Nutrition for the Primary Prevention and Treatment of Cardiovascular Disease: A Needs Assessment of Medical Providers

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Nutrition for the Primary Prevention and Treatment of Cardiovascular Disease: A Needs Assessment of Medical Providers

Abstract

Background: There is conflicting evidence informing the dietary recommendations for cardiovascular disease (CVD) prevention. In addition, there is a lack of education regarding nutrition for medical providers. In order to effect change among the growing population of Americans at risk for CVD, there needs to be a better understanding of the knowledge and attitudes towards nutrition among providers, as well as development and implementation of an educational module with evidence-based research to guide dietary recommendations.

The primary purpose of this study was to evaluate medical providers’ (including nurses, physicians, nurse practitioners, and physician assistants) knowledge and attitudes towards nutrition for prevention and treatment of cardiovascular disease.

Methods: The design of this study was a quantitative survey with additional open-ended questions evaluating medical providers’ knowledge and attitudes regarding nutrition for the prevention of CVD.

Results: Data was analyzed from a quantitative perspective, with one additional open-ended survey question. Descriptive statistics were utilized to evaluate demographic data of participants. The majority of the respondents were bachelors-prepared registered nurses (RN’s). Seventy-five percent of the sample denied having taken or received training specific to nutrition for their role. Medical providers were largely misinformed regarding the dietary steps to take to decrease CVD risk. However, they agreed that nutritional counseling was important for patients well-being. Thirty-eight percent of the sample felt confident in their ability to provide this for patients.

Conclusions: The majority of medical providers surveyed believed that nutritional approaches to prevent and treat CVD were very important, but they did not consider themselves well equipped to educate their patients about them. In addition, many medical providers had inaccurate knowledge of the steps to reduce CVD risk through diet. Educational programs need to be implemented for medical providers in order to equip them with the necessary knowledge to inform patients of the best steps to take to reduce risk of and treat CVD through dietary approaches.

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Title: Nutrition for the Primary Prevention and Treatment of Cardiovascular Disease: A Needs Assessment of Medical Providers

Rachael T. Skeldon

Wegmans School of Nursing: St. John Fisher College

The above student has successfully completed this capstone as partial fulfillment of the requirements for the MS in Advanced Practice Nursing degree from the Wegmans School of Nursing at St. John Fisher College.

Advisor Signature: [Signature]

Date: 12/10/15

This capstone fulfills the requirements of capstone seminars and assists in meeting the program outcomes for the MS in Advanced Practice Nursing degree from the Wegmans School of Nursing at St. John Fisher College.

Second reader Signature: [Signature]

Date: 12/18/15
Nutrition for the Primary Prevention and Treatment of Cardiovascular Disease: A Needs Assessment of Medical Providers

Rachael T. Skeldon BSN, RN

Submitted in partial fulfillment of the requirements for the degree Master’s in Advanced Practice Nursing
Supervised by Dr. Christine Nelson-Tuttle

Wegmans School of Nursing
St. John Fisher College
November 2015
Nutrition for the Primary Prevention and Treatment of Cardiovascular Disease: A Needs Assessment of Medical Providers

Rachael T. Skeldon

Wegmans School of Nursing: St. John Fisher College

Author Note

This research study did not utilize any extraneous financial support or grants. Many thanks for personal assistance with manuscript preparation from Dr. Colleen Donegan, Dr. Chris Nelson-Tuttle, and Dr. Stephanie Townsend.

Please address correspondence and questions regarding this research to: Rachael T. Skeldon, Wegmans School of Nursing, 3690 East Avenue Rochester, NY 14618. Email: rskeldon@sjfc.edu
Abstract

**Background:** There is conflicting evidence informing the dietary recommendations for cardiovascular disease (CVD) prevention. In addition, there is a lack of education regarding nutrition for medical providers. In order to effect change among the growing population of Americans at risk for CVD, there needs to be a better understanding of the knowledge and attitudes towards nutrition among providers, as well as development and implementation of an educational module with evidence-based research to guide dietary recommendations. The primary purpose of this study was to evaluate medical providers' (including nurses, physicians, nurse practitioners, and physician assistants) knowledge and attitudes towards nutrition for prevention and treatment of cardiovascular disease.

**Methods:** The design of this study was a quantitative survey with additional open-ended questions evaluating medical providers' knowledge and attitudes regarding nutrition for the prevention of CVD.

**Results:** Data was analyzed from a quantitative perspective, with one additional open-ended survey question. Descriptive statistics were utilized to evaluate demographic data of participants. The majority of the respondents were bachelors-prepared registered nurses (RN's). Seventy-five percent of the sample denied having taken or received training specific to nutrition for their role. Medical providers were largely misinformed regarding the dietary steps to take to decrease CVD risk. However, they agreed that nutritional counseling was important for patients well-being. Thirty-eight percent of the sample felt confident in their ability to provide this for patients.

**Conclusions:** The majority of medical providers surveyed believed that nutritional approaches to prevent and treat CVD were very important, but they did not consider themselves well equipped to educate their patients about them. In addition, many medical providers had inaccurate knowledge of the steps to reduce CVD risk through diet. Educational programs need to be implemented for medical providers in order to equip them with the necessary knowledge to inform patients of the best steps to take to reduce risk of and treat CVD through dietary approaches.
Research in the past decade has demonstrated that both obesity and metabolic syndrome have become endemic in the United States (Santos, Esteves, Pererira, Yancy, & Nunes, 2012). The term “metabolic syndrome” is defined by the National Heart, Lung, and Blood Institute as a grouping of risk factors that drastically increase the risk of heart disease; these factors include: hyperglycemia, abdominal obesity, hypertension, and hyperlipidemia (2011). Several studies have demonstrated that the consumption of carbohydrate-rich diets, such as the DASH (Dietary Approaches to Stop Hypertension) diet recommended by the American Heart Association (AHA), lead to hyperglycemia and eventual insulin resistance and diabetes (Burger, Beulens, Spijkerman, & Van der A, 2011; Egert, Kratz, Kannenberg, Fobker, & Wahrburg, 2010; Gadgil, Lawrence, Yeung, Anderson, Sacks, Sacks, & Miller, 2013). These factors contribute to the development and worsening of cardiovascular disease (CVD).

The results of the OmniHeart Trial conducted in 2010 found that a diet replacing a portion of carbohydrates with protein or unsaturated fats improved total cholesterol levels and blood pressure, thereby reducing CVD risk (Gadgil et al., 2013). Participants who consumed these diet variations over a six-week time frame had significant increases in measures of insulin sensitivity. These findings support the adoption of a Mediterranean-style diet; improvements in insulin resistance were caused by the increased intake of unsaturated fats rather than a decreased intake of carbohydrates. Furthermore, the PREDIMED trial found that there was a 30% risk reduction in CVD events among high-risk study participants after adopting a Mediterranean diet (Estruch, Ros, Salas-Salvado, Covas, Corella, Aros, Gomez-Garcia, Ruiz-Gutierrez, Fiol, Lapetra, Lamuela-Raventos, Serra-Majem, Pinto, Basora, Munoz, Sorli, Martinez, & Martinez-Gonzales, 2013). In addition, among
three recent studies, participants consuming diets higher in glycemic load had resultant increases in triglycerides and decreases in HDL levels, which are known risk factors for CVD (Burger et al., 2011; Levitan, Mittleman, & Wolk, 2009; Shikany, Tinker, Neuhouser, Yunsheng, Patterson, Phillips, Liu, & Redden, 2010). Furthermore, a meta-analysis was conducted in 2010, and researchers concluded from 21 studies that intake of saturated fat was not associated with increased risk for CVD, and overall there is not sufficient evidence to conclude that dietary saturated fat is associated with increased risk for CVD (Siri-Tarino, Sun, Hu, & Kruss, 2010).

Despite the research, there continues to be a gap in practice recommendations for the prevention of CVD with diet. The implications for practice from these studies indicate the need for an educational program addressing the importance of these dietary factors. The American Medical Association upholds the value of patient education within the policy, *A Declaration of Professional Responsibility*, stating that the world community of physicians will, "educate the public and polity about present and future threats to the health of humanity" (2015). Additionally, the American Nurses Association reinforces the nurse’s role as patient educator in the publication, *Nursing: Scope and Standards of Practice*; stating, "Standard 5b: Health Teaching and Health Promotion: The registered nurse employs strategies to promote health and a safe environment" (2010).

To date, there have not been significant changes in the dietary recommendations put forth by the AHA, which still maintains that a low-fat diet is best for reducing risk for CVD (NIH, 2006). This has led to a gap between the research and medical practice, which needs to be addressed in order to effect change among the growing population of adults suffering with obesity and CVD. Research has indicated that nutrition education is
genuinely lacking in the majority of medical programs within the United States (Vetter, Herring, Sood, Shah, & Kalet, 2008; Boaz et al., 2013). This research, conducted in 2008 found that, “67% of physicians report lack of training in counseling skills and 62% report deficits of knowledge about nutrition as major barriers,” to providing dietary counseling and discussing weight loss with patients (Vetter et al.). Likewise, a study conducted in Israel in 2013 found that only 51.9% of nurses answered nutrition knowledge questions correctly, and that study participants strongly disagreed that, “nurses possess a great deal of nutrition knowledge” (Boaz, Rychani, Barami, Houri, Yosef, Siag, Berlovitz, & Leibovitz, 2013).

Purpose

The primary purpose of this study was to evaluate medical providers (including nurses, physicians, nurse practitioners, and physician assistants) knowledge and attitudes towards nutritional approaches for prevention and treatment of CVD. Baseline knowledge and attitude levels were evaluated to determine if they align with providers’ roles as patient educators.

Methodology

This study anonymously surveyed a convenience sample of medical providers. The questionnaire was created by the researcher for this study utilizing Qualtrics software, and was posted on two social media platforms: Facebook and Twitter. The questionnaire was a 15-item descriptive survey, comprised of four demographic questions, seven knowledge questions, three Likert-scaled attitude questions, and one open-ended attitude question. Questions were developed and based on information from extensive literature review by the researcher. The knowledge questions pertaining to sugar were developed and based on
information from the Harvard School of Public Health’s informational website, *The Nutrition Source* (n.d.). The remaining knowledge questions were developed based on a nutrition survey which was given at SUNY Downstate Medical School in 2005 (Makowske & Feinman). Attitude questions were developed from the study conducted by Vetter et. al in 2008, which originally assessed resident physician knowledge and attitudes about nutrition. The questionnaire was evaluated and approved by expert review. Administration of the survey occurred in September 2015. This project was approved by the St. John Fisher College Institutional Review Board on human subjects research. The results were analyzed with descriptive statistics utilizing Qualtrics software.

**Results**

Out of the 57 individuals who were consented to take the survey, 40 answered all demographic, knowledge, and attitude questions, and 25 answered the open-ended attitude question. The breakdown of responses included: 75% registered nurses, 20% nurse practitioners, and 5% physicians. Of the 40 respondents, 53% had been in practice for 0-5 years, 10% for 6-10 years, 8% for 11-15 years, and 30% for more than 15 years. The majority of this sample (58%) had completed bachelor’s degrees. Eight percent had obtained an associate’s degree, 18% had master’s degrees, 10% had a PhD or doctorate, and 8% classified their highest education level as “Other,” and further specified these to “diploma RN,” and “PCCN certified.” Additionally, 75% of the sampled group denied having taken courses or receiving training specific to nutrition pertaining to their role as a medical professional. Among the 25% who had received training on nutrition, 90% reported that the aforementioned training consisted of an undergraduate level nutrition class; and 10% reported attending lectures specific to nutrition during medical school.
Table 1

Knowledge Questions

<table>
<thead>
<tr>
<th>Question</th>
<th>% Correct</th>
<th>% Incorrect</th>
</tr>
</thead>
<tbody>
<tr>
<td>How many grams of sugar are in one teaspoon?</td>
<td>60%</td>
<td>40%</td>
</tr>
<tr>
<td>What is the recommended daily sugar intake by the FDA?</td>
<td>60%</td>
<td>40%</td>
</tr>
<tr>
<td>How much sugar does the average American consume each day?</td>
<td>55%</td>
<td>45%</td>
</tr>
<tr>
<td>Which food group provides the most energy (calories) per gram?</td>
<td>18%</td>
<td>82%</td>
</tr>
<tr>
<td>Over the past three decades, how has the consumption of fat in the</td>
<td>15%</td>
<td>85%</td>
</tr>
<tr>
<td>American diet changed?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Which food group is most likely to increase triglyceride levels?</td>
<td>13%</td>
<td>87%</td>
</tr>
<tr>
<td>Which dietary replacement will increase an individual’s risk of CVD?</td>
<td>13%</td>
<td>87%</td>
</tr>
</tbody>
</table>

As noted in the above table, the surveyed providers appeared to have an average knowledge regarding sugar intake and amounts for the average American, as they scored slightly above 50% on all three of those knowledge questions. However, there was a significant lack of knowledge regarding which food group is most energy-dense, as well as how the American diet has predominantly changed over the past three decades. In addition, 13% of medical providers identified that carbohydrates would most likely lead to an increase in triglyceride levels, which is a direct marker for CVD risk.
Table 2

Attitude Questions

<table>
<thead>
<tr>
<th>Question</th>
<th>% Strongly Disagree or Disagree</th>
<th>% Neutral</th>
<th>% Strongly Agree or Agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>As a medical provider, I believe that nutrition assessment and counseling should be included at all office visits</td>
<td>8%</td>
<td>10%</td>
<td>83%</td>
</tr>
<tr>
<td>As a medical provider, I am obligated to assess nutritional status and provide recommendations to my patients</td>
<td>8%</td>
<td>20%</td>
<td>73%</td>
</tr>
<tr>
<td>I feel comfortable providing nutritional recommendations to my patients with a variety of health conditions</td>
<td>40%</td>
<td>23%</td>
<td>38%</td>
</tr>
</tbody>
</table>

In response to the attitudinal questions, medical providers agreed that they believe nutrition is an important part of regular office visits, and should be included for patient well-being. However, only 38% of medical providers felt that they would be comfortable enough with their current knowledge level to actually provide these recommendations to their patients.

The open-ended qualitative question asked providers to describe their position on nutrition for the prevention of cardiovascular disease. The survey garnered four main themes among the 25 answers provided. The most common theme noted was the belief that nutrition education is important, with 21 respondents (84%) conveying this message within their answer. The second most common theme was one in which providers expressed the belief that there are barriers to the efficacy of education for their patients. Six respondents mentioned this topic in their answer. The rationale cited by providers for limited efficacy of nutritional teaching included ingrained habits, lack of healthy food availability, and reticence to change among patients. One respondent stated, “Doctors are
often quicker to prescribe medicine before offering nutritional counseling." Similarly, another respondent stated,

Many of my patients will politely listen to a 20 minute discussion of low carbohydrate diet and it’s positive effects on weight loss, insulin resistance, and A1c management and then on the next visit tell you that they would rather continue eating what they’re used to eating and take more medicine.

The last two themes were equally weighted with five responses each, and they encompassed the thoughts that medical providers experience barriers to educating their patients, and that other things in addition to, or instead of nutrition, are important to focus on when educating patients, including exercise, weight loss, smoking, and controlling diabetes. The barriers to providing education cited by respondents included a lack of adequate nutrition knowledge and lack of time during visits and appointments. Several responses that described a lack of adequate nutrition knowledge stated that this was attributable to their specialty background, but that they believed this would be very important for primary care providers and cardiologists to have.

Discussion

The majority of the respondents were bachelors-prepared registered nurses (RN’s). This may allow the data collected from this study to inform nursing practice changes and educational programs. The data specific to nursing knowledge gathered from this study could be utilized to inform undergraduate or graduate curriculum changes for nursing students and would support the inclusion of nutrition courses during training. Previous research has indicated that nurses are frequently the first members of the healthcare team to identify nutritional problems among patients (Boaz et al., 2013). Therefore, knowledge and attitudes of nurses regarding this topic is important to assess.
Within this sample group of medical providers, nurses, even those who tend to be more highly educated, have little training on nutrition and nutrition education. Additionally, the inaccurate responses to knowledge questions indicates that the nutrition training they did receive was out of date. Of the ten percent of the studied population who indicated that they had training in the field of nutrition, 90% stated that this training consisted of an undergraduate nutrition class. This indicates that a vast majority of advanced practice providers and physicians do not receive graduate level (or higher) education regarding nutrition. Furthermore, respondents performed poorly on the knowledge questions, denoting insufficient knowledge to provide accurate nutrition education for patients. Forty-three percent of the sample believed that carbohydrates provide the most energy (calories) per gram, while only 18% recognized that fat provides the most energy per gram. Moreover, an overwhelming majority of the sample believe that fat, instead of carbohydrates, are more likely to increase triglyceride levels and that the consumption of fat in the American diet has increased over the past three decades. The opposite is true. In fact, as the percentage intake of fats in American diets has decreased over the past thirty years, the rates of obesity have increased significantly (Harvard School of Public Health, 2015). Nevertheless, providers do think nutrition education is an important part of medical care and that it is part of their role to provide as patient educators. Eighty-three percent of providers surveyed indicated that they either agreed, or strongly agreed, that nutrition assessment and counseling should be included in regular office visits. Conversely, providers do not feel comfortable providing this education.

Cited barriers to providing nutrition education included mainly a lack of knowledge, and a lack of time during appointments for that education. Interestingly, several providers
expressed that it was often quicker to prescribe medications to patients rather than offering nutritional counseling. This may be correlated with a lack of time during office visits and is important to note. As primary care providers are tasked with providing care to a population that is aging and growing increasingly complex, the primary goals of the medical industry are to still provide high-quality care and reduce costs (Chen, Farwell, & Jha, 2009). The effort to reduce costs may decrease the importance placed on nutrition and nutritional counseling during office visits; this is especially true when providers do not believe themselves to be well informed on the subject initially.

Based on the results of this study, medical providers need increased education and access to up-to-date nutrition information for the prevention and treatment of CVD. By providing this to primary care providers, they will become better equipped to inform their patient population about specific dietary patterns that will reduce the risk of disease and improve quality of life. If nutrition is incorporated into the training programs of medical providers, the potential to effect positive change will be exponential. Furthermore, results of this study have the potential to inform future studies regarding implementation of higher fat, lower carbohydrate diets for the prevention and treatment of CVD.

Limitations of this study include the convenience sampling method utilized to distribute the questionnaire on social media, as well as the small sample size and uneven distribution of medical professionals who answered the survey. Convenience sampling is limited in that it does not represent the entire population of medical professionals. Additionally, the small sample size may limit the weight of the conclusions of this study, as it only evaluated the knowledge and opinions of a small group of professionals. Also, the fact that a majority of RN’s answered the survey compared with physicians and nurse
practitioners makes the data more applicable to nursing, but does not allow adequate conclusions for other medical providers. Further research is needed on this topic and should include a large group of medical professionals with a quantitative study method. A secondary aim following this study would be to create and implement a dietary plan based on current, informed research for patients with CVD and determine the effects of said diet on CVD markers.
References


Nutrition for the Primary Prevention and Treatment of Cardiovascular Disease: A Needs Assessment of Medical Providers
Rachel Sheldon, MSN, RN, FNP-S
Wegmans School of Nursing

Introduction

- Obesity and metabolic syndrome have become endemic in the United States over the past decade.
- Recent research has demonstrated that carbohydrate-rich diets, including the DASH (dietary approaches to stop hypertension) diet recommended by the AHA, may increase blood sugar levels leading to hyperglycemia, eventual insulin resistance, diabetes, and increased triglycerides.

Background

- Several studies have indicated that the previous theory and recommendation for a low-fat diet to prevent cardiovascular disease (CVD) is unnecessary and not supported by evidence (Siri-Tarino, Sun, Ha, & Kruss, 2010).
- The OmniHeart Trial in 2010 found that participants who replaced a portion of dietary carbs with unsaturated fats experienced improved total cholesterol and blood pressures (Gaggl, Lawrence, Young, Anderson, Sacks, Sacks, & Miller, 2013).

Background Cont.

- The PREDMED trial conducted in 2013 found a 30% risk reduction among participants who adopted a Mediterranean diet (Esteban, Ros, Salas-Salvado, Covas, Corella, Arós, Gómez-García, Reis-Coutinho, Fid, Lagarda, Lareu, Raventos, Serra-Majem, Pintos, Barbosa, Manzo, Sorli, Martínez, & Martínez-González).
- In addition, among three recent studies, participants consuming diets higher in glycemic load had resultant increases in triglycerides and decreases in HDL levels, which are known risk factors for CVD (Burger et al., 2011; Levita, Mintman, & Wilk, 2009; Siskosky, Tinker, Neuhouser, Vash, Peterson, Phillips, Liu, & Brodie, 2010).

Background Cont.

- Despite the current research, there has not been a significant change in dietary recommendations that are given to patients for the prevention and treatment of cardiovascular disease.
- In addition, up to 62% of physicians reported a lack of knowledge related to nutrition as a barrier to providing effective counseling to patients and in a 2013 study, roughly 36% of nurses answered nutrition questions correctly (Vetter, Herring, Sood, Shah, & Kalet, 2013; Boaz, Rybak, Barzani, Hourli, Ysne, Slog, Berlozov, Lebovitz).

Purpose

- The primary purpose of this study was to evaluate medical providers (including nurses, physicians, nurse practitioners, and physician assistants) knowledge and attitudes towards nutritional approaches for prevention and treatment of cardiovascular disease.
Methodology

- This study anonymously surveyed a convenience sample of medical professionals on two social media platforms (Facebook and Twitter) using Qualtrics software.
- The questionnaire consisted of a 15 item survey with 4 demographic questions, 7 knowledge questions, 3 Likert scale attitude questions, and 1 open-ended attitude question.
- Survey administration occurred in September 2015.
- This project was approved by the St. John Fisher College Institutional Review Board on human subjects research.

Knowledge Results

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<tr>
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<tr>
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<td>What is the recommended daily sugar intake by the FDA?</td>
<td>40%</td>
<td>60%</td>
</tr>
<tr>
<td>How much sugar does the average American consume each day?</td>
<td>55%</td>
<td>45%</td>
</tr>
<tr>
<td>Which beverage provides the most energy (calories) per serving?</td>
<td>14%</td>
<td>86%</td>
</tr>
<tr>
<td>How many positive changes have been made to the American diet recently?</td>
<td>15%</td>
<td>85%</td>
</tr>
<tr>
<td>Which beverage is most likely to increase sugar levels?</td>
<td>13%</td>
<td>87%</td>
</tr>
<tr>
<td>Which dietary replacement will increase an individual’s risk of CVD?</td>
<td>15%</td>
<td>85%</td>
</tr>
</tbody>
</table>

Attitude Results

<table>
<thead>
<tr>
<th>Question</th>
<th>% Strongly Agree</th>
<th>% Agree</th>
<th>% Disagree</th>
<th>% Strongly Disagree</th>
</tr>
</thead>
<tbody>
<tr>
<td>As a medical professional, I believe that nutritional counseling and education should be included at all office visits</td>
<td>8%</td>
<td>10%</td>
<td>82%</td>
<td>0%</td>
</tr>
<tr>
<td>In taking care of my own patients, I would provide recommendations on nutrition while in practice</td>
<td>40%</td>
<td>30%</td>
<td>30%</td>
<td>0%</td>
</tr>
<tr>
<td>I feel comfortable providing nutritional recommendations to any patient with a variety of health conditions</td>
<td>40%</td>
<td>30%</td>
<td>30%</td>
<td>0%</td>
</tr>
</tbody>
</table>

Results

- The survey had 40 respondents, 75% were nurses, most of whom were bachelor’s prepared.
- 75% of medical professionals in this sample had not taken or received training specific to nutrition specific for their careers.
- Among the 25% who had received training on nutrition, 90% reported that the aforementioned training consisted of an undergraduate level nutrition class, and 10% reported attending lectures specific to nutrition during medical school.

Results Cont.

- Providers appeared to have an average knowledge regarding sugar intake and amounts for the average American, as they scored slightly above 50% on all three of those knowledge questions.
- There was a significant lack of knowledge regarding which food group is most energy-dense, as well as how the American diet has predominantly changed over the past three decades.
- 13% of medical providers identified that carbohydrates would most likely lead to an increase in triglyceride levels, which is a direct marker for CVD risk.
Results Cont.

- Eighty-three percent of providers surveyed indicated that they either agreed or strongly agreed that nutrition assessment and counseling should be included in regular office visits. Conversely, providers did not feel comfortable providing this education.
- Cited barriers to providing counseling included lack of knowledge (on the part of the providers) and lack of time during appointments.

Conclusions

- Based on the results of this study, medical providers need increased education and access to up-to-date nutrition information for the prevention and treatment of CVD.
- By providing this to primary care providers, they will become better equipped to inform their patient population about specific dietary patterns that will reduce their risk of disease and improve quality of life.

Dissemination

- The results of this study may be submitted for publishing with the Journal of Clinical Nutrition, or the Journal of Continuing Nursing Education.
- Additionally, these results may be shared with a GVNA meeting or STTI meeting of nursing professionals.

References

- National Institute of Health (2004). Your guide to lowering your blood pressure with DASH. 20301 Executive Dr.
June 16, 2015

Rachael Skeldon
St. John Fisher College

Dear Ms. Skeldon:

Thank you for submitting your research proposal to the Institutional Review Board.

I am pleased to inform you that the Board has approved your Expedited Review project, "An Educational Approach: Prevention of Cardiovascular Disease Through Diet."

Following federal guidelines, research related records should be maintained in a secure area for three years following the completion of the project at which time they may be destroyed.

Should you have any questions about this process or your responsibilities, please contact me at irb@sfc.edu.

Sincerely,

Eileen Lynd-Balta

Eileen Lynd-Balta, Ph.D.
Chair, Institutional Review Board

ELB:jdr

Purpose: The purpose of this study was to determine whether high dietary glycemic load (GL) and glycemic index (GI) foods were associated with an increased risk of coronary heart disease (CHD) and stroke among a large population of Dutch men and women, and to determine if that association differed between men and women.

Sample/Participants: The population for this study consisted of 22,654 men and women ages 20-65 years selected from a random sampling from 3 cities in the Netherlands from 1993-1997. These cities included: Amsterdam, Doetinchem, and Maastricht. Due to exclusion criteria and attrition, a final number of 19,608 people were eligible for participation. There were 10,753 female and 8,855 male participants.

Methodology: This is a prospective cohort study, with randomly selected participants. Participants were excluded based upon history of diabetes or CHD. Dietary intake was recorded using a food frequency questionnaire, and GL/GI was estimated using Foster-Powell’s international table of GI. Demographic data was analyzed from participants including gender, physical activity, anthropometric measurements, education level, smoking, birth control usage, blood pressure, and cholesterol levels. Morbidity/mortality data was collected from national registries. Cox proportional hazards analysis was used to estimate hazard ratios (HR) for incident CHD and stroke.

Results: This study found that after roughly 12 years of follow up with the participation sample, GL was associated with increased CHD risk among men, but not among women. There were 581 CHD cases and 120 stroke cases among men, and 300 CHD and 109 stroke cases among women. GI was not associated with CHD risk in both genders, but it was associated with increased stroke risk in men only. Also, total carbohydrate and starch intake was linked to higher CHD risk in men, but not in women.

Conclusion: Among men in this population, high GL and GI, as well as high carbohydrate and starch intake lead to increased risk of cardiovascular disease, as well as increased stroke risk. There were no statistically significant connections of this nature for women in this population. The conclusions of this study may be impacted by differences in study populations (Sweden, Japan, Finland, America etc.), as well as the younger age of the participants (20-66) as many similar studies have been conducted with older populations. Further studies need to be conducted to determine if the difference between male and female response to GL/GI is significant.
| Implications for Practice: | Implications for practice based on the findings of this study would be to suggest a reduction in dietary GL and GI foods especially among men. In addition, due to the rising prevalence of childhood obesity, the findings of this study that young men tend to be more sensitive to GL/GI foods should be taken into account among medical providers who are educating parents. It should be suggested that young men consume a diet lower in GL/GI foods in order to reduce future risk of CHD and stroke. It could also be suggested that women consume a diet lower in GL/GI foods as well, although there were not statistically significant findings in this study. The lack of findings for this gender could be based on the population age and it should be noted that there is evidence of prior studies which have demonstrated that there is a positive correlation between GL/GI foods and CHD among women. |

The purpose of this study was to observe the outcomes of two main diet patterns (Mediterranean vs. low fat) in relation to cardiovascular event occurrence among a large group of participants in Spain. This trial was conducted to assess the Mediterranean diet pattern as primary prevention of cardiovascular disease.

A total of 7447 participants were randomly selected for this trial with ages ranging from 55-80 years. 57% of the participants were women. By the end date of the study, 523 people had been lost to follow up for two or more years. The participants were all residents of Spain, and were required to have no cardiovascular disease upon enrollment, but were considered high risk due to a type II diabetes mellitus diagnosis or the presence of at least three major risk factors. These included smoking, hypertension, high LDL levels, low HDL levels, overweight or obese, or family history of premature cardiovascular disease (CVD). Data was collected from the participants from 10/1/03-12/1/10.

This study was a parallel-group, multicenter, randomized trial. The independent variable was the diet. Dependent variable was the cardiovascular event occurrence. Three dietary intervention groups were utilized for this trial: a Mediterranean diet supplemented with extra virgin olive oil (EVOO), a Mediterranean diet supplemented with nuts, and a control (low fat) diet. No calorie restrictions were advised, nor was physical activity promoted for participants. Dieticians ran individual and group dietary training sessions at baseline and then quarterly for the Mediterranean diet groups, in addition to a 14 item questionnaire used to assess adherence at each visit. The control diet group received dietary teaching at baseline, in addition to the 14 item questionnaire, and then received a pamphlet explaining their diet for three consecutive years. In 2006, this was amended, and the control group began receiving group and individual sessions with the same frequency of the Mediterranean diet groups. All participants completed a validated food frequency questionnaire and the Minnesota Leisure-Time Physical Activity Questionnaire yearly. Weight, height, and waist circumference were also measured as well as biomarkers of compliance with dietary advice. This included a urine test for the olive oil group and a blood test for the nut supplementation group, taken at one, three, and five years. Primary end points were considered to be major CVD events including heart attack, stroke, or death from CVD causes.
### Results:
There was a significant difference among the Mediterranean groups and the control group in relation to the diet questionnaire at the three year mark, showing that the Mediterranean groups were more compliant, and increased their intake of EVOO and nuts significantly. This was reinforced by the biomarker urine and blood sample tests. At the end of the trial, 288 primary outcome events had occurred. 96 in the Mediterranean with EVOO group, 83 in the Mediterranean with nuts group and 109 in the control (low-fat) group. The rate of the primary end points were 8.1, 8.0, and 11.2 (respectively) per 1000 person-years. The results demonstrate a protective effect of both Mediterranean diets.

### Conclusions:
Among the participants in this study the Mediterranean diet groups demonstrated a risk reduction of approximately 30%, across both male and female gender in the specified age group, at high risk for CVD. The low overall numbers of primary end point events within the study may explain the lower CVD mortality rates in Mediterranean countries in comparison to northern European countries and the United States. The risk of stroke was also significantly reduced in the two Mediterranean groups. Limitations of this study include the change in teaching protocol for the control group halfway through the trial. Also, there were losses of participants, mainly in the control group and finally, the generalizability of this study may be limited due to the fact that all participants lived in Spain and were at high risk for CVD prior to beginning the study.

### Implications for Practice:
The results of this study support the use of a Mediterranean diet supplemented with EVOO or nuts as a primary prevention for CVD among high-risk people. An implication for practice would be to include and promote this dietary advice to patients that are known to be at high-risk for cardiovascular disease. In addition, it could be recommended that this diet be followed even by people who are not considered high risk for CVD as part of a healthy lifestyle, in order to prevent future possibility and risk of CVD.
### Authors, Year, Title, Journal:

### Purpose:
The purpose of this study was to determine the effects of a carbohydrate rich diet (similar to the Dietary Approaches to Stop Hypertension—“DASH” diet, “CARB”), a protein-rich diet (“PRO”), and an unsaturated fat-rich diet (“UNSAT”) on insulin sensitivity.

### Sample/Participants:
Participants were recruited from two major hospitals: Johns Hopkins Medical Institution in Baltimore, Maryland, and Brigham and Women’s Hospital in Boston, Massachusetts. The participants totaled 164 individuals with diagnoses of pre-hypertension or stage 1 hypertension, without diabetes. In order to participate, individuals were required to be 30 years old or older, and in overall good health. There were 73 female participants, and 91 male participants. 90 participants were African-American, 65 were non-Hispanic White, and nine identified as “other.” The mean age of participants was 59 years old and 79% of participants were overweight or obese. Exclusion criteria included: preexisting diabetes, active or prior cardiovascular disease, LDL cholesterol level >220mg/dL, fasting triglycerides >750mg/dL, weight >350 lbs., use of insulin or hypoglycemic agents, use of blood pressure or lipid lowering medications or vitamins/minerals, and self-reported alcohol intake >14 drinks per week.

### Methodology:
The Optimal Macronutrient Intake Trial to Prevent Heart Disease (OmniHeart) was an investigator-initiated, National Heart, Lung, and Blood institute-funded trial. The study was a randomized, controlled, three-period, crossover feeding study. The dependent variables were the insulin sensitivity measures (QUICKI & HOMA). The independent variable was the specific diet (CARB, PROT, & UNSAT). The CARB diet contained 58% kilocalories from carbohydrate, 15% from protein, and 27% from fat, and was similar in design to the “DASH,” diet. The PROT diet replaced 10% carbohydrate calories with protein and maintained 25% calories from protein, using meat, poultry, eggs, dairy, with a majority of protein sources being plant-based. The PROT diet contained 48% calories from carbs, and 27% from fats. The UNSAT diet replaced 10% carbohydrate calories with unsaturated fats and provided 48% of calories from carbohydrates, 15% from protein, and 37% from fats, utilizing olive, canola, and safflower oils in addition to nuts and seeds to increase fat intake. After ensuring that all participants could tolerate the
food from all three diets, they were randomly assigned to one of six sequences of the three diets. Each feeding period lasted six weeks and had a washout period of 2-4 weeks between them. During the washout period, participants ate their own foods. For each diet there was a seven day menu cycle, and calorie intake was maintained for participants to maintain a constant body weight. All meals were prepared in research kitchens for participants, who maintained their regular exercise frequency and minimum alcohol intake. Fasting blood samples were collected after an eight to twelve hour fast at baseline and at four and six weeks of each feeding period for insulin and glucose levels. Insulin sensitivity was measured using the validated Quantitative Insulin Check Index (QUICKI) measure and the Homeostasis Model Assessment of Insulin Resistance (HOMA-IR). A higher numerical value for HOMA or QUICKI indicates greater insulin sensitivity. QUICKI has been validated at a steady-state measure with a high correlation with the gold standard hyperinsulinemic-euglycemic glucose clamp. HOMA-IR is an alternate assessment of insulin sensitivity, which is more flexible for use among normal weight, overweight, and insulin resistant obese individuals.

Results:

In this trial, the UNSAT diet increased QUICKI by 0.0007 from baseline, but there was no change with the PROT diet or CARB diet. Mean QUICKI measure at baseline was 0.35. HOMA showed similar diet specific responses with an increase of 0.14 after consumption of the UNSAT diet, 0.06 after the PROT diet, and 0.04 after the CARB diet compared with baseline. Therefore, the UNSAT diet increased both QUICKI and HOMA from baseline, while the CARB and PROT did not. Improvements in insulin sensitivity were both statistically and clinically relevant. This data suggests that a diet similar to the Mediterranean diet may improve insulin sensitivity in patients without type II diabetes. This improvement seems to be from the increase in unsaturated fat intake, rather than the decrease in carbohydrate intake, as there were no significant changes when participants consumed the PROT diet with lower carbohydrate. Also, the improvements in QUICKI after the UNSAT diet was most dramatic among participants of normal weight, as the effect decreased as weight increased in participants. In addition, the PROT and UNSAT diets lowered systolic and diastolic blood pressure, and the PROT diet resulted in the largest decrease in LDL level. When compared to the CARB diet, there was a greater reduction in triglyceride levels among participants consuming both the PROT and UNSAT diet. Finally, the UNSAT diet was the only diet that increased HDL levels.
**Conclusions:**
The findings of this study suggest that replacement of a portion of carbohydrates in the diet with unsaturated fats beneficially impacts the main components of metabolic syndrome. These include systolic blood pressure, triglycerides, and HDL cholesterol levels. The significant findings of this study support a diet similar to the Mediterranean-style diet, in order to prevent cardiovascular disease by increasing insulin sensitivity and warding off type II diabetes. Some limitations of this study include the sample size, which is not large enough to meet criteria for statistical significance, as well as the short length of each feeding period (six weeks). However, prior feeding studies have demonstrated that the most significant changes in blood pressure and lipid levels occur within 2-4 weeks of diet changes. Although sample size was small, the findings among the UNSAT group were clinically and statistically significant. Also, this trial was randomized using a computer generator, and utilized a diverse population, which may translate to better applicability of information to a wide array of populations.

**Implications for Practice:**
The results of this study support the inclusion of a diet rich in unsaturated fats, similar to the Mediterranean-style diet, for adults as a preventative measure to improve insulin-sensitivity; thereby decreasing the risk for cardiovascular disease. These diet changes could safely be recommended for both healthy individuals and those with pre-hypertension and pre-diabetes in attempts to stabilize blood pressure and blood glucose levels prior to the incorporation of medications for hypertension and diabetes.

**Purpose:** The purpose of this study was to observe and measure the effects of dietary fat content on cardiovascular disease risk factors in humans when the fatty acid composition and types of carbohydrates were kept constant. Specifically, to compare a high-fat diet with a low-fat diet with regard to its effect on fasting serum lipids and lipoproteins, LDL size, LDL fatty acid composition, LDL α-tocopheral and indices of lipid peroxidation.

**Sample/Participants:** Participants were students recruited from a third-level technical college in Germany. 88 volunteers were screened, with an end result of 47 healthy volunteers enrolled in the study. Inclusion criteria were: non-smoking status, 19-40 years old, BMI < 27 kg/m², serum total cholesterol (TC) < 7.76 mmol/l and serum triacylglycerols (TAG) < 3.39 mmol/l. Exclusion criteria were: metabolic and endocrine disorders, malabsorption syndrome, alcohol abuse, and restrictive dietary requirements. There was an attrition of 10 volunteers, with a final count of 37 participants, 12 men, 25 women, ages 18-34. All procedures were approved by the ethical committee of the University of Muenster, Germany. Written informed consent was obtained from all participants.

**Methodology:** This was a parallel design, controlled feeding study, with two consecutive feeding periods. Both diet groups were low in saturated fatty acids (SFA) and rich in unsaturated fatty acids (USFA), particularly mono-unsaturated fatty acids (MUFA); carbohydrate, fiber, cholesterol, and antioxidant levels were kept constant among groups. Independent variable was the specific diet group (high-fat or low-fat). Dependent variables were the specific measures of serum lipids, LDL size, and lipid peroxidation; all measures of cardiovascular disease risk. Prior to beginning the study, participants recorded a three-day food journal for estimation of caloric intake. Caloric intake was then maintained throughout the study to keep body weight measures constant. Participants consumed a “wash-in” diet rich in SFA for two weeks prior to beginning the study, after which they were randomly assigned to one of the two diet groups, each lasting four weeks. One group received a high-fat diet (40% of total calories), with the opposite group...
receiving a low-fat diet (29%). All food was prepared for participants in the research kitchen. Fasting blood samples were obtained at baseline, after the “wash-in” period, and at two and four weeks of the study diets to measure serum TC, TAG, HDL levels, LDL size, LDL oxidation, and tocopheral content. Urine samples were collected at each of the four visits to measure 8-iso-prostaglandin and creatinine levels. SPSS was utilized to perform statistical analyses on data collected.

**Results:**

Among both groups, serum TC levels decreased significantly. Compared to the wash-in diet, the high-fat diet lowered LDL cholesterol -0.34 mmol/l, and the low-fat diet lowered it -0.41 mmol/l (P <0.001). Serum TAG did not change significantly during the study in either group. Both diets decreased the size of the LDL molecules. Also, plasma levels of oxidized LDL decreased significantly in both the high and low-fat groups. These decreases were directly correlated with decreases in overall LDL levels. LDL α-tocopherol levels did not significantly change among either group.

**Conclusion:**

The main finding of this study was that both the high and low-fat diet, rich in MUFA had similar effects on serum lipid levels, LDL size, and LDL oxidation when compared to the “wash-in” diet which was high in SFA. A high or low-fat diet rich in MUFA and low in SFA significantly decreased TC and LDL serum levels. TAG levels were not impacted largely by either diet, however in prior studies there has been a correlation between increased TAG levels and low-fat/high-carbohydrate diets. This may have been avoided in this study, as the carbohydrates used were low on the glycemic index, and high in fiber. These changes were studied in metabolically healthy, young non-obese men and women. Therefore, applicability of these results may be limited.

**Implications for Practice:**

Implications for practice based on these results would be to limit SFA dietary intake, and to increase the amount of MUFA in the diet. This may be helpful in decreasing CVD risk, as the high-fat, MUFA rich diet in this study was beneficial in reducing LDL levels. Also, the results of this study would indicate that it may be important to consume carbohydrates that are lower on the glycemic index and high in fiber to maintain the protective effects of the diet.
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<td>Purpose:</td>
<td>To examine the association of dietary glycemic index (GI) and glycemic load (GL) with cardiovascular disease and all-cause mortality among middle-aged and older men with a history of hospitalization for cardiovascular disease (CVD) at baseline.</td>
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<td>Sample/Participants:</td>
<td>This study included 4,617 men who had at least one hospitalization for CVD related events recorded in the Swedish in-patient register and who were members of the Cohort of Swedish Men, which was a larger clinical trial conducted in two counties in central Sweden beginning in 1997, looking at diet and lifestyle factors through the use of yearly questionnaires. Of this population, 1060 had been hospitalized for stroke, 2027 had been for myocardial infarction (MI), and 1530 had been for CVD other than stroke or MI. The ethics committees of the Karolinska Institute, Uppsala University Hospital, and Orebro region approved the Cohort of Swedish Men.</td>
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<td>Methodology:</td>
<td>This study was a secondary analysis of quantitative data collected from the Cohort of Swedish Men. Independent variable was the occurrence of CVD deaths or all-cause mortality. Dependent variables were the GI/GL measures of intake. At baseline, the participants completed a 96-item food frequency questionnaire, a demographic questionnaire, anthropometric data, and self-reported physical activity levels. GI/GL levels were calculated using the international Foster-Powell GI and GL tables. BMI and Waist-Hip Ratio (WHR) were calculated from self-reported anthropometric data. Participants were followed from January 1998-December 2003. CVD and all-cause mortality was determined using the Swedish cause-of-death register. Cox proportional hazard model was utilized to measure the incidence rate ratios of CVD and all-cause mortality by quartile of dietary GI/GL. Age was the timescale for the Cox model, and was adjusted for BMI, physical activity, history of hypertension and diabetes, family CVD history, aspirin use, cigarette smoking, and dietary factors to estimate incidence rate ratios (RR's).</td>
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<td>Results:</td>
<td>There were 608 CVD related deaths over the six year follow-up and 1303 death due to all-cause mortality. There were no significant associations between dietary GI/GL and CVD and all-cause mortality in this study. High dietary GI/GL</td>
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appeared to be associated with increased risk of death among men with previous MI and decreased risk of death among men with previous stroke. However, high dietary GL appeared to be associated with increased mortality among men who consumed less cereal fiber and decreased mortality among men who consumed more cereal fiber. These associations did not change among different BMI level or WHR. Therefore, fiber may have been the protective nutrient among this population. High fiber intake may alleviate any harmful effect of a high GL diet through improvements in insulin response, glucose control, and blood lipid levels.

**Conclusions:**
Results of this study suggest that dietary GL may be harmful in the setting of low fiber intake. However, there was not a statistically significant correlation between dietary GI/GL with CVD and all-cause mortality in this population of Swedish men.

**Implications for Practice:**
Further research is needed to confirm the protective effects of increased cereal fiber intake on increased GI/GL diets before a diet high on the GI/GL scale could be recommended to individuals. Prior studies have linked increased GI/GL to increased CVD risk. Also, a study with more objectively collected data would decrease the risk that any self-reported information would alter results. Finally, the food consumed in Sweden may be very different in terms of production than food consumed in other parts of the world. Therefore, applicability of these results may be limited.
| Purpose: | To determine whether a diet of high saturated fat and avoidance of starch (HSF-SA) results in weight loss without adverse effects on serum lipids in obese non-diabetic patients. |
| Sample/Participants: | -Group One: 23 patients (17 men and six women) were referred by their cardiologists for participation in this study, which was approved by the Christianna Care Corporation Institutional Review Board in Newark, Delaware. Recruitment began in August 2000, and the study was completed in September 2001. Inclusion criteria were: obese (based on Body Mass Index (BMI) scale), documented atherosclerotic coronary artery disease (ASCVD), and taking statin medication with LDL levels at goal. Exclusion criteria were: diabetes mellitus, hypoglycemic therapy, cerebrovascular disease, and PCI or CABG in the past six months. Of these participants, ten had undergone coronary artery bypass grafting (CABG), and 16 had undergone percutaneous coronary intervention (PCI). Ten patients met criteria for metabolic syndrome. Mean age was 61 years old.
-Group Two: 15 female participants were referred by gynecologists or reproductive endocrinologists for symptoms of polycystic ovarian syndrome (PCOS). Mean age was 33.9 years old, mean BMI was 36.1. Three of these participants took metformin 500mg twice daily. These participants were monitored for 24 weeks on the HSF-SA diet.
-Group Three: 116 patients with reactive hypoglycemia (RH) were referred by an endocrinologist to this study. There was a large attrition with this group due to dietary compliance. The final count included 8 female, morbidly obese participants who remained on the HSF-SA diet for one year. No participants in this group took weight loss, lipid-lowering or insulin-sensitizing medications. |
| Methodology: | This study was a three-group, dietary study. All groups were prescribed a HSF-SA diet, with instructions to consume one half of all calories daily as saturated fats, primarily from red meat and cheeses. Eggs and other forms of protein were allowed, regardless of cholesterol content. Fresh fruit and |
| Results: | Diet logs from Group One participants indicated compliance with the HSF-SA diet. Accurate measurement of fruit/vegetable consumption was not available, so exact caloric consumption could not be determined. In five male patients, fasting ketonuria was noted, as well as elevated serum β-hydroxybutyrate (BOHB). There was a total body weight loss of 5.2%, and mean BMI decrease of 2.2. Waist size, neck size, hip size and body fat percentage all decreased among these participants to a statistically significant level. Mean fasting glucose decreased by 7.8 mg/dL, mean triglyceride levels decreased 58.4 mg/dL, LDL levels also decreased. Despite massive increases in dietary SF intake, total cholesterol and HDL cholesterol levels were unchanged. Of the ten with metabolic syndrome, eight had changed to a low-risk profile.
Among Group Two participants, there was a 14.3% total body weight loss, with no significant changes in serum lipid levels. Urine ketones were not detected.
Group Three: There was a 19.9% total body weight loss and no significant changes in lipid serum levels. Urinary ketones were not detected. |
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<td>Conclusion:</td>
<td>The HSF-SA diet resulted in statistically significant changes in total body weight and body fat percentage among the ASCVD group. There were also significant decreases in fasting serum glucose, insulin, and triglyceride levels. There was no change in total cholesterol, or LDL and HDL subfractions among participants treated with statin therapy. Among the PCOS and RH group, there were significant decreases in TBW and no changes in serum lipid levels, despite not receiving statin therapy. These results</td>
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indicate that the relationship between saturated fat consumption and ASCVD is not direct. These patients all improved their risks of ASCVD with the HSF-SA diet. Sample sizes were small in this study, and future larger studies should be done to confirm findings.

| Implications for Practice: | Implications for practice would be to suggest the incorporation of a diet with avoidance of non-fruit or vegetable starches and inclusion of more saturated fatty acids, such as red meat, eggs, and cheeses. This type of diet could be prescribed for adults at risk for ASCVD, insulin resistance, diabetes, and metabolic syndrome, as well as to healthy adults as a preventative measure. Dietary education needs to take place to inform the public that the previously held notion that low-fat diets are necessary to avoid ASCVD is not supported by the evidence of current research. |
### Title, Authors, Year, Journal:

### Purpose:
As dietary fat intake has been shown to reduce vascular risk factors, the purpose of this study was to evaluate the association between fat intake and subsequent five-year cognitive decline in 2551 community-dwelling older women at high vascular risk.

### Sample/Participants:
This sub-cohort study utilized a final of 2,551 women, originally participating in the Women’s Antioxidant Cardiovascular Study (WACS). From 1998-2000 (a mean 3.5 years from antioxidant randomization), data was gathered. Average time from dietary assessment to initial cognitive assessment was 3.5 years. Average time from initial to last cognitive assessment was 5.4 years. Originally, 3,170 women were eligible with inclusion criteria of: active participation from 1998-2000 and ≥65 years old. 190 were not reachable for interviewing, 156 declined participating, and 2,824 completed the initial telephone assessment. 273 women were excluded due to incomplete dietary information. This study was approved by the Brigham and Women’s Hospital, Boston, Mass.

### Methodology:
This study was a large prospective cognitive sub-cohort study of the WACS. Independent variable was dietary fat intake. Dependent variable was the cognitive function status measure. Participants received a baseline cognitive telephone assessment and three follow-up cognitive telephone assessments at approximately 2-year intervals. The cognitive function test was the Telephone Interview of Cognitive Status (TICS) and was administered by trained interviewers. The assessment also included the TICS ten-word list delayed recall, East Boston Memory Test immediate recall, East Boston Memory Test delayed recall, and animal naming test. TICS is a validated telephone adaption of the Mini-Mental Status Exam. Primary outcome was rate of change from first to last assessment in the global composite score, computed as an average of all cognitive tests made into z-scores. A secondary outcome was the change in the verbal memory score (indicative of risk of Alzheimer’s disease), which was calculated by averaging the z-scores of the verbal memory tests. Upon enrollment in the original WACS, the Willett semi-quantitative food frequency questionnaire was administered. It contained questions about usual food...
consumption during the past year. Detailed information was gathered on type of fats and oils used to prepare foods, as well as frequency of consumption of fried foods. For each food item, consumption frequency was multiplied by its nutrient content from the U.S. Department of Agriculture. Dietary intake was energy adjusted using the residual method and categorized into tertiles for analysis. Fat types analyzed included: total, saturated, monounsaturated, and polyunsaturated, as well as ratio of polyunsaturated to saturated fat. Trans fats were not included in this study. The association of types of fats consumed and cognitive decline were only analyzed among women who declared that their diet at randomization was almost the same as their usual diet over the past five years.

### Results:

The global composite score of the first assessment ranged from -3.94 to 2.03, with higher scores indicating better cognitive function. The median TICS score was 35 (range 7-41). Women in the top tertile of total fat intake had overall less education, engaged in less physical activity than women in the bottom tertile, and had higher BMI's and rates of diabetes and hypertension. However, these women did not have higher rates of cardiovascular disease, including MI, angina, and hyperlipidemia. There were no significant differences across various fat tertiles in the mean annual rate of change for the global composite score. Among participants ages 65-72, fat intake was not associated with cognitive decline; however, among women aged 73-91, higher intake of mono- and polyunsaturated fats were associated with slower decline in the global cognitive score. The differences among rates between highest and lowest tertiles were equivalent to differences in rates observed with being four years younger for monounsaturated fat and six years younger for polyunsaturated fat. For the secondary outcome in the verbal memory category, the associations with both fats were similarly protective. Further, among women aged 73-91, a 5% isocaloric replacement of energy from carbohydrate intake with energy from ‘good’ fats corresponded to a reduction of mean annual rate of global composite score by 0.02 SU (P=0.04).

### Conclusion:

The modulation of vascular processes is a key element to understanding how dietary fat composition could impact brain function in individuals with pre-existing CVD. This study found that there were no overall associations between dietary fat intake and cognitive decline over a five-year follow-up. Among older women (>72), substitution of carbohydrates with mono- or polyunsaturated fats was associated with a significantly slower rate of cognitive
decline, which was equivalent to delaying aging by four to six years. Participants were mostly Caucasian, which may limit applicability of results to other ethnic groups. The possible beneficial effects of unsaturated fats for preserving cognitive function in older women should be studied further with a larger group of participants to support this evidence.

**Implications for Practice:**

Implications for practice in regards to this research would be the support of a diet with a higher percentage of mono- and polyunsaturated fats. This diet should be promoted especially among older women (>72 years) for the promotion and preservation of cognitive and verbal memory function. This could be safely prescribed for healthy participants and those with CVD. The large amount of misinformation regarding the "benefits" of low-fat diets should be corrected among the general population, as low-fat diets have not shown to be beneficial for cognitive function, or cardiovascular health (in other studies).

**Purpose:** The purpose of this study was to determine the safety and effects of a modified ketogenic diet utilizing low-carbohydrate ingredients and phytoextracts of vegetables.

**Sample/Participants:** The group for this study consisted of 106 Rome council employees in Italy. There were 19 males and 87 females; the mean age was 48. Inclusion criteria included: BMI ≥25, age >18 and <65, currently on a carbohydrate rich diet, desire to lose weight, and ability to participate in a ketogenic diet program. There was an attrition of 19 subjects, therefore 87 participants completed the study. Of these, eight subjects were lost to follow-up, seven withdrew due to noncompliance, and four withdrew for family reasons.

**Methodology:** This was a small experimental protocol pilot study. The dependent variables were blood biomarkers, body composition measurements and body weight. The independent variable was the diet, ketogenic Mediterranean with phytoextracts (KEMPHY). Participants were measured prior to beginning the study for anthropometrics, weight, and blood samples, and again after six weeks of the diet. Blood tests ran included: serum cholesterol, triglycerides, HDL/LDL, BUN, uricemia, creatinine, and liver panel. During the first three weeks of the diet, subjects consumed a very low-carbohydrate diet (34g/day), which was high in protein. Permitted foods included: cooked/raw green vegetables (200g/meal), meat, fish, and eggs (2 times/day), olive oil (40g/day). During weeks 3-6 complex carbs were added back into the diet (50-80g/day), cheese (60g/day), and protein intake was decreased slightly. The percentage of proteins/carbs/fats to total calories for the first
half of the study was 36%/12%/52% and 31%/25%/44% for weeks three through six (completion). Participants took a daily multi-vitamin, as well as consuming specified amounts of phytoextracts each day. This included 20mL/day of extract “A”, 20mL/day extract “B”, & 50mL/day extract “C”. During the first two weeks, participants consumed 40mL before breakfast and lunch daily of extract “D”. Ingredients of each extract blend are listed in Table 3 within the article.

Results:
The results of the blood test collected for this study did not demonstrate significant changes in liver panel values (ALT, AST, GGT, & bilirubin), nor in creatinine, uric acid, nitrogen, or serum electrolytes. There were significant changes in lipid profiles with reductions in triglycerides, total cholesterol and LDL, and a rise in HDL levels. Average weight loss was 7.8%, fat mass was reduced an average of 15.1%. Waist circumference was reduced by an average of 8.9%, and there were also significant reductions in hip and thigh measurements.

Conclusions:
The findings of this study suggest that a very low carbohydrate ketogenic diet (VLCKD), and its modification, the KEMPHY diet are effective as a method for fat loss, as well as improving biomarkers associated with increased risk of cardiovascular disease (CVD). These include a reduction in triglycerides, total cholesterol and LDL, with an increase in HDL. Compliance with this diet suggests that it may be a feasible option for larger groups of individuals. However, the potential benefits of the phytoextracts were only speculated within this study and would need to be studied further.

Implications for Practice:
The results of this study certainly support the inclusion of a Mediterranean style diet, with a significant reduction of carbohydrates. This research should be carried out in a larger setting with a control group in order to fully test the impact of this diet style.
<p>| Purpose: | The purpose of this study was to assess the effect of a moderately hypoenergetic Mediterranean diet (MHMD) and moderately intense exercise program on the preservation of body cell mass (BCM) and cardiovascular disease risk factors in obese women. |
| Sample/Participants: | This study was conducted in Rome, Italy and 60 women between 25-70 years of age were recruited for the study. Their body mass indexes (BMI) ranged from 25-47.8. Upon conclusion of the study, 47 women had finished the entire protocol, and analyses were performed only on the participants who completed all measurements. Exclusion criteria were: systemic diseases such as diabetes, liver or kidney disease, and hypertension requiring medications. Participants with these diagnoses who were NOT on medications were allowed to participate. There was no control group within this study, as researchers felt it would be unethical to withhold treatment from all parties participating. |
| Methodology: | This was a longitudinal study conducted over a four month period, on a small group of Italian women. The dependent variable within this study was BCM measures (using bioelectrical impedance analysis) and cardiovascular disease risk factors including total cholesterol, triglycerides, HDL/LDL, plasma glucose, and blood pressure. The independent variables were the exercise program and the specific diet, MHMD. The MHMD diet followed during the program was the original “Nicotera Mediterranean diet.” Total daily energy (calories) was determined on an individual basis, being equal to +/- 10% of the resting metabolic rate. The diet was made up of 55% carbohydrate, 25% fat, 20% protein, and 30g fiber daily. 100mL of red wine was allowed each day, and no other alcohol consumption was permitted. Protein consumption was evenly divided to ensure both animal and vegetable proteins at a 50/50 ratio. Carbohydrates were mainly pasta, bread, and fresh legumes. Vegetables could be raw or cooked and all meats were grilled. Extra virgin olive-oil was allowed up to 25g/day. Weekly dietary intake was evaluated utilizing a 24hr. dietary recall log. Participants were encouraged to drink up to 2L of water each day, and received instructions every two weeks for new lists of food options and how to prepare them. Exercise was monitored using a validated questionnaire. Subjects participated in a supervised exercise training consisting of 60 minutes of bicycling and running per day for at least two days per week. Participants met with the investigator every two weeks at the outpatient clinic in order to assess compliance. |
| Results: | Mean age of participants was 39.7 years. Following the MDMD diet and exercise program, body weight, BMI, and fat mass were significantly reduced at two and four months. There was not a significant loss in BCM. Serum total cholesterol levels and triglyceride levels decreased significantly at two and four months, as well as LDL levels at four months. There was a significant increase in HDL levels at four months as well. Systolic blood pressure did not change significantly, however diastolic pressure significantly decreased at two months. |
| Conclusions: | There were significant results in this small study of obese Italian women. The MHMD diet resulted in weight loss which was significant in that there was actual fat loss, while BCM remained constant. Body cell mass is related to oxygen consumption and energy expenditure, and therefore was positively impacted by the exercise program initiated. BCM is metabolically active tissue. Therefore, the preservation of this is key in maintaining metabolic rate in order to maintain weight loss and healthy body weight over a period of time. The improvements in cardiovascular disease risk factors demonstrate a protective effect of the MHMD diet and exercise program. This research also supports prior studies including the Lyon heart study, which reported a 50-70% decrease in risk of CVD after four years of Mediterranean diet. |</p>
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<th>Implications for Practice:</th>
<th>The results of this study support the inclusion of a Mediterranean style diet and inclusion of a moderately intense exercise program as primary prevention for cardiovascular disease among obese women. This study should be carried out on a larger population and more varied study groups in order to assess the impact on other individuals. However, the results should be fairly applicable to both American and European countries, as obesity is a rising epidemic in both areas.</th>
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<tr>
<td>Year Published</td>
<td>2010</td>
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<tr>
<td>Purpose</td>
<td>To examine the relationship between dietary glycemic load and cardiovascular disease risk factors including plasma lipid levels, blood pressure, and glucose metabolism factors among post-menopausal women participating in the Women's Health Initiative Study.</td>
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<tr>
<td>Variables</td>
<td>- dietary intake, specifically high glycemic load foods -fasting blood samples (including lipid levels), anthropometric measurements, and blood pressure</td>
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<td>Sample Design</td>
<td>Random sample of 878 Observational Study participants, all part of the Women's Health Initiative study of chronic diseases.</td>
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<td>Instruments/Tools</td>
<td>standardized questionnaires, BMI measured with calibrated stadiometer, calibrated balance-beam or digital scale, BP measured using mercury sphygmomanometer, blood samples obtained in fasting state and maintained at 4 degrees C</td>
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<tr>
<td>Results</td>
<td>Glycemic load was found to be inversely correlated with HDL cholesterol levels among all ethnicities of women in the study ($p=0.004$). Also, glycemic load was related to higher total cholesterol levels among Hispanic participants ($p=0.018$). No significant connections were established between glycemic load and total cholesterol levels among Caucasians and African-Americans in the study.</td>
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<td>Conclusion:</td>
<td>Glycemic load was associated with HDL cholesterol and triacylglycerols and higher dietary GL was associated with adverse lipid levels in caucasian women and hispanic women. More research is needed to confirm a correlation between race and BMI in this population of women.</td>
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<td>Implications for Practice:</td>
<td>As glycemic load was found to correlate with HDL levels among all groups of women, this could become a recommendation for post-menopausal women to decrease the overall GL in their diets. More research would be beneficial to develop a specific guideline for acceptable levels of GL to maintain for optimum HDL levels.</td>
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<tr>
<td>Purpose:</td>
<td>The purpose of this study was to compare the effects of two energy-restricted healthy diets, one with low glycemic index (GI) and one with a high GI, on heart disease risk factors and weight loss in subjects at risk for heart disease.</td>
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<td>Sample/Participants:</td>
<td>This study recruited 18 participants by advertisement. There was an attrition of 4 participants, and one was excluded from final results due to dietary noncompliance. The study was carried out at Hammersmith Hospital in London, England and was funded by the British Heart Foundation. Inclusion criteria were: between ages 35-65, at least one recognized heart disease risk factor (BMI&gt;27-35, waist circumference, elevated total cholesterol and blood pressure). Subjects were medically and dietetically screened prior to inclusion and all major illnesses, lipid lowering and weight loss medications were excluded. Subjects were fitted for a continuous glucose monitor.</td>
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<td>Methodology:</td>
<td>This was a randomized parallel group pilot study conducted over a 12 week period. At randomization, all subjects were advised on healthy eating for heart disease prevention and were advised to consume 50-55% of calories from carbohydrates, &lt;30% from total fat, &lt;10% saturated fats, and consume oily fish twice/week. Subjects were instructed to limit alcohol and salt intake. Also, they were advised to have on high or low GI food with meals and snacks for a specific list of foods. Fasting blood samples were taken at randomization, week six, and week 12 to assess glucose, cholesterol, HDL/LDL, and triglycerides. Dietary compliance was assessed through regular visits, telephone calls, and 7-day food diaries.</td>
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<td>Results:</td>
<td>Results from data collected indicated that only the low GI group lost weight over the 12 week study. However, there were no differences in macronutrient or fiber intake between groups at baseline or week 12. By week 12, the energy intake was significantly reduced in the high GI group. Also, there were no differences between groups in fasting glucose and lipid profiles at baseline or at week 12. However, consumption of the low GI diet led to lower 24hr and overnight glucose profile, suggesting an improvement in hepatic insulin sensitivity. This is key as glucose may lead to atherosclerosis through oxidative stress. This may also suggest that low GI foods promote satiety by preventing marked postprandial hyperglycemia and hypoglycemia.</td>
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<tr>
<td>Conclusions:</td>
<td>This pilot study demonstrated some preliminary evidence that the consumption of a low GI diet may be more beneficial in reducing</td>
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heart disease risk for the middle-aged population as risk for CVD. However, because the study was very small, results should be interpreted with caution. Larger studies need to be conducted to further test these hypotheses. Some results of this study do support prior research in terms of benefits of a lower GI diet however and it’s protective impact on markers of CVD.

<table>
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<tr>
<th>Implications for Practice:</th>
<th>Based on the results of this study, further studies should be completed in order to test the low GI/ high GI diet on a more varied population with a larger number of participants. Also, the results of this study should be taken into account and should add to the knowledge base about the protective effects of a lower GI diet.</th>
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<tr>
<td>Purpose:</td>
<td>The purpose of this study was to conduct a dietary intervention trial to study the effects of replacement of saturated fatty acids (SFA) with monounsaturated fatty acids (MUFA) or carbohydrates of high glycemic index (HGI) with low GI foods on insulin sensitivity and weight loss.</td>
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<td>Sample/Participants:</td>
<td>720 individuals were recruited for this study in five areas of England (Reading, Imperial, Surrey, Cambridge, and Kings). Of these data was analyzed for 548 people. Both men and women were recruited, ages 30-70 years from the general population. Participants had to qualify for entry based on a points system determined by fasting glucose level, BMI, waist circumference, elevated blood pressure, or elevated biomarkers of cardiovascular disease risk. Exclusion criteria were: history of ischemic heart disease, diabetes, cancer, liver or kidney disease, use of lipid lowering drugs or corticosteroids, GI disorders, substance abuse, pregnancy, and unwillingness to follow the specified diet protocol.</td>
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<tr>
<td>Methodology:</td>
<td>This study was a parallel 2x2 factorial design with a controlled intervention. Primary outcome was change in insulin sensitivity and secondary outcomes were changes in CVD risk factors including lipid profiles and blood pressure. Independent variable was the specific diet prescribed. Dependent variables were the biomarkers of CVD disease risk and anthropometric data collected. The intervention diets included similar calorie intake, but varied fat and carbohydrate contents. Groups included high-SFA and HGI, low-fat and HGI, HM and low-GI, and low-fat and low GI. Target intake for total fat was 38% of energy in HFA and HM diets and 28% of energy in the low-fat diets with carb intake of 45% and 55% respectively. Specific foods were supplied for participants through the research facility and food diaries were collected weekly. 24Hr urine was also collected and analyzed, in addition to serum glucose, and lipid profiles. Statistical analyses were completed to account for differences in age, ethnicity, and gender.</td>
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<td>Results:</td>
<td>At conclusion of the study, total cholesterol and LDL levels were significantly lower after consumption of all diets with reduced intake of SFA's. These were greatest in the low-GI group. HDL cholesterol levels were also lower in the low-fat diets. Participants without preexisting CVD or diabetes all lost a small amount of weight during the study. However, there was no evidence of the impact of GI on body weight. There was no significant evidence that dietary changes led to improved insulin sensitivity in this study.</td>
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<td><strong>Conclusions:</strong></td>
<td>This study did not support the replacement of SFA with MUFA or low-GI carbohydrates for high-GI in order to improve insulin sensitivity. However, it did show a positive impact of reduction in SFA and resultant decrease in total cholesterol/HDL ratio. Lowering the GI of the diet enhanced the reduction of cholesterol levels, and further studies should be conducted to assess improvement in insulin sensitivity among these groups.</td>
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<td><strong>Implications for Practice:</strong></td>
<td>Among this large study in England, there was not significant evidence supporting specific dietary change in order to influence increase insulin sensitivity. However, this may conflict with prior studies and therefore further research should be conducted in order to validate findings. This is especially true for the protective effects of decreasing dietary GI intake and cardiovascular disease risk factors.</td>
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