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**The Acceptance of Heart Healthy Food Items Among
College Students**

By

Waleed Mohammed Alrayyes

Thesis

Submitted in partial fulfillment of the requirements for the degree of

Master of Sciences in Family and Consumer Sciences

In the Graduate school, Eastern Illinois University

Charleston, Illinois

2009
Year

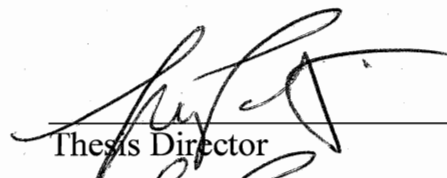
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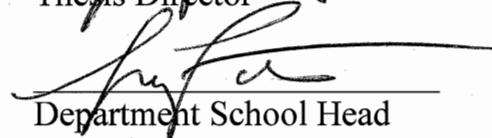
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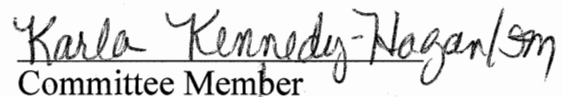
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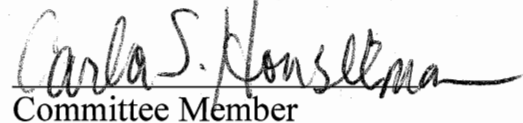
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THE ACCEPTANCE OF HEART HEALTHY FOOD
ITEMS AMONG COLLEGE STUDENT

The Acceptance of Heart Healthy Food Items among College Students

Waleed Mohammed Alrayyes

Eastern Illinois University

Fall 2009

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Dedication

I would like to thank *Allah* (God) who enabled me to complete my work in time. I would also like to express my gratitude towards Prophet Muhammad *Alaih As-Salat-O-Wassalam* (prayers and peace be upon him) who provided me inspiration to work harder.

I would like to dedicate this thesis to my family and friends. Without their support and encouragement I would not be who I am today. I would like to make a special dedication to my mother Raja Al-Rasheed who led me into the field of healthcare so that I can make a difference in the quality of other people's lives.

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I wish to express my deep appreciation and gratitude for the encouragement, expertise and supervision of Prof. Dr. James E. Painter, Chairman of School of Family and Consumer Sciences who is serving as my advisor for this thesis.

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Abstract

This thesis project was undertaken to discover the acceptance of heart healthy food items among college students. Previous studies stated that many college students leaving home and entering college for the first time often make choices that are less healthful. The researchers suggest that this is because of adopting poor diets. As a result of consuming an unhealthy diet coupled with a sedentary lifestyle, students may increase their risk of developing a variety of diseases, such as CVD, later in life.

Data for this study were collected from a sample of 100 college students at a Midwestern University. The samples included undergraduate and graduate students of both sexes who are enrolled in the university as either full time or part time students. The researcher recruited the first 100 students that agree to participate in the study.

Data suggest that most students (90%) were receptive to consuming more of the heart healthy food items that were listed on the questionnaire. A majority of them were willing to incorporate these foods into their daily diet.

Research results indicated there is also a need for increasing the role of the dietitian in giving advice to students on the best practices on healthy eating. The study also suggests areas that need further exploration to find an effective remedy for this important issue such as the things that affects students' food choices.

Chapter I

Introduction

The heart is the muscular organ that pumps blood through the body. It is essential to human life which depends on blood circulation to supply oxygen and nutrients to the various cells of the body. If the heart stops beating for only a few seconds, permanent damage may be done to the brain. Death usually occurs if the heart stops beating for only several minutes.

Diseases of the heart and blood vessels are closely related and are usually classified together as a group called cardiovascular diseases (CVD). The term heart disease and CVD are often used interchangeably. Both are widely used terms that explain a verity of diseases that affect the heart and cardiovascular system. Both terms are also refer to the narrowing or blocking of vessels, which can cause a heart attack, pain in the chest, and stroke. The various types of diseases and the disorders that affect the cardiovascular system are: congenital defects of the heart; coronary artery disease; infections affecting the heart muscle, valves or membranes; congestive heart failure; disorders of the transmission of impulses; and heart murmurs (Eschiti, 2005).

The World Health Organization reported in 2007 that:

- CVD is the number one cause of death globally: more people die annually from CVD than from any other cause;
- An estimated 11.8 million people died from CVD in 2005, representing 30% of all global deaths. Of these deaths, an estimated 7.6 million were due to coronary heart disease and 5.7 million were due to stroke;
- Over 80% of CVD deaths take place in low- and middle-income countries and occur almost equally in men and women;
- By 2015, almost 20 million people will die from CVD mainly from heart

disease and stroke. These are projected to remain the single leading causes of death (World Health Organization, 2007).

Approximately one in four Americans currently have some form of cardiovascular disease. These diseases claim one American life every 32 seconds nearly one million Americans or one out of every two deaths in the nation. Even though the death rate from heart disease has dropped by almost 25 percent in the decade between 1978 and 1988, it is still the number one cause of death in America.

It is remarkable to find that an individual can greatly reduce their chances of developing heart disease by following a healthy diet. Food plays an important role in the body in both promoting good health status and preventing disease progression. Many people do not realize the role of their diet until they begin to suffer from heart disease. Healthful food provides the body with proteins, carbohydrates, fats, and vitamins/minerals. Adequate nutrition supports metabolic processes that help to protect the body against diseases and contributes to the overall quality of an individual's life.

There is a strong correlation between abnormal blood lipid profile values such as: high total cholesterol, high LDL-cholesterol, high triglycerides and low HDL-cholesterol values and an increased prevalence of coronary heart disease (CHD). Primary and secondary prevention trials have also established the importance of lowering serum cholesterol levels in the reduction of death and morbidity from CVD (Olusiet, 1997).

Fat consumed from foods can affect the blood lipid profile in humans. Dietary fat should be controlled in quality and quantity by substituting polyunsaturated fatty acids in the diet for saturated fats, which are customarily consumed. A healthy person should consume about 15-20% of their calorie requirements from fat intake (Joshi,

2000).

Statement of the problem

A study conducted in a Croatian university titled “Diet Quality in Croatian University Students” stated that many college students leaving home and entering college for the first time often deteriorate significantly in health quality. The researchers suggest that this is because of adopting poor diets that contain excessive amounts of sugar, cholesterol, and saturated fats (Satalic, 2007). As a result of consuming an unhealthy diet coupled with a sedentary lifestyle, students gain excessive weight and increase their risk of developing a variety of diseases, such as CVD, later in life.

Purpose of the study

The purpose of this study is to determine how well students accept heart healthy foods. This research will provide a basic overview of the acceptance of adding food items that students can easily and enjoyably be consumed on a daily basis that have potential to improve their health status.

Research question

How well do students accept the addition of heart healthy foods to their habitual diet?

Objectives

- To assess the percentage of students that knows what CVD is.
- To assess the percentage of students that knows which foods reduce the risk of CVD.
- To assess the percentage of students who are willing to consume a heart healthy diet daily through their acceptance of the following foods:
 - Soy milk

- Egg Substitutes
 - Oat bread and cereals
 - Fruits and vegetable
 - Grape wine/juice and tea
 - Sea foods (twice a week), soy burger, and legumes
 - Garlic, olive oil, and nuts
 - Limit the amount of red meat eat to 2-3 serving (3 oz) per week
- To assess the percentage of students who consume daily food items that students marked in the survey.

Operational Definition

Polyunsaturated fatty acid are classified by chemical structure as omega-3 and omega-6 fatty acids imbalance between omega-3 and omega-6 fatty acids can lead to heart disease, depression, asthma, arthritis, and cancer.

A lipid profile measures total cholesterol, HDL cholesterol, LDL cholesterol, and triglycerides. A physician may order a lipid profile as part of an annual exam or if there is specific concern about CVD

Low density lipoprotein (LDL), sometimes referred to as bad cholesterol, is a risk factor for CVD if it is too high.

High density lipoprotein (HDL), sometimes referred to as good cholesterol, is a risk factor for CVD if it is too low.

Triglycerides are a risk factor for developing CVD if they are elevated.

Significance of Study

This study is an important part in the discovery of student knowledge and attitudes towards heart-healthy diets in an effort to promote healthy eating and good health habits to build on later in life. The results of this study will help aid in the development of effective nutrition intervention methods among the young adult population.

Assumptions

- The summer semester will yield a smaller sample size due to the fact that a majority of students are on vacation.
- The majority of students will not be familiar with and have low acceptance of certain heart-healthy foods such as soy milk, egg substitutes and tea.

Limitations

Limitations of this study included sample sizing and type. Convenience sample methods were used to obtain the data in this study that consisted of students who attended a Midwestern university during summer semester. The small sample size is attributed to the timing of the study which occurred during the summer semester where a majority of students are on vacation. No data were available for the acceptance or consumption of egg whites only or egg substitutes and was a recognized limitation of the study. Length of time to conduct the entire study was also a limitation due to the fact that the study was a part of a graduate level thesis. These factors may diminish the generalizability of the results of this study.

Summary

The relationship between food and health is clear and certain; food is necessary for the life, growth, vitality and activity of humans as well as for resisting diseases.

Nutrition habits and diet play a main role in development of heart and vascular disease. These diseases are among chronic diseases which can be avoided through a

healthy life style which includes a healthful diet.

Chapter II

Literature Review

Fruits

In their study of the dietary patterns of college students, Brunt, Rhee and Zhong (2008) found that fruits were one of the foods least eaten in terms of quantity and frequency. Of the 557 who participated in the survey, which used the Diet Variety Questionnaire, only 33% reported an intake of fruits which was limited to only one serving or less within a span of three days. This meant that in a week, the students ate at most two servings of fruit. The questionnaire's list of food choices included citrus, berries and melons while a choice for other fruits was also provided. These fruits were selected as they were determined to be a common component of college students' diet.

Of those who indicated that they had fruits in their diet, 51.9% ate citrus fruits, 27.6% ate berries, and 21% ate melons while 50% ate other kinds of fruits. When body mass index (BMI) is considered, fruit intake among the underweight, healthy, overweight and obese students were not found to be significant. Based on the results of the study, fruit is a poorly accepted food in the study sample especially when compared with the 1 to 3 times per day consumption of snacks high in fat, salt and sugar by nearly all the participants. The fact that students are living away from home and are thus making their own food choices is deemed a significant factor influencing poor diet in this population.

Earlier, a study by Shive and Neyman (2006) among 1,367 predominantly white and female community college students in a rural setting revealed a mean typical fruit intake of 1.8 servings. This is higher than that noted by Brunt, A., Rhee, Y., & Zhong, L. (2008), although this value still falls below the recommended

servings per day. Although fruit was accepted as a health and energy-providing food, a limited food budget was the main barrier for low fruit consumption where 22-27% of the respondents had to cut down their meal sizes because they had no money to purchase food. A significant number of those who ate fewer fruits were also utilizing government food assistance programs.

In another survey conducted by Chung, S., Hoerr, S., Levine, R., & Coleman, G. (2006) regarding the fruit intake of 236 female college students, all had fruit in their diet but the frequency and amount varied. Findings revealed that Thirty four point percent ate less than two servings in a span of three days while 65.3% ate two or more within the same time period. Of the former, 6.8% stated that they had no plans of increasing their intake while a larger 27.9% had the desire to increase their intake within the next 30 days or the next six months. Of the latter, 15% had been eating two or more fruit servings for the past six months while 50.3% have been taking this amount for more than six months. The study shows that among college women, fruit is a well-accepted food where losing weight or maintaining weight loss through a low fat diet was the main reason for consumption.

Vegetables

Concerning vegetable consumption, Granner, M., Sargent, R., & Calderon, K. (2004) surveyed 732 middle school students and found out that their average vegetable intake was 3.2 servings per day. However, not all students readily accepted vegetables as part of their diet. Where those who were white, female and aged 11-13 had higher preference for this food compared to black, male and older students. Considering race, the availability of vegetables at home influenced intake among whites while among blacks, social influences such as family and peers factored in the same. Considering gender, social influence played a role in food choice among males.

For females, the desire not to gain weight was an important factor when choosing food. Similar findings were reported by Chung et.al among college women (2006), whose findings validated those reported by Granner et al.

The research suggests that the acceptance of vegetables significantly differs with age, race and gender among adolescents. Further, Boynton-Jarrett, R., Thomas, T., Peterson, K., Wiecha, J., Sobol, A., & Gortmaker, S. (2003). Found that television viewing is also a factor that decreases the vegetable intake of middle school students. He suggested that heavy advertising influences food choices towards those being advertised.

In determining the vegetable consumption of first year college students in the U.K., a survey by Williams (2000) revealed that 80% had a daily intake below 400g or fell short of the recommended amount per day as per the World Health Organization. Although majority knew that vegetable intake was beneficial to health and significantly influenced acceptance, more than half of the participants were not aware of the recommended daily intake.

Living away from home was a primary factor in the vegetable intake decrease reported by 46% of the students similar to the suggestion of Brunt et.al Thirty three percent were successful in keeping their consumption similar to home, which implies that diets established at home significantly influences students' diets while they are away. Geographical origin also influenced vegetable intake where those living in the south of the UK ate greater amounts of vegetables per day compared to those who came from the north, (Williams, 2000).

Soy products (milk & burger) and legume

Oshiro, C., Maskarinec, G., Petitpain, D., Hebshi, S., & Novotny, R.

(2004).determined the acceptability of drinking soy milk among female adolescents as a possible prevention measure against breast cancer since previous studies indicated such efficacy of soy products. In a sample of 18 females 8-14 years old an initial taste test which ranged from one to five with one as lowest and interpreted as “No way!” or unpalatable and five as highest interpreted as “Hurray!” or delicious was conducted. Eight or 44% rated the drink above three, while 10 or 56% rated it as three or lower of the students. Drinking one serving of soy milk daily for one month, nine of the participants regarded the activity as manageable, eight stated it as a simple task, while one had difficulty. Girls who were already drinking soy milk prior to participation readily consumed the drink.

In the course of the study, improvements were made in taste, variety and texture, which were considered to be significant in persuading young females to drink soy milk on a daily basis. Three flavors were developed as well as different brands introduced. Other ways of consuming soy milk were also practiced, which included mixing the drink in smoothies or incorporating them in cereals and cookies. Aside from taste and manner of preparation, parental encouragement was also crucial in maintaining compliance with soy milk drinking. As suggested by the study, taking these factors into consideration will result in a high level of acceptance of soy milk in the diet of young females.

Research by Wenrich and Cason (2004) determined soy consumption among 353 adults who were part of the Food and Nutrition Education and Food Stamp Nutrition Education welfare programs. The sample, composed primarily of white women with an average age of 46, only 44 (13%) consumed soy products at the time

of the study where just 20 (5.6%) drank soy milk. The low dietary consumption or poor acceptance of soy milk and soy foods in general were attributed to the absence of knowledge in preparation or utilization stated by nearly 90% of the participants. Other contributing factors included: the high price of soy products, the unappealing taste and texture and the misconception that soy was high in cholesterol or increased the chances of developing breast cancer which prevailed among 75% of the women, (Wenrich & Cason, 2004).

In the same year, a study by Rah, J., Hasler, C., Painter, J., & Chapman-Novakofski, K. (2004) sought to establish how race affects the consumption and the intention to consume soy products. Using a sample of 205 women, where 103 were black and 102 were white, fewer than 10% had soy foods in their daily diet. Only 28% had tried soy based drinks and only 34% had ever eaten soy veggie burgers. Among the 5 types of soy foods included in the questionnaire, soy burgers had the highest percentage of being tried as it was perceived as the most palatable. Most of the respondents who had tried consuming soy foods stated that they did this on a very limited basis such as on rare occasions or a few times a year.

Since soy foods were unfamiliar to 66% of the women in the study, the majority had no plans of ever purchasing soy burgers or any soy product while those who have sampled these foods the majority also had no intentions of increasing consumption. However, when taste was rated, soy veggie burger was regarded as a pleasant tasting food as indicated by 55% of the women. More than 70% of the sample viewed soy products as expensive and admitted that they lacked knowledge on the health benefits of soy as well as ways of cooking soy into meals.

Among students, a study by Lacey, J, (2004) sought to determine the familiarity of 111 male and female college students regarding legumes which

included soy. Among the participants, more than half or 66% have tried soy products previously which is a higher than the percentage noted among adults in the Wenrich, T., & Cason, K. (2004) study. Among the college students, 38% had tried soy milk, a higher percentage compared to adults, while only 6% had tried soy burgers, a very low percentage in comparison to the subjects of the Wenrich & Cason study, (Lacey, 2004).

The poor consumption of soy burger and soy milk among adults, adult women and college students can be increased. In Rah et.al. study, between 49 - 52% of the women participants stated that being informed on how soy products can improve their health and being taught how to cook or prepare soy-based dishes will enhance their acceptance and consumption of these food products. Acceptance of soy as a legume similarly increased after the students in Lacey's study attended a Bean Theme course which emphasized the nutritive values of soy products and included soy recipes and cooking demonstrations.

Bread & Cereal

With regard to cereals, another heart healthy food choice, Data from the Bruntet,al study shows a fair acceptance of whole-grain bread as part of their diet. Fifty-nine % or 329 of the 557 college students indicated that they ate this type of bread within the past three days. Among 8,047 city employees, Lallukka, T., Laaksonen, M., Rahkonen, O., Roos, E., & Lahelma, E. (2007). determined whole grain bread consumption to be 22-23% for women and men participants respectively. The acceptance of healthy food habits are found to be influenced by age where older participants were more health conscious than those who were younger.

A study consisted of 221 males, and 336 females showed that better economic status, higher educational attainment and income and home-ownership were also

positively associated with healthy eating (Lallukka, T., et al 2007). This implies that a greater intellectual capacity, more financial resources and security in terms of permanent residence are favorable factors to healthier eating practices. The reasons behind this being that stress levels are decreased and focus can be given to evaluating and improving one's dietary practices.

In 2004, Kafatos et.al. (2005) looked into the consumption of ready to eat cereals among adolescent students in the wake of evidence of the health benefits of this food in the young and also among those with existing cardiovascular disease. A total of 392 students were included in the sample. Results of the survey revealed that ready to eat cereals were well accepted in 27% of the sample who ate them daily, 43% consumed them once a week at the most, while the rest had poor acceptance as they did not eat cereals at all. Consumption was higher among those who resided in urban areas as compared to those who came from rural communities. The majority of those who ate ready to eat cereals did so with milk and did not limit consumption to breakfast. These students also had a lower BMI than those who ate cereals on a non-regular basis and also scored higher in health and dietary indicators such as higher energy or endurance and vitamin-mineral intake. These observations mirrored the results of the study conducted by Bertrais, S., Polo Luque, M., Preziosi, P., Fieux, B., Torra de Flot, M., Galan, P. (2000). concerning ready-to-eat- cereal consumption and health and dietary indicators among adults in France. In this study, acceptance or moderate consumption was 21% of the 2,188 respondents.

Research by DeBate, Topping and Sargent (2001), surveyed the past 24-hour food consumption reports of 630 mostly white college students. Variables considered were race and gender and their effects on BMI, as well as dietary practices compared to recommendations as defined in MyPyramid. The Food Guide Pyramid (FGP). This

guide included complex carbohydrates such as oats and cereals among the complex carbohydrate foods recommended to be eaten in larger amounts or equivalent to 6 servings a day. Only 6.9% of the students incorporated cereals in their diet with consumption way below the FGP recommendation at 2.6 servings a day on the average.

Poor consumption of cereals contrasts with meat consumption where the majority of the students, especially among Black Americans, were able to meet the recommended 2 servings per day. Considering race, Black students were noted to have a lesser consumption of cereals compared to whites, ate daily meals on a less regular basis and had higher consumptions of fast foods. Black female students had higher body mass indices compared to white females. The racial and gender disparity in terms of health status and dietary habits, including lower cereal consumption or acceptance, supports that these factors be considered when developing approaches to promote healthy eating behaviors among college students (DeBate et.al,2001).

Egg

A review by Natoli, S., Markovic, T., Lim, D., Noakes, M., & Kostner, K. (2007) focusing on egg consumption and the risk of cardiovascular disease, mentioned five studies indicating the prevalence of eggs in the diet. In a 1999 study involving 80,082 women and 37,851 men, the respondents ate at least one egg daily. In three other studies with 5,133 males and females, 912 persons and 11,140 vegetarians and meat eaters as participants respectively, eggs were a common fare eaten on a near daily basis. Finally, another study which recruited 39,192 vegetarian and non-vegetarian persons, egg consumption ranged from less than 1 egg to 2 or more eggs per week.

A very recent survey conducted by (Djousse, 2009) cited in Tufts University Health and Nutrition Letter (2009), determined the relationship between egg consumption and the incidence of diabetes. The researchers utilized data from 20,703 males and 36,295 females. Weekly consumption ranged from none to 6 or more eggs. the consumption of cholesterol rich foods, such as eggs, are positively correlated to increased risk of CVD, particularly coronary heart disease, (Escott-Stump & Mahan, 2004).However, the current dietary recommendations limits egg yolk consumption to less than 4 egg yolks a week, (Escott-Stump & Mahan, 2004) .Compared to females, males had higher egg consumption. The researchers considered the possibilities that the common acceptance of eggs could be due to its substitution of other foods. These foods included items such as breads and cereals and asked for an increased consumption of other foods that are traditionally paired with eggs as for instance bacon (Tufts University, 2009). No data were available for the acceptance or consumption of egg whites only or egg substitutes and was a recognized limitation of the study.

Nuts

Nuts are a fairly well accepted food as it is estimated that 10% of consumers in the U.S. or 1 out of every 10 consume them on a regular basis (Lin, B., Frazao, E., & Allshouse, J. 2001)Preferred nuts were almonds, walnuts, hazelnuts, pistachios and cashews where the average daily amount eaten was about 1 gram per consumer per day. Across age, consumption among 6 to 19-year olds ranged from 11-12% and is highest among people aged 40 years old or older at 15%. Across gender, more women ate nuts compared to men while across race whites ate nuts more than Black Americans and Hispanics.

Finally, when economic status is considered, the percentage of people eating nuts increased as income rose. Upper class people were eating 1.6 grams daily, the middle class ate 0.9 grams each day while the low-income ate 0.5 grams on a daily basis (Lin et.al. 2001). Consumption is also higher in the Western and Midwestern states. Hence, acceptance and consumption is dependent on age, gender, race, income and region of origin. Further, more than half of the respondents consumed nuts as snacks while the rest ate them as part of meals. A significant percentage ate plain nuts while other preferred to eat them in baked goods or added to breakfast cereal.

In the study of Brunt, Rhee and Zhong (2008), the percentage consuming nuts was higher among students at 62.2.% of the sample across BMI when compared to the general population put forth by Lin et.al. (2001). However, data on frequency and amount of intake by students were not available. When BMI is considered, most of those with indices within the normal range ate nuts while among those who fell short or exceeded their normal BMI, smaller percentages ate this kind of food.

Grape juice/wine

Plesko, Cotugna and Aljadir (2000) assessed the fruit juice intake of 109 college students who were mainly white females with an average age of 19 years old. The researchers found that grape juice or orange juice was consumed by all those who took part in the survey. However, male students reported a significantly higher consumption of grape, orange or other fruit juice compared to females.

Grape wine or wine is estimated to contain 8-12% alcohol. In a 2001 Youth Alcohol and Health Survey by Jobli, E., Dore, H., Werch, C., & Moore, M. (2005) with recruitment of 458 middle school students in Florida, wine was the most preferred alcoholic drink along with beer. In terms of actual consumption, wine was also the most frequently consumed and in the largest amounts among the drinks in the

questionnaire list. Acceptance of wine was correlated with the perception that their peers were drinking alcohol often, the degree to which they can be influenced to drink, their positive regard for drinking and the intention to drink. Compared to other alcoholic drinks, wine was also regarded by the students as the drink that they will be consuming for most of their lives.

To study the general adults population, Kerr, W., Greenfield, T., Bond, J., Yu, Y., & Rehm, J. (2004), utilized the 21 years of data from the U.S. National Alcohol Surveys from 1979 to 2000 for a period of in order to determine if increasing age, the period of the survey or other factors affected alcohol consumption. A significant observation when it comes to wine use was that the acquisition of higher levels of education within the two decades after the first survey led to a lower frequency of drinking beer. Wine consumption steadily increased as educational attainment also increased.

Tea

A risk factor for diabetes is CVD., therefore it is important to look for the role diabetes plays in CVD. Diabetics are more sensitive to the development of dyslipidemia. "Lipid abnormalities occur in 11% to 44% adults in the United States with diabetes" (Escott-Stump & Mahan, 2004 p.827).

Polychronopoulos, E., Zeimbekis, A., Kastorini, C., Papairakleous, N., Vlachou, I., Bountziouka, V. (2008) determined the correlation of black as well as green tea consumption with the glucose levels of a sample of elderly with normal BMI in the Mediterranean Islands. Of the 300 males and females who participated in the food frequency questionnaire, 54% or just above half of the participants drink a cup or (150 ml) of tea once each week at the minimum. The majority were moderate

drinkers at 1-2 cups per day while nearly all of the tea drinkers preferred green or black tea and had been consuming this drink for the past 30 years.

In 2003, Forshee and Storey focused on the association between beverage consumption and diet quality of the residents of the United States, by analyzing data from the 1994 - 1998 Continuing Survey of Food Intake by Individuals. Among the participants whose ages were 6-29 years old, the average intake for those who drank tea was 138.6g/day and 145g/day for women and men respectively. Tea consumption was about half that coffee intake, and lower than carbonated soft drink consumption. Acceptance of tea is generally poor among the sample of Americans with soft drinks and coffee as the more desired beverage.

Garlic

As for garlic consumption, Tsai, P., Harnack, L., Anderson, K., Lohman, W., & Wei, Z. (2008) reviewed the food frequency survey data from 34,388 post menopausal women who participated in the 1986 Iowa Women's Health Study with the aim of correlating garlic consumption with the incidence of breast cancer. Garlic in the diet was measured using a clove or shake as units. Among post menopausal women, garlic is poorly accepted in the diet at consumptions ranging from less than once a month to only once a week. For those who had garlic at the highest frequency of once weekly, their fruit and vegetable intakes were also high suggesting that garlic may be associated with eating vegetables. This low use of garlic as a food item contrasts with the results of a study involving French participants where garlic intake was very high at 16 times per week or more.

Although evidence to suggest acceptance of garlic among college students or study with CVD was not available at the time of the study, similar research was used. In an investigation of the effects of 14 different supplements as weight-reduction or

energy-boosting treatments among 15,655 men and women with a mean age of 45 years old, Nachtigal, M., Patterson, R., Stratton, K., Adams, L., Shattuck, A., & White, E. (2005) took the respondents' baseline weight, height and BMI and tracked the changes within a period of 8-12 years. Of the sample, around 1,500 males or 10.1% accepted and regularly used garlic in pill form while a slightly higher percentage (10.6%) of women used the same supplement. The range of weight gain in men after 10 years was 9.9 to 14.4 lbs. when disregarding BMI and whether use was high or low. In women, weight gain ranged from 4.5 to 19.9lbs.

Fish & Seafood

Imm, P., Knobeloch, L., & Anderson, H. (2005)., focused on fish consumption of people within the Great Lakes basin who are 18 years old and older. A telephone survey was conducted involving a sample of 4,106 residents of seven states around the lake – Michigan, Minnesota, Illinois, Indiana, Ohio, Wisconsin, Pennsylvania and New York. All respondents were aged 18 and older. Results showed that more than 80% of adults surveyed consumed fish within the past year. The majority did so with a frequency of 1 fish a week which is higher than the national fish consumption amount.

Sources of fish varied with the majority eating fresh or canned fish. Around 22% ate fish that they caught while 7% ate fish from the lake. Males had a greater intake of eating fish caught as sport in any of the lakes while women had a higher intake of consuming tuna. Considering race, whites consumed tuna more than Blacks. Other types of preferred fish include walleye, perch, smelt, trout, chinook and salmon these could be locally caught.

In 2002, Judd, O'Neill and Kalman noted high seafood consumption (45.6-66.2%) among residents in Puget Sound, Washington. The participants either

belonged to Native American tribes, originated from South East Asia or were Pacific Islanders. Native Americans primarily consumed fish. This is while Asians and Pacific Islanders ate the most amount of seafood, had greater variety and utilized a lot more parts of the fish compared to data on the population in general.

Of the kinds of seafood eaten, shellfish was consumed most frequently and these are either bought outside and cooked at home or eaten out in restaurants. Fish was caught in the waters of Puget Sound most of the time. Culture may play a role in the acceptance of fish or seafood as part of diet, as well as the relative availability of these food items compared to inland environments.

Williamson, Chowry and Hilsdon (2004) also measured the fish consumption of 316 residents in a coastal country in Georgia through another survey. Again, the respondents highly accepted seafood as part of their diet with none stating that he had not eaten fish. Majority had moderate intake which meant that seafood composed more than 18% of their diet while a significant number had little intake which meant that seafood made up 15% of their diet. The average seafood intake is more than once a week. Overall, coastal residents in Georgia have a high acceptance of fish and seafood as indicated by common consumption of these foods.

Olive oil

Olive oil makes up one of the three important components of the Mediterranean diet, the other two being wheat and grapes. This diet has been the subject of research because of its potential as a preventive intervention in people with high risk of cardiovascular disease (CVD). Serra-Majem, L., de la Cruz, J., Ribas, L., & Tur, J. (2003) used raw data from a previous dietary assessment survey of 1,600 people aged 18 and above conducted in Spain. The olive oil consumption of the participants ranged from a low 12.3g per day to a high of 42.4g per day, much higher

than the consumption of other fat sources such as butter and other types of oil. Among those surveyed, low olive oil intake was observed along with greater intake of foods rich in sugar (mono or disaccharides) while higher olive oil intake was noted with higher intake of fish, eggs and vegetables.

Salas-Salvado, J., Garcia-Arellano, A., Estruch, R., Marquez-Sandoval, F., Corella, D., Fiol, M., (2008) recruited 772 adults who were at risk for heart disease and using a food frequency questionnaire, aimed to establish a relationship between virgin olive oil and degree of risk CVD. The participants had one or more medical conditions which may hasten the onset of CVD, these being hypertension, above normal BMI, high amount of lipids in the blood and Type II diabetes.

Consumption within the range of 2.03g to 26.29g per day was lower than that noted by Serra-Majem, L., de la Cruz, J., Ribas, L., & Tur, J. (2003). Virgin olive oil intake and adherence to other components of the Mediterranean diet resulted in a lower amounts of vascular cell adhesion molecule-1 in the blood – thought to aid in the development of atherosclerosis. For this study and that by Sera-Majem et.al., full acceptance of olive oil among the participants, albeit in varying amounts, is still due to long established diets in the region which incorporated the use of olive oil.

Chapter III

Methodology

The purpose of this study was to determine how well students accept heart healthy foods. This research provided a thorough overview of the acceptance of adding food items that students can easily and enjoyably be consumed on a daily basis that improve their health status. The study explored students' likelihood of implementing these changes. The data were collected and analyzed for the purpose of answering the research questions.

Design

The current study used a quantitative, non-experimental design. A self reported questionnaire was developed by the researcher to collect the data. The investigator invited students passing through the area to participate in the study and explain the nature of the experiment. A onetime survey was completed by the participants at the time of distribution.

Subjects

The study sample was a convenience sample at a Midwestern University union. The participants included undergraduate and graduate students of both gender who were enrolled in the university as either full time or part time students. The researcher recruited the first 100 students that agree to participate in the study.

Instrument

A self reported questionnaire was developed by the researcher used to collect data. The questionnaire included five sections with a total of eight questions.

- Section 1: Understanding Cardiovascular Disease (CVD). The questions were:

- Do you know what cardiovascular disease is?

- Do you agree or disagree with the following statement, “Eating healthy foods can help to reduce/prevent cardiovascular disease?”

-Section 2: Food intake background. The question in this section was:

- How many days per week do you consume the following foods?
The choices were: cow's milk, soy milk, egg substitutes, fruits, vegetables, oat bread, oat cereals, grape wine/juice, olive oil, garlic, nuts, legumes, seafood, and green tea.

-Section 3: Willingness to changes current diet. The questions in this section were:

- How willing are you to add the following items to your diet soy milk, egg substitutes, fruits, vegetables, oat bread, oat cereals, grape wine/juice, olive oil, garlic, nuts, legumes, seafood, and green tea.
- Are you willing to limit the amount of red meat to two to three servings per week?

-Section 4: Attitude towards changes. The question in this section was:

- What is the likelihood that you will add the food items you marked above to your daily diet?

-Section 5: Demographics. The questions in this section were:

- Are you male or female?
- What is your classification/class standing?

Reliability and validity

In order to test for reliability and validity of this instrument, the questionnaire was pilot tested with a convenience sample of 12 graduate level female college students who did not participate in the current study. The questionnaire was also

reviewed by three Midwestern University professors for content and validity and they agreed the survey appeared to have face validity. The survey tool was refined using input from the students and the thesis committee. The questions in the instruments addressed the researcher's objectives. Even though the research study instrument was pilot tested and corrections were made to the questionnaire, further testing of the instrument such as, Test-retest, needs to be completed in order to achieve reliability.

Procedure for data collection

Institutional Review Board (IRB) approval at the Midwestern University was granted to the investigator before the start of the data collection process. The questionnaire was distributed to the students in the Midwestern University union who were passing through the main hallway and students who were eating lunch. The questionnaire was administered and collected by the researcher. The researcher explained to the students that participation was voluntary and the participants had the option to not answer the questions.

Data analysis

After collecting the data, simple descriptive statistics were used in the statistical analysis of data. Statistical analysis frequencies were performed for all sections in the survey in order to determine prior knowledge, diet history, willingness to change diet, and likelihood of adding these changes. The frequencies were calculated using the statistical package SPSS, version 15.0.

Chapter IV

Results

The questionnaire was comprised of 8 multiple choice questions that assessed knowledge of CVD, diet history, the acceptance of heart healthy foods, likelihood of change, and demographics of a college population. Each question had a set of answers that varied from 2 to 5 responds. Responses were either yes or no; agree, disagree, or no opinion; everyday, frequently, occasionally, seldom, or never; and highly likely, likely, somewhat likely, unlikely, or highly unlikely. The students were asked to read the questions and then answer carefully.

The research included 100 subjects 38 males (38%) and 62 females (62%). The participant's classification/class standing were: 13 freshmen (13%), 9 sophomores (9%), 14 juniors (14%), 36 seniors (36%), and 28 graduate students (28%). All participants were enrolled as either full-time or part-time students.

Question 1

The first question measured the knowledge of cardiovascular disease among the college students. The question was "Do you know what CVD is?" With response choices of either yes or no. The results showed that 86 student (86%) answered that they knew what CVD was, and 14 students (14%) answered they did not know what it was.

Question 2

The second question was "Do you agree with the following statement: 'Eating healthy foods can help to reduce/prevent cardiovascular disease?'" The possible responses were either agree, disagree, or no opinion. The results showed that 88 students (88%) responded agree, 12 students (12%) responded no opinion, and there were no students that responded disagree.

Question 3

The third question was "How many days per week do you consume the following foods?" The possible responses were either everyday, frequently, occasionally, seldom, or never. The results were divided into separate sections for each food item and showed as follows:

Soy Milk

The results for soy milk section showed that 7 students (7%) responded frequently, 26 students (26%) responded occasionally, 4 students (4%) responded seldom and 63 students (63%) responded never.

Fruits

The results for fruit section showed that 46 students (46%) responded everyday, 29 students (29%) responded frequently, 21 students (21%) responded occasionally, 3 students (3%) responded seldom, and 1 student (1%) responded never.

Egg substitutions

The results for egg substitutions section showed that 2 students (2%) responded everyday, 18 students (18%) responded frequently, 34 students (34%) responded occasionally, 9 students (9%) responded seldom, and 37 students (37%) responded never.

Soy burger

The results for soy burger section showed that 13 students (13%) responded everyday, 24 students (24%) responded frequently, 6 students (6%) responded occasionally, 57 students (57%) responded seldom, and no students (0%) responded never.

Oat bread

The results for oat bread section showed that 3 students (3%) responded everyday, 27 students (27%) responded frequently, 28 students (28%) responded

occasionally, 3 students (3%) responded seldom, and 39 students (39%) responded never.

Vegetables

The results for vegetables section showed that 44 students (44%) responded everyday, 35 students (35%) responded frequently, 20 students (20%) responded occasionally and 1 student (1%) responded seldom.

Grape Wine/Juice

The results for grape wine/juice section showed that 9 students (9%) responded everyday, 33 students (33%) responded frequently, 30 students (30%) responded occasionally, 18 students (18%) responded seldom, and 10 students (10%) responded never.

Tea

The results for Tea section showed that 35 students (35%) responded everyday, 35 students (35%) responded frequently, 13 students (13%) responded occasionally, 7 students (7%) responded seldom, and 10 students (10%) responded never.

Garlic

The results for Garlic section showed that 21 students (21%) responded everyday, 36 students (36%) responded frequently, 33 students (33%) responded occasionally, 9 students (9%) responded seldom, and 1 student (1%) responded never.

Olive oil

The results for olive oil section showed that 18 students (18%) responded everyday, 32 students (32%) responded frequently, 32 students (32%) responded occasionally, 15 students (15%) responded seldom, and 3 students (3%) responded never.

Nuts

The results for nuts section showed that 20 students (20%) responded everyday, 40 students (40%) responded frequently, 19 students (19%) responded occasionally, 7 students (7%) responded seldom, and 14 students (14%) responded never.

Sea foods

The results for sea foods section showed that 1 student (1%) responded everyday, 44 students (44%) responded frequently, 32 students (32%) responded occasionally, 15 students (15%) responded seldom, and 8 students (8%) responded never.

Legumes

The results for legumes section showed that 4 students (4%) responded everyday, 43 students (43%) responded frequently, 29 students (29%) responded occasionally, 15 students (15%) responded seldom, and 9 students (9%) responded never.

Cereals

The results for cereals section showed that 7 students (7%) responded everyday, 53 students (53%) responded frequently, 20 students (20%) responded occasionally, 2 students (2%) responded seldom, and 18 students (18%) responded never.

Question 4

The fourth question was "How willing are you to add the following food items to your daily diet?" The possible responses were either strongly willing, willing, no opinion, not willing, extremely not willing. The results were divided into separated section for each food item and showed as follows:

Soy milk

The results for soy milk section showed that 51 students (51%) responded strongly willing, 18 students (18%) responded willing, 10 students (10%) responded no opinion, 7 students (7%) responded not willing, and 14 students (14%) responded extremely not willing.

Egg Substitution

The results for egg substitution section showed that 55 students (55%) responded strongly willing, 29 students (29%) responded willing, 3 students (3%) responded no opinion, 3 students (3%) responded not willing, and 10 students (10%) responded extremely not willing.

Soy Burger

The results for soy burger section showed that 52 students (52%) responded strongly willing, 18 students (18%) responded willing, 9 students (9%) responded no opinion, 9 students (9%) responded not willing, and 12 students (12%) responded extremely not willing.

Oat Bread

The results for oat bread section showed that 63 students (63%) responded strongly willing, 26 students (26%) responded willing, 1 student (1%) responded no opinion, 1 student (1%) responded not willing, and 9 students (9%) responded extremely not willing.

Fruits

The results for fruits section showed that 73 students (73%) responded strongly willing, 16 students (16%) responded willing, 1 student (1%) responded no opinion, 9 students (9%) responded not willing, and 1 student (1%) responded extremely not willing.

Vegetables

The results for vegetables section showed that 73 students (73%) responded strongly willing, 17 students (17%) responded willing, 1 student (1%) responded no opinion, 8 students (8%) responded not willing, and 1 student (1%) responded extremely not willing.

Grape Wine/Juice

The results for grape wine/juice section showed that 63 students (63%) responded strongly willing, 23 students (23%) responded willing, 3 students (3%) responded no opinion, 3 students (3%) responded not willing, and 8 students (8%) responded extremely not willing.

Tea

The results for tea section showed that 68 students (68%) responded strongly willing, 21 students (21%) responded willing, 2 students (2%) responded no opinion, 1 students (1%) responded not willing, and 8 students (8%) responded extremely not willing.

Garlic

The results for garlic section showed that 59 students (59%) responded strongly willing, 25 students (25%) responded willing, 6 students (6%) responded no opinion, 1 student (1%) responded not willing, and 9 students (9%) responded extremely not willing.

Olive Oil

The results for olive oil section showed that 62 students (62%) responded strongly willing, 24 students (24%) responded willing, 4 students (4%) responded no opinion, 8 students (8%) responded not willing, and 2 students (2%) responded extremely not willing.

Nuts

The results for nuts section showed that 61 students (61%) responded strongly willing, 22 students (22%) responded willing, 5 students (5%) responded no opinion, 4 students (4%) responded not willing, and 8 students (8%) responded extremely not willing.

Sea foods

The results for sea foods section showed that 58 students (58%) responded strongly willing, 23 students (23%) responded willing, 4 students (4%) responded no opinion, 14 students (14%) responded not willing, and 1 student (1%) responded extremely not willing.

Legumes

The results for legumes section showed that 56 students (56%) responded strongly willing, 23 students (23%) responded willing, 5 students (5%) responded no opinion, 13 students (13%) responded not willing, and 3 students (3%) responded extremely not willing.

Cereals

The results for the cereal section showed that 65 students (65%) responded strongly willing, 24 students (24%) responded willing, 2 students (2%) responded no opinion, 5 students (5%) responded not willing, and 4 students (4%) responded extremely not willing.

Question 5

The question was " Are you willing to limit the amount of red meat they eat to 2-3 serving (3oz) per week?" The possible responses were: strongly willing, willing, no opinion, not willing, extremely not willing.

The results were that 53 students (53%) responded strongly willing, 24 students (24%) responded willing, 14 students (14%) responded no opinion, 5 students (5%) responded not willing, 4 students (4%) responded extremely not willing.

Question 6

The question was "What is the likelihood to add the food items you marked above to your daily diet?" The possible responses were either, highly likely, likely, somewhat likely, unlikely, highly un likely. The results showed that 46 students (46%) responded highly likely, 26 students (26%) responded likely, 18 students (18%) responded somewhat likely, 6 students (6%) responded unlikely, 4 students (4%) responded highly unlikely.

Result:

Table 1

Students Knowledge Response Percentage of CVD

<i>Question</i>	<i>Yes</i>	<i>No</i>
<i>Do you know what CVD is?</i>	86	14

Table 2

Students Knowledge Response of the Relationship Between CVD and Healthy Eating

<i>Question</i>	<i>Agree</i>	<i>No Opinion</i>	<i>Disagree</i>
<i>Do you agree that eating healthy foods can help to reduce/prevent CVD ?</i>	88	12	0

Table 3

Frequency of Daily Heart Healthy Food Items Consumption

<i>Food Item</i>	<i>Everyday</i>	<i>Frequently</i>	<i>Occasionally</i>	<i>Seldom</i>	<i>Never</i>
<i>Soy milk</i>	0	7	26	4	63
<i>Fruits</i>	46	29	21	3	1
<i>Egg substitutes</i>	2	18	34	9	37
<i>Soy burger</i>	13	24	6	57	0
<i>Oat bread</i>	3	27	28	3	39
<i>Vegetables</i>	44	35	20	1	0
<i>Grape wine/juice</i>	9	33	30	18	10
<i>Tea</i>	35	35	13	7	10
<i>Garlic</i>	21	36	33	9	1
<i>Olive oil</i>	18	32	32	15	3
<i>Nuts</i>	20	40	19	7	14
<i>Sea food</i>	1	44	43	15	8
<i>Legumes</i>	4	43	29	15	9
<i>Cereals</i>	7	53	20	2	18

Table 4
Acceptance of Daily Food Item Incorporation

<i>Food Item</i>	<i>Strongly willing</i>	<i>Willing</i>	<i>No opinion</i>	<i>Not willing</i>	<i>Extremely Not</i>
<i>Soy milk</i>	51	18	10	7	14
<i>Fruits</i>	73	16	1	9	1
<i>Egg substitutes</i>	55	29	3	3	10
<i>Soy burger</i>	52	18	9	9	12
<i>Oat bread</i>	63	26	1	1	9
<i>Vegetables</i>	73	17	1	8	1
<i>Grape wine/juice</i>	63	23	3	3	8
<i>Tea</i>	68	21	2	1	8
<i>Garlic</i>	59	25	6	1	9
<i>Olive oil</i>	62	24	4	8	2
<i>Nuts</i>	61	22	5	4	8
<i>Sea food</i>	58	23	4	14	1
<i>Legumes</i>	56	23	5	13	3
<i>Cereals</i>	65	24	2	5	4

Chapter V

Discussion

The number of people who develop cardiovascular disease continues to remain high (WHO, 2007). Students are at a greater risk of developing CVD since over 90% of students eat at fast food restaurants six to eight times per week with convenience being a large contributor to the student's food choices (Driskell et al., 2005). Students generally eat at fast food restaurants as part of their busy lifestyle (Driskell et al., 2005, pp. 798-801). The purpose of this study was to determine how well students accept heart healthy foods. This research will provide a thorough overview of the acceptance of adding food items that students can easily and enjoyably be consumed on a daily basis that improve their health status. The questionnaire was distributed to students who attended a Midwestern university to determine the acceptance of heart healthy food items.

Results showed that a high percentage of the students 86% knew what cardiovascular disease was. A low percentage of students 14% did not know what cardiovascular disease was. Also a high percentage of the students 88% agreed that eating healthy foods can help to prevent and reduce the risk of getting cardiovascular disease. No students disagreed that eating healthy food can prevent and reduce the risk of getting cardiovascular disease and 12% of the students had no opinion. These findings are unique in that similar studies have not been conducted or have not been made available at this time.

In question 3 the students were asked about the number of days per week that they consume some heart healthy food items. Then in question 4 the students were asked about their willingness to add these food items. The first item on the questionnaire pertained to Soy milk. When asked about the consumption of soy milk

none of the students 0% responded everyday and very low percentage of the students 7% responded frequently, 26% responded occasionally, 4% responded seldom, and more than half of the students 63% responded never. When asked about the willingness of adding soy milk to their daily diet more than half of the students 69% responded strongly willing/willing. The results show a good acceptance and willingness to add soy milk to their daily diet. This finding agrees with a previous study conducted by Oshiro, C., Maskarinec, G., Petitpain, D., Hebshi, S., & Novotny, R. (2004), measuring the acceptance of soymilk by adolescent girls where they found that 44% of their sample enjoyed the taste of soy milk and therefore was accepting of soy milk, (Oshiro, et.al.2004).

In another study entitled "Consumption and Perceptions of Soy among Low Income Adults", the results did not agree with researcher's findings, where only 5.6% of the sample found soy milk acceptable. This was mostly contributed to a lack of participants' knowledge on the preparation and utilization of soymilk and not related to taste, (Wenrich and Cason 2004).

The second questionnaire food item considered daily fruit consumption. Participants were first asked how many times per week they consumed fruit. Forty-six percent 46% responded every day, 29% responded frequently, 21% responded occasionally, 3% responded seldom, and 1% responded never. When the sample was asked about their willingness to incorporate more fruit into their daily diet, eighty-nine responded strongly willing/willing, 10% responded, not willing, and only 1% responded no opinion. This indicated excellent acceptance of this food item. However, the results conflict with those of a previous study, "Differences in Dietary Patterns Among College Students According to BMI" by Burnt, et.al, where they found that participants consumed less fruit, in terms of quantity and frequency. Only

33% of the sample reported an intake of fruit which was limited to one serving within a 3-day period suggesting a fair acceptance of this food item, (Burnt et.al, 2008).

Conversely the finding of the study "Processes Underlying Young Women's Decisions to Eat Fruits and Vegetables" by Chung et.al, agrees with the researcher findings in that 65.3% of their sample ate two or more servings of fruit, which shows very good acceptance of this food item (Chung et.al, 2008).

The students were then asked about the frequency of egg substitute consumption. According to the results 2% responded every day, 18% responded frequently, 34% responded occasionally, 9% responded seldom, 37% responded never. Subsequently they were asked about their willingness to add egg substitutes to their daily diet. Eight-four responded strongly willing/willing, 13% responded not willing/extremely not willing, and only 3% responded no opinion. The majority of the participants had a very good acceptance of this food item, which directly correlates to the previous study entitled "High Egg Consumption Associated with Diabetes Risk" by Djousse et.al where they found that their participants consumed 6 or more eggs per week indicating a very good acceptance (Djousse et.al, 2009). Although research suggested that eggs are well accepted the amount of the eggs consumed by the population in the aforementioned study does not support a heart healthy diet. The purpose of reviewing this study was to determine the acceptance of the product in the absence of studies pertaining to egg substitutes. Data on eggs rather than egg substitutes were used due to the fact that no data were available for the acceptance or consumption of egg whites or egg substitutes.

Another food item surveyed pertained to the consumption frequency of soy burger per week. The results illustrate that 13% of participants responded every day, 24% responded frequently, 6% responded occasionally, 57% responded seldom, and

0% responded never. They were also asked about their willingness to add soy burger to their daily diets, where the results show 70% responded strongly willing/willing, 21% responded extremely not willing/not willing, and 9% responded no opinion. This demonstrates a good acceptance of soy burger from the participants. Similar results were found from the study, "Applying the Theory of Planned Behavior to Women's Behavioral Attitudes on Consumption of Soy Products" by the researcher Rah, J.H, where it has been found that 34% of the participants tried soy burger and was perceived as the most palatable of soy products, (Rah, et al, 2004).

In regards to the consumption of oat bread, the results showed that 3% responded every day, 27% responded frequently, 28% responded occasionally, 3% responded seldom, and 39% responded never. They were then asked about participants' willingness to add oat bread to their daily diet. The findings indicated that 89% responded strongly willing/willing, 1% responded no opinion, 10% responded not willing/extremely not willing. According to these finding there was very good acceptance of the oat bread, which correlates with the research findings found in the study entitled "Difference in Dietary Pattern Among College Students According to BMI" by Brunt, et.al. They found that 59% of the college student sample indicated that they ate this type and similar types of bread within the past 3 days, (Brunt, et al., 2008).

Vegetables were also a part of the questionnaire. The students were asked about the number of days they consumed vegetables. The researchers found that 44% responded every day, 35% responded frequently, 20% responded occasionally and 1% responded seldom. They were then asked about their willingness to add vegetables to their daily diet, which resulted in 80% responded strongly willing/willing, only 1% responded no opinion and 9% responded not willing. In regards to vegetables, the

students showed a good acceptance and were willing to incorporate them into their daily diet. This was also corroborated in the previous findings by Granner et.al, where results showed that average vegetable intake for students was 3.2 serving per day, however not all students readily accepted vegetables as part of their diet, (Granner, et al, 2004).

However, a study conducted to determine the vegetable consumption of first year college students in the U.K disagrees with the researcher's findings where 80% of the students had a daily intake below 400g or fell short of the recommended amount per day, (Williams, 2000).

The students were then asked to indicate the number of days they consumed grape juice/wine. The results showed that 9% responded every day, 33% responded frequently, 30% responded occasionally, 18% responded seldom, and 10% responded never. Subsequently, they were asked about their willingness to add grape juice/wine to their daily diet. The results showed that 86% responded strongly willing, 3% responded no opinion, 11% responded not willing/extremely not willing. These findings suggest a very good acceptance of grape juice/wine in a student's daily diet.

The study " Usefulness of a Brief Fruit and Vegetable FFX in a College Population" by Plesko, et.al agreed with these findings, where the researchers found that grape juice was consumed by all students who took part the survey, (Plesko, et al, 2000). In addition, the study "High Potency and Other Alcoholic Beverage Consumption Among Adolescents" by Jobli, et.al. also agreed with researcher findings, where student's attitudes indicate popularity and a preference for wine, (Jobli et. al., 2004).

Subsequently, the students were asked about the number of days they consume green and/or red tea. The results found that 35% responded every day, 35% responded

frequently, 13% responded occasionally, 7% responded seldom, and 10% responded never. They were also asked about their willingness to add tea to their daily diet. The results found that 89% responded strongly willing/willing, 2% responded no opinion, 9% responded not willing/extremely not willing. The results indicate a very good acceptance of tea by the students, which agrees with the previous finding from the study "Effects of Black and Green Tea Consumption on Blood Glucose Levels in Non-Obese Elderly Men and Women from Mediterranean Islands" by Polychronopoulos, et.al. where they found that 54% drink a cup or 150ml of tea once a week. The majority were moderate tea drinkers, consuming 1-2 cups a day and nearly all the participants consumed tea for the last 30 years which demonstrates a very good acceptance of tea, (Polychronopoulos, et al., 2008).

Consumption and acceptance of garlic was also surveyed. When the students were asked how often they consumed garlic, the findings reported that 21% responded every day, 36% responded frequently, 33% responded occasionally, 9% responded seldom, and 1% responded never. They were also asked about their willingness to add garlic to their daily diet. The findings reported that 84% responded strongly willing/willing, 6% responded no opinion, 10% responded not willing/extremely not willing. According to these findings, the acceptance level of garlic was very good. However, these findings disagree with the research "Dietary Intake of Garlic and Other Allium Vegetables and Breast Cancer Risk in a Prospective Study of Postmenopausal Women" by Tsai, et.al. whose results demonstrated poor acceptance of garlic with consumption levels ranging from less than once a month to only once a week, (Tsai, et al, 2008). Interestingly, research may be confounded as garlic consumption was correlated with vegetable consumption in that the participant had a low consumption rate of vegetables and used garlic as a

condiment for them. The study entitled "Dietary Supplements and Weight Control in a Middle-Age Population" also disagreed with the researcher's findings, in that they found a low acceptance of garlic 20.7% taken regularly in pill form, (Nachitgal, et. al, 2005).

Following garlic, olive oil was also surveyed for consumption rates and acceptance. The results of this question illustrated that 18% responded every day, 32% responded frequently, 32% responded occasionally, 15% responded seldom, and 3% responded never. Results of the willingness of dietary olive oil incorporation showed that 86% of participants responded strongly willing/willing, 10% responded extremely not willing/not willing, and 4% responded no opinion. For this food item the results showed a very good acceptance from the students and in so doing, conclusively correlated with the research concluded on "Olive Oil and the Mediterranean Diet: Beyond the Rhetoric" performed by Serra-Majem et.al. (2003)

The researchers found that their participant's olive oil consumption average was 27.35 g per day, therefore demonstrating a good acceptance of the product, (Serra-Majem, et. al, 2003).

In another study by Salas-Salvado, et.al., the researcher found that the average daily intake of olive oil by their participants was 14.16 g per day which also correlated with the findings of this current study, (Salas-Salvado, et al, 2008).

Consumption of nuts was also included in the questionnaire. The results from nuts section indicated that 20% responded everyday, 40% responded frequently, 19% responded occasionally, 7 % responded seldom, and 14% responded never. They were also asked to indicated their willingness to incorporate nuts into their daily diets. The findings showed that 83% responded strongly willing/willing, 5% responded extremely not willing/not willing, and 12% responded no opinion. Therefore, there

was a good acceptance of nuts as a majority of respondents were willing to incorporate nuts into their diet. This is in full accordance with the study conducted Brunt, et.al that reported 62.2% of the sample consumed nuts, (Brunt, et. al, 2008).

However, the results found in the study " U.S. Consumption Patterns of Tree Nuts" by Lin, et.al, disagreed with both above studies and the finds of this current study as according to this study only 10% of consumers in the U.S consume nuts on regular basis. The rationale for the low consumption rate is not due to acceptance rate but rather to financial difficulties, gender, race and age preferences, (Lin, et. al, 2001).

The following question pertaining to seafood consumption and acceptance, which indicated that for this set of respondents, 20% responded everyday, 40% responded frequently, 19% responded occasionally, 7% responded seldom, and 14% responded never. The respondent were also asked to rate their willingness to incorporate seafood into their daily diets. The finding reported that 81% responded strongly willing/willing, 4% responded extremely not willing/not willing, and 15% responded no opinion. Seafood also has a good acceptance rate from the students. These findings are in great accordance to the results from the research entitled" Fish Consumption and Advisory Awareness in the Great Lakes Basin" where finding reported that 80% of surveyed participants consumed fish within the last year, (Imm, et.al. 2005). Also agreeing with the findings above, the study entitled "Are Seafood PCB Data Sufficient to Assess Health Risk for High Seafood Consumption Groups", found 45.6-66.2% of participant consume sea food, (Judd, et al, 2003).

The students were then asked about the frequency of legume consumption. Reported findings showed that 20% responded everyday, 40% responded frequently, 19% responded occasionally, 7 % responded seldom, and 14% responded never. The participants were then asked to evaluate their willingness to incorporate legume into

their diet. The results are as follows: 79% responded strongly willing/willing, 5% responded extremely not willing/not willing, and 16% responded no opinion. This suggests good acceptance from the respondents.

These results confirm the findings in the study "Improving Familiarity with Legumes in an Introductory Tertiary Nutrition Course in Pennsylvania, USA" where results found that the participant average legume consumption was 2.3 servings or 4.4 cups per week which is above the recommended amount, and also shows an excellent acceptance,(Lacey, 2004).

The final component of question three pertained to frequency of oat cereal consumption. Participants responded as follows: 7% responded every day, 53% responded frequently, 20% responded occasionally, 2% responded seldom, and 18% responded never. When asked about willingness to incorporate oat cereal into their diet, 89% responded strongly willing/willing, 2% responded extremely not willing/not willing, and 9% responded no opinion. For these respondents, there was a very good acceptance of this food item. Interestingly, these findings disagree with those of a previous study conducted by DeBate, et.al, where they found that only 6.9% of the students incorporated cereals in their daily diet indicating a poor acceptance,(DeBate, et. al, 2001). In another study by Kafatos, et.al., entitled " Consumption of Ready-to-Eat Cereals in Relation to Health and Diet Indicators Among School Adolescents in Crete, Greece" findings reveal fair acceptance of cereal in that 27% of the students consumed cereals daily, (Kafatos, et al., 2005).

Question number five pertained to student willingness of limiting the amount of red meat consumed to 2-3 serving (3oz) per week. The researchers reported 77% of participants responded strongly willing/willing, 9% responded extremely not willing/not willing, and 14% responded no opinion. Respondents demonstrated good

acceptance of limiting this food item. These findings are in direct opposition of the findings reported by DeBate, et. al, reporting that the overwhelming majority of students are eating fast foods, which are predominately meat food selections, on the average of 6-to-8 times a week, (DeBate, et. al, 2001).

In question number six, the students were asked about the likelihood of adding the food items they marked that they would add to their daily diet. The results showed that 90% responded highly likely/likely/somewhat likely, and 10% responded unlikely/highly unlikely. Therefore the respondents reported an excellent likelihood of adding the food items that the students marked to their daily diet and was a higher percentage than what the researcher had originally hypothesized.

Recommendation for future research

Further studies on food choices associated with cardiovascular disease are needed. Since there was limited research on food choices of students, future research involving males and females and individuals with and without known CVD should be conducted. Research should explore the types of food that the college students' are consuming and compare the foods to heart healthy foods. Future research could examine the reason behind choosing or not choosing, accepting or not accepting heart healthy foods, such as preference, convenience, cost and other issues. When researchers identify the problems, proper education programs can be implemented to help young people to choose heart healthy food items and improve the quality of health by reducing and preventing the risk of getting cardiovascular disease.

Recommendations for practice

Future practice should focus on educating the young population. As mentioned previously, during distributing of the questionnaire some of the students appeared to be unsure what some of the heart healthy food items were? As one participant stated, "What are oats". And another participant replied with, "Really, is wine good for the heart," These statements suggested that some young people are confused or misled in certain aspects of nutrition. A second recommendation includes encouraging the consumption of eating a variety of heart healthy food items such as soy products, whole grains, fruits and vegetables and sea foods and limiting the amount of red meats.

Summary

The relationship between food and health is clear and certain; food is necessary for the life, growth, vitality and activity of humans as well as for resisting diseases. Diet and healthy nutrition habits promote heart and vascular health because

healthy diet and nutrition plays an essential role in the prevention and treatment of cardiovascular disease. A sound, heart-healthy diet will reduce the risk of cardiovascular disease as well as contribute to the overall treatment of those who already have cardiovascular disease.

The number of people at risk of developing cardiovascular disease continues to grow, especially among students due to their busy lifestyle. Students are more prone to make unhealthy food choices due to tight schedules regarding coursework, lack of appropriate food preparation knowledge and/or lack of resources and social activities that often revolve around calorically dense, low nutritional value foods. All of these factors will impact their overall health in addition to their cardiovascular health.

The purpose of this research was to assess the acceptance of heart healthy foods by college-aged students by assessing the willingness of incorporating specific foods into their diets. The researcher hypothesized that a majority of the respondents will have adequate knowledge of cardiovascular disease and can identify the relationship between diet and cardiovascular disease. In addition, a least half of the respondents would be willing to incorporate some of the heart-healthy food items into their diets.

A questionnaire was distributed to a sample of one hundred college-aged students at a Midwestern university. The questionnaire was composed of eight questions pertaining to awareness of heart-healthy foods and willingness to incorporate these foods into the daily diet. The researcher concluded that the vast majority of students 86% had adequate knowledge of cardiovascular disease as well as eighty-eight percent could appropriately identify the relationship between diet and cardiovascular disease. A majority 90% of the students also found it likely to

incorporate heart-healthy food items into their daily diet. These findings exceeded researcher's hypothesized results.

Making appropriate food choices are the first step towards improving dietary intake and health in an effort toward preventing and reducing the risk of diseases such as cardiovascular disease. Early proper nutrition intervention may help to prevent and reduce the effect of the diseases later in life and improve the quality of life. Taking busy lifestyles into consideration, particularly for college students, more awareness and lifestyle appropriate interventions are needed in order to ensure disease prevention. More research into the food choices of college students and the factors that influence these choices are needed. Regarding the role of the dietitian/dietetics, a more active role in the promotion of healthy eating and healthy lifestyle should be taken, particularly for this age group in an effort to make early disease prevention possible.

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Appendix A

Questionnaire in English

The Acceptances of Heart Healthy Food Items Among College Student

Please Circle the appropriate remark.

Section 1: This section describes your perceived understanding of Cardiovascular Disease.

1) Do you know what cardiovascular disease is?

- a) Yes b) No

2) Do you agree or disagree with the following statement? "Eating healthy foods can help to reduce/prevent cardiovascular disease?"

- Agree No opinion Disagree

Section 2: Food Intake Background.

3) How many days per week do you consume the following foods?

- | | |
|------------------------|--|
| Cow's milk | <input type="checkbox"/> Everyday <input type="checkbox"/> Frequently <input type="checkbox"/> Occasionally <input type="checkbox"/> Seldom <input type="checkbox"/> Never |
| Soy milk | <input type="checkbox"/> Everyday <input type="checkbox"/> Frequently <input type="checkbox"/> Occasionally <input type="checkbox"/> Seldom <input type="checkbox"/> Never |
| Egg subs/white | <input type="checkbox"/> Everyday <input type="checkbox"/> Frequently <input type="checkbox"/> Occasionally <input type="checkbox"/> Seldom <input type="checkbox"/> Never |
| Soy burger | <input type="checkbox"/> Everyday <input type="checkbox"/> Frequently <input type="checkbox"/> Occasionally <input type="checkbox"/> Seldom <input type="checkbox"/> Never |
| Oat bread | <input type="checkbox"/> Everyday <input type="checkbox"/> Frequently <input type="checkbox"/> Occasionally <input type="checkbox"/> Seldom <input type="checkbox"/> Never |
| Fruits | <input type="checkbox"/> Everyday <input type="checkbox"/> Frequently <input type="checkbox"/> Occasionally <input type="checkbox"/> Seldom <input type="checkbox"/> Never |
| Vegetables | <input type="checkbox"/> Everyday <input type="checkbox"/> Frequently <input type="checkbox"/> Occasionally <input type="checkbox"/> Seldom <input type="checkbox"/> Never |
| Grape juice/wine | <input type="checkbox"/> Everyday <input type="checkbox"/> Frequently <input type="checkbox"/> Occasionally <input type="checkbox"/> Seldom <input type="checkbox"/> Never |
| Tea (green/red) | <input type="checkbox"/> Everyday <input type="checkbox"/> Frequently <input type="checkbox"/> Occasionally <input type="checkbox"/> Seldom <input type="checkbox"/> Never |
| Garlic | <input type="checkbox"/> Everyday <input type="checkbox"/> Frequently <input type="checkbox"/> Occasionally <input type="checkbox"/> Seldom <input type="checkbox"/> Never |
| Olive oil | <input type="checkbox"/> Everyday <input type="checkbox"/> Frequently <input type="checkbox"/> Occasionally <input type="checkbox"/> Seldom <input type="checkbox"/> Never |
| Almond/walnut/hazelnut | <input type="checkbox"/> Everyday <input type="checkbox"/> Frequently <input type="checkbox"/> Occasionally <input type="checkbox"/> Seldom <input type="checkbox"/> Never |
| Seafood | <input type="checkbox"/> Everyday <input type="checkbox"/> Frequently <input type="checkbox"/> Occasionally <input type="checkbox"/> Seldom <input type="checkbox"/> Never |
| Legumes | <input type="checkbox"/> Everyday <input type="checkbox"/> Frequently <input type="checkbox"/> Occasionally <input type="checkbox"/> Seldom <input type="checkbox"/> Never |
| Cereals (oat) | <input type="checkbox"/> Everyday <input type="checkbox"/> Frequently <input type="checkbox"/> Occasionally <input type="checkbox"/> Seldom <input type="checkbox"/> Never |

Section 3: changes to current diet:

4) How willing are you to add the following food items to your daily diet?

- Soy milk Strongly willing Willing No opinion Not willing Extremely not willing
- Egg subs/white Strongly willing Willing No opinion Not willing Extremely not willing
- Soy burger Strongly willing Willing No opinion Not willing Extremely not willing
- Oat bread Strongly willing Willing No opinion Not willing Extremely not willing
- Fruits Strongly willing Willing No opinion Not willing Extremely not willing
- Vegetables Strongly willing Willing No opinion Not willing Extremely not willing
- Grape juice/wine Strongly willing Willing No opinion Not willing Extremely not willing
- Tea (green/red) Strongly willing Willing No opinion Not willing Extremely not willing
- Garlic Strongly willing Willing No opinion Not willing Extremely not willing
- Olive oil Strongly willing Willing No opinion Not willing Extremely not willing
- Almond/walnut/hazelnut Strongly willing Willing No opinion Not willing Extremely not willing
- Seafood twice a week Strongly willing Willing No opinion Not willing Extremely not willing
- Legumes Strongly willing Willing No opinion Not willing Extremely not willing
- Cereals (oat) Strongly willing Willing No opinion Not willing Extremely not willing

5) Are you willing to limit the amount of red meat I eat to 2-3 serving (3 oz) per week?

- Strongly willing Willing No opinion Not willing Extremely not willing

Section 4: Your attitude toward changes to your diet.

6) What is the likelihood that you will add the food items you marked above to your daily diet?

- Highly likely likely somewhat likely unlikely highly unlikely

Section 5: General questions.

7) Are you? Male Female

8) What is your classification/class standing?

- Freshmen Sophomore Junior Senior Graduate