion that she played sports in high school. Though she felt she needed to make modifications in some areas, she felt she would never let herself get overweight or obese because of how she felt when eating unhealthy and not exercising.

“... I mean I know I have stuff I need to fix, but I guess because of me being active, I’m not just gonna let myself just not workout at all ‘cause I just feel terrible if I feel like I’m gaining weight whatsoever. ... (I was) voted “Buffest Bod” in high school and so I have like little abs and muscles in my arms. So it’s like if I see any of that going off, I feel really weird, but like I want to keep it up.”

Both participants who ranked their obesity risk at “3” noted different reasons. The first explained that her risk assessment was based upon the fact that she gained twenty pounds while in college last year. She mentioned that, while in high school, she played sports, and worked a part-time job. Her “on the go” activity kept her weight in-check, as

opposed to her current activity level. She is now making a conscious effort to lose weight by watching her diet and by exercising.

“I got here and I’m not doing nothing. I don’t have a car and I cannot go anywhere.”

Participant two based her obesity risk solely on a current medical status. She explained that she gained twenty pounds from taking medication for a medical condition. This particular medication caused her to gain weight during high school. Due to worsening of her condition, her doctor continued increasing the dose, which caused weight gain. Though now in college, she mentioned that the weight still has not come off. She is not, however, worried about becoming overweight based on her current perceptions and dietary habits.

CHAPTER 4

DISCUSSION

This study explored the utility of Health Belief Model constructs in predicting dietary behaviors of college females between the ages of 18-to-25 in a purposive sample. The dietary and weight management survey analysis supported current literature which is suggestive of poor eating habits and behaviors among college students (Brevard & Ricketts, 1996). Among students who participated in the survey, three-in-four were “at-risk” for poor fruit and vegetable consumption (four-or-fewer servings per day) and one-in-five were “at-risk” for high-fat consumption (three-or-more servings per day). Among students classified as “at-risk” for poor fruit and vegetable consumption, two-thirds (67.2%) were white and one-third (32.8%) were black.

No statistically significant differences were found between body mass indices and dietary risk, regarding both fruit/vegetable and high-fat consumption patterns. Both groups, “at-risk” and “not at-risk” were found to have BMI classified as normal. Therefore, there were no significant findings to support that students who ate healthier had lower body mass indices than those who reported not eating healthy. This is suggestive that college students, as a whole, should be targeted for health education on dietary and exercise behaviors. Significant differences were found between BMI and race. Black females were found to have significantly higher BMI than white females.

Dietary risk of fruit and vegetable consumption and high-fat intake were found to be independent of race. White females were more likely to be classified as “at-risk” for meeting the daily intake of fruit and vegetables as compared to their black counterparts. Likewise, no significance differences were found between white and black females in the

analysis of the NCHRBS (CDC, 1997). Black females were more likely, although not statistically significant, to be at “at-risk” for high-fat food consumptions as compared to that of their white counterparts. Likewise, these findings are consistent with the NCHRBS (CDC, 1997).

Focus group participants, as a whole, reported making unhealthy food choices due to several factors; chief among them was eating out. Participants believed they had no choice but to eat what was offered due to financial reasons, convenience, meal plan choices, faulty dorm room equipment such as a refrigerator, and poor placement of kitchen facilities in older dormitories. The majority of participants reported using EAGLEXPRESS® on and off campus for their meals. Participants felt that food choices offered on campus were not healthy; and many establishments that accept EAGLEXPRESS® off campus are, in essence, fast food restaurants (participants were not questioned as to what types of food they consumed at the off-campus facilities). Participants’ normal dinner choices on campus included food establishments such as Landrum, Lakeside Café, Chik-Fil-A®, and the Pickle Barrel. Therefore, students’ perceptions of how nutrition-conscious they were matched their dietary behaviors; as most students noted their awareness of their poor dietary consumption habits.

Although majority of focus group participants reported poor dietary habits, all noted that their parents believed dietary practices were an important component to health. This importance was expressed during childhood in the form of healthy meals and snacks, most of which were cooked and eaten at home. Family dynamics and occupation of parents seemed to play a role in the decision of meal-intake at home or in a restaurant. For example, one participant’s mother worked many hours during the day and did not

cook meals very frequently; another participant eat out frequently because both of her parents were accounts and they never had time to cook. All participants noted creative ways their parents encouraged them to eat fruits and vegetables as children. Only one participant mentioned high-fat and high-sugar snacks in the household as a child.

Participants reported eating out a lot more with their families now that they are in college, as opposed to the meals that were typically cooked at home when they were children. Two participants still cook all their own meals because, as children, every meal they consumed was cooked at home.

Participant perception of susceptibility, related to obesity and its related diseases, emerged as minimal immediately during the focus groups. Participants also reported that they did not perceive themselves as being “at-risk” for obesity and its sequelae; inconsistent with what they viewed to be the complications related to the diseases: students rated severity as high (a “4” or “5” on the five-point scale). Diseases, specifically pertaining to obesity, included high blood pressure, high cholesterol, cancer (especially the types linked to obesity), cardiovascular disease, and diabetes (type-2). All participants reported family contact with one or more of the above-mentioned diseases except cancer (types specifically related to obesity). Although concerned at first about their own personal diet with regard to the sick family member, dietary concern became less and less as they watched their loved ones maintain and manage their lifestyle with no problems. Ironically, over one-half of participants identified an overweight family member.

All participants felt that daily issues (time management, daily class schedules, family issues, etc.) took direct precedence over the worry of long-term illnesses. Some

participants did not feel that chronic illnesses could even begin this early in their lives. Others thought that the importance of dietary behaviors have been overlooked by society. Media campaigns for drunk driving, seat belt use, biking safety, and drug use are frequent; campaigns for daily dietary intake are not.

In the view of student participants, health education related to dietary issues on the Georgia Southern University Campus was described as less than desirable. Students reported receiving most of their dietary information from Healthful Living (HLTH 1520); physical activity classes were also a source of information for students, but not much knowledge was gained from these classes. Students did not report receiving any information on dietary behaviors from Health Services, food establishments on campus, or other courses offered at Georgia Southern University. Since most students participating in the HLTH 1520 classes are freshman, it is assumed they have not had time in their academic career to take more in-depth nutrition classes such as Nutrition and Health (NTFS 2530). One participant remarked that Georgia Southern University Health Services did not make any effort to provide educational sessions on this topic unless requested to do so. This may suggest that Georgia Southern University Health Services personnel – including the health educators – need to take a more active role in dietary education on campus. It might also be beneficial for the university to consider adding more nutrition courses to the core curriculum, and/or placing much greater emphasis on nutrition as students enter their first-year experience on campus. Given the obesity epidemic among adolescents, showing that the campus places much emphasis on healthy eating habits would send the message early-on to students at Georgia Southern University to inform and reiterate the importance of eating healthy.

Media influences appear to affect perceptions of body image and dietary intake. When questioned, participants recalled what they had heard, seen, or read on the radio, television, or in magazines. Participants began to discuss body image issues among “what’s acceptable” and “what’s not.” Black participants appeared to be more comfortable discussing body image and felt bigger, more voluptuous body sizes were most attractive; these same individuals gave examples of famous actresses/models such as Queen Latifah and Tyra Banks. They felt both of these body types portrayed images closer to average, everyday woman. Conversely, white participants thought beauty to be based more on looks and size (i.e. Jessica Simpson); thus supporting the research of Henriques & Calhoun (1999) and Rucker & Cash (1992) that white women have higher body dissatisfaction, while black females possess less disparaging attitudes toward their bodies. One participant remarked that the musician and movie star, Jessica Simpson, was “stick skinny” and “gorgeous.” Duly noted, two white females in the group discussed weight gain and the worry of becoming overweight.

Currently, the health behavior literature related to dietary risk is limited in scope as it relates to the Health Belief Model, including only measures related to structural, socio-psychological, and perceived benefits and barriers. There is no known instrument that examines the other constructs of the Model as it relates to dietary behavior patterns in a college student population. This study was a preliminary investigation that served to poll that population on the perceptions of their susceptibility, severity, and risk of obesity as it relates to diet. In addition Cues to Action were included. It is hoped that results will be used to formulate a set of questions that will be tested on a representative sample of college students, so that a complete assessment tool for the Model can be created.

This theory provided important evidence for future research. First, focus group participants, when questioned, did not perceive their susceptibility to obesity and its related diseases as high. Second, they did not feel that obesity was a direct threat to their current lifestyle or threatened them in the future. Third, cues to action for a healthy diet were found to be less than desirable. Therefore participants reported no attempts to consciously make healthy food choices. Although majority of participants reported prior contact with an obesity-related diseases through a family member, reports on mass media campaigns, health education on campus, and advice from other was relatively low. Ironically, participants did perceive the severity of obesity and its related diseases as high. This suggests that college-aged students feel a certain invulnerability to chronic disease. When looking at how all these factors affect the likelihood of taking the recommended action (i.e. consumption of five-or-more fruits and vegetables and two-or-fewer servings of high-fat foods per day), students did not report making healthy dietary decisions.

In designing and conducting this study, there were several limitations worth noting that may have had an impact on results. Healthful Living 1520 (HLTH 1520) is a course usually taken in student's first couple of years in at college. First, due to the use of a purposive sample, (i.e., students who were enrolled in HLTH 1520), 91.2% of the study population was comprised of students between 18-and-20 years old. As a result, the sample was non-representative of the 18-to-25 age range expected, which limited the generalizability of study results to all Georgia Southern University students. Second, 215 dietary and weight management surveys were returned from sampled classes. Thirty-three surveys were omitted: twenty-two surveys were incomplete; seven participants

returned surveys with identified ages outside the study criteria for age (18-to-25); and four participants identified themselves as other than black or white. As a result, data analysis included 182 surveys. Third, the data gathered in the dietary and weight management survey was self-report data; thus, the extent to which participants were inclined to provide socially desirable responses is not fully known. Finally, a fourth limitation was the cross-sectional, non-experimental design of the study, which provided only a snapshot of behaviors from the previous day. Such a design allows only a limited range of analysis; any conclusions about causal relationships that might exist in the data are not warranted.

REFERENCES

- Abrams, K.K., Allen, L.R., & Gray, J.J. (1993). Disordered eating attitudes and behaviors, psychological adjustment, and ethnic identity: a comparison of black and white female college students. *International Journal of Eating Disorders*, 14(1), 49-57.
- Bandura, A. (1977a). *Social Learning Theory*. Englewood Cliffs, NJ: Prentice-Hall.
- Bandura, A. (1977b). Self-efficacy: Toward a unifying theory of behavioral change. *Psychological Re-view*, 84, 191-215.
- Becker, M.H., (Ed.) (1974). The Health Belief Model and Personal Health Behavior. *Health Education Monographs*, 2(Entire Issue).
- Brevard, P.B. & Ricketts, C.D. Residence of college students affects dietary intake, physical activity and serum lipid levels. *Journal of the American Dietetic Association*, 96(1), 35-38.
- Centers for Disease Control and Prevention (CDC) (1997). *Youth Risk Behavior Surveillance: National College Health Risk Behavior Survey – United States, 1995*. Retrieved September 3, 2005 from, <http://www.cdc.gov/mmwr/preview/mmwrhtml/00049859.htm>.
- CDC (2005a). *Overweight and Obesity: Economic Consequences*. Retrieved September 2, 2005, from, http://www.cdc.gov/nccdphp/dnpa/obesity/economic_consequences.htm.
- CDC (2005b). *BMI - Body Mass Index: BMI for Adults: Body Mass Index Formula for Adults*. Retrieved December 19, 2005, from <http://www.cdc.gov/nccdphp/dnpa/bmi/bmi-adult-formula.htm>.

- Dinger, M.K. & Waigandt, A. (1997). Dietary intake and physical activity behaviors of male and female college students. *American Journal of Health Promotion*, 11(5), 360-362.
- Douglas, K.A. & Collins, J.L. (1997). Results from the 1995 National College Health Risk Behavior Survey. *Journal of American College Health*, 49(5), 55-66.
- Fallon, A. (Ed.) (1990). *Culture in the Mirror: Sociocultural Determinants of Body Image*. New York, NY: Guilford Press.
- Georgia Southern University (2006). *What is EAGLEXPRESS?* Retrieved March 25, 2006, from <http://services.georgiasouthern.edu/food/eaglex.php>.
- Glanz, K. & Rimer, B. K. (1997). *Theory at a Glance: A Guide for Health Promotion Practice*. Bethesda, MD: National Cancer Institute.
- Glanz, K., Rimer, B., & Lewis, F. (Eds.) (2002) *Health Behavior and Health Education, Third Edition*. San Francisco, CA: Jossey-Bass.
- Glass, G.V. & Hopkins, K.D. (1984). *Statistical Methods in Education and Psychology, Second Edition*. Englewood Cliffs, NJ: Prentice-Hall, Inc.
- Grzywacz, J.G. & Marks, N.F. (1999). Family solidarity and health behaviors. *Journal of Family Issues*, 20(2), 243-268.
- Henriques, G.R. & Calhoun, L.G. (1999). Gender and ethnic differences in the relationship between body esteem and self-esteem. *Journal of Psychology*, 133, 357-368.
- Hochbaum, G.M. (1958). *Public Participation in Medical Screening Programs: A Sociopsychological Study*. PHS Publication No. 572. Washington, DC: U.S. Government Printing Office.

- Hoyt, W.D. & Kogan, L.R. (2001). Satisfaction with body image and peer relationships for males and females in the college environment. *Sex Roles*, 45, 199-215.
- Kirscht, J.P. (1974). The Health Belief Model and illness behavior. *Health Education Monographs*, 2, 2387-2408.
- McArthur, L., Rosenberg, R., Grady, F., & Howard, A. (2002). College students' compliance with food guide recommendations. *Journal of Family and Consumer Sciences*, 94(2), 29-39.
- Morgan, D.L. (1997). *Planning Focus Groups*. Thousand Oaks, CA: Sage Publications.
- National Center for Health Statistics (2005). *Prevalence of Overweight and Obesity Among Adults: United States, 1999-2002*. Retrieved September 21, 2005, from, <http://www.cdc.gov/nchs/products/pubs/pubd/hestats/obese/obse99.htm>.
- National Institute of Diabetes and Digestive and Kidney Diseases (NIDDK) (2005). *Statistics related to overweight and obesity*. Retrieved December 16, 2005, from <http://win.niddk.nih.gov/statistics/#econ>.
- Racette, S.B., Deusinger, S.S., Strube, M.J., Highstein, G.R., & Deusinger, R.H. (2005). Weight changes, exercise, and dietary patterns during freshman and sophomore years of college. *Journal of American College Health*, 53(6), 245-251.
- Rosenstock, I.M. (1974). Historical origins of the Health Belief Model. *Health Education Monographs*, 2, 328-335.
- Rozmus, C.L., Evans, R.E., Wysochansky, M., & Mixon, D. (2005). An analysis of health promotion and risk behaviors of freshman college students in a rural southern setting. *Journal of Pediatric Nursing*, 20(1), 25-33.

- Rucker, C. & Cash, T. (1992). Body images, body-size perceptions, and eating behaviors among African-American and white college women. *International Journal of Eating Disorders*, 12(3), 291-299.
- Shankar, P., Dilworth, J.E.L., & Cone, D. (2004). Dietary intake and health behavior among black and white college females. *Family and Consumer Sciences Research*, 33(2), 159-171.
- Siewe, Y.J. (1999). Stanges on limiting dietary-fat intake implications for African Americans. *Journal of Black Studies*, 29(5), 731-746.
- Spear, B. & Rinold, C. (1999). *Handbook of Health Promotion and Disease Prevention*. New York, NY: Kluwer Academic/Plenum Publishers.
- SPSS, Inc. (2004). *Statistical Package for the Social Sciences (SPSS) – Version 12.0*. Chicago, IL: SPSS, Inc.
- Steers, W.N., Elliott, E., Nemiro, J., Ditman, D., & Oskamp, S. (1996). Health beliefs as predictors of HIV-preventive behavior and ethnic differences in prediction. *Journal of Social Psychology*, 136(1): 99-110.
- Tedders, S.T., Parrillo, A.V., & Carter, D. R. (Center for Rural Health Research). *Student Health Risk Behavior Profile- Georgia Southern University: Executive Summary*. Statesboro, GA: Georgia Southern University; 2004 July. 59 pp.
- U.S. Department of Health & Human Services [USDHHS] (1998). *Clinical Guidelines on the Identification, Evaluation, and Treatment of Overweight and Obesity in Adults: The Evidence Report*. Publication No. 98-4803. Washington, DC: National Institutes of Health, National Heart, Lung, and Blood Institute, National Institute of Diabetes and Digestive Kidney Diseases.

USDHHS (2005). *Dietary Guidelines for Americans, Sixth Edition*. Atlanta, GA:
Department of Agriculture.

Wee, C., Phillips, R., Legedza, A., Davis, R., Soukup, J.R., Colditz, G.A., & Hamel,
M.B. (2005). Health care expenditures associated with overweight and obesity among
U.S. adults: Importance of age and race. *American Journal of Public Health*, 95(1),
159-166.

World Health Organization (WHO) (2003). *Obesity and Overweight*. Retrieved
September 2, 2005, from,

<http://www.who.int/dietphysicalactivity/publications/facts/obesity/en/print.html>.

APPENDIX A

HYPOTHESES, SIGNIFICANCE OF THE STUDY, DELIMITATIONS,
LIMITATIONS, ASSUMPTIONS, AND DEFINITION OF TERMS*Hypotheses*

It is hypothesized that the following relationships would be found to exist in 15-item questionnaire administered to students:

First, a positive relationship will exist between body mass index (BMI) and dietary risk. Specifically, low-BMI will be associated with healthy food choices (i.e., low dietary risk), and high-BMI will be associated with unhealthy food choices (i.e., high dietary risk);

Second, black females will have higher BMI levels than white females.

Third, white females will be more likely than black females to make healthy food choices.

From the focus groups, it is hypothesized that the following would be found:

Fourth, students who perceive themselves at-risk for obesity will be more likely than those who do not perceive themselves at-risk to report healthy dietary behaviors (consuming five-or-more fruits and vegetables per day and two-or-fewer servings of high fat foods per day);

Fifth, black females will be less likely than white females to perceive themselves at-risk for obesity from unhealthy food choices.

Finally, white females will be more likely than black females to perceive themselves at-risk for obesity.

Significance of the Study

In 1995, 20.5% of college students nationwide were categorized as being overweight based on body mass index (CDC, 1997). Nutritional habits of college students, based on several studies, are of concern to health professionals and family and consumer scientists (McArthur, Rosenberg, Grady, & Howard, 2002). These concerns are founded on research that characterizes young adult diets as low in energy, fiber, calcium, iron, vitamin A, and carotenoids, and high in fat (McArthur et al., 2002). Young adults often make poor food choices, and the need exists among college students for better nutrition education interventions about healthy eating choices (McArthur et al., 2002).

Furthermore, research has shown that white females are more likely to weigh less than black females; white females are more sensitive and conscious of weight issues than are black females. With the 1995 data available from the NCHRBS, black college females appear more likely to be overweight and less likely to attempt weight loss techniques, such as exercise and diets low in fat. While black women are overweight more frequently than white women in adulthood, the prevalence of overweight among blacks in infancy and early childhood has been reported to be less than or equal to that of whites (Spear & Reinhold, 1999). This suggests that during preadolescent and adolescent years, racial differences of obesity emerge (Spear & Reinhold, 1999). Not only are adult black females less concerned about their weight and about weight reduction, but they also appear more tolerant of obese individuals than are black males and whites (Spear & Reinhold, 1999). Current research indicates that obesity is higher among black women; however, limited data has been supportive in finding reasons why disproportionate rates of obesity are occurring between these two groups.

In addition there is currently no known instrument that will assess all components of the Health Belief Model as they relate to dietary behaviors. After a review of the literature, valid and reliable measures were found for benefits and barriers to a healthy diet (Abood, Black, & Feral, 2003; Dittus, Hillers, & Beerman, 1995; McDonell, Roberts, & Lee, 1998; McIntosh & Kubena, 1996; Shive & Neyman, 2003; Von Ah, Ebert, Ngamvitroj, Park, & Kang, 2004) and questionnaires to measure dietary knowledge (Al-Numair, 2004; Petrovici, 2004; Yeh, 2000). However there seems to be a gap in attempts to evaluate Health Belief Model constructs that measure the threat of obesity, severity and susceptibility to obesity and its sequellae, and cues to action for a healthy diet. Furthermore, only a few of the listed studies, employing the Health Belief Model, were tested on the college population.

Delimitations

The study will be delimited to the following items. First, participants recruited for the study will be adult females, aged 18-to-25 years of age.

Second, all participants will be currently enrolled at Georgia Southern University, a mid-sized university in the southeastern United States.

Third, for this study, questions concerning height, weight, dietary behaviors, and attempted weight loss, as well as selected demographic items will be included.

Limitations

This study is limited in that it only consisted of select constructs of the Health Belief Model, which included the following: perceived susceptibility and perceived severity of obesity, perceived threat of obesity and its sequellae, and cues to action. The content and

meaning of the findings from focus group discussions were based on interpretation by the researcher.

The sample was purposively selected from the Master list of classes during Spring Semester of 2006. Healthful Living courses (HLTH 1520) were selected, causing the sample age of participants to be skewed toward freshman classes, which limited generalizability of the results. Since the majority of participants were in the freshman class, responses may have reflected prior behavioral patterns, rather than those newly established or formed at Georgia Southern University.

The instrument used for assessment of consumption of fruits, vegetables, and high-fat foods was a paper-pencil questionnaire, relying on self-report. The study only included those students who opted to participate.

Assumptions of the Study

The conduct of this study was based upon the following assumptions. First, it is assumed that participants understood the questions presented in the fifteen-item questionnaire and answered each question honestly. Second, students may have inaccurately reported their heights and weights for many reasons.

Definition of Terms

Terms pertinent to the study were defined as follows:

Body Mass Index [BMI]. A measure of body weight status, which uses the mathematical formula of $\text{weight (kg)} \div \text{height (m}^2\text{)} \times 703$. (CDC, 2005).

Cancer. A term for diseases in which abnormal cells divide without control. Cancer cells can invade nearby tissues and can spread through the bloodstream and lymphatic system to other parts of the body. (NCI, 2005)

Cardiovascular Disease. Refers to diseases of the heart and blood vessel system (arteries, capillaries, veins) within a person's entire body, such as the brain, legs, and lungs (USDA, 2005).

Cues to Action are strategies used in the Health Belief Model that activate one's readiness; they provide how-to information, promote awareness, and employ a system of reminders for those interested in changing behavior. (Glanz, Rimer, & Lewis, 2002).

Health Belief Model. A model of behavior developed in the 1950s by scientists at the U.S. Public Health Service to explain the failure of people to participate in health programs designed to prevent and detect disease. The model posits that, in order for a person to take action to avoid a disease, he would need to believe: 1) that he was personally susceptible to it; 2) that the occurrence of the disease would have at least moderate severity on some component of his life; and 3) that taking a particular action would be beneficial by reducing his susceptibility to the condition by reducing the disease's severity, and that it would not entail overcoming important psychological barriers in order to act (Rosenstock, 1974).

Hypertension. Also known as high blood pressure. Defined in an adult as a blood pressure greater than or equal to 140 mm Hg systolic pressure or greater than or equal to 90 mm Hg diastolic pressure (AHA, 2005).

Obesity. Defined as a body mass index (BMI) greater-than-or-equal-to 30.0 kg/m² for both men and women (NHLBI, 1998).

Overweight. Defined as having a body mass index (BMI) greater-than-or-equal-to 27.8 kg/m² for men and greater-than-or-equal-to 27.3 kg/m² for women (NHLBI, 1998).

Perceived Barriers. Used in the Health Belief Model, perceived barriers relate to one's beliefs about the tangible and psychological costs of a particular action (Glanz, Rimer, & Lewis, 2002).

Perceived Benefits. Used in the Health Belief Model, are one's beliefs in the efficacy of a particular action to reduce the risk or seriousness of disease (Glanz, Rimer, & Lewis, 2002).

Perceived Severity. Used in the Health Belief Model, relate to one's belief as to how serious a condition and its sequelae are; it specifies consequences of the risk and the conditions (Glanz, Rimer, & Lewis, 2002).

Perceived Susceptibility. Used in the Health Belief Model, relates to a person's perception of his/her risk of contracting an illness (Glanz, Rimer, & Lewis, 2002).

Type-II Diabetes. Formerly called adult-onset diabetes or non-insulin-dependent diabetes, is the most common form of diabetes. Type-II diabetes usually begins with insulin resistance, a condition in which fat, muscle, and liver cells do not use insulin properly. At first, the pancreas keeps up with the added demand by producing more insulin. In time, however, it loses the ability to secrete enough insulin in response to meals (NDIC, 2004).

References

- Abood, D.A., Black, D.R., & Feral, D. (2003). Nutrition education worksite intervention for university staff: application of the health belief model. *Journal of Nutrition Education and Behavior*, 35(5), 260-267.
- Al-Numair, K.S. (2004). Nutrition knowledge of primary care physicians in Saudi Arabia. *Pakistan Journal of Nutrition*, 3(6), 344-347.
- American Heart Association (AHA) 2005. *What is high blood pressure?* Retrieved February 25, 2006, from <http://www.americanheart.org/presenter.jhtml?identifier=2112>.
- Centers for Disease Control and Prevention (CDC) (1997). *Youth Risk Behavior Surveillance: National College Health Risk Behavior Survey – United States, 1995*. Retrieved September 3, 2005 from, <http://www.cdc.gov/mmwr/preview/mmwrhtml/00049859.htm>.
- CDC (2005). *BMI - Body Mass Index: BMI for Adults: Body Mass Index Formula for Adults*. Retrieved December 19, 2005, from <http://www.cdc.gov/nccdphp/dnpa/bmi/bmi-adult-formula.htm>.
- Dittus, K.L., Hillers, V.N., & Beerman, K.A. (1995). Benefits and barriers to fruit and vegetable intake: relationship between attitudes and consumption. *Journal of Nutrition Education*, 27(3), 120-126
- McArthur, L., Rosenberg, R., Grady, F., & Howard, A. (2002). College students' compliance with food guide recommendations. *Journal of Family and Consumer Sciences*, 94(2), 29-39.

- McDonell, G.E., Roberts, D.C., & Lee, C. (1998). Stages of change and reduction of dietary fat: effect of knowledge and attitudes in an Australian university population. *Journal of Nutrition Education*, 30(1), 37-44.
- McIntosh, W. & Kubena, K.S. An application of the health belief model to reductions in fat and cholesterol intake. *Journal of Wellness Perspectives*, 12(2), 1996.
- National Cancer Institute (NCI) (2005). *What you need to know about cancer- an overview*. NCI Publication No. 05-1566. Retrieved February 23, 2006, from <http://www.cancer.gov/cancerinfo/wyntk/overview>.
- National Diabetes Information Clearinghouse (NDIC). *Your guide to diabetes: type one and type two*. NIH Publication No. 05-4016. Retrieved February 25, 2006, from <http://www.diabetes.niddk.nih.gov/dm/pubs/type1and2/type1and2.pdf>.
- National Heart, Lung, and Blood Institute (NHLBI) (1998). *Clinical guidelines on the identification, evaluation, and treatment of overweight and obesity in adults: The evidence report*. NIH Publication No. 98-4083. Washington, DC: National Institutes of Health.
- Petrovici, D. (2004). *Diet and Health: Are consumers Will to Perform Health Behaviours?* Canterbury, Kent, England. Retrieved November 28, 2005, from, www.kent.ac.uk/KBS/research-information/working-papers/Petrovici-No-65.pdf.
- Rosenstock, I.M. (1974). Historical origins of the Health Belief Model. *Health Education Monographs*, 2, 328-335.
- Shive, S.E. & Neyman, M.R. (2003). Prevalence and predictors of fruit intake among community college women in the extended opportunity program and services. *Californian Journal of Health Promotion*, 1(1), 91-102.

Spear, B. & Rinold, C. (1999). *Handbook of Health Promotion and Disease Prevention*.

New York, NY: Kluwer Academic/Plenum Publishers.

United States Department of Agriculture (USDA) (2005). *Appendix C: Glossary of*

Terms. Retrieved December 27, 2005, from

<http://www.health.gov/dietaryguidelines/dga2005/document/html/appendixC.htm>.

Von-Ah, D., Ebert, S., Ngamvitroj, A., Park, N., & Kang-D.H. (2004). Predictors of

health behaviours in college students. *Journal of Advanced Nursing*, 45(5), 463-474.

Yeh, M-C.P. (2000). Nutrition knowledge, health beliefs, and use of nutrition

supplements among older adults in Northwestern Wisconsin. Unpublished master's

thesis. University of Wisconsin-Stout. Retrieved January 31, 2006, from,

<http://www.uwstout.edu/lib/thesis/2000/2000yehm.pdf>

APPENDIX B

EXTENDED REVIEW OF LITERATURE

The Epidemic of Obesity

Cardiovascular disease, diabetes, and cancer account for over 60% of all deaths in the United States (Renehan & Howell, 2005). These chronic diseases are also major contributors to the burden of early mortality and morbidity in the United States. Each of these debilitating diseases has common risk factors: smoking; physical inactivity; and obesity. The World Health Organization [WHO] has described obesity as "...one of today's most blatantly visible – yet most neglected – public health problems..." threatening developed and undeveloped countries alike (WHO, 2006). Currently more than one billion adults are overweight – at least 300 million of these are classified as clinically obese (WHO, 2003). Once denoted in the literature as a behavioral problem, obesity is now seen differently, and has been reclassified as a chronic disease (Committee on Government Reform, 2004). Obesity is a complex and dynamic condition, with serious social and psychological dimensions, affecting virtually all ages and socioeconomic groups (Pi-Sunyer, 1991). This culturally emerging pandemic is responsible for chronic health conditions and sizable financial consequences to affected societies around the world. Obesity has become one of the most prevalent chronic health problems in the United States and will only continue to escalate if serious measures are not taken to obstruct and deter its growth.

Prevalence of Obesity in the United States.

In the early 1980s, the Centers for Disease Control and Prevention (CDC) began to study the link between individual health behaviors and the prevalence of premature death

and disability. The Behavioral Risk Factor Surveillance Survey was introduced as a data collection tool in 1984; by 1994, all fifty states were participating (CDC, 2005a). In 1991, four states had obesity prevalence rates of between fifteen and nineteen percent; no states at that time had obesity rates at-or-above 20% (CDC, 2005a). In 2004, seven states reported obesity rates of 15% - 19%; thirty-three states had obesity rates of 20% - 24%; and nine states reported rates of more than 25% (one state reported no data) (CDC, 2005a). During the past two decades, adult obesity rates have more than doubled (Basset & Perl, 2004). The prevalence of adult obesity in the United States was reported at 65% in 2004 (CDC, 2005e); which reflects a 61% from the adult prevalence rate of 23% in 1994 (CDC, 2005e). Southern states were denoted as the first area in the United States to report an increase of more than 20% in adult obesity rates (Lopez, 2004).

The prevalence of obesity over time has shown to be substantially higher among those of lower socioeconomic status, and among less well-educated women (Kuller, 1999); black females appear disproportionately affected by problems related to be overweight and obese (National Center for Health Statistics, [NCHS], 2004). The National Health and Nutrition Examination Survey (NHANES) 1999-2002 findings indicate that 33% of adult females were obese (NCHS, 2004). Among Non-Hispanic black females, nearly one-half (49%) were obese, as compared to one-in-three (31%) white females (NCHS, 2004).

Children and adolescent overweight and obesity rates are beginning to mimic adult trends. An estimated 16% of children and adolescents' ages 6-19 years were classified as overweight, which reflects a 45% increase in the 11% observed in the previous administration – NHANES III (NCHS, 2005). Non-Hispanic black (21%) adolescents

ages 12-to-19 were more likely to be overweight than non-Hispanic white adolescents (14%) (NCHS, 2004). Findings from the 1999-2002 NHANES do *not* show a decrease in overweight and obesity trends among children and adolescents, but reveal even higher levels. This trend is predictive of an upcoming generation of overweight and obese adults who will suffer repercussions from overweight and obesity-related health problems.

Body Mass Index.

Body composition refers to the type of matter, which defines human body weight. There are many different methods used to determine an individual's level of body fat, a component of body composition. Each method has its advantages and disadvantages. The most utilized and accepted measurement technique, employed in numerous health-related studies, is body mass index, or BMI (Rosato, 2000). BMI is *the* measurement standard used to classify those of who are underweight, of normal weight, overweight, and obese (Rosato, 2000). BMI is a simple technique to use because it only requires two measures: body weight and height. This type of information is easily and quickly obtained in one of two ways: (1) actual measurements of the participant needed for the study or (2) self-report. Most large studies utilize self-reported information for research design use (Irvin, 2003).

The use of BMI (also known as Quetelet's Index) was first developed in the nineteenth century by Lambert Adolphe Jacques Quetelet (Gallager, Visser, Sepulveda, Pierson, Harris, & Heymsfield, 1996). BMI is a calculation that compares a person's height to his or her weight. The actual formula for BMI, using the English system is: weight in pounds \div (height in inches)² x 703 (Centers for Disease Control and

Prevention [CDC], 2005b). The metric formula is: weight in kilograms \div (height in meters)² x 10,000 (CDC, 2005b). The World Health Organization [WHO], the CDC, the National Institutes of Health (NIH), and the National Health, Lung, and Blood Institute (NHLBI) use these universally-accepted measurement categories for determining weight-in-excess on an individual's body (NIH, 2000). The BMI categories recommended each has a specific range for a person's weight status, as follows: underweight (BMI < 18.5); normal weight (BMI of 18.5-to-24.9); overweight (BMI of 25.0-to-29.9); and obese (BMI of 30.0 or greater) (CDC, 2005b).

As easy and convenient as BMI is to calculate, there are those who feel it does not accurately assess weight status (Irvin, 2003). According to Tzamaloukas, Murata, & Vanderjagt (2005), there are many more components to individual body composition aside from height and weight. Body composition is determined by numerous factors, such as gender, age, race, skeletal frame, nutrition, exercise, weight, height, and the presence of debilitating illness (Tzamaloukas, Murata, Hoffman, Schmidt, Hill, Leger, Macdonald, Caswell, Janis, & White, 2003). Since BMI only takes into account body weight and height, the aforementioned factors are important in correctly classifying one's body fat. Therefore researchers that report problems with BMI usually feel this technique misclassifies the study results and therefore reports incorrect data.

Obesity-Related Physical Complications.

Over the past two decades, the alarming increase in overweight and obesity is clearly linked to the rise in certain health problems experienced by Americans who suffer from this condition. The NIH created "Clinical Guidelines of the Identification, Evaluation, and Treatment of Overweight and Obesity in Adults." Accordingly, all adults eighteen

years of age and older with a BMI ≥ 25.0 are considered at-risk for untimely death and disability as consequences of high body fat. As adipose tissue masses increase in the body, the potential for negative health consequences also increases. Overweight and obesity problems are classified in two ways: non-fatal, but debilitating to health; and life threatening. Non-fatal health problems associated with overweight and obese individuals include respiratory difficulties, chronic musculoskeletal problems, skin problems, and infertility (WHO, 2003). The more life-threatening problems include cardiovascular (CV) disease; conditions associated with insulin resistance, such as type-2 diabetes; and certain types of cancers, especially the hormonally related and large-bowel cancers (WHO, 2003). As reported by Visscher & Seidell (2001) obesity is more likely to impact morbidity in an individual as opposed to mortality.

Cardiovascular diseases are defined as diseases of the heart and blood vessel system (arteries, capillaries, veins) within a person's entire body, such as the brain, legs, and lungs (United States Department of Agriculture [USDA], 2005). Obesity's relationship with cardiovascular disease risk factors and cardiovascular disease is well documented (Kuller, 1999). Specifically, the distribution of body fat plays an important role in CVD-severity. High levels of abdominal visceral fat deposits show a strong relationship to inflammation and clotting of blood vessels (Kuller, 1999). Obesity itself is a risk factor for hypertension (high blood pressure), low HDL (high-density lipoprotein) cholesterol levels, high LDL (low-density lipoprotein) cholesterol levels, and high triglyceride levels (American Heart Association [AHA], 2005); the same risk factors for heart disease as well. In the CARDIA (Coronary Artery Risk Development in Young Adults) and ARIC (Athero-sclerosis Risk in the Community) studies, the prevalence of hypertension,

hyperlipidemia, and diabetes among black men and women were related to the degree of obesity as measured by the sum of skin folds (Kuller, 1999). Findings from this study revealed the percentage of body fat and waist-to-hip ratio strongly correlated with cardiovascular risk factors. In a seven-year follow up study, BMI increased for all four race and gender categories; increased BMI was greater among blacks than whites, especially among black women (Kuller, 1999).

Diabetes mellitus, commonly known as diabetes, is a group of diseases that affect the body's ability to produce and use insulin effectively. There are two major types of diabetes: Type 1 -insulin-dependent diabetes (juvenile onset); and Type-2-non-insulin dependent diabetes (adult onset) (CDC, 2003). Estimates show 18 million Americans (8.7 % of the population) aged 20 or older had diabetes in 2002 (CDC, 2003). Of the population aged 20 years or older, 12.5 million (8.4% of the population) of all non-Hispanic whites have diabetes; 2.7 million (11.4%) of all non-Hispanic blacks aged 20 years or older have diabetes (CDC, 2003). After adjusting for population age differences, non-Hispanic blacks are 1.6 times as likely to have diabetes as non-Hispanic whites (CDC, 2003).

Type-2 diabetes is a medical condition characterized by the body's inability to produce enough insulin or utilize it effectively; accounting for 90-95% of all cases in the U.S. population (Irvin, 2003). This type of diabetes can develop by simply getting older, being overweight or obese, and becoming inactive (Poston, Suminski, & Foreyt, 2000). Due to the demographics of the aging population in the United States, sedentary lifestyles, and poor nutritional choices, the incidence and prevalence of diabetes is

projected to rise at uncontrolled rates (Mokdad, Bowman, Ford, Vinicor, Marks, & Koplan, 2001).

Overweight and obesity has been linked to increasing the risk for several types of cancer; particularly those affecting the breast, endometrium, colon, prostate, and gallbladder (Hamilton & Greenway, 2004). These cancers are related to hormonal changes in varying degrees that are affected by age, menstrual status, weight, and body-fat distribution (Hamilton & Greenway, 2004). According to Pi-Sunyer (1995) the exact correlation between obesity and developing certain types of cancer is not known; however the association between other cancers and having excess body fat is more than evident. Overweight women are more likely to develop cancers of the breast (post-menopausal), uterus, colon, kidneys, esophagus, stomach, and gallbladder; obese women are at a two to four time's greater risk for cancer of the uterus and kidneys specifically (National Cancer Institute [NCI], 2004). Overweight and obese females have an increased chance of cancer due to elevated estrogen production in the excess fatty tissues (Irvin, 2003). Increases in the manufacturing of estrogen within excess fat cells begin to take place in the body of an obese female (Pi-Sunyer, 1995). These increases have been correlated with cancer rates in women, especially cancers of the reproductive organs and breast (Schapira, Clark, Wolfe, Jarrett, Kumar, & Aziz, 1994).

Persons with overweight or obesity problems are at an increased risk for developing serious medical complications, such as cardiovascular disease, cancer, and diabetes. There are numerous other medical conditions that cause disability among overweight and obese persons, such as arthritis (osteo and rheumatoid), fetus birth defects carried by an obese person, carpal tunnel syndrome (CTS), chronic venous insufficiency (CVI),

daytime sleepiness, deep vein thrombosis (DVT), end-stage renal disease, gallbladder disease, gout, impaired immune response, impaired respiratory functioning, infection following wounds, infertility, liver disease, low back pain, obstetric and gynecologic complications, all over body pain in general, pancreatitis, sleep apnea, strokes, surgical complications, urinary stress incontinence (involuntary urine loss), and Cushing's syndrome (Caldwell & Kimball, 2001).

Obesity-Related Psychological Complications.

Complex and problematic in nature, it is not surprising that individuals with problems related to overweight/obesity report a poor or diminished quality of life (Kolotkin, Meter, & Williams, 2001). Generally stated, overweight and obese persons are more likely to be ridiculed and discriminated within society in three areas: employment; education; and healthcare (Irvin, 2003; Puhl & Brownell, 2001). For example Puhl and Brownell (2001) describe a 5 feet 4 inch 224 pound female who was ridiculed in boot camp for her inability to complete extreme physical tasks. After being forced by her drill sergeant to begin a 2.7-mile run/walk on a hot humid day, she collapsed on the ground panting. Drill instructors sat nearby while she lay in the sun babbling and foaming at the mouth for hours (Puhl & Brownell, 2001). She died due to organ failure in the heat. Puhl and Brownell (2001) also report unethical findings from teachers who describe the worst thing that can happen in life is to become obese; nurses report becoming repulsed by seeing obese patients. Experts and researchers have discovered high rates of depression, body dissatisfaction, and low self-esteem among overweight or obese persons (Irvin, 2003). Obese individuals become discontent with how they look and feel about their bodies, leading to low self-esteem (Rand & Wright, 2000). When self-esteem becomes

low, so does self-efficacy. Due to cultural, societal, and media standards, all Americans are brainwashed to believe how their bodies should look: excessively thin (Stunkard & Sobal, 1995). Even a person of normal body weight may be stressed out about how his/her image appears as compared to models and other icons in society.

The Cost of Obesity in the United States.

The economic impact of the obesity and overweight population in terms of illness, diseases and lost productivity is significant. Obesity, a complex and dynamic disease state, is linked to a significant amount of other health problems (Pi-Sunyer, 1993; Van Itallie, 1979; Mann, 1974). Obesity-related costs can be broken down into two categories: direct and indirect. Direct costs include fees spent on or by the individual: physicians and other professionals, hospital and nursing home services, medications, home health care, and quality of life (National Institute of Diabetes and Digestive and Kidney Diseases [NIDDK], 2005). Indirect costs include the monetary value of lost pay, overuse of sick days, and loss of wages due to premature death. In 1997, both indirect and direct costs associated with obesity in the United States totaled \$99.2 billion (NIDDK, 2005). In 2000, expenditures climbed to \$117 billion (NIDDK, 2005). Of the \$117 billion spent in 2000, direct costs were \$61 billion and indirect cost \$56 billion (NIDDK, 2005). Sturm (2002) found obesity to be more costly than health risks associated with tobacco use (smoking), heavy alcohol use, and poverty. Only one health expenditure is more costly than obesity, the cost of aging (Sturm, 2002). As stated by Melton (2005): “Americans are literally paying the price of the obesity epidemic.” (p. 54) United States taxpayers overweight or not, will absorb half the medical expenditure cost for obesity through Medicare and Medicaid (CDC, 2005c).

College Students and Obesity

Currently more than 12 million people aged 18-to-24 live in the United States (Racette, Deusinger, Strube, Highstein, & Deusinger, 2005). The vast majority (57%) attends secondary educational institutions either part-time or full-time (Racette et al, 2005). The post-secondary educational atmosphere presents an opportune time for active intervention and health education targeted to college students. The Centers for Disease Control and Prevention administered a self-reported risk behavior survey in 1995. This survey was administered in 2,919 college and university setting nationwide; both two year and four-year institutions participated (CDC, 1997). The survey requested demographic information such as gender, race, and age. This data served as the foundation for findings reported in the National College Health Risk Behavior Survey (NCHRBS) (CDC, 1997; Irvin, 2003).

Findings from the NCHRBS revealed that 20.5% of students surveyed were classified as overweight or obese based on body mass index (CDC, 1997). Black students (33.5%) were significantly more likely than white students (19.5%) to be classified as overweight (CDC, 1997). Further examination of subgroups based on gender and race proved to be significantly different. Black females (35.8%) were significantly more likely than white females (18.5%) to be overweight (CDC, 1997). White females were significantly more likely than blacks to be participating in weight loss than black females and more likely to use exercise and vomiting as weight loss prevention techniques (CDC, 1997).

Several studies have been conducted to support frequent data of overweight and obesity among black females. In the Alameda County Study that began in 1965, participants 18 years and older – not necessarily all went to college – were administered

questionnaires consisting of demographic information, mental and physical health, social relationships, and socioeconomic position (SEP) (Baltrus, Lynch, Everson-Rose, Raghunathan, & Kaplan, 2005). Follow up questionnaires were sent out in 1974, 1983, 1994, and 1999. Reports of SEP revealed black participants were found to be more disadvantaged than whites. Black women weighed almost 5 kg (11 pounds) more at baseline measures and gained weight at a greater rate than did white women (Baltrus et al., 2005). After a period of more than three decades, white women would only gain 13.26 kg (30 pounds) whereas black women gained 17 kg (37.5 pounds) (Baltrus et al., 2005).

College Students and Dietary Behaviors

Healthy lifestyle behaviors have a significant influence on physical and mental health (Grzywacz & Marks, 1999). Family influence is one of the primary factors responsible for molding and shaping individuals' health habits, attitudes, beliefs, and behaviors (Grzywacz & Marks, 1999). As late adolescents begin their journey to college, they experience freedom and independence from direct parental supervision. In this new environment, different views and lifestyle behaviors are molded and shaped by the series of new social, academic, financial, and personal stresses to their new college environment (Rozmus, Evans, Wysochansky, & Mixon, 2005). These new freedoms foster the promotion in college students to make personal choices in all aspects of their life, particularly diet choices.

Findings from epidemiological and clinical research suggest that consuming diets high in energy, total and saturated fat, and cholesterol and low fiber increase risk of coronary heart disease, stroke, diabetes, hypertension, and certain forms of cancer

(McArthur, Rosenberg, Grady, & Howard, 2002). Even with the issuance of guidelines for dietary intake from government and non-governmental agencies available since the 1970's, the three leading causes of death among men and women in this country today are all diet related (McArthur et al., 2002). When discussing dietary habits, health professionals are very concerned about the critical molding period of early adulthood. The dietary habits of college students have been described as less than desirable, lacking in minerals, nutrients, fiber, vitamins and high in fat. Studies suggest that the college atmosphere fosters habits such as frequently skipping meals, consuming large amounts of high-fat foods such as fast food, consuming high-calorie snack foods with avoidance of certain nutritious foods, consuming increased amounts of alcohol, and adopting unsound weight loss techniques (Grzywacz & Marks, 1999). College students tend to adopt these unhealthy dietary habits due to limited food preparation skills, restricted food storage and cooking facilities, preoccupation with weight, financial restrictions, and misconceptions about nutrition (Grzywacz & Marks, 1999).

Dietary Intake of Fruits and Vegetables.

The National Cancer Institute recommends five-or-more servings of fruits and vegetables per day for all Americans over two years of age (USDHHS, 2005). The five-serving minimum – three vegetables and two fruits – is standard; it is recommended that women in particular consume at least seven servings of fruits and vegetables per day (USDHHS, 2005). According to the U.S. Department of Health and Human Services (USDHHS) (2005), following these dietary guidelines can help protect against cancer and cardiovascular disease, as well as help in weight management. Currently, the dietary behaviors of many college students are reported as poor and unhealthy (Brevard and

Ricketts, 1996; Dinger & Waigandt, 1995; Henderson, 2000). Fruit and vegetable intake is of particular concern among this population. Several studies show that the consumption of fruits and vegetables among this group do not meet standard requirements (CDC, 1997; Dinger & Waigandt, 1997; Haberman & Luffey, 1998). According to the National College Health Risk Behavior Survey (NCHRBS), greater than one-in-four college students met the recommendations regarding daily fruit and vegetable intake at the time of the survey (CDC, 1997); no significant differences were found between white and black females. Haberman and Luffey (1998) surveyed 302 students at a large urban university. Findings revealed that 80% of students surveyed had inadequate amounts of grains, fruits, and vegetables.

Dietary Intake of Fat.

Diets high in fat are a major contributor to the overweight and obesity epidemic in the United States. As a nutrient, fat (nine kilocalories per gram) carries with it a higher caloric value than protein and carbohydrates; with provide four kilocalories per gram consumed. USDHHS (2005) suggests that all Americans 18 years of age or older should consume no more than 20%-to-35 % of their caloric intake from fat. The NCHRBS questioned participants on how many servings of high-fat foods they consumed on the previous day (specifically French fries, cookies, doughnuts, cakes, pies, pizza, hamburgers, hotdogs, or sausages). Greater than three-in-four students (78.2%) reported eating two-or-fewer servings during the day preceding the survey (CDC, 1997). White (79.1%) and Hispanic (81.2%) students were significantly more likely than black students (69.3%) to have eaten two-or-fewer servings of foods typically high in fat (CDC, 1997). Among females, white (86.4%) and Hispanic (84.7%) students were more likely than

black students (75.1%) to eat two-or-fewer servings high in fat foods (CDC, 1997). In a study conducted by Shankar, Dilworth, and Cone (2004), black college females consumed significantly more fat and cholesterol than their white counterparts, however, this study did reveal that black females more frequently purchased “regular” foods (those typically not containing high levels of fat) while white females more often purchased low-fat or fat-free foods (Shankar, Dilworth, & Cone, 2004). Siewe’s (1999) study was consistent with CDC’s in that black women were less likely to choose foods low in fat, to make efforts to reduce fat content in foods, and more likely to choose foods high in fats than were whites. Siewe (1999) advanced a “preference” hypothesis, in that the differences observed were not due to a lack of knowledge among black women regarding risk and associated health issues, but more likely indicative of an attraction for fatty foods.

Why These Differences Appear.

Obesity can happen to anybody, regardless of race, gender, or socioeconomic status. Black females are disproportionately affected by chronic diseases, including obesity (Hargreaves, Schlundt, & Buchowski, 2002); they report suffering higher levels of health-related problems due to overweight and obesity as well (Kumanyika, 1994). Ironically, college-aged black women generally report higher levels of body image satisfaction than their white counterparts (Abrams, Allen, & Gray, 1993; Rucker & Cash, 1992). For decades, differences have been documented between white and black females with regard to dietary fat intake, body composition, and ethnicity identity (Siewe, 1999); many researchers have sought to more fully understand these differences. For example, black women are more likely than white women to experience a disproportionately high

prevalence of excess body fat and related diseases (Adams-Campbell, Nwankwo, Ukoli, Omene, Haile, and Kuller, 1988; Ortiz, Russell, Daley, Baumgartner, Waki, Lichtman, Wang, Pierson, & Heymsfield, 1992).

There appears to be a universal preoccupation with body image among young women that has intensified over the past few decades (Hoyt & Kogan, 2001). Body-image development clearly occurs in a cultural context; cultures define gender-specific standards for physical attractiveness, body weight, and body shape (Fallon, 1990). Society imposes pressures to drive the best car, live in the most expensive house, wear designer clothes, and possess the perfect body image. These very pressures lead women to strive for extreme measures in order to consummate the image society deems acceptable and beautiful. If individually internalized and utilized in “goodness of fit” self-evaluations, cultural standards shape the individual’s body-image experiences and his/her adjustive behaviors (e.g., dieting, exercising, grooming, etc.) to manage these body-image experiences (Rucker & Cash, 1992). White women consistently score higher on body dissatisfaction indices as compared to black women (Henriques & Calhoun, 1999), while black females possess less disparaging attitudes toward body image, and evaluate their overall appearance more positively (Rucker & Cash, 1992).

Communication and media specialists have spent much time and money since the invention of radio and television in determining the impact that programming, commercials messages, and advertisements have on the attitudes and behaviors of its consumers (Botta, 2000). There have been claims for decades bombarding the communication industry for the negative effect it has in contributing to body dissatisfaction among its consumers, especially adolescents and young adults who,

through the influence of these media, form of self-identity with the world (Botta, 2000). Current studies have begun to pay particular attention to viewers who carry more body weight under the assumption that they spend more time watching television, resulting in the adoption of undesirable behaviors imitating what they view (Botta, 2000). Greenberg & Brand (1994) found that black women watch more television than do European white women. Despite being heavier overall, twice as many black women report satisfaction with their body compared to their white counterparts (Abrams, Allen, & Gray, 1993). With less pressure to meet social standards to meet an ideal of thinness, black women experience more positive attitudes toward overweight and obesity, thereby reporting less social pressure about their weight. Although this seems as a protective factor against harsh and unrealistic normative standards of society as well as eating disorders commonly experience by white women, it does not protect black women from the adverse health risk and diseases associated with being overweight.

The Health Belief Model.

The Health Belief Model (HBM) was among the first that adapted theory from the behavioral sciences directly to health problems; it remains one of the most widely-recognized conceptual frameworks of health behavior (Glanz & Rimer, 1997). The Health Belief Model was developed initially in the 1950s by a group of social psychologists in the U.S. Public Health Service to explain the widespread failure of people to participate in programs to prevent and detect disease (Hochbaum, 1958; Rosenstock, 1974). Later, the model was extended to include people's responses to disease symptoms (Kirscht, 1974), and to their behaviors in response to diagnosed illness, particularly as they related to adherence to medical regimens (Becker, 1974).

The Health Belief Model consists of five constructs. *Perceived Susceptibility* relates to a person's perception of his/her risk of contracting an illness. Related to a medically established illness, this dimension includes one's acceptance of the diagnosis, personal estimates of getting a disease again, and susceptibility to illness in general. *Perceived Severity* is one's belief of how serious a condition and its sequelae are; it specifies consequences of the risk and the conditions. Individuals inherently weigh their susceptibility to disease in combination with their perception of its severity to arrive at a perception of *Perceived Threat*.

A person's acceptance of personal risk and susceptibility is an important factor leading to health-promoting behavior. Nonetheless, an individual's course of action often depends on that person's perceptions of the benefits and barriers related to health behavior. *Perceived Benefits* are one's beliefs in the efficacy of a particular action to reduce the risk or seriousness of disease; such perceptions often define the action to be taken and clarify the positive effects that may be expected. *Perceived Barriers* are one's beliefs about the tangible and psychological costs of a particular action (e.g., expense, danger, and pain). A non-conscious cost-benefit analysis occurs; individuals weigh the benefits minus the barriers to action. Combined levels of susceptibility and severity provide the impetus to act, and the perceptions of benefits (less barriers) provide a clear path of action (Rosenstock, 1974).

Cues to Action are strategies that activate one's readiness; they provide how-to information, promote awareness, and employ a system of reminders for those interested in changing behavior. A diverse set of demographic, sociopsychological, and structural variables may affect a person's perceptions, thereby potentially influencing health-related

behavior. Modified versions of the Health Belief Model contain additional measures (Steers, Elliott, Nemiro, Ditman, & Oskamp, 1996). A recent addition is the concept of *Self-Efficacy* (Bandura, 1977a; 1977b), the level of one's personal confidence in his or her ability to successfully perform a behavior. Formally added by Rosenstock and others in 1988, self-efficacy as a construct allows HBM to better fit the challenges of changing habitual unhealthy behaviors, such as being sedentary, smoking, or overeating (Glanz, Rimer, & Lewis, 2002).

Many researchers have utilized the axioms of the Health Belief Model to investigate dietary knowledge, habits, and beliefs. According to Rosenstock (1982), the utility of this behavioral model and its components is well-documented in explaining segments of societal behavior. Regarding Health Belief model components, a review of the literature suggests certain areas have been studied to a greater degree than have others. Specifically valid and reliable measures were found for benefits and barriers to a healthy diet (Petrovici, 2004; Von Ah, Ebert, Ngamvitroj, Park, and Kang, 2004; Abood, Black, & Feral, 2003; Shive & Neyman, 2003; Ling & Horwath, 2001; McDonell, Roberts, & Lee, 1998; McIntosh & Kubena, 1996; Dittus, Hillers, & Beerman, 1995) and questionnaires to measure dietary knowledge (Al-Numair, 2004; Petrovici, 2004; Shive & Neyman, 2003; Yeh, 2000). However there seems to be a gap in attempts to evaluate Health Belief Model constructs that measure the threat of obesity, severity and susceptibility to obesity and its sequellae, and cues to action for a healthy diet.

Extended Review of Literature References

- Abood, D.A., Black, D.R., & Feral, D. (2003). Nutrition education worksite intervention for university staff: application of the health belief model. *Journal of Nutrition Education and Behavior*, 35(5), 260-267.
- Adams-Campbell, L.L., Nwankwo, M., Ukoli, F., Omene, J., Haile, G.T., and Kuller, L.H. (1988). Body fat distribution patterns and blood pressure in black and white women. *Journal of the National Medical Association*, 82, 573-576.
- Abrams, K.K., Allen, L., & Gary J.J. (1993). Disordered eating attitudes and behaviors, psychological adjustment, and ethnic identity: a comparison of black and white female college students. *International Journal of Eating Disorders*, 14, 49-57.
- Al-Numair, K.S. (2004). Nutrition knowledge of primary care physicians in Saudi Arabia. *Pakistan Journal of Nutrition*, 3(6), 344-347.
- American Heart Association (AHA) (2005). Obesity and overweight: aha scientific position. Retrieved December 30, 2005, from, <http://www.americanheart.org/presenter.jhtml?identifier=4639>.
- Baltrus, P.T., Lynch, J.W., Everson-Rose, S., Raghunathan, T.E., & Kaplan, G.A. (2005). Race/ethnicity, . study. *American Journal of Public Health*, 95, 1595-1601.
- Bandura, A. (1977a). *Social Learning Theory*. Englewood Cliffs, NJ: Prentice-Hall.
- Bandura, A. (1977b). Self-efficacy: Toward a unifying theory of behavioral change. *Psychological Re-view*, 84, 191-215.
- Bassett, M.T. & Perl, S. (2004). Obesity: the public health challenge of our time. *American Journal of Public Health*, 94(9), 1477.

Becker, M.H., (Ed.) (1974). The Health Belief Model and Personal Health Behavior.

Health Education Monographs, 2(Entire Issue).

Brevard, P.B. & Ricketts, C.D. (1996). Residence of college students affects dietary intake, physical activity, and serum lipid levels. *Journal of American Dietetic Association*, 96(1), 35-38.

Brandon, L.J. (1998). Comparison of existing skinfold equations for estimating body fat in African American and white women. *American Journal of Clinical Nutrition*, 67, 1155-1161.

Botta, R.A. (2000). The mirror of television: a comparison of black and white adolescents body image. *Journal of Communication*, 50(3), 144-162.

Caldwell, W & Kimball, C.T. (Eds.) (2001) *Obesity Sourcebook*. Health Reference Series: First Edition. Detroit, MI :Omnigraphics

Centers for Disease Control and Prevention (CDC) (2003). *National diabetes fact sheet*.

Retrieved January 28, 2006, from

<http://www.cdc.gov/diabetes/pubs/estimates.htm#prev>

CDC (2005a). *About the BRFSS*. Retrieved January 28, 2006, from

<http://www.cdc.gov/brfss/about.htm>.

CDC (2005b). *BMI - Body Mass Index: BMI for Adults: Body Mass Index Formula for*

Adults. Retrieved December 19, 2005, from

<http://www.cdc.gov/nccdphp/dnpa/bmi/bmi-adult-formula.htm>.

CDC (2005c). *Overweight and Obesity*. Retrieved January 28, 2006, from,

<http://www.cdc.gov/nccdphp/dnpa/obesity/index.htm>.

- CDC (2005d). *Overweight and Obesity: Economic Consequences*. Retrieved September 2, 2005, from, http://www.cdc.gov/nccdphp/dnpa/obesity/economic_consequences.htm.
- CDC (2005e). *Overweight and Obesity: Obesity Trends: U.S. Obesity Trends 1985–2004*. Retrieved December 29, 2005, from <http://www.cdc.gov/nccdphp/dnpa/obesity/trend/maps/index.htm>.
- CDC (1997). *Youth Risk Behavior Surveillance: National College Health Risk Behavior Survey – United States, 1995*. Retrieved September 3, 2005 from, <http://www.cdc.gov/mmwr/preview/mmwrhtml/00049859.htm>.
- Dinger, M.K. & Waigandt, A. (1997). Dietary intake and physical activity behaviors of male and female college students. *American Journal of Health Promotion*, 11(5), 360-362.
- Dittus, K.L., Hillers, V.N., & Beerman, K.A. (1995). Benefits and barriers to fruit and vegetable intake: relationship between attitudes and consumption. *Journal of Nutrition Education*, 27(3), 120-126.
- Flegal, K.M., Carroll, M.D., Ogden, C.L., & Johnson, C.L. (2002). Prevalence and trends in obesity among US adults. *Journal of American Medical Association*, 288, 1723-1727.
- Gallager, D., Visser, M., Sepulveda, D. Pierson, R.N., Harris, T., & Heymsfield, S.B. (1996). How useful is body mass index for comparison of body fatness across age, sex, and ethnic groups? *American Journal of Epidemiology*, 143(3), 228-239.
- Glanz, K. & Rimer, B. K. (1997). *Theory at a Glance: A Guide for Health Promotion Practice*. Bethesda, MD: National Cancer Institute.

- Glanz, K., Rimer, B., & Lewis, F. (Eds.) (2002) *Health Behavior and Health Education, Third Edition*. San Francisco, CA: Jossey-Bass.
- Greenberg, B.S. & Brand, J.E. (1994). Minorities and the mass media: 1970s to 1990s. In J. Bryant & D. Zillmann (Eds.). *Media Effects: Advances in Theory and Research* (pp. 273-314). Hillsdale, NJ: Erlbaum.
- Grzywacz, J.G. & Marks, N.F. (1999). Family solidarity and health behaviors. *Journal of Family Issues*, 20(2), 243-268.
- Haberman, S. & Luffey, D. (1998). Weighing in college students' diet and exercise behaviors. *Journal of American College Health*, 46(4), 189-192.
- Haslam, D.W. & James, P.T. (2005). Obesity. *The Lancet*, 366, 1197-1209.
- Hamilton, M. & Greenway, F. (2004). Obesity and associated complications. In Hofbauer, Keller, & Boss (Eds.) *Pharmacotherapy of Obesity: Options and Alternatives* (pp. 88-109). Florida: CRC Press.
- Henderson, C.W. (2000). International students gain fat, weight from American diet. *Obesity, Fitness & Wellness Weekly*, 2-4.
- Henriques, G. & Calhoun, L.G. (1999). Gender and ethnic differences in relationship between body esteem and self-esteem. *Journal of Psychology*, 4, 357-368.
- Hochbaum, G.M. (1958). *Public Participation in Medical Screening Programs: A Sociopsychological Study*. PHS Publication No. 572. Washington, DC: U.S. Government Printing Office.
- Huang, T.K., Harris, K.J., Lee, R.E., Nazier, N., Born, W., & Kaur, H. (2003). Assessing overweight, obesity, diet, and physical activity in college students. *Journal of American College Health*, 52(2), 83-87.

- Irwin, C.C. (2003). An examination of the relationship between selected demographic variables, behavioral intention, and self-reported behavior toward the obese among college students. *UMI Proquest Digital Dissertations*, 64(09), 3207. (UMI No. AAT 3103198).
- Kirscht, J.P. (1974). The Health Belief Model and illness behavior. *Health Education Monographs*, 2, 2387-2408.
- Kolotkin, R.L., Meter, K., & Williams, G.R. Quality of life and obesity. *Obesity Reviews*, 2(40), 219-229.
- Kuczmarski, R.J., Flegal, K.M., Campbell, S.M., Johnson, C.L. (1994). Increasing prevalence of overweight among US adults: the national health and nutrition examination surveys. *Journal of American Medical Association*, 272, 205-211.
- Kumanuika, S.K. (1994). Obesity in minority populations: an epidemiologic assessment. *Obesity Research*, 2, 166-182.
- Kuller, L.H. (1999). The epidemiology of obesity in adults in relationship to cardiovascular disease. In Fletcher, Grundy, & Hayman (Eds.). *Obesity: Impact on Cardiovascular Disease* (pp. 3-29). New York: Futura Publishing Company.
- Ling, A.C. & Horwath, C. (2001). Perceived benefits and barriers of increased fruit and vegetable consumption: validation of a decisional balance scale. *Journal of Nutrition Education*, 33(5), 257-265.
- Lopez, R. (2004). Urban sprawl and risk for being overweight or obese. *American Journal of Public Health*, 94(9), 1574-1579.
- Mann, G.V. (1974). The influence of obesity on health (first of two parts). *New England Journal of Medicine*, 291(4), 178-185.

- McDonell, G.E., Roberts, D.C., & Lee, C. (1998). Stages of change and reduction in dietary fat: effect of knowledge and attitudes in an Australian university population. *Journal of Nutrition Education*, 30(1), 37-44.
- McIntosh, W.A. & Kubena, K.S. (1996). An application of the health belief model to reductions in fat and cholesterol intake. *Journal of Wellness Perspectives*, 12(2), 98-108.
- Melton, B.F. (2005). *The Culture of Obesity*. Unpublished doctoral dissertation, Georgia Southern University, Statesboro.
- Mokdad, A. Bowman, B. Ford, E. Vinicor, F., Marks, J., & Koplan, J. (2001). The continuing epidemics of obesity and diabetes in the United States. *The Journal of the American Medical Association*, 282(16), 1519-1522.
- National Cancer Institute (NCI), 2004. *Obesity and Cancer: Questions and Answers*. Retrieved December 29, 2005, from, <http://www.cancer.gov/cancertopics/factsheet/Risk/obesity>.
- National Center for Health Statistics (NCHS) (2004). *Obesity Still a Major Problem, New Data Shows*. Retrieved December 15, 2005, from, <http://www.cdc.gov/nchs/pressroom/04facts/obesity.htm>.
- NCHS (2005). *Prevalence of Overweight Among Children and Adolescents: United States, 1999-2002*. Retrieved January 28, 2006, from, <http://www.cdc.gov/nchs/products/pubs/pubd/hestats/overwght99.htm>.
- National Institute of Diabetes and Digestive and Kidney Diseases (NIDDK) (2005). *Statistics related to overweight and obesity*. Retrieved December 16, 2005, from <http://win.niddk.nih.gov/statistics/#econ>.

- National Institutes of Health [NIH] (2000). *The Practical Guide Identification, Evaluation, and Treatment of Overweight and Obesity in Adults*. NIH Publication No. 00-4084
- Ortiz, O., Russell, M., Delay, T.L., Baumgartner, R.N., Waki, M., Lichtman, S., Wang, J., Pierson, R.N., & Heymsfield, S.B. (1992). Differences in skeletal muscle and bone mineral mass between black and white females and their relevance to estimates of body composition. *American Journal of Clinical Nutrition*, 55, 8-13.
- Petrovici, D. (2004). Diet and Health: Are consumers willing to perform health behaviours? Canterbury, Kent, England. Retrieved November 28, 2005, from, www.kent.ac.uk/KBS/research-information/working-papers/Petrovici-No-65.pdf.
- Pi-Sunyer, F.X. (1991). Health implications of obesity. *American Journal of Clinical Nutrition*, 53, 1595S-1603S.
- Pi-Sunyer, F.X. (1995). Medical complications of obesity. In K. Brownell & C. Fairburn (Eds.), *Eating disorders and obesity: A comprehensive Handbook* (pg. 401-405). New York: Guilford Press.
- Pi-Sunyer, F.X. (1993). Medical hazards of obesity. *Annals of Internal Medicine*, 119(7), 655-660.
- Poston, H.W.S.C., Suminski, R.R. & Foreyt, J.P. (2000). Physical activity level and the treatment of severe obesity. In C. Bouchard (Ed.), *Physical Activity and Obesity*. Champaign, IL: Human Kinetics.
- Puhl, R. & Brownell, K.D. (2001). Bias, discrimination, and obesity. *Obesity Research*, 9(12), 788-805.

- Racette, S.B., Deusinger, S.S., Strube, M.J., Highstein, G.R., & Deusinger, R.H. (2005). Weight changes, exercise, and dietary patterns during freshman and sophomore years of college. *Journal of American College Health, 53*(6), 245-251.
- Rand, C. S. W., & Wright, B.A. (2000). Continuity and change in the evaluation of ideal and acceptable body sizes across a wide age span. *International Journal of Eating Disorders, 28*(1), 90-100.
- Renahan, A. G. & Howell, A. (2005). Preventing cardiovascular disease, cancer and diabetes. *The Lancet, 365*(9469), 1449-1451.
- Rosato, F.D. (2000). *Fitness for wellness: the physical connection* (4th ed.) Dubuque, IA: Kendall/Hunt.
- Rosenstock, I.M. (1974). Historical origins of the Health Belief Model. *Health Education Monographs, 2*, 328-335.
- Rosenstock, I.M. (1982). The Health Belief Model and nutrition education. *Journal of the Canadian Dietetic Association, 43*(3), 184-192.
- Rozmus, C.L., Evans, R.E., Wysochansky, M., & Mixon, D. (2005). An analysis of health promotion and risk behaviors of freshman college students in a rural southern setting. *Journal of Pediatric Nursing, 20*(1), 25-33.
- Rucker, C. & Cash, T. (1992). Body images, body-size perceptions, and eating behaviors among African-American and white college women. *International Journal of Eating Disorders, 12*(3), 291-299.
- Schapira, D.V., Clark, R.A., Wolff, P.A., Jarrett, A.R., Kumar, N.B., & Aziz, N.M. (1994). Visceral obesity and breast cancer risk. *Cancer, 74*(2), 632-639.

- Shive, S.E. & Neyman, M.R. (2003). Prevalence and predictors of fruit intake among community college women in the extended opportunity program and services. *California Journal of Health Promotion*, 1(1), 91-102.
- Steers, W.N., Elliott, E., Nemiro, J., Ditman, D., & Oskamp, S. (1996). Health beliefs as predictors of HIV-preventive behavior and ethnic differences in prediction. *Journal of Social Psychology*, 136(1): 99-110.
- Stunkard, A.J. & Sobal, J. (1995). Psychosocial consequences of obesity. In K. Brownell & C. Fairburn (Eds.), *Eating Disorders and Obesity: A comprehensive handbook* (pp. 417-425). New York: The Guilford Press.
- Spear, B.E. & Reinold, C. (2001). Obesity and nutrition. In Raczynski & DiClemente (Eds.), *Handbook of Health Promotion and Disease Prevention* (pp. 171-189). New York: Kluwer Academic/Plenum Publishers.
- Steers, W.N., Elliott, E., Nemiro, J., Ditman, D., & Oskamp, S. (1996). Health beliefs as predictors of HIV-preventive behavior and ethnic differences in prediction. *Journal of Social Psychology*, 136(1): 99-110.
- Sturm, R. (2002). The effects of obesity, smoking, and problem drinking on chronic medical problems and health care cost. *Health Affairs*, 21(2), 2145-2253.
- Racette, S.B., Deusinger, S.S., Strube, M.J., Highstein, G.R. & Deusinger, R.H. (2005). Weight changes, exercise, and dietary patterns during freshman and sophomore years of college. *Journal of American college health*, 53(6), 245-251.

- Tzamaloukas, A.H., Murata, G.H., Hoffman, R.M., Schmidt, D.W., Hill, J.E., Leger, A., Macdonald, L., Caswell, C., Janis, L., & White, R.E. (2003). Classification of the degree of obesity by body mass index or by deviation from ideal weight. *Journal of Parenteral and Enteral Nutrition*, 27(5), 340-348.
- Tzamaloukas, A.H. Murata, G.H., & Vanderjagt, D.J. (2005). Limitations and pitfalls of body mass index as an indicator of body fat content. In L.A. Ferrera (Eds.), *Body Mass Index and Health* (pp. 59-80). New York: Nova Science Publishers, Inc.
- United States Department of Agriculture (USDA) (2005). *Appendix C: Glossary of Terms*. Retrieved December 27, 2005, from <http://www.health.gov/dietaryguidelines/dga2005/document/html/appendixC.htm>.
- U.S. Department of Health and Human Services (USDHHS) (2005). *Dietary guidelines for Americans, sixth edition*. Atlanta, GA: Department of Agriculture.
- Vanderbilt University Medical Center (2001). *Vanderbilt Center for Surgical Weight Loss: Glossary*. Retrieved December 16, 2005, from <http://www.mc.vanderbilt.edu/root/vumc.php?site=bariatric&doc=4265>.
- Van Itallie, T.B. (1979). Obesity: adverse effects on health and longevity. *American Journal of Clinical Nutrition*, 32(12), 2723-2733.
- Visscher, T.L.S. & Seidell, J.S. (2001). The public health impact of obesity. *Annual Review of Public Health*, 22, 335-375.
- Von Ah, D., Ebert, S., Ngamvitroj, A., Park, N. & Kang, D.H. (2004). Predictors of health behaviours in college students. *Journal of Advanced Nursing*, 48(5), 463-474.

- Wilfley, D.E., Schreiber, G.B., Pike, K.M., Striegel-Moore, R.H., Wright, D.J., & Rodin, J. (1996). Eating disturbance and body image: a comparison of a community sample of adult black and white women. *International Journal of Eating Disorders*, 20(4), 377-387.
- World Health Organization (WHO) (2005). *Facts Related to Chronic Diseases*. Retrieved December 16, 2005, from <http://www.who.int/dietphysicalactivity/publications/facts/chronic/en/print.html>.
- WHO (2003). *Obesity and Overweight*. Retrieved September 2, 2005, from, <http://www.who.int/dietphysicalactivity/publications/facts/obesity/en/print.html>.
- WHO (2006). *Controlling the Global Obesity Epidemic: The Challenge*. Retrieved February 27, 2006, from, <http://www.who.int/nutrition/topics/obesity/en/index.html>.
- Yeh, M-C.P. (2000). Nutrition knowledge, health beliefs, and use of nutrition supplements among older adults in Northwestern Wisconsin. Unpublished master's thesis. University of Wisconsin-Stout. Retrieved January 31, 2006, from, <http://www.uwstout.edu/lib/thesis/2000/2000yehm.pdf>.

APPENDIX C

INSTRUMENTATION: HEALTH BELIEF MODEL RUBRIC

Opening Questions...

1. How's the food?
2. Is it any different from what you might have had if you didn't come here tonight?
3. What do you normally eat for dinner?
4. What about your friends and family?

Perceived Susceptibility...

1. For those of you who are about the right weight, do you ever think about getting...
 - High Blood Pressure
 - High Cholesterol
 - Obesity
 - Cancer (especially the types linked to obesity)
 - Cardiovascular Disease
 - Diabetes (type-II)

2. For those of you who are overweight (or have family/friends who are overweight), do you (they) think about...
 - High Blood Pressure
 - High Cholesterol
 - Obesity
 - Cancers (especially the types linked to obesity)
 - Cardiovascular Disease
 - Diabetes (type-II)

Perceived Severity...

1. For those of you who are about the right weight, how severe do you think are the following diseases?
 - High Blood Pressure
 - High cholesterol
 - Obesity
 - Cancer (especially the types linked to obesity)
 - Cardiovascular Disease
 - Diabetes (type-II)

2. For those of you who are overweight (or have family/friends who are overweight), what about you?
 - High Blood Pressure
 - High cholesterol
 - Obesity
 - Cancer (especially the types linked to obesity)
 - Cardiovascular Disease
 - Diabetes (type-II)

Cues to Action...

Family History...

1. Is there anyone in your family who you would consider to be obese?
2. Any history of the diseases we talked about a few minutes ago?
3. As a child, do you remember a lot of fruits and vegetables...high-fat foods?
4. Growing up, were most of your family meals eaten at home or in restaurants?
5. Do you think your parents feel dietary habits are an important component of health?
6. What type of foods do you currently eat with your family?

Mass Media Campaigns...

1. Let's talk TV, radio, and magazines...what do you recall seeing, hearing, and reading about related to food?

Health Education...

1. What health information have you received related to dietary behaviors, obesity, or both from...
 - GSU Health Services
 - HLTH 1520 – Healthful Living
 - Physical Activity Courses
 - Other Courses
 - Food Establishments On-Campus
 - Other Sources

Advice From Others...

1. What do friends or family members say to encourage you to make healthy dietary choices?
2. What about preparing meals at home as opposed to eating in restaurants?
3. Has a doctor recently advised you to lose weight or change your dietary habits?
 - For those of you who did...did you follow the advice...how long?
 - For those of you who did not...would you comply...how long?

Perceived Threat of Obesity...

1. Bottom line, do you consider yourself to be at-risk for becoming overweight or obese?
2. Rate your risk, where 1 = not-at-all and 5 = certain.
3. Talk briefly about it, if you will...

Thank you for participating...

APPENDIX D

INSTRUMENTATION: DIETARY AND WEIGHT MANAGEMENT SURVEY

The following questions ask about your dietary and weight management behaviors. This is a confidential survey; your participation is completely voluntary. Mark only one answer to each question.

1. Yesterday, how many times did you eat fruit?
 0 times 1 time 2 times 3-or-more times
2. Yesterday, how many times did you drink fruit juice?
 0 times 1 time 2 times 3-or-more times
3. Yesterday, how many times did you eat green salad?
 0 times 1 time 2 times 3-or-more times
4. Yesterday, how many times did you eat cooked vegetables?
 0 times 1 time 2 times 3-or-more times
5. Yesterday, how many times did you eat hamburger, hot dogs, or sausage?
 0 times 1 time 2 times 3-or-more times
6. Yesterday, how many times did you eat French fries or potato chips?
 0 times 1 time 2 times 3-or-more times
7. Yesterday, how many times did you eat cookies, doughnuts, pie, or cake?
 0 times 1 time 2 times 3-or-more times
8. During the past 30 days, did you **diet** to lose weight or keep from gaining weight?
 Yes No
9. During the past 30 days, did you **exercise** to loose weight or to keep from gaining weight?
 Yes No
10. During the past 30 days, did you **vomit or take laxatives** to lose weight or keep from gaining weight?
 Yes No
11. During the past 30 days, did you take **diet pills** to loose weight or to keep from gaining weight?
 Yes No

Please fill in the following information:

Age (in years): _____ **Race (check one):** White Black

Weight (in pounds): _____ **Height (in feet and inches):** ___ feet ___ inches

I will be able to participate in a focus group next week on ___ Tuesday or ___ Thursday.

Thank you for taking the time to complete this questionnaire.