

Nutrition and Erectile Dysfunction

By

Bernard J. Rosen

A Dissertation Submitted in Partial Fulfillment of the
Requirements for the Degree of

Doctor of Philosophy

Clayton College of Natural Health

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ABSTRACT

The incidence of erectile dysfunction among men is rising steadily. A number of risk factors are associated with its development. One of the most significant risk factors is a diet not providing sufficient nutrients. This study illustrates how poor nutrition contributes to erectile dysfunction and how improved nutrition relieves its symptoms. A survey of males between the ages of 30 and 80 provides information regarding their dietary habits, lifestyle, and erectile functioning. This data and a comprehensive literature review address research questions assessing the risk factors for erectile dysfunction in the population and associations between these variables. This analysis indicates the two research hypotheses are true: 1) men with poor nutrition are more likely to suffer from erectile dysfunction than men with good nutrition across all age groups; and 2) satisfactory erectile function can be restored through positive dietary changes and nutritional supplementation.

The majority of men exhibit unhealthy dietary and lifestyle patterns. Despite believing they are eating healthy diets the evidence is to the contrary. A significant number of men already suffer from erectile dysfunction while much of the remainder of the population is at significant risk for its future development. It is important for men to recognize that erectile dysfunction is a warning signal for other diseases, particularly cardiovascular disease. It is also important for men to understand that erectile dysfunction may not be the first symptom to appear, but once other diseases express themselves it likely follows.

A significant effort is required to provide men with information and education so they better understand the role of diet in contributing to erectile dysfunction. This will enable them to make informed choices regarding their behavior in relationship to the key risk factors. While the evidence presented in this study is compelling, future studies including quantitative research based on a random national sample and clinical interventions would provide additional support for this position.

DEDICATION AND ACKNOWLEDGEMENTS

This paper is dedicated to my children, Zachary and Mollie, for their understanding and support throughout my schooling and writing. I wish to acknowledge my teacher, Yogarupa Rod Stryker for guiding me in identifying the purpose of my life and providing the teachings and practices to support me in that development.

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LIST OF ABBREVIATIONS

AChE	Acetyl Cholinesterase
ANOVA	Analysis of Variance
BMI	Body Mass Index
BPH	Benign Prostatic Hypertrophy
CAD	Coronary Artery Disease
CDC	Center for Disease Control
cGMP	Cyclic Guanosine Monophosphate
CHD	Coronary Heart Disease
CVD	Cardiovascular Disease
DHA	Docosahexaenoic Acid
DHEA	Dehydroepiandrosterone
DQI-R	Diet Quality Index - Revised
ED	Erectile Dysfunction
EPA	Eicosapentaenoic Acid
HDL-C	High Density Lipoprotein to Cholesterol Ratio
HEI	Healthy Eating Index
IIEF	International Index of Erectile Function
IRB	Institutional Review Board
LDL	Low Density Lipoprotein
LUTS	Lower Urinary Tract Symptoms

LIST OF ABBREVIATIONS (Continued)

MAO	Monoamine Oxidase
MMAS	Massachusetts Male Aging Study
NANC	Nonadrenergic Noncholinergic
NO	Nitric Oxide
OPC	Oligomeric Proanthocyanidins
PDE-5	Phosphodiesterase – 5
SAD	Standard American Diet
TC/HDL-C	Total Cholesterol to High Density Lipoprotein to Cholesterol Ratio
WHO	World Health Organization

CHAPTER 1: INTRODUCTION

Introduction

A significant number of men throughout the world suffer from erectile dysfunction (ED). The incidence of erectile dysfunction is on the rise, driven in part by the increase in male life span. There are significant social costs associated with erectile dysfunction. It impacts a man's satisfaction with life, his relationships with others, and increases the burden on global health care systems. With the increase in male life expectancy throughout the world, men desire and should be able to enjoy healthy sexual relations into their later years. Due to erectile dysfunction many will not.

The relationship between a man's diet and his level of erectile functioning has yet to be studied at any considerable depth by the scientific community. Researchers have investigated the relationship between diet and other vascular diseases such as diabetes or cardiovascular disease, but none of the studies directly considered erectile dysfunction. Esposito, Giugliano, et al. (2006) state, "To the best of our knowledge, the role of dietary factors in ED has never been addressed" (p. 370). It is this author's belief that there is a significant relationship between a man's nutrition and his erectile functioning. If this is true, then it is new and significant information that must be communicated to the male population.

Statement of the Problem or Issue

Many men throughout the world suffer from erectile dysfunction and the incidence is increasing. The Massachusetts Male Aging Study finds that erectile dysfunction affects 52% of men between the ages of 40 and 70 (Feldman, Goldstein, Hatzichristou, Krane, & McKinlay, 1994, p. 58). This means that over 30 million men in the United States suffer from some form of erectile dysfunction (MacDonagh, Ewings & Porter, 2002, p.212). Goldstein (2000b) expects that cases of erectile dysfunction will more than double over the next 25 years (When things go wrong section, para. 1). According to Ponholzer et al., “Demographic changes towards advanced ageing in upcoming decades will substantially increase the number of men at risk for ED” (2005, p. 80).

Erectile dysfunction affects the man not only at the physical level, but at an emotional level as well. MacDonagh et al. (2002) state, “This condition compromises overall quality of life and is associated with depression, anxiety and the loss of self-esteem” (p. 212). Thus, the growing incidence of erectile dysfunction will create new social costs across the world.

To the big pharmaceutical companies, the treatment of erectile dysfunction has become a major source of income and investment. Newspapers, magazines, radio and television are full of advertisements for Viagra, Cialis, and Levitra, offering the magic pill to restore erections, but not offering any resolution to the underlying conditions. Pfizer (2007a) reports \$1.7 billion of Viagra sales in 2006 (p. 20). This was an increase of \$100 million over 2005’s sales of \$1.6 billion (Pfizer, 2006, p. 22). Eli Lilly (2007) reports \$747 million worldwide sales of Cialis in 2005 (p. 19). This is an increase from

\$131 million in 2004 (Eli Lilly, 2005, p.13). Eli Lilly introduced Cialis into the U.S. market in December 2003. In 2004, the first full year of sales in the U.S., Eli Lilly reports \$206.6 million of sales (Eli Lilly, 2005, p. 14). In 2005 Eli Lilly reports \$272.9 million of sales in the U.S., an increase of 32% in just one year (2007, p. 19). Bayer (2007) reports an increase in worldwide sales of Levitra from €260 million in 2005 to €314 million in 2006, a 20.8% increase (p. 54). It is clearly big business; and it is growing.

The purpose of this study is to test the theory that nutrition is both a cause of and a resolution for erectile dysfunction. Nutrition, the independent variable, will be defined to be inclusive of diet and supplementation. Erectile dysfunction, the dependent variable, will be defined either by answers to specific questions from a validated questionnaire or through medical diagnosis reported on a survey. Lifestyle factors (specifically smoking, alcohol consumption, drug usage, weight management, and exercise) will be considered as intervening variables. The study will present evidence of: 1) a direct association between poor nutrition and erectile dysfunction; and 2) a direct association between improved nutrition and improved erectile function.

The benefits of the study are threefold: 1) it will be educational; 2) it will improve erectile function in men with the associated benefit of quality of life enhancements through physically and emotionally healthier men functioning in society; and 3) it may help to reduce health care costs of men relating to the physical and emotional problems associated with erectile dysfunction.

Background and History

Several researchers believe that the increase in erectile dysfunction is a direct result of poor dietary habits and lifestyle choices. According to MacKay (2005) it is becoming more apparent that erectile problems are a result of an overall unhealthy lifestyle (para.14). Lamm (2005) states, “I have found that many of the declines in hardness often attributed to age are actually the result of sedentary living and poor nutrition” (p. 12). Compared to prior generations, today’s men are more sedate, exercise less, have poor diets, and are exposed to a variety of toxic environmental and stressful conditions. These factors play a contributory role to the problem. Lamm (2005) also believes:

The ideas of self-sufficiency, physical strength, and confidence – a man’s mental hardness as well as his physical hardness – are vital parts of being a man.

Moreover, a crucial aspect of male hardness is the strength of his erection. When the penis is hard, life is good. When hardness diminishes, so does a man’s health and his innate sense of who he is. (p. xviii)

Incidence of Erectile Dysfunction

The National Institute of Health (1992) defines erectile dysfunction (ED) as “the inability to achieve or maintain an erection sufficient for satisfactory sexual performance” (Prevalence and association with age section, para. 1). Erectile dysfunction is prevalent throughout the United States and the world. It increases in severity with age. This is of particular concern to an aging population including men and women who desire to continue sexual relations well into their later years.

The ground breaking study on the incidence of erectile dysfunction in the United States is the Massachusetts Male Aging Study (MMAS); a community based, random-sample cohort, observational survey of men held in cities and towns near Boston, Massachusetts. Feldman et al. (2000) describe their methodology:

Men ages 40-70, selected from state census lists, were interviewed in 1987-1989 and reinterviewed in 1995-1997. Data were collected and blood was drawn in participants' homes. ED was assessed from responses to a privately self-administered questionnaire. Analysis was restricted to 513 men with no ED at baseline and no diabetes, heart disease, or related medications at either time. (p. 328)

Results of this study indicate, "The combined prevalence of minimal, moderate and complete impotence was 52%. The prevalence of complete impotence tripled from 5 to 15% between subject ages 40 and 70" (Feldman et al., 1994, p. 54). In the MMAS erectile dysfunction is classified as minimal, moderate, or complete. Of the 52% of men who suffer from erectile dysfunction 17% have minimal ED, 25% have moderate ED, and 10% have complete ED (Feldman et al., p. 56).

The National Health and Social Life Survey reports that 16% of men under the age of 40 suffer from erectile dysfunction. It also finds African-Americans are 20% more likely to suffer from erectile dysfunction than Caucasians (Laumann, Paik & Rosen, 1999, p. 540-541).

The MMAS data also translates in terms of incidences per 1000 person years. In this terminology, incidence of erectile dysfunction is 30 cases per 1000 person years for men between the ages of 50 and 59, and 46 cases per 1000 person years for men between

the ages of 60 and 69 (Shiri et al., 2004, p. 392). This compares to a study in Finland with results of 22 and 49 cases per 1000 person years for those same age groups (Shiri et al., p. 392). The total MMAS population experience was 26 cases per 1000 person years, compares to 39 in the Finland study, and 66 in a Brazilian study (Shiri et al., p. 391).

The worldwide incidence of erectile dysfunction is estimated at over 152 million men, with a forecast of 322 million men by the year 2025 (Moreland, Hsieh, Nakane & Brioni, 2001, p. 225). A European study in Vienna of 2,869 men between the ages of 20 and 80 using a five question version of the International Index of Erectile Function questionnaire (IIEF) finds that 32% of their sample have some level of erectile dysfunction. The IIEF questionnaire was developed by Pfizer Inc, USA and is accepted by the medical and scientific community as a validated questionnaire for determining erectile dysfunction and measuring treatment effectiveness. The incidence by age group is 26% for ages 20 to 30, 29% for ages 31 to 50, 37.5% for ages 51 to 60, and 71.2% for those between 71 and 80 years old (Ponholzer et al., 2005, p. 81). A Canadian study of 3,921 men between the ages of 40 and 88 using the complete 15 question version of the IIEF finds that 49.4% of men sampled have some level of erectile dysfunction (Grover et al., 2006, p. 213). An Australian study of adult males in 2002 indicates that 39% reports some degree of erectile dysfunction and 18.6% experience severe erectile dysfunction (Allen, 2004, p. 24). Cheng, Ng, Chen, and Ko (2007b) in a meta-analysis of erectile dysfunction in Asian populations find, "Age-specific prevalence rates were 15.1% (12.2-18.1), 29.6% (19.7-39.6), 40.6% (23.6-57.7), 54.3% (36.0-72.6) and 70.0% (62.3-77.7) for age groups 20-39, 30-39, 40-49, 50-59, and 60-69 years, respectively" (p. 240).

Studies show that older adults continue to desire sexual intimacy when there is a partner and health status that allows this behavior. A study in 29 countries consisting of 27,000 men and women aged 40 to 80 reports, “Only 17% of men and 23% of women said ‘older people no longer want sex’” (Nicolosi et al., 2004, p. 994). This same study finds 28% of men have at least one complaint relating to erectile dysfunction (p. 991). According to Fischer, “Experts have found that if nothing physical interferes with erectile response, men can enjoy sexual intercourse well into their 90s” (1996, p. 6).

Anatomy and Physiology of Penile Erection

The creation and maintenance of a penile erection requires a series of reactions in the body. As MacKay (2004) says, “An erection requires intact psychological, neural, and vascular responses and reflects a dynamic balance of excitatory and inhibitory forces” (p. 5). For the process to work consistently and correctly, these bodily systems must be healthy.

The penis contains three structures made of erectile tissue that support an erection. These structures are the corpus spongiosum and a pair of corpora cavernosa. The corpus spongiosum runs the length of the penis, ends at the glans penis, and surrounds the urethra. It is through the urethra that either urine or semen can exit the penis. There is one corpora cavernosa on each side of the penis. These tissues fill with blood to create an erection. The corpora cavernosa are kept in place by a fibrous sheath that encompasses them. This sheath is called the tunica albuginea. The erectile tissue of the corpus spongiosum and the corpora cavernosa contains many tiny blood vessels called cavernous sinuses. Smooth muscles surround each of the blood vessels and

regulate their activity. These vessels are supported by collagen, a fibrous tissue made of protein. Blood flows into the penis through the penile arteries and out of the penis through the penile veins. Nerves connect the spinal cord to the penis.

Stanislavov and Nikolova (2003) state, "Penile erection is a vascular dynamic process involving increased arterial blood inflow to the penis, penile engorgement with blood, and decreased venous outflow from the penis" (p. 208). As Lamm (2005) states it so simply, "The more blood that flows in, the longer this inflow is maintained, and the longer the outflow is prevented, the longer an erection will be sustained" (p. 36).

The penis is either flaccid or erect. When the penis is flaccid (not erect), the small arteries leading to the cavernous sinuses are contracted. The smooth muscles are also contracted which limits the amount of blood that can enter the penis and reduces the inflow of blood. When the male becomes sexually aroused the central nervous system releases a number of chemicals. Chief among them is nitric oxide. Stanislavov and Nikolova (2003) describe the role of nitric oxide:

Nitric oxide (NO) is considered to be the principal mediator of penile erection, acting both as a neurotransmitter released in the nonadrenergic, noncholinergic (NANC) nerve terminals of the penis and as a vasodilator produced by the endothelial cells of penile arteries and sinusoids. (p. 208)

The enzyme nitric oxide synthase converts L-arginine (an amino acid) into nitric oxide. The receptor for nitric oxide in vascular smooth muscle is guanylate cyclase. These two chemicals interact, producing cyclic guanosine monophosphate (cGMP). The cGMP causes the smooth muscle to relax and blood flows into the cavernous sinuses and the penis becomes erect. At the same time, the veins in the penis are squeezed almost

completely shut due to this pressure. Since the veins are shut, blood can not drain from the penis, and it remains erect.

At a later point, once the arousal has subsided, or the man has ejaculated, the cGMP is broken down and the penis again becomes flaccid. The main chemical responsible for this part of the process is an enzyme called phosphodiesterase-5 (PDE-5). Prescription drugs such as Viagra, Cialis, and Levitra are PDE-5 inhibitors. They work by preventing the breakdown of cGMP, thus keeping blood in the penis to maintain the erection.

The nervous system plays a critical role in the process of creating an erection. It communicates the state of arousal throughout the body. The nerves serving the penis are the dorsal penile and perineal nerves. These nerves are a continuation of sympathetic, parasympathetic, and sensory and motor somatic nerves. They control the tone of the corpus cavernosum smooth muscle and its related vascular system.

The somatic nerves begin the initiation of the arousal signal to the brain. It is these nerve messages, relayed by neurotransmitters that drive the entire process. The pudendal nerve connects the penis with nerve fibers that go to the skin of the penis and the genital area. The parasympathetic nervous system governs the release of the nitric oxide and the subsequent events leading to the erection. It tells the smooth muscle in the penis to relax and the muscular walls of the arteries to dilate. This allows the blood to rush into the penis and for it to swell with blood. The sympathetic nervous system governs keeping the penis flaccid. It sends the signal for the arteries to contract, less blood comes to the penis, the pressure is relieved, and blood can flow out the veins. It is important to note here that events which engage the sympathetic nervous system, such as

stress, cause penile artery muscles to contract and blood to leave the penis, making it more difficult to obtain and maintain an erection (MacKay, 2004, p. 6).

Two other neurotransmitters that are significant in the erectile process are dopamine and serotonin. These neurotransmitters influence the male sex drive. Dopamine is the chemical messenger that relays pleasure, while serotonin tells the body to be calm. Dopamine can send positive signals to the brain to encourage sexual activity, while low dopamine levels will decrease libido. Low levels of serotonin can affect our mood and aggression levels also decreasing libido (Lamm, 2005, p. 98-99).

Morganstern and Abrahams (1994) identify five early warning signals of erectile dysfunction – much fewer morning erections, much fewer spontaneous erections, much slower achievement of erection, increasing inability to assume sexual positions, and increasing inability to maintain an erection (p. 85).

Types of Erectile Dysfunction

For the erectile process to function correctly, several systems of the body need to be healthy – blood needs to be flowing smoothly and unobstructed throughout the body, nerves need to be firing and sending messages between the brain and the tissues, and libido needs to be present encouraging sexual interest. Therefore, erectile dysfunction is usually caused by one or more of the following pathologies: arterial vascular pathology, neurologic pathology, endocrine causes, or psychogenic causes (Goldstein, Siroky, & Krane, 1983, p. 77-81).

Arterial vascular pathology refers to blood flow in to and out of the penis. It results from a variety of factors including endothelial dysfunction, atherosclerosis,

narrowing or blockage of any of the arteries anywhere from the heart to the penis, or penile venous leakage. Neurologic pathology could include damage to any of the nerves which play a part of male sexual functioning. A main culprit here is usually diabetes, as diabetic males have high rates of erectile dysfunction. The endocrine system is responsible for supplying hormones to the body. Testosterone is the main hormone associated with male sexuality. Low testosterone levels have been associated with reduced libido, but testosterone has no proven effect on actual erectile functioning. There are a variety of psychogenic causes such as performance anxiety, depression, fear of rejection or failure, feelings of anger, hostility and shame, and high levels of stress (Goldstein et al., 1983, p. 78-81).

Risk Factors of Erectile Dysfunction

It used to be believed that erectile dysfunction was primarily caused by mental or emotional factors and was not a physical problem. However, the current thinking is the opposite. It is now accepted that more than 80% of persistent cases of erectile dysfunction come from one or more identified physical causes, while the remaining 20% come from unknown physical causes or psychological causes (Morganstern & Abrahams, 1994, p. 74). Fischer agrees stating, "Today's medical establishment recognizes that the large majority of potency problems have a physiological basis" (1996, p. vii-viii). The National Institutes of Health Consensus Development Panel on Impotence found "vasculogenic impotence accounts for about 75% of MED [male erectile dysfunction] patients" (Moreland et al., 2001, p. 225).

To better understand the issue of erectile dysfunction, it is important to identify the underlying risk factors. Risk factors can be placed in two groups. The first group will be referred to as “common causes.” The second group looks at the relationship between erectile dysfunction and “medically diagnosed” diseases. Obviously, there is a fine line between these groups and it can be challenging to identify exactly where the “common cause” becomes classified as a “disease.”

For the purposes of discussion, common causes will be considered to be factors – both physical and psychological – that are not recognized by the medical establishment as a “disease” and more of an indicator of current or past behavior. These risk factors have been identified and analyzed in scientific studies of men with erectile dysfunction or other vascular diseases. No conclusive “cause” per se has been isolated. Most studies concluded erectile dysfunction is often multifactorial. The common elements among the risk factors are that all contribute towards endothelial, vascular or nerve damage.

These risk factors include – in no particular order of significance – age, alcohol consumption, diet, endothelial dysfunction, male hormones, inflammation and obesity, sedentary lifestyle, cholesterol, prescription drugs, smoking, stress, and motorcycling. Endothelial dysfunction, as we will discover, is very similar to erectile dysfunction in that the medical community debates whether it is in fact a symptom or a disease. These risk factors, except for age, are considered to be modifiable causes, as they are often an outcome of specific behaviors that can be changed.

The “medically diagnosed” based risk factors include atherosclerosis, depression, diabetes, cardiovascular disease (CVD), coronary artery disease (CAD), coronary heart disease (CHD), high blood pressure, metabolic syndrome, and lower urinary tract

symptoms (LUTS). These are often a direct result of the “common causes” listed above. There have been many scientific studies to address the relationship between erectile dysfunction and these diseases. These will be reviewed in the Literature Review section of this paper.

The Significance of Viagra

No discussion of erectile dysfunction is complete without a brief mention of the significance of the development and introduction of Pfizer’s prescription medication - Viagra (sildenafil). It created a whole new paradigm for erectile dysfunction sufferers when it was introduced to the market in 1998. Prior to the introduction of Viagra, erectile dysfunction was not often discussed either publicly or privately between a doctor and his patient. It was more commonly known as “impotence,” thus bearing a strong reference to emasculation. Before the introduction of sildenafil only 25% of men with ED in the Netherlands discussed their condition with their medical doctor (Speel, van Langen & Meuleman, 2003, p. 366).

Prior to the development of Viagra, there were limited (in number and effectiveness) allopathic treatments available for erectile dysfunction. The common belief was that it was “all in the head.” This was expressed by Reuben (1969) in his classic work *Everything You Always Wanted to Know about Sex but Were Afraid to Ask*, “There is convincing evidence that the source of male potency is in the brain” (p. 121). Kinsey (1949) also believes, “Impotence in a male under 55 years of age is almost always the product of psychologic conflict” (p.323). It should be noted that this was perhaps

more likely in 1948 when the research was conducted due to the healthier dietary habits and lifestyles present at that time.

The treatments commonly used prior to Viagra include: vacuum constriction devices (VCD), penile implants, vasoactive drugs (penile injections), and urethral suppositories (Bonnard, 1999, p. 56-67). Needless to say, these were mostly invasive and difficult to perform techniques. They could and did bring upon erections, but did not necessarily lead to intercourse due to their invasive nature (Bonnard, p. 53).

There are two other popular erectile dysfunction prescription medications available on the market today – Cialis (tadalafil) by Eli Lilly and Levitra (vardenafil HCl) by Bayer, Schering-Plough, and GlaxoSmithKline. While there is no question that these medications will produce an erection for most men, the real question is at what cost. There are a variety of side effects and reported adverse reactions including some that can do extreme harm and are some that are life threatening. As Bonnard (1999) says:

In these cases the erectile dysfunction can even be seen as a self-regulating safety mechanism: the body taking care of itself. If the body was physically prepared for intercourse, it would be able to achieve an erection. That it can't is a clear sign that there are significant underlying problems, and some significant changes in lifestyle are called for. (p. 13)

Schwarz and Rodriguez (2005) report on the safety of sexual activity in men diagnosed with heart disease. During sexual activity a man may exhibit increases in heart rate, blood pressure, and respiratory rate that are the equivalent of moderate exertion and as physically challenging as walking two to four miles per hour. They conclude, "People with a sedentary lifestyle, however, do seem to be at mildly increased risk of having a

heart attack after sex than their more active counterparts” (p. S5). However, “From a cardiac standpoint [sex is] less threatening than triggers such as anger, emotional stress or other forms of physical exertion that (usually) occur with greater frequency than orgasm” (p. S5).

Research Questions

This study utilizes the data gathering methods of primary research (a 38-question survey) and secondary research (literature review). The research questions focus on gaining a better understanding of the causes of erectile dysfunction, the risk factors for erectile dysfunction, and therapies available for the treatment of erectile dysfunction. The literature review provides information for all the research questions, while the primary research survey provides data from a sample to address research questions 2 through 10. The research questions are:

1. What is erectile dysfunction? Is it a disease of its own or a symptom of another disease?
2. What is the typical or average Body Mass Index (BMI) of males between the ages of 30 and 80?
3. How do men perceive their own diet? Do men see the connection between their diet and their current and/or future health?
4. What is the typical or average diet of males between the ages of 30 and 80? What are their food and beverage consumption patterns?
5. How are perceptions and beliefs reflected in actual behavior?

6. What is the typical or average lifestyle of males between the ages of 30 and 80?
What are their smoking, drinking, drug usage, and exercise patterns?
7. What is the typical or average erectile functioning of males between the ages of 30 and 80? How do symptoms and severity of erectile dysfunction vary by age?
8. What is the relationship between nutrition (diet and supplementation) and erectile dysfunction?
9. What is the relationship between lifestyle factors and erectile dysfunction?
10. What risk factors for erectile dysfunction are present in males between the ages of 30 and 80?
11. Can erectile function be improved through positive dietary changes and nutritional supplementation?

Hypotheses

Given the clinical nature of this study, both null hypotheses and research hypotheses are offered. Null hypothesis number one is: there is no relationship between the nutritional quality of a man's diet and his experience of erectile dysfunction. Research hypothesis number one is: men with poor nutrition are more likely to suffer from erectile dysfunction than men with good nutrition across all age groups. Null hypothesis number two is: there is no relationship between eating a healthy diet and restoring erectile function in men previously suffering from erectile dysfunction. Research hypothesis number two is: satisfactory erectile function can be restored through positive dietary changes and nutritional supplementation.

Significance of the Study

This study is significant because it approaches the issue of erectile dysfunction as a preventable occurrence. It will establish a definitive link between nutrition and erectile function. This study is important for men of all ages as it encourages a healthy diet and proper supplementation to prevent erectile dysfunction and/or to improve erectile function for those with erectile dysfunction. It will help them to understand what the body requires for the physical erectile process to be successful. The study will make them aware of the facts to encourage healthier lifestyle choices today, rather than once the symptoms occur. As Derby et al. state, "Primary prevention may be the most effective approach to alleviating the consequences of ED" (2000, p. 302).

It is this writer's goal that providing men with strong evidence that poor nutritional habits will create future sexual performance issues will motivate behavioral change. It is the writer's belief that fears regarding health issues from obesity, heart disease, or diabetes have not seemed to motivate changes to healthier diets as of yet. Lamm supports this position, "It has always been very clear to me that men need some kind of motivating force to bring about positive health changes....I think of only one thing: sex" (2005, p. xviii). Katscher (1994) agrees with the importance of prevention, "The implications for preventive medicine are significant, because many of the risk factors for CHD ... are behaviorally modifiable. The prospect of erectile dysfunction provides a compelling motivation for behavioral change" (p. 618).

Many current health industry studies indicate that the population of the United States is becoming less healthy. Health care costs per capita in the United States are the highest in the industrialized world (Anderson, Hussey, Frogner & Waters, 2005, p.903).

The majority of disease can be either prevented or have its onset delayed through proper diet and nutrition. Men often view themselves in terms of their sexual performance and vitality. By maintaining performance and vitality they are likely to avoid the psychological problems from these issues, leading to significant improvement in their lives and relationships. This study will help men to understand that through better diet choices they can achieve improved physical, mental and emotional health with the additional economic benefit of reduced health care expenses.

The potential benefit to all men suffering from erectile dysfunction is the knowledge that through diet and supplementation they can reverse this problem. This will provide physical and psychological benefits. This can have considerable impact on health care costs associated with all diseases that could be prevented by the consumption of a healthy diet. Health care costs associated with prescription drugs and psychological counseling would be vastly reduced. Men will be more physically healthy and able to enjoy a full sexual relationships with their spouse or significant other. Therefore, men and women will both enjoy a greater quality of life through a reduction in the incidence of erectile dysfunction.

Definition of Terms

β -blocker – Also known as a beta-adrenergic blocking agent. “Any drug that inhibits the activity of the sympathetic nervous system and of adrenergic [male, such as testosterone and androsterone] hormones” (Venes, 2001, p. 229).

Diabetes – “Diabetes mellitus is a disorder in which blood sugar (glucose) levels are abnormally high because the body does not produce enough insulin” (Beers, 2003, p.

962). The following tissue or organs are affected that impact erectile functioning.

“Blood vessels – Atherosclerotic plaque builds up and blocks large or medium-sized arteries in the heart, brain, legs, and penis. The walls of the small blood vessels are damaged so that the vessels do not transfer oxygen normally and may leak” (Beers, p.

963). “Nerves – Nerves are damaged because glucose is not metabolized normally and because the blood supply is inadequate” (Beers, p. 963).

Dopamine – “A catecholamine neurotransmitter, or brain messenger, implicated in some forms of psychosis and abnormal movement disorders” (Venes, 2001, p. 603).

Flavonoids – A type of phytochemical antioxidant.

Monoamine oxidase (MAO) inhibitors – Drugs used to inhibit monoamine oxidase. Used to treat depression and Parkinson’s disease. They have been reported to have serious side effects and should not be used by persons on serotonin reuptake inhibitors. (Venes, 2001, p. 1314)

Phytochemicals – “Any of the hundreds of natural chemicals present in plants. Many have nutritional value; others are protective (e.g. antioxidants)...Important phytochemicals include indole, phytosterol, polyphenol, saponins, phenolic acids, protease inhibitors, carotenoids, capsaicin, and lignans” (Venes, 2001, p. 1586).

Procyanidins – A form of antioxidants.

Quassinoids – A flavonoid, antioxidant (Beling, 1997, p. 93)

Saponins – A blood-cleansing, cholesterol-lowering phytochemical (Beling, 1997, p. 93).

Serotonin –“A chemical, 5-hydroxytryptamine (5-HT) found in ... the central nervous system. Serotonin is a vasoconstrictor ...it plays important roles in ... obsessive-compulsive behaviors, depression, and eating.” (Venes, 2001, p. 1875).

Summary

This study is important as it is the first of its kind to address the issue of nutrition as both a cause of and resolution for erectile dysfunction. Other studies have recommended changing diets, developed supplementation programs, or suggested the elimination of risk factor behaviors to address erectile dysfunction. However, no published statistically-based study has taken the holistic approach and gathered data to determine the relationship between diet, nutrition, lifestyle and erectile function. As stated by Derby et al., “No studies have prospectively examined whether modification of behavioral risk factors alters the risk of developing ED” (2000, p. 302).

CHAPTER 2: A REVIEW OF RELATED LITERATURE AND RESEARCH

Introduction

What exactly is erectile dysfunction and what causes it? Is it a physical condition or a psychological condition? How is it related to other diseases? Is it a symptom of other diseases or a disease on its own? Or is it a warning sign of other diseases to come? Does a man's diet have anything to do with whether or not he will have erectile dysfunction? Human health is very complex, with many interacting components. These are among the many questions that researchers have posed in their quest to better understand erectile dysfunction and to recommend potential treatments. This literature review will summarize these key findings.

Literature Review

There are many factors that can cause or contribute to erectile dysfunction. It is very difficult to determine an exact cause as often several of these factors may be present simultaneously. Allen (2004) provides a comprehensive list:

They may be psychological (performance anxiety, depression, relationship issues, etc.), neurological (Parkinson's and Alzheimer's diseases, injury, MS, diabetic neuropathy, etc.), metabolic (hyperlipidemia, diabetes, hypertension), or the ED may be due to reduce circulation (as in atherosclerosis), drug use (recreational or

those used for hypertension, hypercholesterolaemia, depression, etc.) or hormonal abnormalities (low testosterone, high Prolactin or thyroid disease). (p. 25)

Risk Factors of Erectile Dysfunction

The risk factors to be reviewed (in no particular order of significance) are: age, alcohol consumption, diet, endothelial dysfunction, male hormones, inflammation and obesity, sedentary lifestyle, cholesterol, prescription drugs, smoking, stress, and motorcycling.

Age

The Kinsey (1949) study first establishes age as a key risk factor for the development and severity of erectile dysfunction. In this study 25% of 65 year old men and almost 75% of men over the age of 80 suffer from erectile dysfunction. Men under 45 years report incidence of erectile dysfunction below 3% (Kinsey, Pomeroy, & Martin, p. 236). The Massachusetts Male Aging Study reports a tripling of complete erectile dysfunction between the ages of 40 and 70 (Feldman et al., 1994, p. 54). The Rancho Bernardo Study by Fung et al. reports the incidence of erectile dysfunction as 16% in men fewer than 50 years of age and over 71% in men 70 years and over (2004, p. 1409).

The Health Professionals Follow-up Study finds moderate to significant erectile dysfunction in 12% of males under the age of 59, 22% of males between the ages of 60 and 69, and 30% of males older than age 69 (Bacon et al., 2003, p. 162). Bacon et al. also report a significant increase in incidence of erectile dysfunction correlating with age. They identify the first reported erection problems in men and find that:

Fewer than 2% of men who reported erection problems said that their first difficulty occurred before age 40 years, and only 4% said that it occurred between age 40 to 49 years. After age 50 years, the percentage of men who had experienced their first problems with erection increased sharply – 26% in men age 50 to 59 years and 40% in men age 60 to 69 years. The prevalence of erectile dysfunction increased with increasing age. (p. 163)

While the Massachusetts Male Aging Study and the Kinsey studies identify age as a key risk factor, other studies including Bacon et al. (2003) point to underlying overall health as the most significant factor. In the following quotation comorbid conditions refer to and include hypertension, hypercholesterolemia, heart disease, other cancer, diabetes, and stroke.

Men who remained free of comorbid conditions had the lowest prevalence of erectile dysfunction at all ages. For men younger than 60 years of age who had one or more comorbid condition, the prevalence of erectile dysfunction was double that of healthy men, even when participants with prostate cancer were excluded. Men with a healthy lifestyle and no chronic disease had the lowest risk for erectile dysfunction. (p. 163-164)

Alcohol Consumption

Perhaps William Shakespeare said it best, “Drink provokes the desire, but it takes away the performance.” Goldstein gives three reasons for this. First, the production of testosterone is reduced by excessive alcohol consumption. Second, liver function is

disturbed causing other hormones critical to sexual vitality to be depleted. Third, the nervous system is damaged by excessive alcohol (Goldstein & Rothstein, 1995, p. 180).

There have been no studies looking at the alcohol consumption risk factor alone. Shiri et al. (2004) identify only one population based follow-up study that looked at alcohol and erectile dysfunction and it “failed to show an effect of alcohol consumption on ED” (p. 389). This was a reference to the MMAS, which only evaluates an increase in alcohol consumption over the study period. It did not address alcohol consumption in general with incidence of erectile dysfunction. What it does say is, “A change in heavy drinking status was not associated with ED risk” (Derby et al., 2000, p. 305). An opposing point of view is offered by Lemere and Smith (1973) who state, “We do believe that it was neurogenic; that if damage to the nervous system by alcohol is severe and prolonged enough, it may be irreversible, resulting in permanent sexual impotence even during a state of sobriety” (p.213). Rosen et al. state, “Thus, the effects of alcohol on ED prevalence and incidence remain unclear” (2005, p. 77M).

Diet

Feldman et al. (2000) include the consumption of a fatty diet as a modifiable risk factor for both erectile dysfunction and coronary heart disease (p. 328). However, in their own literature review they state, “The relation of diet to erectile dysfunction is not addressed in the literature, except insofar as a high-cholesterol diet was used to induce atherosclerosis and thereby venous ED in laboratory rabbits” (p. 336).

Given the close connection between erectile dysfunction and coronary heart disease or cardiovascular disease, there is anecdotal evidence of improved sexual

performance of subjects who have been placed on “heart healthy” diets. Ornish found, “The same factors that affect blood flow in the heart affect other areas of the body, including the penis ... when patients go on my program ... they often have a great improvement in sexual function” (as cited in Fischer, 1996, p. 27).

There is significant support for the role of the diet. Goldstein, a senior researcher in the Massachusetts Male Aging Study writes, “What a man eats may significantly impact on penile arteries – an important part of successful blood flow and healthy erections” (1995, p. 176). McDougall (1998), who also utilizes a heart healthy diet to treat patients with cardiovascular disease concurs, “Begin by becoming healthy with diet and exercise” (para. 2, Comments section).

Endothelial Dysfunction

Erectile dysfunction and endothelial dysfunction are very similar in nature. In fact, erectile dysfunction is a direct result of endothelial dysfunction affecting the penis. Ganz (2005) states, “ED and endothelial dysfunction are not only caused by the same underlying risk factors and a loss of NO, but they also share molecular mechanisms that lead to a loss of NO through reduced synthesis and/or enhanced degradation” (p. 9M).

The endothelium is a single layer of cells that line the luminal surface of blood vessels. The health of the endothelium is critical to the vascular system and thus to the erection process. Rodriguez, Dashti, and Schwartz (2005) state, “The endothelium has a variety of synthetic and metabolic capabilities that enable it to regulate the coagulation cascade, the functions of circulating cells, as well as local vasodilatory and constrictive responses” (p. S13). Basically, it allows the arterial system to deliver sufficient oxygen

throughout the body. When these cells are healthy they regulate the coagulation cascade “exerting predominantly fibrinolytic, anticoagulant and antiaggregatory effects” (Rodriguez et al., p. S13). This serves to prevent thrombus formation which is a factor in developing atherosclerosis. There is a strong connection between impaired endothelial function and subsequent cardiovascular events (Ganz, 2005, p. 9M).

In addition, endothelial cells are the main source of nitric oxide (NO). Endothelial dysfunction results in impaired release of nitric oxide, thus making it difficult to achieve and maintain an erection. Because the penis is a highly vascularized organ, it is a likely anatomical location for the early detection of a systemic vascular disease. There is a significant need for nitric oxide as penile erection requires up to 80% dilation of penile arteries (Kaiser et al., 2004, p. 183). If there is not sufficient nitric oxide, there will be no erection. Ganz (2005) concludes, “Thus, ED, just as endothelial dysfunction, appears to be a sensitive forerunner of atherosclerosis and its complications” (p. 9M).

Ganz (2005) discusses five ways that nitric oxide is lost in the body. The first is through increased oxidative stress in cavernosal tissue. This is typical of erectile dysfunction associated with hypercholesterolemia, diabetes, and aging. There is excessive production of oxygen-derived free radicals which combine with nitric oxide and deactivate it. The second way is an overabundance of advanced glycation end products in the cavernosal tissue. This is usually associated with diabetes and aging. These end products can directly deactivate nitric oxide or do so through the production of free radicals. The third mechanism is an excess of arginase II, an enzyme that breaks down L-arginine, so it is not available to be synthesized into nitric oxide. The fourth way is from a reduction of androgen hormones which reduces nitric oxide synthesis. The fifth

mechanism is an increase in Rho/Rho kinase which leads to a reduction of nitric oxide and reduced smooth muscle dilation (p. 9M-10M).

All these studies indicate that endothelial dysfunction is one of the key drivers behind erectile dysfunction. Once it is present, erectile dysfunction is likely to follow. Ganz (2005) reports, “Evidence exists that erectile dysfunction (ED) is analogous to endothelial dysfunction, a known precursor to atherosclerosis in terms of molecular mechanisms and underlying risk factors” (p. 8M).

Male Hormones

Male hormones have an impact on sexual desire, but their exact role in the erection process is not known. Testosterone declines with age and thus may relate to the increased incidence of erectile dysfunction in older men. Camacho and Reyes-Ortiz (2005) explain, “Low testosterone results in decreased libido in both men and women, and may affect erectile function when severely lowered in men” (p. S53). They continue:

Testosterone declines with age in men at a rate of 1-2% per year. Free testosterone levels are reduced from 3% in the fifth decade and up to 30% in the 7th decade. Sex hormone binding globulin that normally binds 60% of total testosterone may bind up to 75% in older men, and only 1-2% of testosterone is free, while the remaining is bound to albumin. (p. S54)

Another way to look at this occurrence is that beginning at age 30, blood levels of testosterone begin to decline at a rate of approximately two percent per year. This means that by age 45 a man will only have 60% of the testosterone he had at age 25. By age 50 it is around 55% (Kilham, 2004a, p. 15).

Proponents of some of the herbs that are used as natural remedies for erectile dysfunction claim it is the herb's ability to increase available testosterone that makes them effective. Studies also show that testosterone levels can increase through regular physical exercise (Lamm, 2004, p. 74).

Other studies find that no connection between sexual function and testosterone level (Seidman, 2003, p. 32). In fact, supplementing a man's testosterone level may produce an unintended result. Seidman reports, "These results suggest that exogenous testosterone may increase the frequency of sexual activity without improving erectile function or mood" (p. 34). Seidman concludes that while testosterone level decreases with age and erectile dysfunction increases with age, there is not a cause and effect relationship (p. 36).

One other hormone that is related to erectile dysfunction is dehydroepiandrosterone (DHEA). The Massachusetts Male Aging Study data shows an inverse relationship between serum DHEA levels and erectile dysfunction (Feldman et al., 2002, p. 593). Some studies suggest that DHEA supplementation may improve erectile dysfunction; however there is no clinical evidence to support that position. A Bulgarian study utilizes phytochemicals extracted from *Tribulus terrestris* plants and claims an increase in serum DHEA levels leading to improved sexual desire and functioning (Adimoelja & Adaikan, 1997, p. S64).

Inflammation and Obesity

There is a chain reaction of events of which inflammation is at the center. Oxidative stress places the body in a proinflammatory state leading to the impairment of

endothelial function resulting in erectile dysfunction and laying the ground work for atherosclerosis. Fonseca and Jawa (2005) find, “Markers of low-grade inflammation are positively associated with endothelial dysfunction in human obesity” (p. 13M-14M). Higdon and Frei (2003) state, “The idea that obesity is a state of chronic oxidative stress and inflammation, even in the absence of other CVD risk factors, increases the importance of developing effective prevention and treatment strategies for obesity” (p. 365).

Esposito and Giugliano (2005) state, “A growing body of evidence implicates adipose tissue in general, and visceral adiposity in particular, as key regulators of inflammation” (p. 394). Thus inflammation is directly linked to being overweight which is related to developing obesity, the metabolic syndrome, diabetes, and erectile dysfunction.

Obesity is identified as a major health problem facing the United States and the world. The World Health Organization (WHO) considers obesity as, “One of the most serious public health challenges facing the WHO European Region today” (2007, p.1). Esposito and Giugliano (2005) provide some interesting statistics from the Center for Disease Control, “According to a recent CDC report, 64% of Americans (more than 127,000,000 are overweight: of these 30% are obese (60,000,000) and 4% are significantly obese” (p. 392). Finkelstein, Fiebelkorn, and Wang (2003) find the 9.1% of U.S. medical expenses in 1998 are related to obesity, representing almost \$100 billion in current dollars (p. 219). Flegal, Graubard, Williamson, and Gail (2005) estimate up to 305,000 deaths attributed to obesity on an annual basis (p. 1866). According to Lamm (2005), “Obesity is a primary risk factor for heart disease and is linked to many other

ailments as well, including diabetes, high cholesterol, high blood pressure, certain cancers, gallstones, and degenerative arthritis. You can add erectile dysfunction to this list” (p. 49).

Data from several studies indicate a higher prevalence of erectile dysfunction in obese men. (Esposito & Giugliano, 2005, p. 392). Walczak as cited in Esposito and Giugliano (2005) finds that as many as 79% of overweight or obese men may report symptoms of erectile dysfunction (p. 392). In the Health Professionals Follow-up Study physical activity and leanness, two modifiable lifestyle factors, were related to good erectile function. The study also shows that men with a BMI greater than 28.7 are likely to carry a 30% higher risk for ED than those with a normal BMI (25 or lower) (Bacon et al., p. 161). BMI (Body Mass Index) is used as a standard to define and categorize characteristics of obesity. “BMI is weight (in kilograms) divided by height (in meters squared). Overweight is defined as a BMI of 25 to 29.9, and obesity is defined as a BMI of 30 or more” (Beers, 2003, p. 914).

The Massachusetts Male Aging Study also associates obesity with risk of erectile dysfunction (Derby et al., 2000, p. 304). The Rancho Bernardo Study of Fung et al. (2004) determines obesity as a strong predictor of erectile dysfunction as well (p. 1409). Shiri et al. (2004) state, “Our results indicate that sociodemographic and lifestyle factors, except age and obesity, have little influence on ED” (p. 389).

Sedentary Lifestyle

Sedentary lifestyle is a key risk factor for erectile dysfunction. It has been shown that increasing activity and exercise levels can improve erectile function. Esposito,

Giugliano, et al. (2004) report that improved erectile function was highly correlated with increasing activity levels (p. 2983). Bacon et al. (2003) state, “Frequent vigorous exercise was associated with a 30% lower risk for erectile dysfunction than was very little or no exercise” (p. 165). An interesting finding came from the Massachusetts Male Aging Study. Derby et al. (2000) find, “Midlife changes may be too late to reverse the effects of smoking, obesity, and alcohol consumption on erectile dysfunction. In contrast, physical activity may reduce the risk of erectile dysfunction even if initiated in midlife” (p. 302).

Cholesterol

While cholesterol levels are closely associated with risk of cardiovascular disease, they have not been established as a stand alone risk factor for erectile dysfunction, but appear to be associated with other risk factors, such as age. Higher levels of cholesterol may also be linked to endothelial dysfunction and impact erectile dysfunction through that mechanism. Brunner et al. (2005) state, “Familial hypercholesterolaemia is associated with the development of endothelial dysfunction before the onset of clinically overt arterial disease” (p. 234-235). Junemann et al. as cited in Roumeguere, Wespes, Carpentier, Hoffman and Schulman (2003) state:

As hypercholesterolaemia is often associated with impairment of the endothelium-dependent relaxation decreasing the penile relaxation in the erectile process, a reduction of NO production may be one explanation for the development of ED in men with hypercholesterolaemia with implications for patients’ management such as risk factor for heart disease. (p. 358)

Roumeguere et al. (2003) explain that age, HDL-C and TC/HDL-C are predictors of erectile dysfunction (p. 355). Nikoobakht, Nasseh, and Pourkasmaee (2005) state, “Our findings suggest that there is a significant correlation between total cholesterol and LDL with ED....We have shown this correlation was not significant in men <40 y, thus confirming the theory that organic factors play their role especially in the elderly” (p. 526). The Rancho Bernardo Study reports, “High fasting plasma cholesterol and triglyceride levels were significant risk factors for more severe ED” (Fung et al., 2004, p. 1409). The Massachusetts Male Aging Study finds that lower HDL levels correspond with greater incidence of erectile dysfunction. They find, “The age-adjusted probability of moderate impotence increased from 6.7 to 25% as high density lipoprotein cholesterol decreased from 90 to 30 mg/dl” (Feldman et al., 1994, p. 56). A study in South Carolina reported by Fischer (1996) describes that, “Men with high total cholesterol levels had almost twice the risk of impotency as men with normal cholesterol levels” (p. 24).

Prescription Drugs

Fischer (1996) reports there are over 200 prescription drugs that may cause erectile dysfunction (p. 18). The Massachusetts Male Aging Study finds that men who took particular types of medications were significantly more likely to have erectile dysfunction. Men taking vasodilators have almost a four times greater likelihood of complete erectile dysfunction; men taking cardiac drugs and hypoglycemic agents have almost three times greater likelihood; and men taking antihypertensives have a significantly greater likelihood (Feldman et al., 1994, p. 56). Grimm et al. (1997) find, “Men taking antihypertensive drugs at initial screening (stratum 2) were approximately

twice as likely to report erection problems as men not taking drugs (stratum 1)” (p.8). Schwarz and Rodriguez (2005) state, “The use of medications such as β -blockers, digoxin and thiazide diuretics might eventually cause but more likely worsen sexual dysfunction” (p. S4). Camacho and Reyes-Ortiz (2005) cite studies that suggest serotonin reuptake inhibitors, bupropion, mirtazepine, nefazodone, tricyclic antidepressants, neuroleptics, antihypertensives, centrally acting sympatholytic agents and β -blockers as potential causes of erectile dysfunction (p. S53-S54). Some of these drugs act by increasing serotonin in the central nervous system. This may “tighten the brain’s built-in brakes on erection, ejaculation and other sexual functions in some people” (Goldstein, 2000b, The brain’s brakes section, para. 5).

Smoking

Smoking cigarettes constricts the arteries, thereby reducing blood flow to the genitals (Fischer, 1996, p. 42). Clinical studies to date report mixed results in correlating smoking and erectile dysfunction. The Tampere Study establishes a “small, nonsignificant excess risk of ED in current and in past smokers” (Shiri et al., 2004, p. 390). Brunner et al. (2005) point out that there are chemicals in tobacco smoke that are toxic to endothelial cells that cause structural and functional changes, including decreased activity of (e)NOS, increased adhesion expression, and impaired regulation of specific thrombotic factors (p. 234).

The Massachusetts Male Aging Study describes a variety of findings in relation to smoking, many of which seem open to interpretation, and vary depending upon the lead writer of the research. Derby et al. (2000) explains that subjects who stopped smoking in

middle age do not significantly reduce their risk of erectile dysfunction compared to those who continue to smoke (p. 304). Feldman et al. (2000) write, “Cigarette smoking at baseline almost doubled the likelihood of moderate or complete ED at follow-up. Cigar smoking and passive exposure to cigarette smoke also significantly predicted incident ED” (p. 328). Derby et al. did state, “The current analysis could not examine the effects of long-term quitting or smoking cessation in early adulthood on subsequent ED risk (p. 304). When smoking is combined with other risk factors in the MMAS, it is more significantly related to erectile dysfunction (Feldman et al., 1994, p. 57).

Stress

Stress is a major factor in erectile dysfunction. Usually stress is discussed within the context of mental and emotional ramifications. However, there are also physical ramifications which have a direct affect on sexual performance. A significant level of stress can be placed upon the body by poor food consumption habits. Diets loaded with sugar and other processed and refined foods cause the body to be constantly searching for the right balance of blood sugar. The hormones insulin and cortisol are continuously produced as the body attempts to find homeostasis. Constant surges of insulin cause inflammation and irritation to the arteries. This ultimately becomes a condition of chronic inflammation causing irritation to the endothelium. The arteries thicken as the body protects itself from a possible arterial leak or burst, particularly the arteries near the heart which are under the greatest blood pressure. As arteries thicken, blood flow is reduced. In addition, the constant production of cortisol brings upon adrenal gland fatigue, resulting in additional physical stress. Another by-product of the adrenal glands

sensing stress in the body is the increase of cholesterol production. Cholesterol is naturally produced in the body as its mechanism for protecting the arteries under pressure. This illustrates how a poor diet (one that is rich in sugars, refined, and processed foods) can induce stress and contribute to erectile dysfunction.

Motorcycling

Ochiai et al. (2006) investigate the relationship between motorcycling and erectile dysfunction using the IIEF-5 survey. Their conclusion:

The prevalence of ED in the motorcycle group increased by age as: 58, 63, 76 and 93%, for motorcyclists in 20-29, 30-39, 40-49 and 50-59 years, respectively.

There was a significant difference in the prevalence of ED between the motorcycle group and the control group in all age groups...Although the severity of ED in motorcyclists was not so severe, motorcycling may be one of the risk factors for ED. (p. 396)

Erectile Dysfunction and Vascular Diseases

When determining the causes of erectile dysfunction, it is similar to the old question of what came first, the chicken or the egg. There are a variety of names for different manifestations of vascular problems including endothelial dysfunction, erectile dysfunction, atherosclerosis, coronary heart disease, coronary artery disease, cardiovascular disease, hypertension, metabolic syndrome, and diabetes. All of these do have one thing in common – blood flow to the penis is ultimately reduced making it more difficult to achieve and sustain a penile erection.

The association between erectile dysfunction and vascular diseases finds support in many studies. Ganz (2005) states, “Accumulating evidence suggests that ED is also a clinical biomarker or a ‘warning sign’ for the damaging effects of cardiovascular risk factors that may precede overt manifestations of coronary artery disease (CAD) by many years” (p. 9M). Sullivan et al. (1999) report, “These findings are similar to those seen in the penile L-arginine-NO pathway and would support the concept that vasculogenic changes in the penile vascular bed in erectile dysfunction mirror those in the coronary arteries” (p. 662). The Massachusetts Male Aging Study finds the age-adjusted probability of erectile dysfunction to be 39% for those being treated for cardiovascular disease versus 9.6% in the sample population (Feldman et al., 1994, p.56).

Several authors have noted the high association between erectile dysfunction and common vascular diseases. Goldstein (2000b) reports that the major physical causes of erectile dysfunction are: vascular (40%); diabetes (30%); medication (15%); pelvic surgery, radiation, or trauma (6%); neurological (5%); endocrine (3%); and other (1%) (Further information section, para. 6). Kostis et al. (2005) conclude, “Atherosclerotic disease involving the coronary, brain, or peripheral circulation shares common risk factors with ED. Moreover, ED may be an early or sole symptom of atherosclerotic vascular disease” (p. 317). Montorsi et al. (2005) report the prevalence of erectile dysfunction, “with hypertension (30%), diabetes (42%), CAD (58%), cerebrovascular disease (65%), and peripheral arterial disease (73%)” (p. 20M-21M).

Montorsi et al. (2005) propose the “artery size hypothesis” to explain the link between erectile dysfunction and coronary artery disease:

Given the systemic nature of atherosclerosis, all major vascular beds should be affected to the same extent. However, symptoms rarely become evident at the same time. This difference in rate of occurrence of different symptoms is proposed to be caused by the different size of the arteries supplying different vascular beds that allow a larger vessel to better tolerate the same amount of plaque compared with a smaller one. According to this hypothesis, because penile arteries are smaller in diameter than coronary arteries, patients with ED will seldom have concomitant symptoms of CAD, whereas patients with CAD will frequently complain of ED. (p. 19M)

For this hypothesis to be valid, the following conditions need to be true: erectile and coronary artery disease are two varieties of the same disease; incidence of coronary artery disease in individuals with erectile dysfunction should be low; incidence of erectile dysfunction in individuals with coronary artery disease should be high; and most of the time an individual will experience erectile dysfunction prior to the onset of symptoms of coronary artery disease (Montorsi et al., 2005, p. 19M). Montorsi et al. determine these conditions to be true, “We recently confirmed our previous findings, showing that 71% of patients with chronic ischemic syndromes and ED had sexual symptoms preceding the onset of CAD symptoms” (p. 22M). In another study, Montorsi et al. (2003) establish that, “ED symptoms were reported as having become clinically evident prior to CAD symptoms by 99/147 (67%) patients. The mean time interval between the onset of ED and CAD was 38.8 months (range 1-168)” (p. 360). Kloner et al. (2003) find that 75% of men with ischemic heart disease have erectile dysfunction (p. S46). Montorsi et al. (2005) conclude, “Erectile dysfunction is essentially an atherosclerotic disease because of

progressive or concomitant microvascular (i.e., endothelial dysfunction) and macrovascular (vascular obstruction) alterations” (p. 22M).

The artery size theory receives further support from Kupelian, Shabsigh, Araujo, O’Donnell, and McKinlay (2006):

The small diameter (1 to 2 mm) of the cavernous arteries and relatively high content of endothelium and smooth muscle per unit volume of tissue compared to other organs make the penis more susceptible to damage from oxidative stress and atherosclerosis than larger vessels. (p. 224-225)

Erectile dysfunction is recognized as a warning signal for diagnosed atherosclerosis. Kaiser et al. (2004) report findings of damage to the penile vascular beds occurring prior to the appearance of systemic vascular illness, “This defect is predominantly in the smooth muscle and can occur before the development of other overt functional or structural systematic vascular disease” (p. 184). Billups (2005a) concludes, “ED may indeed be one of the first clinical manifestations of atherosclerosis, which begins as a nonobstructive, functional process” (p. S21-S22). He further states, “New clinical research studies are showing that ED likely precedes the development of systemic occlusive atherosclerotic disease and has great potential as a clinical tool to aid in early detection of subclinical CVD ... difficulty in maintaining a firm erection, may be among the early manifestations of oxidative stress and inflammation” (Billups, 2005b, p. 57M).

Cardiovascular disease is the leading cause of death in the United States. Thompson et al. (2005) state, “In men, 50% of deaths due to coronary heart disease occur without a history of the disease” (p. 3000). This certainly supports using erectile

dysfunction as an early warning signal for cardiovascular disease and encouraging men suffering from erectile dysfunction to be screened for this life threatening condition.

The Rancho Bernardo Study was specifically designed to determine if the common risk factors for coronary heart disease measured in men at mid-life would predict erectile dysfunction 25 years later. The findings of this study were significant. Fung et al. (2004) report, "The CHD risk factors measured in mid-life, including age, current cigarette smoking, obesity, hypercholesterolemia, and hypertriglyceridemia, were associated with incident ED 25 years later" (p. 1410). Given that many of these risk factors are modifiable, it is possible to greatly reduce a man's likelihood of developing erectile dysfunction later in life. With this knowledge base, Billups (2005a) believes, "Education of patients and physicians is another critically underserved area....Perhaps it is time to elevate the discussion of ED to the level of public health concern that is associated with prevention of cardiovascular disease" (p. S24).

Hypertension is also strongly associated with erectile dysfunction. In the Massachusetts Male Aging Study, Feldman et al. (2000) report hypertension to be one of the strongest "marginally significant predictors" of erectile dysfunction (p. 333). The age-adjusted probability of erectile dysfunction is 15% for those being treated for hypertension versus 9.6% for the sample population (Feldman et al., 1994, p. 56). In the Treatment of Mild Hypertension Study, Grimm et al. (1997) state that, "Erection problems were also reported more than twice as often in men with SBP \geq 140 mm Hg than in men with SBP $<$ 140 mm Hg; the highest rate of erection problems was in men with SBP \geq 140 mm Hg" (p. 8). The Rancho Bernardo Study of Fung et al. (2004) did not

find any association between hypertension and erectile dysfunction, but this study had a low number of men with hypertension (p. 1410).

The significance of all this information linking erectile dysfunction, endothelial dysfunction, hypertension, atherosclerosis, coronary artery disease, coronary heart disease and cardiovascular disease is that many of these risk factors are modifiable through behavioral changes. Billups (2005a) expresses the importance of this:

The recognition of ED as a harbinger of systemic cardiovascular disease represents a remarkable opportunity for prevention. Unfortunately, misinformation and stigma continues to prevent many men from discussing ED with their physicians and many physicians from aggressively asking men about erectile difficulty in the office setting. I firmly believe that all men 25 y of age and older should be screened for ED, regardless of their clinical presentation and level of sexual function. (p. S23)

There have been several studies that suggest endothelial function can be restored after improving the lipid profiles of HDL-C and TC/HDL-C (Roumeguere et al., 2003, p. 358). Diet modification and nutritional supplementation is one possible way to obtain these results.

Erectile Dysfunction and Other Diseases

While vascular diseases are strongly linked with erectile dysfunction, there are other diseases also strongly associated. These include the metabolic syndrome, diabetes, neurological disorders, depression, and lower urinary tract symptoms. Again, several of these diseases, particularly metabolic syndrome and diabetes also cause endothelial

dysfunction which as discussed is a precursor to vascular diseases. Ponholzer et al. (2005) identifies that other than age the most significant risk factors for erectile dysfunction (in order) are “diabetes, hyperlipidemia, lower urinary tract symptoms, hypertension and psychological stress” (p. 80).

The Metabolic Syndrome

The term “metabolic syndrome” is used to identify a group of conditions that frequently appear together in individuals. The metabolic syndrome is also referred to as Syndrome X. Metabolic syndrome is, “Also called the syndrome of insulin resistance, includes high triglyceride levels, a low HDL cholesterol level, high blood pressure, resistance to the effects of insulin, a high level of sugar (glucose) in the blood, and an increased tendency to form blood clots. It also includes being overweight (particularly if fat accumulates in the abdomen)” (Beers, 2003, p. 922).

Fonseca and Jawa (2005) define metabolic syndrome as, “Comorbidities of obesity include type 2 diabetes mellitus, hypertension, and lipid abnormalities, all of which contribute to cardiovascular disease (CVD) and are associated with endothelial dysfunction ... the term *metabolic syndrome* is now widely used to define this cluster” (p. 13M).

The Adult Treatment Panel III (ATP III) provides a guideline for determining metabolic syndrome from the presence of at least three of the following characteristics: abdominal obesity (waist circumference >40 inches/102 cm in men or >35 inches/88 cm in women), elevated triglycerides (>150 mg/dl), reduced levels of HDL cholesterol (<40 mg/dl in men or <50 mg/dl in women), high blood pressure (>130/85 mmHg), and high

fasting glucose (>110 mg/dl) (Esposito & Giugliano, 2005, p. 392). These are similar risk factors for erectile dysfunction and related to endothelial dysfunction. Metabolic syndrome is a major concern in the United States. Ford, Giles, and Dietz (2002) estimate that 24.0% of American males and 23.4% of American females have metabolic syndrome, approximately 47 million people (p. 356).

Esposito and Giugliano (2005) write:

Obesity and the metabolic syndrome are highly prevalent in the US population. Thus, a large group of people are at risk for developing diabetes and cardiovascular disease. Since endothelial dysfunction may play a role in the pathophysiology of both these conditions and ED, the high prevalence of ED in people with obesity or the metabolic syndrome is of potential concern. (p. 396)

There is significant support for the strong relationship between erectile dysfunction and the metabolic syndrome. Esposito and Giugliano (2005) continue, “Obesity and the metabolic syndrome are states of chronic oxidative stress and inflammation, which may increase free radical formation which could quench and deactivate nitric oxide, reducing its availability for target cells” (p. 394). Kupelian et al. (2006) use the data compiled from the Massachusetts Male Aging Study and determine that erectile dysfunction was a strong predictor of the development of metabolic syndrome, particularly in “men with a BMI of less than 25 a group not usually considered at risk for CVD or type 2 diabetes” (p. 225).

Diabetes

While diabetes will cause vascular damage as discussed above, it is still classified as a disease of the endocrine system due to the fact that insulin is not sufficiently provided to the body. In fact, diabetes has one of the strongest correlations with erectile dysfunction of any disease. Studies report erectile dysfunction common in men with diabetes, affecting anywhere between 20% and 85% (Romeo, Seftel, Madhun & Aron, 2000, p. 788). Feldman et al. (1994) in the Massachusetts Male Aging Study find that men with diabetes have three times the risk for erectile dysfunction as men without diabetes and that erectile dysfunction will occur 10 to 15 years earlier in men with diabetes than those in the general population (p. 58). They also report that the age-adjusted probability for erectile dysfunction was 28% for those being treated for diabetes versus 9.6% for the sample population (p. 56). A study by Lewis (2001) finds that erectile dysfunction will often follow the diagnosis of diabetes mellitus within ten years in at least half of the men studied (p. 209).

Fedele et al. (2000) investigate erectile dysfunction in Type 1 and Type 2 diabetics in Italy. There was no prior study that differentiated between these groups. This study finds that Type 2 men had a 37% incidence of erectile dysfunction compared to a 51% incidence for Type 1 men after taking age into account. They also report that the incidence of erectile dysfunction increases with age for both groups. The strongest relationships are between poor metabolic control and smoking for both groups, while higher BMI increases the risk only in the Type 1 group (p. 524). Fedele et al. provide an excellent summary of results of other diabetes investigations:

McCulloch et al., in a study conducted in the UK, reported 35% ED for both Type 1 and Type 2. Brunner et al. reported 49% of ED in 59 Type 1 patients. Klein et al., in a study including 359 Type 1 men aged less than 30 years at diagnosis and with diabetes lasting ≥ 10 years, reported data stratified for age with 1% ED at 21-30 years and 47% in patients ≥ 43 years. Nathan et al. in a study of 125 Type 2 diabetic patients aged 55-74 years, reported a prevalence of 71% ED. (p. 524)

Fonseca and Jawa (2005) cite additional studies showing the strong relationship between erectile dysfunction, diabetes, and increasing age (p. 13M). In one study the incidence of erectile dysfunction increases from 1.1% in men aged 21-30, to 55% in men aged 50-60, and to 75% in men over 60 (Klein, Klein, Lee, Moss & Cruickshanks, 1996, p. 135).

There are many reasons why men with diabetes have this significant incidence of erectile dysfunction. Fonseca and Jawa (2005) create a comprehensive list of the pathophysiology of erectile dysfunction in diabetic men:

ED in men with diabetes has a multifactorial etiology. The specific mechanisms and associated impairments include (1) hyperglycemia and increasing age, leading to glycation of elastic fibers and failure of relaxation of the corpora cavernosa; (2) multiple drug treatments associated with ED (diuretics, β -blockers); (3) dyslipidaemia; (4) endothelial dysfunction of the sinusoidal endothelial cells, resulting in a decrease in nitric oxide (NO) release and impaired vasodilatation; (5) peripheral vascular disease, resulting in reduced arterial and arteriolar inflow; (6) advanced glycation end products, leading to increased reactive oxidizing substances and reduced NO production; (7) failed neural

transmission from the spinal cord because of diabetic neuropathy and reduced production of neuronal NO synthase, reducing levels of neuronal NO release to the cavernosal smooth muscle; and (8) hypogonadotropic hypogonadism. (p. 14M)

Because men with diabetes will often present vascular, neurological and endocrinological components, it is difficult to identify the precise “cause” of their erectile dysfunction, and is considered to be multifactorial in origin. In men with diabetes, Romeo et al. (2000) find, “Erectile dysfunction correlates with the level of glycemic control. Peripheral neuropathy and hemoglobin A1c but not patient age were independent predictors of erectile dysfunction” (p. 788).

Neuropathy

Neuropathy (nervous system damage) is a significant component of erectile dysfunction. Without the ability to sense and relay messages of stimulation the erection process is impeded. Bleustein, Arezzo, Eckholdt, and Melman (2002) state, “We found a significant correlation between the IIEF score (encompassing patients with all forms of erectile dysfunction) and neurophysiological measurements of touch, pressure, vibration and thermal discrimination” (p. 438).

Depression

There is strong evidence for a bidirectional relationship between erectile dysfunction and depression (Shiri et al, 2006, p. 348). Depressive symptoms may cause erectile dysfunction (often times from the medication or medications prescribed for

depression), and at the same time erectile dysfunction may bring about depressive symptoms (from loss of sexual vitality and subsequent stress). Roose (2003) believes depression and erectile dysfunction may have a common root cause in vascular disease (p. 29). Haas et al. (2005) conclude, “Elevated depressive symptoms independently predict increased risk for carotid atherosclerosis, a marker of coronary atherosclerosis (p. 549).

Goldstein (2000a) states, “There is an interesting, understudied mutually reinforcing relationship between ED, cardiovascular disease and depression” (p. S147). According to Goldstein there have been many scientific studies that show a strong association between depression and cardiovascular disease (p. S147). As part of the Massachusetts Male Aging Study the relationship between depression and erectile dysfunction was investigated. Goldstein continues, “A strong positive association was found between ED and depressive symptoms....depressive symptoms were associated with significantly higher rates of ED, independent of age” (p. S149). The study finds that moderate to complete erectile dysfunction is almost twice as likely in men who have symptoms of depression, independent of all other confounders (p. S149).

Lower Urinary Tract Symptoms

Rosen et al. (2003) describe lower urinary tract symptoms (LUTS) as being common in men over 50 years of age as more than 50% of men 50 years and older suffer from LUTS (p. 638). Men with LUTS may experience a variety of sexual dysfunctions, such as ejaculatory loss, painful ejaculation, or erectile dysfunction (Rosen et al., p. 637). These symptoms “are usually caused by benign prostatic hypertrophy (BPH), which is

characterized by urinary frequency, urgency, decreased force of stream, and nocturia” (Rosen et al., p. 638). The Rosen et al. study reports, “Within each age category, the frequency of erection difficulties was strongly related to LUTS severity” (p. 639). Unfortunately, most men do not seek treatment for LUTS and accept the symptoms as due to aging.

Herbal and Supplement Therapies for Erectile Dysfunction

Several sources identify nutritional supplementation as beneficial for reducing symptoms of erectile dysfunction. The supplements most often discussed are L-arginine, Omega-3 essential fatty acids, anti-oxidants (including Pycnogenol, grape seed extract, red wine extract), and niacin. The herbs most often presented are ashwagandha, ginkgo, ginseng, horny goat weed (*epimedium*), maca, *rhodiola rosea*, saw palmetto, Tongkat Ali, tribulus, and yohimbine.

Supplement Therapies

Several studies find supplementation with arginine to improve sexual function. Appleton (2002) highlights the semi-essential amino acid arginine as the pre-cursor to nitric oxide, a critical component in the erection process. He concludes that arginine supplementation is a safe and effective therapy for many health conditions, including erectile dysfunction in recommended doses of 1-15 g per day (p. 518).

Others have used arginine in combination. Stanislavov and Nikolova (2003) determined that arginine used with Pycnogenol “causes a significant improvement in sexual function in men with ED without any side effects” (p. 207). Pycnogenol is an

extract from French maritime pine bark (*Pinus pinaster*). It is an antioxidant that provides several benefits. Similar to L-arginine, it has been shown to enhance production of nitric oxide (Stanislavov & Nikolova, p. 208). In addition, as an antioxidant containing procyanidins it benefits the cardiovascular system by reducing LDL levels, reducing platelet aggregation, and increasing the strength and elasticity of blood vessels (Kilham, 2004b, para. 3). Lamm (2005) adds, “Pycnogenol helps restore elasticity and smoothness to the skin by reinforcing collagen fibers, and strengthens tiny capillaries, the blood vessels that help nourish cells, such as the ones in the penis” (p. 69).

Lamm’s *The Hardness Factor* features a six week program to improve overall health and sexual performance. He acknowledges the success of pharmaceuticals in treating erectile dysfunction, however identifies the inherent dangers of the drugs. Lamm (2005) uses the following daily protocol: Pycnogenol (80 mg), L-arginine (3 g), Horny Goat Weed (2 500 mg capsules), 2 Omega-3 fatty acid capsules (minimum of 400 mg of EPA and 300 mg of DHA), red wine extract (200 mg), grape seed extract (100 mg), niacin (2 400 mg capsules), Vitamin C (500 mg), and Vitamin E (400 IU) (p. 217).

Eicosapentaenoic acid (EPA) and docosahexaenoic acid (DHA) Omega-3 fatty acids are beneficial to the cardiovascular system and the nervous system. According to Lamm (2005), “Fish oil can reduce plaque inside artery walls, decrease blood clotting, lower triglyceride (blood fat) levels, and decrease both blood pressure and blood vessel inflammation” (p. 56). These effects help to improve blood flow and may improve erectile functioning. Fish that are high in Omega-3 fatty acids are a key part of the Mediterranean diet which has been found to be effective in “reducing the prevalence of ED in men with metabolic syndrome” (Esposito, Ciotola, et al., 2006, p. 405). Esposito

and Giugliano describe obesity and the metabolic syndrome as being states of chronic inflammation and oxidative stress in the body (2005, p. 394).

Red wine extract and grape seed extract are antioxidants that contain procyanidins. Jeremy et al. (2000) state, “Free radical damage and impaired function and availability of NO also result in increased adhesion and aggregation of platelets and neutrophils and the release of vasoconstrictor substances” (p. 50). In general, nitric oxide is quickly oxidized in the blood stream. Antioxidants are important to the erectile process because they can prolong the bioavailability of nitric oxide (Carr & Frei, 2000, p. 1811).

Kilham (2004b) describes the following health benefits of oligomeric proanthocyanidins (OPC) as found in red wine extract and grape seed extract that directly pertain to improved erectile functioning:

- Acts as a superior antioxidant, protecting cells in the body against destruction by free radicals.
- Prevents oxidation of LDL cholesterol by scavenging oxidative free radicals.
- Reduces LDL cholesterol, thus reducing the risk of cardiovascular disease.
- Prevents the build-up of oxidized cholesterol on artery walls.
- Reduces platelet aggregation, thus reducing the risk of atherosclerosis.
- Increases the strength and elasticity of blood vessels, protecting against rupture, leakage and degeneration.
- Enhances the ability of collagen to repair itself, thereby protecting against age-related and degenerative processes.

- Reduce high blood pressure by inhibiting the activity of ACE (angiotensin converting enzyme).
- Inhibits swelling (edema) and inflammation. (para. 3)

Niacin (vitamin B₃) has been shown to lower cholesterol and raise levels of HDL cholesterol (Lamm, 2005, p. 57). Lamm continues, “Recent studies have shown that niacin actually promotes the regression of hardened arteries, rejuvenating the blood vessels, and increasing the amount of blood that is pumped into the penile arteries” (p. 183).

Herbal Therapies

Herbs have been used throughout human history for their medicinal properties. It is only recently that scientific investigation and controlled clinical trials have been utilized to evaluate their effectiveness for specific conditions. Bucci (2000) provides a summary of that research. Most of the herbs he cites are known for their aphrodisiac or male sexual performance enhancing effects:

The following herbs are currently used to enhance physical performance regardless of scientific evidence of effect: Chinese, Korean, and American ginsengs; Siberian ginseng, mahuang or Chinese ephedra; ashwagandha; rhodiola; yohimbe; *Cordyceps* fungus, shilajit or mummio; smilax; wild oats; Muira puama; suma (ecdysterone); *Tribulus terrestris*; saw palmetto berries; beta-sitosterol and other related sterols; and wild yams (diosgenin). (p. 624S)

In *The Viagra Alternative*, Bonnard (1999) lists 24 herbs that are considered natural therapies for erectile dysfunction. His list includes: black cumin seed, bois bande,

broom rape, cyperus, damiana, dodder, ginkgo biloba, ginseng, kava, kola nut, maca, mint, muira puama, nettle, rosemary, saffron, savory, saw palmetto, St. John's wort, thyme, tribulus terrestris, valerian, verbena, and yohimbe (p. 81-110).

Different cultures around the globe have their favorite plant for male (and often female) sexual enhancement. In Kilham's book (2004a), *Hot Plants: Nature's Proven Sex Boosters for Men and Women*, these native traditions are explored. Among Malaysia's aboriginal people it is Tongkat Ali (*Eurycoma longifolia*); for Russians and Greeks it is *Rhodiola rosea*; in West Africa it is *Pausinystalia yohimbe*; for the Chinese it is *Epimedium* (horny goat weed) or either Siberian ginseng (*Eleutherococcus senticosus*) or Red ginseng (*Panax ginseng*); in the Indian (Ayurvedic medicine) tradition it is ashwagandha (*Withania somnifera*); in the Brazilian rain forests it is catuaba (*Erythroxylum catuaba*); in the Middle East it is zallouh (*Ferulis harmonis*); and in the Central Highlands of Peru it is maca (*Lepidium meyenii*).

As mentioned, few clinical tests have been conducted that validate these plants as effective in the treatment of erectile dysfunction. However, what does exist is years of history (and in some cases thousands of years) of their use in native medicine or folklore. A logical question to ask is if these herbs do not work, why would this knowledge continue to be passed along from generation to generation? Some of the clues as to why these plants may be effective come from the chemical compounds found in the plants from tests performed in scientific laboratories.

Kilham (2004a) describes Tongkat Ali extract as an herb that boosts sex drive, sexual function and performance through increasing testosterone production. Tongkat Ali works by inhibiting the sex hormone agent binding globulin, allowing free

testosterone to remain in the blood (p. 14). The root of the plant contains quassinoids, alkaloids, and other phytochemicals that are antiviral, antimalarial, and anticarcinogenic (Kilham, p. 13). In animal testing, copulation at three to four times normal activity has been observed (Kilham, p. 14). Kilham reports, "In laboratory tests on human testicular tissue, Tongkat Ali extract increased the formation of testosterone fourfold" (p. 14). Sahelian (2005c, Tongkat Ali side effects section) cites insomnia, restlessness, and impatience as possible side effects.

Rhodiola rosea has been used in traditional folk medicine to increase energy, stamina and sexual desire and performance. It is known in Siberia for its ability to fight stress and fatigue. Stress has mental, emotional and physical side effects. As Kilham (2004a) says, "In fact, stress causes innumerable flaccid erections, dry vaginas, and cases of lost sexual desire in men and women" (p. 31). However, we know that stress manifests at the physical level and that over 80% of erectile dysfunction is physical in origin. Kilham continues:

Stress isn't just in the head. Its effects contribute to cardiovascular disease, nervous disorders, poor digestive function, compromised immunity, chronic fatigue, depression, and sleeplessness. Left unchecked, stress causes biochemical damage that results in reduced sexual desire and impaired sexual function in men and women. (p. 31)

Rhodiola rosea contains some unique compounds, called rosavins (rosin, rosavin, and rosarin), as well as salidroside and antioxidants which may account for its antistress properties (Kilham, 2004a, p. 46). *Rhodiola* has been found to lower corticotrophin releasing factor (CRF), a substance that builds up in the body as a result of stress and has

been found to impair sexual function (Kilham, p. 47). Thus, *Rhodiola* has been found to be most effective in situations where sexual desire and function has been reduced due to stress. Kilham (2004a) cites a variety of other studies that support the use of *Rhodiola rosea* extract in the restoration of normal sexual function in both men and women (p. 48). Sahelian (2005b, *Rhodiola* side effects section) points out that as an herb that can increase energy, a high dose or too much *rhodiola* can cause restlessness, irritability, and insomnia.

Douglass (2003) identifies yohimbine and maca root as natural therapies for erectile dysfunction (para. 8). Yohimbe is the actual plant, a tall evergreen tree, while yohimbine is the primary alkaloid found in its bark. Yohimbine has been used as a drug for the treatment of erectile dysfunction for over 70 years. Yohimbine hydrochloride being the active ingredient in these over-the-counter and prescription drugs.

Yohimbine works by blocking the presynaptic alpha-2-adrenergic receptors in the brain. This reduces levels of norepinephrine which blocks the normal sympathetic inhibitory reaction which would otherwise suppress sexual arousal. This further causes an enhancement of nitric oxide release from the penile nerves (Simonsen, Prieto, Hernandez, de Tejada, and Garcia-Sacristan, 1997, p. 2356). Or, as Kilham (2004a) describes it, “Yohimbine ... is a known fast-acting central nervous system stimulant ... causes dilation of the peripheral vessels of the corpus cavernosum....In plain words, the bark extract promotes a good, firm erection” (p. 52-53).

There are no human clinical studies on whole yohimbe bark or bark extract; however there are studies on yohimbine. These studies all show positive responses to erectile dysfunction through its use. While it is generally safe, there are potential side

effects. On the mild side there are reports of headache, sweating, agitation, hypertension, and sleeplessness (MacKay, 2004, p. 9). On the more severe side, yohimbine is an active monoamine oxidase (MAO) inhibitor, meaning it may activate psychosis, increase anxiety, increase blood pressure, and cause tachycardia, tremors, and vomiting (Halsted, 2003, p. 1004S). Yohimbe has been ruled unsafe by the U.S. Food and Drug Administration. It is not recommended for long term use and is contraindicated for people with liver or kidney diseases or who have chronic inflammation of the sexual organs or prostate gland (Bucci, 2000, p. 626S).

Maca is a root vegetable and member of the cruciferous family. As such it is rich in amino acids, iodine, iron, potassium, and magnesium (MacKay, 2004, p. 11 and Kilham, 2004a, p. 154). Maca is also a source of essential fatty acids (linoleic acid, palmitic acid and oleic acid) and sterols (sitosterol, campesterol, ergosterol, brassicasterol, and ergostadienol) (Kilham, p. 154). It also contains two unique chemical compounds, previously unidentified, and now called macamides and macaenes. It is believed from studies on rodents that these two compounds are responsible for increasing sexual desire and function (MacKay, p. 11). Kilham (2004a) reports, “Both men and women report a significant boost in libido, and a number of men who have suffered from erectile dysfunction have improved, as a result of taking maca” (p. 160). No major side effects have been recorded (Allen, 2004, p. 29).

Horny Goat Weed (*epimedium*) is a stimulating herb that has been shown to increase sexual desire, arousal and activity. Kilham (2004a) states, “In TCM [Traditional Chinese Medicine] epimedium is used to restore sexual energy, treat impotence, increase production of semen, strengthen connective tissue such as bones, tendons, and muscles”

(p. 74). The green leaves of the *epimedium* plant contain flavonoids, polysaccharides, and icariin (Kilham, p. 74). It is these compounds that are believed responsible for its claimed effects, although the exact way it works has not been established by the scientific community.

Flavonoids are part of the polyphenol family. These are found in “fruits, vegetables, and nuts and their products, and possess important antioxidant properties. Flavonoids include proanthocyanidins, quercetin, and epicatechin, found mainly in chocolate, tea, and wine. Red wine also contains resveratrol, a nonpolyphenol antioxidant product of grape skins” (Halsted, 2003, p. 1003S). Dubick & Omaye as cited in Halsted find, “In addition to antioxidant effects on LDL, other potentially cardioprotective effects of polyphenols include inhibition of platelet aggregation and vascular relaxation through the production of nitric oxide” (p. 1003S).

Lamm (2005) cites several clinical trials he conducted that established men using *epimedium* experience increased libido and erection hardness (p. 113). It is one of the supplements recommended by Lamm in his six week program. Kilham (2004c) reports studies have shown that *epimedium* “increases sexual activity in animals and humans, improves sperm production and has a moderate androgen-like influence on the testes, prostate gland, and anal muscles, thereby influencing sexual desire and activity” (How it works section, para. 1).

Research has shown that *epimedium* may act as an inhibitor of the enzymes acetyl cholinesterase (AChE) and monoamineoxidase (MAO). AChE is known to stop neurotransmissions at cholinergic synapses. Through this action *epimedium* may be keeping the important cholinergic neurotransmitters associated with sexual arousal active,

keeping the sensory nerves throughout the body stimulated, including those in the genital area. By acting as an MAO inhibitor, *epimedium* may elevate levels of norepinephrine, adrenaline, serotonin and dopamine. This is found in animal testing (Kilham, 2004c, How it works section, para. 2). High dopamine levels support the release of leutenizing hormone (LH) which stimulates the testes to produce testosterone, a key hormone supporting libido. There are possible side effects from horny goat weed. As an herb with a stimulating nature, it can cause an increase in heart rate, heart rhythm disturbances, or insomnia when taken in high doses (Sahelian, 2005a, Horny goat weed side effects section).

Ashwagandha and ginseng are rich in alkaloids. Alkaloids have been studied repeatedly for their effects on human performance (Bucci, 2002, p. 624S). MacKay (2004) reports, "Laboratory studies of *Panax ginseng* have shown it may improve vascular endothelial abnormalities by increasing the production of NO" (p. 10). The main active ingredients in ginseng are saponins glycosides (ginsenosides), sterols, coumarins, flavonoids, and polysaccharides (Kilham, 2004a, p. 171). The sterols stimulate sexual and adrenal functions and the flavonoids protect the cardiovascular system (Kilham, p. 172). Ginseng also stimulates the central nervous system, another key part in the erectile process (Kilham, p. 175). In animal testing of rabbits, these were found to relax the corpus cavernosal smooth muscle by increasing available nitric oxide (Choi et al., as cited in MacKay, 2004, p. 10). Ryan (1997) notes that ginseng may also reduce human prostate enlargement, lower blood sugar, and raise HDL cholesterol levels, thereby reducing other erectile dysfunction risk factors (p. 98). MacKay (2004) cites two

additional studies supporting the use of ginseng and concludes, “From the available data it appears *Panax ginseng* may possess the ability to improve erectile function” (p. 10).

Some of the other herbs previously mentioned include ginkgo, tribulus, and saw palmetto. Ginkgo (*Ginkgo biloba*) has been shown to improve erectile dysfunction by increasing blood flow to the penis through the peripheral arteries (Sikora, Sohn, Dentz, Rohrmann, & Schafer, 1989, p. 188A). Allen (2004) cites three studies, two of which showed positive effects to erectile dysfunction through the use of ginkgo (p. 29).

Tribulus has been shown to increase testosterone levels with no side effects (Bucci, 2000, p. 626S). Saw palmetto has been shown to reduce prostate enlargement with no side effects (Ryan, p. 98-99).

Dietary Therapies for Erectile Dysfunction

In all of the literature there was only one scientific, peer reviewed study investigating dietary therapy as a treatment for erectile dysfunction. Esposito, Giugliano, et al. (2006) investigated the relationship between men following the Mediterranean diet and erectile dysfunction. “To the best of our knowledge, the role of dietary factors in ED has never been addressed. In the present case-control study, we investigated the relation of the Mediterranean diet with ED” (p. 370). Esposito and her associates at the University of Naples (Italy) are among the leading erectile dysfunction researchers in the world having conducted a number of well cited studies. If there were other studies available, they would likely know.

Ironically, there are records of dietary therapy for erectile dysfunction being used by medieval Persian practitioners. Ghadiri and Gorji (2004) explain, “Medieval Persian practitioners believed that proper nutrition played an essential role in sexual activity, they

placed special emphasis on food and diet in their therapeutic management of ED” (p. 81). Their article contains an extensive list of foods and herbs that were recommended and used for the treatment of erectile dysfunction (Ghadiri & Gorji, p. 81-82).

There have been studies that connect what is commonly called the “Standard American Diet” (SAD) with risk factors for erectile dysfunction and other vascular diseases. Lopez-Garcia et al. (2004) report a relationship between the SAD and “markers of inflammation and endothelial dysfunction, particularly C-reactive protein (CRP), interleukin 6, E-selectin, soluble intercellular adhesion molecule 1 (sICAM-1), and soluble vascular cell adhesion molecule 1 (sVCAM-1)” (p. 1029). Schulze et al. (2005) discuss the relationship between inflammation, diabetes and erectile dysfunction:

This pattern, which was high in sugar-sweetened soft drinks, refined grains, diet soft drinks, and processed meat, but low in wine, coffee, cruciferous vegetables and yellow vegetables, was associated with an increased risk of diabetes....The dietary pattern identified may increase chronic inflammation and raise the risk of developing type 2 diabetes. (p. 675)

Nikoobakht et al. (2005) discuss the connection between hyperlipidemia and erectile dysfunction and suggest, “They can prevent these complications by modifying their lifestyle like increasing body activity and changing diet” (p. 526).

Esposito, Giugliano, et al. (2006) report that men who ate a diet that “was high in fruit, vegetables, nuts, whole grains, and fish, but low in red and processed meat and refined grains was more represented in subjects without ED as compared to men with ED” (p. 373). This type of diet is very similar to the traditional Mediterranean diet as summarized in Esposito, Giugliano, et al.:

Which is characterized by a high intake of vegetables, legumes, fruits and nuts, and cereals, and a high intake of olive oil associated with a low intake of saturated fats, a moderate intake of fish, a low-to-moderate intake of dairy products, a low intake of meat and poultry, and a regular but moderate intake of ethanol, primarily in the form of wine and generally during meals. (p. 373)

Esposito, Giugliano, et al. (2006) conclude that their study proves the relationship between diet and the development of erectile dysfunction and that men should follow dietary guidelines that increase their consumption of vegetables, fruits, nuts and healthy fats (p. 373). The most statistically significant differences between subjects with erectile dysfunction and those without erectile dysfunction are for greater intake of vegetables, fruits and nuts, and a lower ratio of monounsaturated to saturated lipids in the blood (Esposito et al., p. 372).

The Esposito, Giugliano, et al. (2004) study was a two year dietary intervention of 65 men with metabolic syndrome. The recommended composition of the diet was 50-60% carbohydrates, 15-20% proteins, and less than 30% fats. The fat mix was less than 10% saturated fats, 10-15% monounsaturated fats, and 5-8% polyunsaturated fats. The daily fiber intake was to be 18 g. The total daily caloric intake was 1700 kcal for the first year and 1900 kcal for the second year (p. 2978). They report “Men on the intervention diet had a significant decrease in glucose, insulin, LDL-cholesterol, triglycerides, and blood pressure, and a significant increase in HDL-cholesterol” (Esposito, Ciotola, et al., 2006, p. 408). With relationship to erectile dysfunction, “About one third of the men of the intervention group regained a normal sexual function” (Esposito, Ciotola, et al., p. 408). Their study concludes, “The results of the present study show that dietary factors

may be important in the development of ED: adoption of healthy diets would hopefully help preventing ED” (Esposito, Giugliano, et al., 2006, p. 370).

Esposito, Ciotola, et al. (2006) discuss some specific benefits of the Mediterranean diet. The high vegetable and fruit content of the diet provides increased levels of food antioxidants and dietary fiber compared to the SAD or the regular diet of their control group. They refer to some of their previous studies that find “antioxidant vitamins or food antioxidants ... improve the transient endothelial dysfunction seen in healthy subjects after consumption of a single high-fat meal...As dietary fiber may have anti-inflammatory roles” (p. 409). It is the antioxidants and the fiber that play a major role in reducing the oxidative stress which can positively affect erectile functioning. They continue, “A Mediterranean-style diet rich in whole grain, fruits, vegetables, legumes, walnut, and olive oil might be effective *per se* in reducing the prevalence of ED in men with metabolic syndrome” (p. 409). Shiri, Anasari and Hassani (2006) in the Tampere Study conclude, “A diet rich in fruits may have a beneficial effect on erectile function” (p. 348).

It is significant to note that the Mediterranean-style diet does contain some fat. This fat comes from olive oil (a monounsaturated fat); limited animal and dairy products (saturated fat); and vegetables, grains, and nuts (polyunsaturated fats). The fats that are excluded from this diet are the highly processed polyunsaturated fats (all the grain, vegetable, and nut oils that are heated while processed) and trans-fats (fats created to preserve food and increase shelf life). Research has shown that these fats play a major role in decreasing HDL cholesterol levels, raising LDL cholesterol levels (particularly the

heart disease marker Lipoprotein [a]), and increasing blood sugar levels (Enig, 2000, p. 42-43).

Other studies have looked at the impact of lowering specific risk factors for erectile dysfunction or other diseases (such as cardiovascular disease or diabetes), but there was no specific diet utilized to achieve these goals. These studies only present evidence that lowering the risk factors would likely reduce incidence of erectile dysfunction. Fung et al. (2004) find that lowering cardiovascular disease factors in mid-life may reduce the likelihood of developing erectile dysfunction later in life. They also encourage that erectile dysfunction be studied in future clinical trials of fat lowering agents and lifestyle changes (p. 1405).

There is a strong consensus in both the medical literature and the lay literature that diet can be both a cause of erectile dysfunction and aid in its treatment. It is a logical conclusion that the elimination of dietary habits that are creating the situation can lead to rectifying the situation. Feldman et al. (2000) conclude, "It would follow that ED and CHD share the modifiable risk factors leading to arteriosclerosis, such as smoking, fatty diet, adverse serum lipid levels, hypertension, physical inactivity, and obesity" (p. 328).

All of the lay books cited in this study such as Bonnard's *The Viagra Alternative* (1999), Lamm's *The Hardness Factor* (2005), Kilham's *Hot Plants* (2004a), Ryan's *Reclaiming Male Sexuality* (1997), Goldstein's *The Potent Male* (1995), and Fischer's *The Better Sex Diet* (1996) all speak to the benefit of a healthy diet in promoting strong erectile function. In fact, the Bonnard, Lamm, and Goldstein books are authored by medical doctors. However, while these books discuss the benefits of healthy diets and

provide some suggestions for herbal or nutritional supplements, they do not provide the scientific evidence to back up their claims.

Bonnard (1999) encourages a healthy diet containing “a wide variety of foods in moderately sized portions. Limit fat, cholesterol, sodium, alcohol, and sugars. Eat sparingly of red meat and highly processed foods ... eat as much fresh and organic produce as possible” (p. 139).

Lamm (2005) is the only author who matches specific foods with specific aspects of erectile functioning to include in the diet. The other authors provide general lists and recipes, but do not explain the science behind specific foods. Lamm’s list of 23 specific foods that contain the key vitamins and nutrients essential for successful erectile functioning includes: apples (fiber and flavonoids – quercetin), arugula (antioxidants), asparagus (antioxidants), avocado (healthy monounsaturated fat source and antioxidants), banana (potassium and vitamin B₆), blueberries (antioxidants – anthocyanins and fiber), carrots (vitamin A, flavonoids, fiber), chili peppers (antioxidant, capsaicin – a chemical that lowers LDL levels), chocolate (flavonoids, antioxidants), cucumbers (fiber), fennel (libido stimulating), figs (fiber, potassium, iron and calcium), garlic (slows plaque buildup, prevents formation of blood clots, lowers blood pressure), ginger (relaxes blood vessels), grapes (antioxidants), honey (amino acids, antioxidants), nuts (source of arginine and minerals), olive oil (healthy monounsaturated fat, flavonoids, antioxidants), salmon (source of Omega-3 essential fatty acids), spinach (antioxidants), tea (antioxidants), tomatoes (vitamins C and A, antioxidants), and whole grains (complex carbohydrates for sustained energy) (p. 280-284).

The cited authors strongly believe that a healthier diet will lead to improved sexual performance. Lamm's (2005) believes, "Dietary changes, regular exercise, and a variety of supplements that I will describe ... can bring dramatic results in a man's hardness and overall sexual satisfaction" (p. 19). Fischer (1996) discusses several popular diets that are aimed at reversing cardiovascular disease and how some men following these diets have noticed improved erectile function and sexual satisfaction. These include diets designed by Ornish, Barnard, and McDougall (p. 25-28). Each of these diets emphasizes whole grains, fruits and vegetables, and limits fat consumption, thereby similar to the Mediterranean diet. However, the findings are not supported through scientific research.

Lifestyle Therapies for Erectile Dysfunction

In addition to the dietary factors related to development and incidence of erectile dysfunction discussed by Esposito, Giugliano, et al. (2006), they report "physical inactivity was significantly higher in men with ED" (p. 372). The Esposito, Giugliano, et al. study monitors the physical activity of their subjects for "frequency (times per week), duration (in minutes per time), and intensity of sports- or occupation-related physical activity" (p. 371). An excellent summary of the findings of Esposito, Giugliano, et al. is described by Billups (2005a), "A recent study has shown that aggressive intervention with diet and exercise improves ED and endothelial cell function while decreasing systemic inflammatory mediators and the severity of other traditional cardiovascular risk factors" (p. S23).

Several other studies report similar findings. The Health Professionals Follow-up Study concludes that modifiable lifestyle factors “including physical activity and leanness, were associated with maintenance of good erectile function” (Bacon et al., 2003, p. 168). Cheng, Ng, Do, and Chen (2007a) report from a meta-analysis of population based studies the strong association showing physical activity to be preventative and possibly able to reverse erectile dysfunction:

Considering the fairly robust results of this meta-analysis and the supplementary evidence from the cohort studies, and the RCT [randomized controlled trials], there is good evidence to show that above average physical activity might be protective against ED (HPFS) [Health Professionals Follow-up Study] and might even reverse the development of ED through improvement in erectile function score (RCT). (p. 252)

Esposito and Giugliano (2005) report that nitric oxide production increases from exercise. The endothelial cells respond to short-term increases in shear stress on their surfaces by producing vasodilator compounds such as nitric oxide (p. 396). The Massachusetts Male Aging Study finds “men who initiated physical activity in midlife had a 70% reduced risk for erectile dysfunction relative to those who remained sedentary” (Derby et al., 2004, p. 304).

The greatest benefits occur when improved diet and increased exercise are combined. Fischer (1996) believes, “Combining a low-fat diet with a healthy lifestyle is the best way to maintain potency and restore sexual vitality” (p. 11). Her description of a healthy lifestyle includes moderate daily exercise, not smoking, moderate or no alcohol consumption, getting sufficient sleep, and reducing stress through regular activities (p.

16). The Ornish program is a lifestyle modification program. His belief is that heart disease can be reversed by following his low-fat vegetarian diet with the addition of moderate exercise and daily meditation or yoga to reduce stress.

Rosen, Friedman and Kostis (2005) conclude from a review of several studies: Taken together, these studies show that significant improvements in sexual function can be expected in patients receiving intensive lifestyle change (e.g., weight loss, exercise, cognitive therapy), which are also likely to be accompanied by positive changes in weight, fitness levels, and other markers of cardiovascular health. (p. 78M)

Prescription Drug Therapies for Erectile Dysfunction

There are several prescription drugs available to treat erectile dysfunction – Cialis (tadalafil) by Eli Lilly, Levitra (vardenafil HCl) by Bayer, Schering-Plough, and GlaxoSmithKline, and Viagra (sildenafil citrate) by Pfizer. These drugs act as PDE-5 inhibitors preventing the breakdown of cGMP; keeping blood in the penis and thus maintaining an erection. The drugs have been shown to produce erections in most men. Rajfer et al. (2007) find, “Tadalafil 2.5 mg and 5 mg, dosed once a day for 24 weeks, was well tolerated and significantly improved erectile function” (p. 95). Steidle et al. (2007) discover that sildenafil “helped improve sexual intercourse frequency, flexibility and success” (p. 154). Althof et al. (2003) find, “Sildenafil treatment was associated with significant improvement in all mean SEAR [Self-Esteem and Relationship] domain and subscale scores” (p. 889-890). It should be noted that the Steidle et al. study is funded by Pfizer and the Rajfer et al. study is funded by Eli Lilly.

The most popular drug in terms of market share is Viagra. Since all the drugs are similar in how they work and their basic chemistry, Viagra will be used as an example to illustrate some of the risks associated with taking these medications. Pfizer (2007b) provides the following information providing possible side effects:

Like all medicines, VIAGRA can cause some side effects. These effects are usually mild to moderate and don't last longer than a few hours. Some of these side effects are more likely to occur with higher doses. The most common side effects of VIAGRA are headache, flushing of the face, and upset stomach. Less common side effects that may occur are temporary changes in color vision (such as trouble telling the difference between blue and green objects or seeing a blue color tinge to them), eyes being more sensitive to light, or blurred vision.

In rare instances, men taking PDE5 inhibitors (oral erectile dysfunction medicines, including VIAGRA) reported a sudden decrease or loss of vision in one or both eyes. It is not possible to determine whether these events are related directly to these medicines, to other factors such as high blood pressure or diabetes, or to a combination of these. If you experience sudden decrease or loss of vision, stop taking PDE5 inhibitors, including VIAGRA, and call a doctor right away.

In rare instances, men have reported having an erection that lasts many hours. You should call a doctor immediately if you ever have an erection that lasts more than 4 hours. If not treated right away, permanent damage to your penis could occur.

Heart attack, stroke, irregular heartbeats, and death have been reported in men taking VIAGRA. Most, but not all, of these men had heart problems before taking this medicine. It is not possible to determine whether these events were directly related to VIAGRA (p. 4).

The above address just the possible side effects. There is also a multitude of concerns related to combining Viagra with other medications or recreational drugs an individual may be taking. Pfizer (2007b) continues:

If you take any medicines that contain nitrates – either regularly or as needed – you should never take VIAGRA. If you take VIAGRA with any nitrate medicine or recreational drug containing nitrates, your blood pressure could suddenly drop to an unsafe level. You could get dizzy, faint, or even have a heart attack or stroke. Nitrates are found in many prescription medicines that are used to treat angina (chest pain due to heart disease) such as:

- nitroglycerin (sprays, ointments, skin patches or pastes, and tablets that are swallowed or dissolved in the mouth)
- isosorbide mononitrate and isosorbide dinitrate (tablets that are swallowed, chewed, or dissolved in the mouth)

Nitrates are also found in recreational drugs such as amyl nitrate or nitrite (“poppers”). If you are not sure if any of your medicines contain nitrates, or if you do not understand what nitrates are, ask your doctor or pharmacist (p. 3).

As illustrated by the above information these medications are not for use by everyone. Communication and honesty with the prescribing physician is critical when considering a drug therapy for erectile dysfunction. The warnings in Pfizer (2007b)

continue with recommendations of the information to disclose to a prescribing doctor regarding pre-existing or past conditions, other remedies, and other medications (p.2). Alpha-blockers and protease inhibitors “can change the way VIAGRA works” (Pfizer, p. 2).

Clearly there is a significant amount of information to consider when deciding whether or not to pursue a drug therapy for erectile dysfunction.

Diet Quality and Healthy Eating

One of the major challenges for any study involving diet is the development of an index to reflect the overall quality of a diet. Kennedy, Ohls, Carlson, and Fleming (1995) state, “Although extensive research has been conducted on the links between diet and chronic disease, little research has been done on methods to assess overall diet quality” (p. 1103). In response, they developed the Healthy Eating Index (HEI) in 1995 for use by the US Department of Agriculture “to monitor changes in dietary intake over time and as the basis of nutrition promotion activities for the population” (Kennedy et al, p. 1103).

The HEI uses ten components, each having a score from 0 to 10, creating a total possible score of 100. These ten components and how to obtain a score of 10 are (all servings are daily): five food groups (grains: 6-11 servings; vegetables: 3-5 servings; fruits 2-4 servings; milk: 2-3 servings; and meat: 2-3 servings); four nutrients (total fat: 30% of less energy from fat; saturated fat: less than 10% energy from saturated fat; cholesterol: less than 300 mg; and sodium: less than 2,400 mg); and a measure of variety in food consumption: 16 different kinds of food over a 3-day period (Kennedy et al., 1995, p. 1104). Kennedy et al. use data “from the 1989 and 1990 Continuing Survey of

Food Intake by Individuals to analyze the HEI for a representative sample of the US population” (p. 1103). The sample size is 7,463. The methodology behind the HEI will not be explained in detail in this document due to space limitations. However, the results are relevant. The average score is 63.9, with few people scoring very high or very low. The categories in which people scored lowest were consumption of fruit, saturated fat, grains, vegetables, and total fat. This means people had too much saturated and total fat, and not enough fruit, grains, and vegetables (Kennedy et al., p. 1103).

The HEI does not officially classify diets as “healthy” or “unhealthy,” but achievement of the 100 points is supposed to be representative of “healthy eating.” With only 12% of the sample having an HEI score greater than 80, there is a strong indication that the overall American diet is not very healthy (Kennedy et al., 1995, p. 1107).

A second measurement tool to measure overall diet quality is the Diet Quality Index. It was revised in 1999 and is called the Diet Quality Index Revised (DQI-R). Similar to the HEI it has a possible 100 point score. The components of the DQI-R are described by Haines, Siega-Riz, and Popkin (1999): total fat less than 30% energy intake; saturated fat less than 10% energy intake; dietary cholesterol less than 300 mg per day; 2-4 servings of fruit per day; 3-5 servings of vegetables per day; 6-11 servings of grain per day; calcium intake as recommended for age; iron intake as recommended for age; dietary diversity score - eating a variety of foods from 23 broad food categories; and dietary moderation score - teaspoons of added sugar, discretionary fat, sodium intake, and alcohol intake (p. 698-700).

Similar to the HEI the DQI-R does not designate diets as “healthy” or “unhealthy.” Haines et al. (1999) report on data from the 1994 Continuing Survey of

Food Intakes by Individuals, a sample of 3,202 adults. The methodology behind the DQI-R will not be explained in detail in this document due to space limitations.

However, similar to the HEI, the results of the study are relevant. The average score is 63.4, very similar to the HEI results. Respondents were “less likely to have met goals related to fruit servings (19.6% met goal), grain servings (23.1% met goal), and calcium intakes (16.6% met goal) relative to the Recommended Dietary Allowance” (p. 697).

Also, similar to the HEI, only 11.7% of the respondents had a score greater than 80 (Haines et al., p. 702).

Neither the HEI nor the DQI-R is directly compared to the Nutrition Index. Both the HEI and DQI-R consider grains, milk and meat to be healthier choices than the Nutrition Index. In fact, the HEI and DQI-R allow for processed and non-whole grains which are strongly discouraged in the Nutrition Index. Therefore, it could be assumed that even diets meeting the HEI or DQI-R standards would be considered “unhealthy” as measured by the Nutrition Index.

Deficiencies of the Available Literature

In reviewing the literature and available studies, the issue of erectile dysfunction is often approached after it has occurred, rather than in a preventative mode. Outside of the Esposito, Giugliano, et al. (2006) and Esposito, Ciotola, et al. (2006) references, most of the literature completely ignores dietary factors. Even the studies utilizing herbal or natural therapies (Appleton (2002), Stanislavov & Nikolova (2003), Douglass (2003), and Kilham (2004a)) address erectile dysfunction through supplementation protocols rather than through dietary or lifestyle alteration. Much of the literature positions erectile

dysfunction as a by-product of obesity, heart disease or diabetes, rather than a condition of its own that can be addressed through proper diet. Only Lamm (2005) addresses improved diet as a specific remedy for erectile dysfunction and includes it in his six week program. However, he does not include any statistically significant research results in his book to support his claims.

In several studies describing preventative measures for erectile dysfunction or cardiovascular disease diet is completely excluded. There is the mention of modifying body weight, but no advice on how to accomplish that. From the Speel et al. (2003) study:

The two basic and often in combination advocated tools in these preventative cardiovascular medicine programs are: (1) modification of lifestyle factors such as smoking, body weight and lack of exercise with the aid of counseling and (2) modification of physical and biochemical risk factors (i.e. hypertension, dyslipidaemia and diabetes mellitus) with the aid of pharmacological interventions (i.e. anticoagulant therapy, ACE-inhibition and lipid lowering). (p. 369)

The Thompson et al. (2005) study addresses a variety of factors, but it too does not specifically mention dietary habits. They find, “In an adjusted model, covariates included age, body mass index, blood pressure, serum lipids, diabetes, family history of myocardial infarction, race, smoking history, physical activity, and quality of life” (p. 2996).

Summary

To this author, when all the evidence is weighed, there appear to be two main underlying causes of erectile dysfunction - vascular health and stress. Both of these causes are directly affected by diet and nutrition. As Fisher states, “The Massachusetts Male Aging Study exploded the myth that impotence is an inevitable consequence of aging. The study concluded that impotence is related to preventable diseases, not to aging” (1996, p. 29). According to Ryan, “The state of a man’s health has more influence on his potency than his age. A 30 year-old in bad health is more likely to be impotent than a 70 year-old in good health!” (1997, p. xix).

With this conclusion, it is evident that education is needed for men of all ages so they can better understand the outcomes of their dietary and lifestyle choices. Billups (2005b) sees a significant opportunity, “The next several years will be exciting because new clinical experience will provide guidelines on how to integrate ED in the management of CVD as well as how to incorporate ED to improve preventive vascular health in men” (p. 60M).

CHAPTER 3: DESIGN OF THE STUDY

Introduction

The purpose of this study is to test the theory that nutrition is both a cause of and a resolution for erectile dysfunction. Nutrition, the independent variable, will be defined to be inclusive of diet and supplementation. Erectile dysfunction, the dependent variable, will be defined either by answers to specific questions from a validated questionnaire or through medical diagnosis reported on a survey. Lifestyle factors (specifically smoking, alcohol consumption, drug usage, weight management, and exercise) will be considered as intervening variables. The study will present evidence of: 1) a direct association between poor nutrition and erectile dysfunction; and 2) a direct association between improved nutrition and improved erectile function.

Methodology

Data will be gathered utilizing a survey to investigate the relationship between nutrition and erectile dysfunction for male participants aged 30 to 80. The survey will include questions regarding diet, supplementation, respondent opinions, lifestyle factors, and questions from the International Index of Erectile Function (IIEF) questionnaire. The IIEF was developed by Pfizer Inc, USA. It is accepted by the medical and scientific community as a validated questionnaire for determining erectile dysfunction and

measuring treatment effectiveness. The survey data will be analyzed to determine the extent of the relationships between nutrition, lifestyle and erectile function in the sample group. The survey will be consistent with phenomenological research, a qualitative approach, as it is studying specific human experiences (erectile dysfunction) as self described and categorizing by interpreting nutritional and lifestyle habits. According to Creswell (2003):

Qualitative research is fundamentally interpretative. This means that the researcher makes an interpretation of the data ... analyzing the data for themes or categories, and finally making an interpretation or drawing conclusions about its meaning personally and theoretically....It also means that the researcher filters the data through a personal lens that is situated in a specific sociopolitical and historical moment. One cannot escape the personal interpretation brought to qualitative data analysis. (p. 182)

Data Collection and Analysis

In order to determine the effects of diet and supplementation on erectile dysfunction human subjects are required. The subjects recruited for survey participation will be males between the ages of 30 and 80 that are willing to complete the survey. Subjects will be recruited from e-mail lists that the principal investigator has obtained permission from the list owner to utilize for this purpose.

Questionnaire

Survey participants were recruited through e-mail and completed the survey anonymously through an Internet web site. Expected completion time for the survey instrument is 7 to 15 minutes. The survey was available between December 15, 2006 and February 13, 2007. Please see Appendix A for a copy of the survey instrument. With regards to the survey all correspondence is private, confidential and anonymous. However, persons other than those doing the study may look at study records. Those with the right to look at the study records include the Clayton College IRB. Records can also be opened by court order. All records will be kept private to the extent allowed by law. Initials rather than names will appear on study records where possible. Names and other facts that might point to a respondent will not appear when this study is presented or published.

E-mail lists were provided by interested parties or associations such as The ManKind Project[®] or by other businesses or associations in which the researcher has affiliation. The ManKind Project[®] is an educational organization committed to empowering men to missions of service. It offers “trainings which support men in developing lives of integrity, accountability, and connection to feeling. Our trainings challenge men to develop their abilities as leaders, partners, fathers, and elders in order to offer their deepest gifts in service to the world” (The Mankind Project, n.d., home page).

The criteria for inclusion in the data results will be males between the ages of 30 and 80. Females and males not in that age group will be excluded.

Survey Analysis Plan

The survey has been designed so that all questions can be analyzed on their own, in combination, and as part of an index. Three indices will be created – the Nutrition Index, the Lifestyle Index, and the Erectile Function Index. Please see Appendix A: Survey Instrument for the specific questions. A discussion of the functionality of the survey tool follows.

Questions 1 (height) and 2 (weight) will be used to determine Body Mass Index (BMI). Respondents will be assigned groups based upon the BMI. Respondents with a BMI of 24 or less will be considered “normal”; respondents with a BMI between 25 and 29 will be considered “overweight”; respondents with a BMI between 30 and 39 will be considered “obese”; and respondents with a BMI greater than 40 will be considered “extremely obese.” The National Institute of Health (2000) uses these classifications (p. 46). This information will address the research question regarding typical or average BMI of males and will identify relationships between BMI and erectile dysfunction.

Question 3 (age) will be used to place respondents into groups to analyze the impact of age across different variables. Respondents will be grouped in the following age categories: 30-39 years of age; 40-49 years of age; 50-59 years of age; 60-69 years of age; and 70-79 years of age. This information will address the research questions concerning typical or average diets and lifestyles by age group and will identify relationship between age and erectile dysfunction.

Questions 4 (ethnicity) and 5 (state of residence) are for demographic purposes. This information will not be used in any specific analysis.

Questions 6 and 7 (eating out of the home patterns), question 10 (beverage consumption), questions 12 through 16 (food consumption), and question 18 (use of organics) form the Nutrition Index. The Nutrition Index is the most important variable in the survey. It will address the null hypothesis that there is no relationship between the nutritional quality of a man's diet and his experience of erectile dysfunction.

Almost all of the components of the Nutrition Index have a maximum of five points allocated to them. Four components (points in parentheses) – butter (4), soy based “dairy” products (3), poultry (4), and eggs (4) have less than five points allocated. These exceptions were made due to the difficulty in classifying these foods along a spectrum of consumption and less agreement among the “experts” as to their relative health properties. Please see Appendix B: Survey Instrument with Scoring for complete details on the scoring of each question.

The maximum score on the Nutrition Index is 150 points. A diet will be considered “healthy” with a minimum score of 99 points. For classification purposes scores greater than 119 will be considered “very healthy diet”; scores between 99 and 118 will be considered “healthy diet”; scores between 79 and 98 will be considered “unhealthy diet”; and scores below 78 will be considered “very unhealthy diet.”

Questions 6 and 7 (eating out frequency) are combined for a maximum score of 5; a healthy diet score will be 4. Question 10 (beverage consumption) has a maximum score of 5; a healthy diet score will be 4. Question 12 (grain consumption) has a maximum score of 20; a healthy diet score will be 11. Question 13 (fruits and vegetables consumption) has a maximum score of 25; a healthy diet score will be 15. Question 14 (dairy consumption) has a maximum score of 27; a healthy diet score will be 20.

Question 15 (main meal consumption) has a maximum score of 33; a healthy diet score will be 23. Question 16 (sweets and snacks consumption) has a maximum score of 15; a healthy diet score will be 12. Question 18 (organic food consumption) has a maximum score of 20; a healthy diet score will be 10.

The specifics of the healthy diet minimum score of 99 points is constructed as follows (points in parenthesis): one to two meals out during the week (4); beverages are no coffee or soft drinks, focusing on water and fruit and vegetable blended drinks (4); grains - bread 1-3 times per week (3), cereal 1-3 times per week (3), white rice or pasta 1-3 times per week (2), and whole grains 1-3 times per week (3); vegetables - vegetables every day (4), salad 1-3 times per week (2), potato 1-3 times per week (2), French fries less than once per week (3), and fruit every day (4); dairy - cheese 1-3 times per week (3), yogurt 1-3 times per week (3), ice cream less than once per week (4), margarine less than once per week (4), butter less than once per week or 1-3 times per week (4), and soy dairy products less than once per week (2); main meals - red meat less than one time per week (4), poultry 1-3 times per week (4), fish 1-3 times per week (3), pasta 1-3 times per week (2), vegetable main dish 1-3 times per week (3), pizza less than one time per week (4), and eggs 1-3 times per week (3); all sweets and snacks are less than 1 time per week (12); and using organics (10).

Questions 8 and 9 reflect the respondent's view of their own nutrition. This information will address the research question comparing respondents' perceptions and actual performance on the Nutrition Index.

Question 11 (type of diet – vegetarian, vegan or non-vegetarian diet) records the respondent's current type of diet. This information is being gathered to see if there is a relationship between type of diet, the Nutrition Index, or erectile dysfunction.

Questions 22 through 29 form the Lifestyle Index. The Lifestyle Index will be analyzed to identify its relationship to erectile dysfunction. The maximum score on the Lifestyle Index is 35 points. A healthy lifestyle will have a minimum score of 25 points. Each question is worth a maximum of 5 points. A healthy lifestyle minimum score was constructed as follows: 1-2 hours per day of television and computer at home (3); 3-5 days of exercising (3); 30-60 minutes of exercise (3); total sitting time of 3-5 hours (3); not smoking (5); one drink maximum (3); and no drug usage (5). Please see Appendix B: Survey Instrument with Scoring for further details on scoring for each question.

For classification purposes a Lifestyle Index score between 31 and 35 will be considered “very healthy lifestyle”; a score between 25 and 30 will be considered “healthy lifestyle”; a score between 15 and 24 will be considered “unhealthy lifestyle”; and a score between 0 and 14 will be considered “very unhealthy lifestyle.”

Question 30 (conditions diagnosed and/or currently taking prescription medications) provides information regarding diseases that a respondent is diagnosed. This will be one of the methods to identify respondents with erectile dysfunction and will also be used as an indicator of overall health. The more diseases that a respondent is diagnosed, the less healthy they are considered.

The Erectile Function Index is constructed from Questions 32 to 38. This is the second method to identify respondents with erectile dysfunction. The Erectile Function Index information will be used to identify associations between erectile dysfunction and

age, lifestyle, and nutrition. The maximum score on the Erectile Function Index is 35 points. Each question is worth a maximum of 5 points. Please see Appendix B: Survey Instrument with Scoring for further details on scoring for each question.

For classification purposes a respondent with a score between 32 and 35 will be considered “no erectile dysfunction”; respondents with a score between 22 and 31 will be considered to have symptoms of “occasional erectile dysfunction”; respondents with a score between 11 and 21 will be considered to have symptoms of “consistent erectile dysfunction”; respondents with scores between 0 and 10 will be considered “no sexual activity” due to abstinence from sexual relations.

Respondents who report sexual activity and have scores of 10 or below will be classified as “consistent erectile dysfunction.” Due to the fact that some men are diagnosed with erectile dysfunction and placed on medications that relieve the symptoms there is the possibility that the Erectile Function Index will not indicate erectile dysfunction. Therefore, all respondents diagnosed with erectile dysfunction (from question 30) will be assigned to the “consistent erectile dysfunction” classification.

The data will be analyzed using appropriate statistical methods for quality of data and sample size. SPSS Graduate Pack 15.0 for Windows (SPSS Inc., Chicago) will be used for all statistical analysis. The initial design of the study expected to use basic statistical analysis of mean, median, mode and standard deviation for all variables and multivariate statistical analysis procedures including cross tabulations, correlations, ANOVA (analysis of variance), regressions, discriminant analysis, and factor analysis. The key underlying information in this study is the data that creates the three indices. Upon completion of the survey and initial analysis of the data, it was evident that the data

did not follow a normal distribution pattern. The procedures that produce statistically significant results for this type of data are limited. Most of the techniques previously considered are not appropriate for the data collected. Therefore, most of the findings of the study will be supported by frequencies, means, modes, and cross tabulations.

Frequency distributions will be performed for all variables. Means will be determined for quantitative variables. Modes will be determined for qualitative variables. Cross tabulations will provide insight into associations between specific variables such as the Nutrition Index, the Lifestyle Index, the Erectile Function Index, BMI groups, and age groupings.

Assumptions

No special populations will be utilized in this study. All men between the ages of 30 and 80 can participate in the study regardless of ethnicity or sexual preference. The study will take place within the subject's home and personal environment.

A survey was selected as the most efficient means to gather data from respondents. Other possible methods such as direct observation, face to face interviews, or the completion of food diaries may have provided more accurate information, but would have required additional time and resources. The use of an Internet website to collect the data was selected due to the personal nature of the information being gathered (particularly that regarding sexual performance and satisfaction). This allowed the survey to be completed anonymously and in the privacy of the home potentially positively impacting response rates. It is assumed that participants will provide honest answers to the questions on the survey.

It is likely that there will be some bias inherent in the sample. The respondents are being recruited through the Principal Investigator's personal contacts. The first level contact is likely to be Caucasian, have average or above average income levels, and greater concern regarding their personal health. However, as requests for respondents move from the first level contact to subsequent level contacts, this likelihood is decreased and a wider population will be reached. Given that the underlying assumption of this study is the effect of nutrition on erectile dysfunction, and one of the prevalent underlying risk factors is weight, the Principal Investigator will be able to compare the BMI levels of this sample to national population studies to determine the relative risk factors of this sample versus the national distribution.

The rationale for the selected age group for the study is that it contains males that are likely to be sexually active and have settled into their adult nutritional pattern. By age 30, that pattern may have already caused or may be leading to symptoms of erectile dysfunction. The incidence of erectile dysfunction in males under the age of 30 is generally low and outside the scope of this study.

For the purposes of this study a healthy diet is one that emphasizes whole foods - vegetables, fruits, whole grains, and limited meat as its major components. It is a balanced diet, low in unhealthy fats, sugars, and refined and processed foods with minimal consumption of coffee and soft drinks. It encourages the use of organic foods.

The Nutrition Index has been created to represent consumption patterns of a healthy diet. The score of 99 points is intended to represent a healthy diet, but not necessarily the optimum or most healthy diet. The construct of the healthy diet minimum score of 99 points limits meals out during the week; focuses on water as the main

beverage; emphasizes whole grains, organic fruits and vegetables; discourages non-fermented dairy products; limits meat consumption, with emphasis on fish containing Omega-3 fatty acids; and limits all sweets and snacks.

The healthy diet of this study was compared to two other diets - Dean Ornish's heart healthy diet (The Preventative Medicine Research Institute, 2004, nutrition page) and the National Diabetes Education Program's Diabetes Food Pyramid diet (n.d., meal planner pages) – which were scored using the Nutrition Index survey questions. The Ornish diet is a vegetarian diet composed mainly of fruits, vegetables, and whole grains. There are no animal products allowed, which excludes all dairy and meat. The diet does not specifically call for utilizing organic food sources. Otherwise, it is very similar to the intervention diet. This diet scored a 107 on the Nutrition Index. (See Appendix C: Nutrition Index Diet Scores for the details.) The Diabetes Food Pyramid diet closely mirrors the Food Pyramid of the USDA, slightly altered for diabetics. This diet allows for non-whole grain breads, crackers, snacks, dairy, meat, and provides no guidelines for eating out or consuming organic foods. This diet scored a 74 on the Nutrition Index. (See Appendix C: Nutrition Index Diet Scores for the details.)

Scope and Limitations

The scope of this study is limited to the effect of nutrition (and to a lesser extent, lifestyle) on erectile dysfunction. It is exploring the physical factors related to erectile dysfunction and is not considering potential psychological factors. Information concerning race and state of residence of the respondents is being gathered. However, the study will not address these differences in experience of erectile dysfunction.

The survey is using a self-selected sample of convenience rather than a national random sample. This is likely to produce biased data as previously explained. In addition, much of the data collected is qualitative (categorical or ordinal) in nature and the quantitative data collected does not follow a normal distribution; limiting the number of statistical procedures that can be performed.

Other possible data collection methods such as direct observation, face to face interviews, or the completion of food diaries may have provided more accurate information, but would have required additional time and resources. The use of an Internet website to collect the data was selected due to the personal nature of the information being gathered (particularly that regarding sexual performance and satisfaction). This allowed the survey to be completed anonymously and in the privacy of the home potentially positively impacting response rates. The survey is based on self-reporting and honesty in the responses. In addition, it may be difficult to get males across all age groups to respond. While Internet access is fairly widespread, using it to complete a survey may be biased toward younger, more affluent and more educated people.

There are also potential limitations concerning the definitions of a healthy diet and good nutrition versus poor nutrition. There are often differing opinions regarding the health contributions of various foods. The Principal Investigator has created his definition of healthy foods from the literature he has reviewed in preparation for this study. The Nutrition Index is measuring the types of food consumed, not the quantity of food consumed. Quantity is irrelevant to the health of the diet for the purposes of this study. However, even if a person is eating too much healthy food, that will still be

captured by the BMI measurement. The effect of prescription medications on erectile dysfunction will not be accounted for within the study.

Summary

The research has been designed to utilize the most effective methods for gathering and analyzing the data given the availability of subjects and resources to complete the study. The scope of the study is wide enough and the limitations are addressable to allow the Principal Investigator to answer his research questions and explore his hypotheses.

CHAPTER 4: RESULTS AND FINDINGS

Introduction

Results from the survey and findings in the literature are consistent. The literature identifies diets that are high in processed foods, high in bad fats, and lacking in fruits and vegetables as risk factors for erectile dysfunction. The survey indicates that the lower the nutritional content of a diet (lower score on the Nutrition Index), the greater the likelihood of erectile dysfunction. The literature discusses age and overall health as key determinants of incidence and severity of erectile dysfunction. The survey shows rising erectile dysfunction rates as age increases and that the healthier lifestyle a man leads, the less likely he is to experience erectile dysfunction. The literature and the survey both identify patterns of unhealthy diets. These diets are light in whole grain, vegetable and fruit consumption and heavy with processed foods and unhealthy fats. The detrimental effects of these diets accumulate over time, with gradual degeneration of the vascular system eventually leading to erectile dysfunction.

Analysis of Data

A total of 251 surveys were completed. Four of the respondents did not reply to the questions forming the Erectile Function Index. Since almost all of the questions are answered, these surveys are included in the data analysis. While drawing conclusions from the data it is important to remember the self-reporting nature of the study and to be

aware of potential under-reporting of some of the unhealthier food choices and lifestyle behaviors.

Survey Demographics

Most of the respondents are Caucasian (91.6%), followed by Latino or Hispanic (4.0%), other (2.4%), African or African American (1.2%), and Asian, Asian American or Pacific Islander (0.8%). (See Appendix D, Table D1.) Given that African or African Americans are under represented in the sample and as a group is 20% more likely to have erectile dysfunction, total erectile dysfunction findings of this survey are likely to be lower than statistically normal sample of the population.

The majority of the respondents are from the state of Wisconsin (49.4%). This was expected. It is the Principal Investigator's state of residence and the Mankind Project[®] e-mail list used to solicit respondents is composed predominantly of residents of Wisconsin. Other states with significant numbers of respondents include California (6.8%); Illinois (6.4%); Florida (5.2%); and New York (4.0%). (See Appendix D, Table D2 for a complete list of respondents by state of residence.)

Height and weight information is used to calculate Body Mass Index (BMI). Height of the respondents ranges from 60 to 80 inches, with an average height of 70.4 inches. (See Appendix D, Table D3.) Weight ranges from 105 to 470 pounds, with an average weight of 193.3 pounds. (See Appendix D, Table D4.) This produces a BMI range from 19 to 55, with an average BMI of 27.3. Most respondents are classified as overweight (46.2%). The other classifications are: normal (27.5%); obese (23.5%); and extreme obesity (2.8%). (See Appendix D, Table D5.)

The survey population exhibits fewer normal (27.5% versus 36.0%) and more overweight (72.5% versus 64.0%) individuals in comparison to the CDC report cited in Esposito and Giugliano (2005, p. 392). A possible reason for this is the distribution of the respondents' state of residence. With more than one-half of the respondents from Wisconsin, as opposed to a national representative sample, the data may be skewed. Wisconsin is a state known to have greater obesity than the national average.

The ages of the respondents are between 30 and 78, with an average age of 47.7. (See Appendix D, Table D6.) Most of the respondents are between the ages of 30 and 59 years old (86.9%). The sample consists of men aged: 30-39 (25.9%); 40-49 (32.3%); 50-59 (28.7%); 60-69 (10.0%); and 70-79 (3.2%). The potential limitation of having an inadequate number of responses from men over the age of 60 did materialize. This will reduce the number of statistically valid analyses that can be performed on this variable. (See Appendix D, Table D7.)

Respondent Beliefs and Diet Type

Most respondents believe they eat a healthy diet (72.1%). When presented with the statement, "I eat a healthy diet," results are: strongly agree (16.7%); agree (55.4%); disagree (22.3%); and strongly disagree (5.6%). (See Appendix D, Table D8.) At the same time, most respondents would like to eat healthier (85.7%). When presented with the statement, "I would like to eat a healthier diet," results are: strongly agree (24.7%); agree (61.0%); disagree (12.0%); and strongly disagree (2.4%). (See Appendix D, Table D9.) Respondents believe that their diet impacts their current health (89.6%) and that their diet impacts their future health (94.8%). (See Appendix D, Tables D10 and D11.)

For the most part respondents believe they are eating “the right amount” of meat (82.9%); grains (62.2%); dairy (72.9%); and desserts (57.0%). Vegetables (62.2%) are the one food group respondents believe they are eating “not enough.” Under eating of vegetables is consistent with studies measuring food quality discussed in the literature. Dessert (37.8%) had the highest percentage of respondents believing they are eating “too much.” (See Appendix D, Tables D12 through D16.)

There are few vegans (2.4%) or vegetarians (4.4%) in the sample. The vast majority of the respondents eat meat and animal products (93.2%). Given the limited number of vegans and vegetarians further comparisons between those groups and the overall population are not statistically valid. (See Appendix D, Table D17.)

The Nutrition Index

A series of questions regarding food and beverage consumption patterns in and out of the home and the use of organic products form the Nutrition Index. Questions are scored and analyzed individually and then added together to create the Nutrition Index. The Nutrition Index forms the basis for much of the further analysis of the data.

Eating meals out of the home is prevalent in the sample. Only 4.8% report eating no meals out of the home. The mode for eating meals out is 1-3 meals out (53.4%). Other responses are: 4-6 meals out (28.3%); 7-10 meals out (10.4%); and more than 10 meals out (3.2%). Fast food meals are popular with the respondents as 60.6% report they eat out at fast food restaurants. (See Appendix D, Tables D18 and D19.)

The most popular beverages are water (87.6%); regular coffee (62.5%); 1% or skim milk (29.1%); blended fruit or veggie drinks (28.7%); 2% milk (14.3%); diet soft

drinks (13.9%); regular green tea (10.8%); and regular herbal tea (10.8%). All other beverages were consumed by 10% or less of the sample. These include: soy milk (10.0%); decaffeinated coffee (8.4%); regular black tea (8.4%); whole milk (4.4%); and decaffeinated tea (3.2%). (See Appendix D, Tables D20 through D33.) The mode of the beverage score, a component of the Nutrition Index is 4. Most respondents' beverage score was above a 3. Beverage scores are: 0 (8.0%); 1 (0.8%); 2 (1.6%); 3 (25.1%); 4 (38.6%); or 5 (25.9%). (See Appendix D, Table D34.)

Processed and refined grains (bread, tortilla, roll, biscuit, muffin, English muffin or bagel) are a staple in many diets. These are consumed every day or more by 54.6% of the respondents and 4-6 times per week by another 23.9%. The results are: less than once per week (6.8%); 1-3 times per week (14.7%); 4-6 times per week (23.9%); every day (38.2%); 2-3 times per day (13.5%); and 4-5 times per day (2.8%). There are no respondents who do not eat these foods. (See Appendix D, Table D35.)

Cooked or cold cereal consumption has a mode 1-3 times per week (28.7%). It is eaten: never (13.1%); less than once per week (19.5%); 1-3 times per week (28.7%); 4-6 times per week (20.3%); and every day (18.3%). It was not consumed 2-3 times per day or more by anyone in the sample. (See Appendix D, Table D36.)

Other refined and processed grains (white rice or white pasta) are also highly consumed with a mode of 1-3 times per week (55.4%). These foods are eaten: never (8.0%); less than once per week (29.9%); 1-3 times per week (55.4%); 4-6 times per week (3.6%); and every day or more (3.2%). (See Appendix D, Table D37.)

Whole grains (brown rice, whole wheat pasta, quinoa, buckwheat, amaranth, millet, barley) considered to be the healthiest grain choices are consumed with a much

lower frequency. The sample has a mode of less than once per week (36.7%). Whole grains are eaten: never (13.9%); less than once per week (36.7%); 1-3 times per week (32.7%); 4-6 times per week (11.6%); every day (4.0%); 2-3 times per day (0.8%); and 4-5 times per day (0.4%). (See Appendix D, Table D38.)

Vegetables have low to moderate consumption by the sample group. This is consistent with the results from the HEI and DQI-R studies. Only 49% of the respondents eat at least one serving of vegetables per day. The vegetable consumption pattern is: never (0.0%); less than once per week (4.0%); 1-3 times per week (17.5%); 4-6 times per week (29.5%); every day (29.1%); and 2-3 times per day or more (19.9%). (See Appendix D, Table D39.)

Salads such as a house salad, Caesar salad, or other leafy green salad also have low to moderate consumption patterns by the sample group. Only 13.1% of the sample has at least one salad per day. Salads were eaten: never (2.4%); less than once per week (15.5%); 1-3 times per week (41.4%); 4-6 times per week (27.5%); and every day or more (13.1%). (See Appendix D, Table D40.)

Potatoes are a popular item as 61.4% of the respondents eat potatoes between 1 and 6 times per week and 28.3% eat French fries 1-3 times per week or more. Potato consumption is: never (6.4%); less than once per week (30.7%); 1-3 times per week (51.8%); 4-6 times per week (9.6%); and every day or more (1.6%). (See Appendix D, Table D41.) French fries are eaten: never (19.5%); less than once per week (52.2%); 1-3 times per week (25.5%); and 4-6 times per week (2.8%). (See Appendix D, Table D42.)

Fruit consumption is low with the sample mode at 1-3 times per week. This is also consistent with the findings of the HEI and DQI-R studies. Only 35.8% of the

respondents have fruit every day or more. Fruit is consumed: never (0.8%); less than once per week (11.6%); 1-3 times per week (31.1%); and 4-6 times per week (20.7%); every day (22.3%); and 2-3 times per day or more (13.5%). (See Appendix D, Table D43.)

Cheese is a popular item with the mode at 1-3 times per week (42.2%) and 83.6% of the respondents eat cheese 1-3 times per week or more. The cheese consumption pattern is: never (4.8%); less than once per week (11.6%); 1-3 times per week (42.2%); and 4-6 times per week (24.3%); every day (15.1%); and 2-3 times per day or more (2.0%). (See Appendix D, Table D44.)

Yogurt or cottage cheese is the least popular dairy product. Similar to the situation with whole grains, the healthiest option within a category is the least consumed food by the sample. The mode for yogurt or cottage cheese is less than once per week (33.5%) and 55.8% of the respondents eat it less than once per week or never. Yogurt or cottage cheese is eaten: never (22.3%); less than once per week (33.5%); 1-3 times per week (24.3%); and 4-6 times per week (12.0%); and every day (8.0%). (See Appendix D, Table D45.)

Ice cream consumption is reported at a moderate level with a mode of less than once per week (55.0%). Ice cream is consumed: never (15.9%); less than once per week (55.0%); 1-3 times per week (24.3%); than 4-6 times per week (4.0%); and every day (0.8%). (See Appendix D, Table D46.)

It appears that the information that margarine is not healthy has been communicated to this sample as reflected by a mode of no margarine consumption (52.2%). While that is a positive occurrence, 15.2% still consume margarine more than

4-6 times per week. Margarine is consumed: never (52.2%); less than once per week (18.7%); 1-3 times per week (13.9%); 4-6 times per week (7.6%); every day (5.6%); and 2-3 times per day (2.0%). (See Appendix D, Table D47.)

As stated earlier, the amount of butter that should be consumed is still controversial in the nutrition circles. To some it is a saturated fat and all saturated fats are bad. To others it is a natural saturated fat and these are required by the body as part of good nutrition. The mode for butter is 1-3 times per week (26.7%). Only a very small percentage eats butter 2-3 times per day or more (1.6%). Other consumption of butter by the respondents is: never (17.5%); less than once per week (25.1%); 1-3 times per week (26.7%); 4-6 times per week (16.7%); every day (12.4%); and 2-3 times per day (1.6%). (See Appendix D, Table D48.)

Consumption of soy based “dairy” products is light with a mode of never (62.5%). These foods tend to be popular with vegetarians and vegans, but not across the whole population. Soy “dairy” consumption is: never (62.5%); less than once per week (17.9%); 1-3 times per week (8.0%); 4-6 times per week (7.2%); every day (3.6%); and 2-3 times per day (0.8%). (See Appendix D, Table D49.)

Red meat (beef, bison, and pork) can be considered a staple in the diet of the sample group. The mode is 1-3 times per week (53.4%) and 21.1% eating red meat at 4-6 times or more per week. Red meat is consumed: never (10.0%); less than once per week (15.5%); 1-3 times per week (53.4%); 4-6 times per week (17.1%); every day (2.0%); and 2-3 times per day (2.0%). (See Appendix D, Table D50.)

Poultry (chicken, turkey, and duck) is also a staple in the diet with a mode of 1-3 times per week (57.8%). Poultry is eaten: never (6.8%); less than once per week (4.8%);

1-3 times per week (57.8%); 4-6 times per week (27.5%); every day (2.4%); and 2-3 times per day (0.8%). (See Appendix D, Table D51.)

Fish or seafood is eaten less than other animal proteins. The mode is 1-3 times per week (51.4%), with another 38.2% eating fish less than once per week or never. Fish is consumed: never (8.8%); less than once per week (29.5%); 1-3 times per week (51.4%); 4-6 times per week (9.2%); every day (0.8%); and 2-3 times per day (0.4%). (See Appendix D, Table D52.)

Pasta, such as lasagna or spaghetti, with meat sauce is typically eaten less than once week (45.4%), yet 41% have it 1-3 times per week or more. Pasta is eaten: never (13.5%); less than once a week (45.4%); 1-3 times per week (39.0%); 4-6 times per week (1.2%); and every day (0.8%). (See Appendix D, Table D53.)

A vegetable or soy based main dish is one of the least popular main meal selections. Vegetable or soy based main dish is consumed: never (25.5%); less than once per week (36.3%); 1-3 times per week (24.7%); 4-6 times per week (7.6%); every day (3.6%); and 2-3 times per day (2.4%). (See Appendix D, Table D54.)

Pizza is reported to be eaten less than once per week in the typical diet. Pizza is eaten: never (7.6%); less than once per week (61.8%); 1-3 times per week (29.9%); 4-6 times per week or more (0.8%). (See Appendix D, Table D55.)

Eggs are another popular main meal source with a mode of 1-3 times per week (49.0%). Eggs are consumed: never (6.4%); less than once per week (28.7%); 1-3 times per week (49.0%); 4-6 times per week (10.4%); and every day (5.6%). (See Appendix D, Table D56.)

Sweet roll, doughnut, pie, cake or cookies are popular items. Only 9.6 % of the respondents report not eating these foods. Sweets are consumed: never (9.6%); less than once per week (32.7%); 1-3 times per week (37.1%); and 4-6 times per week or more (20.7%). (See Appendix D, Table D57.)

Candy or candy bar is another regular part of most people's diets. They are eaten: never (19.1%); less than once per week (36.7%); 1-3 times per week (30.7%); 4-6 times per week or more (13.5%). (See Appendix D, Table D58.)

Of all the "junk" food, salty snacks are the most prevalent being eaten by the sample group. Salty snacks are consumed: never (7.6%); less than once per week (26.7%); 1-3 times per week (39.8%); 4-6 times per week (18.3%); and daily or more (7.6%). (See Appendix D, Table D59.)

Most of the respondents state that their current diet is typical of the past few years (40.2%), while a small percentage is on a relatively new diet (8.8%). Other diet responses are typical of diet over most of adult life (27.9%) and typical of diet for the last 5-7 years (23.1%). These results suggest that for the most part respondents are fairly well set in established dietary habits. (See Appendix D, Table D60.)

Consumption of organic food is very low across all categories. Never is the mode for meat (62.2%), dairy (54.2%), and boxed/canned/frozen foods (51.4%), while sometimes is the mode for fruits and vegetables (41.0%). Fruits and vegetables are the most frequently purchased organic foods (23.9% usually and always buy organic) followed by dairy (19.1%); boxed/canned/frozen foods (15.5%); and meat (12.4%). (See Appendix D, Table D61 for organic fruits and vegetables, Table D62 for organic meat, Table D63 for organic dairy, and Table D64 for organic boxed/canned/frozen foods.)

The scores from the variables contained in this section are added together to create the Nutrition Index. The Nutrition Index ranges from a low score of 44 to a high score of 122; the average score being 75.78 (very unhealthy diet). (See Appendix D, Table D65.) Most respondents were classified with a very unhealthy diet. Less than 10% of the sample had what is considered to be a healthy diet. The foods considered to be the most nutritious – whole grains, vegetables, fruits, fermented dairy, vegetable main meals, fish and seafood that are organic - have the lowest consumption patterns. At the same time the foods believed to be the least healthy – coffee, refined grains, processed foods, non-fermented dairy, meats, and pasta that are not organic have relatively high consumption. These food consumption patterns mirror those of the HEI and DQI-R studies.

Respondents are classified as follows: very healthy diet (0.8%); healthy diet (8.4%); unhealthy diet (31.5%); and very unhealthy diet (59.4%). Given the fact that there are so few healthy diets comparisons between healthy and unhealthy diets will not be statistically valid. However, comparisons can be made between the unhealthy diet and very unhealthy diet segments. (See Appendix D, Table D66.)

Questions regarding current use of supplements show that 57.0% of the respondents currently take vitamins or supplements.

The Lifestyle Index

The Lifestyle Index is created from a series of questions to gauge the physical activity level of the respondent, along with smoking, drinking, and recreational drug use habits. Sedentary lifestyle, smoking, drinking and drug use are contributory risk factors

to erectile dysfunction identified in the literature review. A series of questions explores the overall health of the respondent, identifying diagnosis or prescription medication usage for a variety of diseases.

Four questions look at the overall physical activity of the respondent. These are the amount of time spent at home watching television or using the computer, the amount of time spent sitting during the course of the day, the number of days per week exercising, and the amount of time spent at a typical exercise session. Style of exercise is also recorded.

The typical respondent spends a lot of time sitting during the day. Most respondents spend 1-2 hours per day (43.0%) or 3-4 hours per day (28.3%) watching television or using the computer and are sitting for a total of 6-9 hours per day (42.2%) or 3-5 hours per day (35.5%). (See Appendix D, Tables D68 and D69.)

Further evidence of sedentary lifestyle is seen in the exercise data. Almost 20% of the sample does not exercise and among those that do exercise 75.9% workout for an hour or less. The respondents exercise frequency is: does not exercise (19.1%); 1-2 days per week (27.1%); 3-5 days per week (33.5%); and 6-7 days per week (20.3%). The typical exercise duration is: less than 30 minutes (31.3%); 30-60 minutes (49.4%); 1-2 hours (17.1%); and more than 2 hours (2.4%). (See Appendix D, Tables D70 and D71.) The most popular forms of exercise are: walking (45.0%); weight training (31.1%); treadmill (21.5%); running (21.1%); rides bicycle (19.1%); yoga (16.3%); rides stationary bicycle (13.5%); aerobics (13.5%); swimming (7.6%); martial arts (4.8%); and Pilates (1.6%). (See Appendix D, Tables D72 through D83.)

Overall cigarette, alcohol, and drug usage were low. Of the respondents 85.3% do not smoke cigarettes, 57.8% do not drink, and 83.7% never use recreational drugs.

(See Appendix D, Tables D84 and D86.)

Overall diagnosis and taking medications for specific diseases was relatively low. Erectile dysfunction was the second most diagnosed disease after hypertension. This is consistent with the notion of erectile dysfunction being an early warning signal for other disease, particularly cardiovascular disease. Diagnoses and taking medication by disease is: cardiovascular disease – 9.6% diagnosed, 8.4% taking medications; depression – 12.0% diagnosed, 8.4% taking medications; diabetes – 4.8% diagnosed, 4.0% taking medications; erectile dysfunction – 12.4% diagnosed, 8.8% taking medications; hypertension – 13.5% diagnosed, 10.0% taking medications; impaired renal function – 1.6% diagnosed, 0.8% taking medications; pelvic trauma – no one diagnosed; and prostatic disease – 6.0% diagnosed, 2.4% taking medications. (See Appendix D, Tables D87 through D102.)

The scores from the variables contained in this section are added together to create the Lifestyle Index. The Lifestyle Index ranges from a low score of 5 to a high score of 35; the average score being 21.16 (unhealthy lifestyle). (See Appendix D, Table D103.) Most respondents were classified with an unhealthy lifestyle (61.4%). Just over 27% of the sample had what is considered to be a healthy lifestyle. Respondents are classified as follows: very healthy lifestyle (2.4%); healthy lifestyle (25.1%); unhealthy lifestyle (61.1%); and very unhealthy lifestyle (11.2%). (See Appendix D, Table D104.)

The Erectile Function Index

The Erectile Function Index is composed of seven questions selected from the IIEF. During pre-testing of the survey the full 15 question IIEF was used. The pre-test group commented that several of the questions were too invasive and they did not see the connection to erectile functioning. After receiving this feedback and the review of studies in the literature using a five question version of the IIEF, seven questions most pertinent to erectile functioning were selected for this study. Several questions in the IIEF that pertain to orgasmic function, intercourse satisfaction, and overall satisfaction were removed to arrive at the final survey. Four participants chose not to respond to the erectile function questions. In reviewing the survey responses it appears that in a few cases there was confusion in answering the questions as evidenced by slight inconsistencies in the answers. However, on the whole it appears most respondents did understand the nuances of the questions and answered appropriately.

Responses to the question “How often were you able to get an erection during sexual activity?” are: no sexual activity (5.7%); almost never/never (2.0%); a few times (2.8%); sometimes (4.5%); most times (8.5%); and almost always/always (76.5%). (See Appendix D, Table D105.)

Responses to the question “When you had erections with sexual stimulation, how often were your erections hard enough for penetration?” are: no sexual activity (5.7%); almost never/never (2.0%); a few times (3.2%); sometimes (4.0%); most times (8.9%); and almost always/always (76.1%). (See Appendix D, Table D106.)

Responses to the question “During sexual intercourse, how often were you able to maintain your erection after you had penetrated (entered) your partner?” are: did not

attempt intercourse (8.1%); almost never/never (1.2%); a few times (3.6%); sometimes (5.3%); most times (8.9%); and almost always/always (72.9%). (See Appendix D, Table D107.)

Responses to the question “During sexual intercourse, how difficult was it to maintain your erection to completion of intercourse?” are: did not attempt intercourse (8.5%); extremely difficult (1.2%); very difficult (0.8%); difficult (4.9%); slightly difficult (10.5%); and not difficult (74.1%). (See Appendix D, Table D108.)

Responses to the question “When you attempted sexual intercourse, how often was it satisfactory for you?” are: did not attempt intercourse (8.9%); almost never/never (1.2%); a few times (0.8%); sometimes (7.3%); most times (18.6%); and almost always/always (63.2%). (See Appendix D, Table D109.)

Responses to the question “How would you rate your level of sexual desire?” are: very low/none at all (2.0%); low (6.9%); moderate (33.2%); high (31.2%); and very high (26.7%). (See Appendix D, Table D110.)

Responses to the question “How would you rate your confidence that you could get and keep an erection?” are: very low (4.9%); low (4.9%); moderate (15.8%); high (20.2%); and very high (54.3%). (See Appendix D, Table D111.)

The scores to the above questions in total create the Erectile Function Index. Scores range from a low of 2 to a perfect score of 35. Since most men in the group do not suffer from erectile dysfunction most scores are at the upper end of the scale. The average score on the Erectile Function Index was 29.4, with the mode the perfect score of 35 (18.6%). The high end scores include: 35 (18.6%); 34 (15.8%); and 33 (17.0%). (See Appendix D, Table D112.) Based on the Erectile Function Index the respondents are

classified as: no sexual activity (4.5%); no dysfunction (63.6%); occasional erectile dysfunction (21.9%); and consistent erectile dysfunction (10.1%). (See Appendix D, Table D113.)

One of the limitations of the survey is a respondent taking a prescription medication for erectile dysfunction may not exhibit the characteristics defined by the survey questions, resulting in an artificially high score on the Erectile Function Index. This is the case for six of the respondents who are diagnosed with erectile dysfunction but are not symptomatic due to the use of prescription medications. To address this issue the Erectile Function Index is adjusted for analytical purposes. The six individuals described are placed in the “consistent erectile dysfunction” classification. In addition, a total of eight individuals with no sexual activity who have not been diagnosed with erectile dysfunction can not be measured for erectile dysfunction and are removed from the analysis. This leaves a total population of 239 for classification in the Adjusted Erectile Function Index variable that is used for all analysis relating to erectile dysfunction. With these adjustments the respondents are classified as: no dysfunction (64.4%); occasional erectile dysfunction (22.6%); and consistent erectile dysfunction (13.0%). (See Appendix D, Table D114.)

Findings

As discussed earlier in the *Scope and Limitations* section the number of valid statistical analyses that can be performed on the data are limited by its qualitative nature. In addition, as respondents are segmented into groups for simple two-way cross tabulations, in many cases not enough of the cells contain five results making some Chi-

Square testing invalid. Where it is possible and logical, data is combined and cross tabulated to produce cells with five results so Chi-Square results are valid. The two-way cross tabulations are an effective tool for comparing the proportions of the population created by the two variables. Chi-Square results are presented in the Tables for reference.

Whether erectile dysfunction is considered a disease in its own right or symptoms of another disease (such as vascular disease) is an irrelevant point to this author. The relevant statement is that erectile dysfunction is a dis-ease of the body. As stated earlier, in 80% of the cases of consistent erectile dysfunction, the root cause is physical. That means blood is not flowing, muscle is not being supported by collagen, or nerve cells are not firing correctly. All of these functions are ultimately dependent upon the body receiving the proper nutrients either through the food it receives and/or through additional supplementation with vitamins and herbal products. To make matters worse, in addition to not providing the body with proper nutrients, many men are further depleting their resources through unhealthy lifestyles.

Nutrition and Erectile Dysfunction

Most of the men surveyed believe they are eating a healthy diet (72.1% either agree or strongly agree). But, do they really believe it? There is some doubt given that 85.7% agree or strongly agree that they would like to eat a healthier diet, 62.2% believe they do not eat enough vegetables, and 37.8% state they eat too much dessert. To gain a better understanding of the strengths and weaknesses of the typical diet exhibited by the respondents each component of the Nutrition Index is compared to the “healthy” score for that element.

Eating out is prevalent among the respondents as 95.2% of respondents eat meals out and 60.6% eat at fast food restaurants. Eating out, particularly at fast food restaurants is a source for poor quality foods that are usually cooked in unhealthy oils, laden with fat and salt to provide taste, and generally served in large portions. A healthy score for eating out was 4 which could be obtained by not eating out at all or by eating out 1-3 times per week but not at any fast food restaurants. The average score for the group was 3.44 with 58.2% meeting or exceeding the healthy score. (See Appendix D, Table D115.)

In the beverage category the healthiest drinks are water and blended fruit or vegetable drinks. Respondents scored well in these categories with consumption at 87.6% and 28.7% respectively. The healthiest drink – water – is the most consumed. On the other hand, three of the unhealthiest drinks – coffee, diet soft drinks, and soft drinks – are consumed by 62.5%, 27.9%, and 13.9% of the respondents. A healthy beverage score was a 4 and 64.5% of the sample score at or above that level. This information is contained in previously referenced Appendix D, Tables D20 through D34.

The healthy score for the grains category is 11 and the respondents have an average score of 8.74. (See Appendix D, Table D116.) For the refined flour foods (bread, tortilla, roll, biscuit, muffin, English muffin or bagel) healthy is 1-3 times per week; only 21.5% of the sample meet or exceed this level. For bowl of cooked or cold cereal healthy is 1-3 times per week; 67.3% meet or exceed this level. For serving of white rice or white pasta (refined grains) healthy is 1-3 times per week; 93.2% meet or exceed this level. For serving of brown rice, whole wheat pasta or other whole grains

healthy is 1-3 times per week; 49.4% meet or exceed this level. This information is contained in previously referenced Appendix D, Tables D35 through D38.

The healthy score for the fruits and vegetables category is 15 and the respondents have an average score of 14.32. (See Appendix D, Table D117.) This average is somewhat misleading as respondents did score well versus potato and French fries consumption, but not on the more important fruits and vegetable consumption. For servings of vegetables a healthy score is every day; less than half of the group – 49.0% meet or exceed this level. For salad a healthy score is 1-3 times per week; 82.1% meet or exceed this level. While this score seems positive on the surface, much of the salad consumed is iceberg lettuce which is known for very low nutritional quality and is often topped with lots of dressing to provide taste. A future refinement of this survey tool would be to get more information pertaining to the quality of the salad and the type and quantity of dressing being used. For potato a healthy score is 1-3 times per week; 88.8% meet or exceed this level. For French fries a healthy score is less than once per week; 71.7% meet or exceed this level. For piece of fruit or serving of berries or raisins a healthy score is every day; only 35.9% meet or exceed this level. This information is contained in previously referenced Appendix D, Tables D39 through D43.

The healthy score for the dairy category is 20 and the respondents have an average score of 15.81. (See Appendix D, Table D118.) For cheese a healthy score is 1-3 times per week; 58.6% meet or exceed this level. For yogurt or cottage cheese a healthy score is 1-3 times per week; just 44.2% meet or exceed this level. For ice cream a healthy score is less than once per week; 70.9% meet or exceed this level. For margarine a healthy score is less than once per week; 70.9% meet or exceed this level.

For butter a healthy score is less than once per week to three times per week; 51.8% meet or exceed this level. For soy based “dairy” products a healthy score is less than once per week; 80.5% meet or exceed this level. This information is contained in previously referenced Appendix D, Tables D44 through D49.

The healthy score for the main meal category is 23 and the respondents have an average score of 18.43. (See Appendix D, Table D119.) For red meat a healthy score is less than once per week; only 25.5% meet or exceed this level, indicating greater than recommended meat consumption. For poultry a healthy score is 1-3 times per week; 57.8% meet this level. For fish or seafood a healthy score is 1-3 times per week; 61.8% meet or exceed this level. For pasta with meat sauce a healthy score is 1-3 times per week; 98% meet or exceed this level. For vegetable or soy based main dish a healthy score is 1-3 times per week; only 38.2% meet or exceed this level (another incidence of low vegetable consumption). For pizza a healthy score is less than once per week; 69.3% meet or exceed this level. For eggs a healthy score is 1-3 times per week; 64.9% meet or exceed this level. This information is contained in previously referenced Appendix D, Tables D50 through D56.

The healthy score for the sweets and snacks category is 12 and the respondents have an average score of 7.68. (See Appendix D, Table D120.) For sweet roll, doughnut, pie, cake or cookies a healthy score is less than once per week; only 42.2% meet or exceed this level. For candy or candy bar the healthy score is less than once per week; 55.8% meet or exceed this level. For salty snacks a healthy score is less than once per week; only 34.3% meet or exceed this level. This information is contained in previously referenced Appendix D, Tables D57 through D59.

The healthy score for use of organic products is 10 and the respondents have an average score of 3.75. A healthy score is a blend of usage between sometimes and usually; only 13.9% meet or exceed this level. (See Appendix D, Table D121.)

As previously discussed the healthy score on the Nutrition Index is a 99 and the respondents have an average score of 75.78. Only 9.2% of the respondents have either a healthy diet (8.4%) or a very healthy diet (0.8%). This information is contained in previously referenced Appendix D, Table D65. Therefore, it is difficult to make valid comparisons between the healthy and unhealthy diet groups. However, it is valid to compare the unhealthy and very unhealthy diet groups. Age appears to be independent of diet as the Nutrition Index classification is evenly distributed across age groups. (See Appendix D, Table D122.) The very unhealthy diet group had a much greater proportion of erectile dysfunction than the unhealthy diet group as 28.0% had occasional erectile dysfunction and 15.4% had consistent erectile dysfunction versus 16.2% and 8.1% respectively. (See Appendix D, Table D123.)

The use of vitamin and/or herbal supplements is another component to nutrition. These are often used to obtain additional nutrients or address specific concerns. Among respondents, as diets became less healthy there is less likelihood that these individuals take vitamin or herbal supplements. (See Appendix D, Table D124.) However, there is no association between taking vitamins or herbal supplements and degrees of erectile dysfunction. (See Appendix D, Table D125.)

The majority of the dietary habits of the sample group are unhealthy or very unhealthy. The healthiest foods in each category – organically produced, whole grains, vegetables, fruit, fermented dairy, fish or seafood, healthy fats – are the least consumed

foods. The unhealthiest foods in each category – highly processed and refined products, white flour products, potatoes, cheese, red meat, baked goods, sweets, and salty snacks – are all highly prevalent in the diet of most of the sample. These are exactly the types of foods that are identified as contributing to the dietary risk factors for erectile dysfunction.

The works of Esposito, Kilham, Lamm, and Ornish all suggest that symptoms of erectile dysfunction can be reduced or eliminated through proper diet and/or supplementation with specific vitamins and herbal products. The Esposito study was scientific, while the Kilham, Lamm, and Ornish studies are anecdotal, yet convincing by the fact that they continue in popularity.

Lifestyle and Erectile Dysfunction

To gain a better understanding of the strengths and weaknesses of the typical lifestyle exhibited by the respondents each component of the Lifestyle Index is compared to the “healthy” score for that element.

For watching television or using the computer at home a healthy score is 1-2 hours per day; 55.4% meet or exceed this level. For total time sitting during the day a healthy score is 3-5 hours per day; 45.8% meet or exceed this level. For number of days per week exercising a healthy score is 3-5 days; 53.8% meet or exceed this level. For exercise workout duration a healthy score is more than 30 minutes; 84.7% of those exercising meet or exceed this level, however when the entire group is considered 68.9% meet or exceed this level. For smoking a healthy score is not smoking; 85.3% do not smoke. For alcohol consumption a healthy score is an average of one drink maximum per day; 82.9% meet or exceed this level. For recreational drug usage a healthy score is

no usage; 83.7% meet this level. This information is contained in previously referenced Appendix D, Tables D68 through D86.

As previously discussed the healthy score on the Lifestyle Index is a 25 and the respondents have an average score of 21.16. Only 27.5% of the respondents have either a healthy lifestyle (25.1%) or a very healthy lifestyle (2.4%). This information is contained in previously referenced Appendix D, Table D103. There is a weak association between the Lifestyle Index and erectile dysfunction. There is no erectile dysfunction in the very healthy lifestyle group and there is a little more erectile dysfunction in the very unhealthy lifestyle group, however the healthy lifestyle group and the unhealthy lifestyle group have similar experiences of erectile dysfunction. (See Appendix D, Table D126.)

BMI, Age, Overall Health and Erectile Dysfunction

Poor nutrition and unhealthy lifestyle ultimately translate into being overweight. The BMI is the accepted methodology for classifying the population relative to this factor. The results of this survey are 27.5% of the respondents considered normal, 46.2% overweight, and 26.3% obese or extremely obese. This information is contained in previously referenced Appendix D, Table D5. This is consistent with numbers from other nationwide studies and reports from the government. While BMI showed no relationship to age, consistently higher incidences and severity of erectile dysfunction are evident the greater the BMI. This information is consistent with the scientific studies reviewed earlier. (See Appendix D, Tables D127 and D128.)

There is a very strong association between age and erectile dysfunction. This is discussed in all the literature and evident from the survey data collected. As age

increases both the incidence and severity of erectile dysfunction increase. While sample sizes in the 60-69 and 70-79 year old groups are small, the pattern still holds. In the 30-39 age group 81.0% have no erectile dysfunction; 15.9% have occasional erectile dysfunction; and 3.2% have consistent erectile dysfunction. This is consistent with The National Health and Social Life Survey report of 16% of men under 40 having erectile dysfunction (Laumann et al., 1999, p. 540-541). In the 40-49 age group 71.1% have no erectile dysfunction; 19.7% have occasional erectile dysfunction; and 9.2% have consistent erectile dysfunction. In the 50-59 age group 57.1% have no erectile dysfunction; 25.7% have occasional erectile dysfunction; and 17.1% have consistent erectile dysfunction. In the 60-69 age group 36.4% have no erectile dysfunction; 31.8% have occasional erectile dysfunction; and 31.8% have consistent erectile dysfunction. In the 70-79 age group 12.5% have no erectile dysfunction; 50.0% have occasional erectile dysfunction; and 37.5% have consistent erectile dysfunction. (See Appendix D, Table D129.)

Across the whole sample 64.4% have no erectile dysfunction; 22.6% have occasional erectile dysfunction; and 13.0% have consistent erectile dysfunction. This is slightly below, yet consistent with the MMAS results of 52% of men between the ages of 40 and 70 having erectile dysfunction; 17% considered minimal, 25% considered moderate; and 10% considered complete (Feldman et al., 1994, p. 56). The results from the sample are also consistent with the Kinsey, the Rancho Bernardo Study, and the Health Professionals Follow-Up Study all reported herein.

An indication of overall health is the number of diseases that a respondent is diagnosed. While the survey certainly does not contain a comprehensive list of diseases,

over one-third (36.4%) of the respondents are diagnosed with one or more diseases. (See Appendix D, Table D130.) There is an association between the number of diseases and erectile dysfunction. Using the number of diseases diagnosed as a proxy for overall health, as health declines (the number of diseases increases) so does the incidence and severity of erectile dysfunction. All respondents with three or more diseases diagnosed have erectile dysfunction, while 66.7% of respondents with two diseases diagnosed have erectile dysfunction. (See Appendix D, Table D131.) In addition, there are strong associations between respondents diagnosed with cardiovascular disease and depression having erectile dysfunction. For those not diagnosed with cardiovascular disease 67.1% do not have erectile dysfunction. For those diagnosed with cardiovascular disease 60.8% have erectile dysfunction. For those not diagnosed with depression 67.0% do not have erectile dysfunction. For those diagnosed with depression 55.5% have erectile dysfunction. (See Appendix D, Tables D132 and D133.)

Summary

The majority of erectile dysfunction is due to physical causes, primarily degeneration of the vascular system. The literature strongly advocates that diet and lifestyle are key contributors to this type of physical degeneration. The survey supports this position showing strong association between diet and erectile dysfunction and weaker association between lifestyle and erectile dysfunction. The literature shows that as men age the incidence and severity of erectile dysfunction increases. The survey data supports this position. The literature supports the position that overall health is more significant than age with respect to incidence of erectile dysfunction. Healthy older men

have less risk than unhealthy younger men. The survey data also supports this position. The literature supports that symptoms of erectile dysfunction can be reduced through dietary (nutritional) and lifestyle changes. The survey indicates that current dietary and lifestyle habits of most men are very unhealthy. These patterns account for the rising rate of erectile dysfunction. It is a logical conclusion that changing to healthier dietary and lifestyle patterns can help improve erectile functioning.

CHAPTER 5: CONCLUSIONS, IMPLICATIONS AND RECOMMENDATIONS FOR FURTHER RESEARCH

Conclusions and Implications

Erectile dysfunction is a major concern for the male population. Incidence of erectile dysfunction increases as men age; and men are living longer than any other time in history. Both men and women desire to continue satisfactory sexual relations as they age. The evidence presented herein suggests that current nutritional habits enable the realized increase in erectile dysfunction and at the same time disable the ability to achieve the desire for satisfactory sexual relations. In order to fulfill this desire specific action must be taken to change the end result of a lifetime of poor dietary and sedentary lifestyle habits. The studies in the scientific literature and the suggestions in the lay literature strongly suggest that improving the diet will result in improved erectile functioning.

One of the conclusions of this study is that while men believe they are eating healthy, the plain fact is they are not. However, they do recognize the importance of diet and its connection to their current and future health; and this is significant. While the studies recognize age as key determinant of erectile dysfunction, it is not a “true” risk factor as it is not a modifiable behavior. The most significant risk factor is then overall health which is modifiable through diet and lifestyle changes.

Of particular interest is how the inherent bias in the survey relates to connecting the significance of diet and future health. The survey did not collect the demographics to support this position, but the believed bias is towards a sample group with higher income and/or education levels than the average or typical male between 30 and 80 years old. This is presumed from the e-mail lists used to solicit respondents. Given that, it can be assumed that the respondents have been exposed to the main stream messages concerning healthy diets and believe they are eating healthy based on the available information. This illustrates the need to provide correct information and education regarding healthy food choices. The performance of this group indicates that it is likely they will act upon this new information and modify risk behaviors.

The Nutrition Index, Lifestyle Index, and BMI scores of the respondents profile a high risk group for future erectile dysfunction. It is reported that men with BMI scores greater than 28.7 have a 30% greater risk for erectile dysfunction (Bacon et al., 2003, p. 161). The survey data and the literature identify the transition from the 40-49 year old group to the 50-59 year old group and then to the 60-69 year old group with both incidence and severity of erectile dysfunction increase significantly along the way. As the unhealthy eating and lifestyle habits continue over time so does vascular degeneration. The sample group exhibits significant risk factors for future cases of the metabolic syndrome, diabetes, cardiovascular disease, and of course, erectile dysfunction. This too calls out for education to explain to men the physical degeneration that is happening and the likely results unless their behaviors are modified.

The fact that erectile dysfunction often appears first on the scene should be used to educate men to potential future health issues. The Rancho Bernardo Study is a prime

example of erectile dysfunction as a warning signal for cardiovascular disease. Today's popular solution is to take some Viagra and everything is "fixed." Unfortunately nothing is farther from the truth. The body is very wise. The erectile dysfunction is an early warning system. It is the body telling the man that he is not healthy enough to reproduce; he is not healthy enough to be a father. Like all living species we are programmed to survive and reproduce. The first mission is survival. If the body senses survival at risk, it will not reproduce. Once again there is an urgent need to educate men regarding this built in early warning signal for cardiovascular disease. The body is telling the man that it is time to change the pattern of lifetime of poor nutrition and lifestyle choices. It is time to allow the body to repair itself and provide it the proper nutrients.

The Nutrition Index exhibits a stronger association with erectile dysfunction than the Lifestyle Index, but they are both important factors as expressed in the literature. The formula is quite simple. The diet of most respondents is unhealthy or very unhealthy. It is loaded with sugar and bad fats. The lifestyle of most respondents is unhealthy. It is full of stress and contains limited physical or mental activity to reduce this stress. The diet (sugar and fat) and the lifestyle (stress) produce inflammation and irritation throughout the vascular and nervous systems. This inflammation and irritation create degeneration; and the degeneration creates the symptoms and the diseases. Once again, education needs to be provided for men to receive correct information so they can make informed decisions and better understand the consequences of their behaviors.

Recommendations for Further Research

It is recommended that further research be conducted on this topic. The first recommendation would be to conduct the survey with a national random sample to obtain representative responses for all age groups. This would ensure that statistically valid conclusions could be drawn across all age groups and that more advanced statistical methods could be employed. It would also provide the opportunity to revise the survey to clarify questions that seemed to generate confusion, add questions that would provide additional insight, and delete questions that did not provide meaningful information.

The second recommendation is to conduct an intervention to determine the effects of dietary changes and nutritional supplementation on experiences of erectile dysfunction. The subjects recruited for this phase would be males between the ages of 30 and 70 that exhibit symptoms of erectile dysfunction and are willing to participate in the intervention. This would be quantitative field research with the change in erectile dysfunction measured through comparisons of before and after scores on the Erectile Function Index based on the IIEF.

Intervention Proposal

The criteria for inclusion in the intervention will be subjects that are categorized with erectile dysfunction and are willing to change their diet and nutritional supplementation patterns to participate in the study. Screening questions are contained in the original survey instrument utilized in the study. (See Appendix A.) Erectile dysfunction is identified in responses to questions 30 or 32 through 38. Question 30 asks whether the respondent has been diagnosed with erectile dysfunction. Questions 32

through 38 determine the Erectile Function Index score for the respondent. Participants will be excluded through the use of these screening questions. Responses to questions 28 through 31 in the survey will be used for exclusionary purposes. Respondents that have been diagnosed by a medical professional with cardiovascular disease, depression, diabetes, hypertension, impaired renal function, pelvic trauma, or prostatic disease (question 30); respondents listing prescription medications for psychological illnesses (questions 30 and 31); and respondents exhibiting alcohol or drug abuse (questions 28 and 29) will be excluded from the intervention. These conditions of exclusion are selected to be consistent with exclusionary factors used by Esposito, Giugliano, et al. (2006, p. 371).

Should this work be performed as a post-Doctoral study, participants will sign a written consent form approved by the Clayton College of Natural Health Institutional Review Board (IRB). Any personal information recorded will be limited to that which is essential to the research. Names and records of subjects will be maintained in computer data files only accessible to the principal investigator through password protection. Data will be coded such that once subjects have been selected from the original population all links and personal information contained in the original population will be deleted. No personally identifiable data will be disclosed to anyone other than the research team without the written consent of the subjects or their legal representatives. Exceptions may be made in case of emergency need for intervention. Due to the nature of this study it is unlikely that emergency need for intervention will occur.

Informed Consent Process

The recruitment procedure will ensure voluntary participation. Potential subjects will be recruited through the nutritional consulting practice of the Principal Investigator. The research will be introduced to the potential subject through direct conversation with the Principal Investigator. Once the research has been introduced the following will occur:

1. Confirm that the potential subject is still interested in participating.
2. Confirm that the potential subject meets selection criteria.
3. The potential subject will receive a document containing information to ensure his understanding of the research. This document will include the purpose of the study, risks, benefits, confidentiality, investigator's telephone number to call for questions, and the informed consent document.
4. Review above document with each potential subject.

Intervention Analysis Plan

In the intervention participants between the ages of 30 and 70 will be selected to determine the effects of dietary changes and specific nutritional supplementation on their experiences of erectile dysfunction. This will be quantitative field research with the change in erectile dysfunction measured through comparisons of before and after scores on the IIEF. A success rate of improved erectile function will be determined.

Participants will be requested to follow dietary and supplement suggestions for a period of ninety days and then complete the IIEF survey questions at the end of the ninety

day period. This score will be compared to the score on the IIEF received during the screening process to measure change.

The diet that would be utilized during the intervention is slightly stricter than the “healthy diet” (Nutrition Index score of 99) previously discussed herein and scores a 126 on the Nutrition Index. Following are guidelines to help subjects plan meals. During each week the subject will have fourteen main meals (lunch and dinner), seven breakfast meals, and snacks. For main meals, subjects may have organic grass fed beef or bison 1-2 times per week, organic chicken or turkey 1-2 times per week, wild salmon, mackerel, or other cold water oily fish 3-4 times per week, soy protein meal 2-3 times per week, whole grain and vegetable meal 3-4 times per week, whole grain pasta and vegetable meal 1-2 times per week, vegetable based pasta and vegetable meal 1-2 times per week, and whole grain and vegetable soup meal 1-2 times per week. These guidelines create 13-21 meals per week. For breakfast, subjects may have organic cage free eggs 1-2 times per week, hot whole grain cereal (such as oats) 3-4 times per week, cold whole grain organic cereal 4-6 times per week. Cereals can be topped with organic whole milk yogurt (1/4 to 1/3 cup) and nuts or seeds (1/8 cup). For snacks, subjects should have fruit 2-3 times per day.

To provide subjects with additional guidance here are more examples of foods to be included and excluded from the diet.

Grains: The participant may have the following whole grains 1-2 times per day: brown rice, quinoa, barley, millet, whole oats, and buckwheat. The following grains should be limited to a combined total of 2-3 servings per week: whole wheat bread, whole wheat pasta, whole wheat pita bread, whole wheat bagels, whole wheat muffins,

buckwheat noodles, instant oatmeal, corn, and corn tortillas. Not to be eaten: white bread, white rice, white flour pasta, white flour tortillas, white flour bagels, white flour muffins, and white flour noodles.

Vegetables: The participant may have unlimited vegetables except for avocado and olives (1-2 servings per week).

Legumes: The participant may have unlimited legumes, except for soy products. Soy products (such as tofu, “veggie” burgers, and tempeh) should only be used if they have less than 3 g of fat per serving and limited to 2-3 servings per week.

Nuts and Seeds: The participant may have nuts and seeds, but should consume them in limited portions (no more than one handful per serving, 1-2 servings per day). Pumpkin seeds, sunflower seeds, almonds and walnuts should be included.

Fruits: The participant may have unlimited fruit. Fruit is best eaten alone, so it is recommended for snacks.

Dairy: Only organic whole milk yogurt and limited butter or ghee (preferred) should be consumed. If the participant uses any other dairy, it should be derived from soy and used per the above soy product guidelines in the “Legumes” section. No margarine should be consumed.

Eggs: The participant may have eggs, but limited to 1-2 times per week.

Oils: The participant should not use any oils, except virgin coconut and cold pressed extra virgin olive oil.

Foods to Avoid: All varieties of animal milk, cheese, sour cream, and ice cream (except organic whole milk yogurt and butter or ghee). No mayonnaise and salad dressings (except for Braggs brand salad dressings are allowed). No refined and/or sugar

coated cereals, use whole grain and organic varieties instead. Coffee, decaffeinated coffee, black teas, soft drinks, particularly colas should be avoided. Drink water, green tea, decaffeinated tea, herbal tea, and freshly made fruit and vegetable drinks. No salty snacks – potato chips, pretzels, popcorn, corn chips, etc. No foods containing hydrogenated or partially hydrogenated oils should be used, that includes margarine. Additional examples of oils to avoid include corn oil, peanut oil, sunflower oil, safflower oil, vegetable oil, palm oil, soy oil, and cottonseed oil. The participant is encouraged to read ingredient lists for all packaged foods very closely, particularly crackers for the oils previously mentioned plus hydrogenated and partially hydrogenated oils.

The supplements to be used are among those discussed in the literature reviewed and background sections of this document. The supplements are selected to provide support for specific biological activities that are part of the erection process. The amount of the supplement to be consumed each day was based on what has been shown to be both safe and effective in other studies cited in this document. There is minimal risk associated with these supplements. The supplements will be introduced in a phased approach to monitor participant reaction. The following supplements and amounts will be taken on a daily basis: L-arginine (5 g per day); Omega 3's (600 mg EPA and 400 mg DHA per day); Grape seed extract - 92% proanthocyanidins (200 mg per day); and OPC – Oligomeric proanthocyanidins (100 mg per day).

L-arginine is a semi-essential amino acid that is a precursor to nitric oxide (NO). Nitric oxide supports proper relaxation and vasodilation of penile arteries allowing for blood to engorge the penis and bring upon an erection. Omega 3's are essential fatty acids to support the cardiovascular system by lowering LDL levels and support the brain

and nervous system by providing the nutrients required for healthy cells. Grape seed extract and OPC (from European Maritime pine bark) are both sources of antioxidants. These particular antioxidants were selected for their effectiveness with the cardiovascular system in preventing plaque development and for increasing HDL levels.

During the first week the participants will take the L-arginine and the Omega 3's. During the second week they will continue to take L-arginine and the Omega 3's and add the antioxidant supplements (grape seed extract and OPC). For the duration of the study they will take the complete supplement protocol.

Assumptions

No special populations will be utilized in this study. All men meeting the selection criteria between the ages of 30 and 70 can participate in the study regardless of ethnicity or sexual preference. The study will take place within the subject's home and personal environment.

An intervention was selected to test the hypothesis that satisfactory erectile function can be restored through positive dietary changes and nutritional supplementation. This hypothesis could only be tested through the use of human beings. The suggested diet and supplements selected for the intervention are designed to promote vascular health. Support for this type of intervention can be found in Esposito, Giugliano, et al. (2006). They state, "As ED and atherosclerosis may share some pathways, it seems reasonable to assume that dietary factors, which are so important in reducing the burden of CHD disease, may also play a role in reducing the occurrence of

ED” (p. 370). The suggested diet and supplements are based upon the diet used in the Esposito, Giugliano, et al. study and other “heart healthy” diets discussed herein.

The intervention diet used is stricter than the “healthy diet” and is closer to the optimum health diet. Given that the intention of the intervention is to heal the body, it is imperative to follow a more optimum diet.

The intervention diet received a score of 126 on the Nutrition Index. It is constructed as follows (points in parenthesis): 1-3 meals out during the week, but no fast food (4), beverages are no coffee or soft drinks of any kind, focusing on water and fruit and vegetable blended drinks (5); whole grains are emphasized, bread 1-3 times per week (3), cereal 1-3 times per week (3), no white rice or pasta (5), and whole grains 4-6 times per week (4); fruits and vegetables are emphasized, vegetables 2-4 times per day (5), salad 1-3 times per week (2), potato less than once per week (4), French fries never (5), and fruit 2-3 times per day (5); non-fermented dairy products are discouraged, cheese never (5), yogurt 4-6 times per week (4), ice cream never (5), margarine never (5), butter 4-6 times per week (3), and soy dairy products less than once per week (2); meat consumption should be limited, red meat less than once per week (4), poultry 1-3 times per week (4), fish 4-6 times per week (4), pasta with meat sauce never (5), vegetable main dish 4-6 times per week (4), pizza never (5), and eggs 1-3 times per week (3); all sweets and snacks are never (15); and using organics consistently (12).

The supplements to be used are among those discussed in the literature reviewed and background sections of this document. The supplements were selected to provide support for specific biological activities that are part of the erection process. The amount of the supplement to be consumed each day was based on what has been shown to be

both safe and effective in other studies cited in this document. There is minimal risk associated with these supplements. The supplements will be introduced in a phased approach to monitor participant reaction.

Benefits to Participants

All participants in the study will receive the benefit of nutritional consulting from the investigator throughout the process. Nutritional consulting will occur prior to the study to educate the participant regarding the study protocol, during the study should the participant have additional questions, and post study to review and discuss the participants' experiences during the study. The potential benefit to the subject is regaining his sexual potency and realizing the additional benefits of a heart healthy diet. This will provide physical and psychological benefits to the subject. He will be more physically healthy and again be able to enjoy a full sexual relationship with his spouse or significant other.

Risks to Participants

The risks associated with this research are minimal. The subjects currently suffer from erectile dysfunction and its associated physical and psychological issues. Should the subjects receive symptom relief, there may be definite physical and psychological benefits to regaining the ability to have normal sexual relations. Should the subjects not experience improvement in their conditions, their physical and psychological issues may remain status quo. There is limited potential for psychological harm from not experiencing the benefits they had hoped for from their participation in the study. There

is limited potential for a short term detoxification reaction to the new foods and supplements.

The study will require two changes to the subject's current behavior. The first change will be dietary, as the subject will consume a heart and vascular healthy diet. Similar diets have been used in previous studies, such as those conducted by Ornish and McDougall, and documented safe and effective in reducing cardiovascular disease. Whether or not the subjects obtain improved erectile function, they are likely to obtain improved health from the diet. The second change will be the use of specific nutritional supplements. The nutritional supplements used in this study have been documented safe and effective in previous independent studies as cited in the background section.

Given the nature of this study it is unlikely that harm will be done to the subjects. Subjects will be instructed to immediately contact the principal investigator and their primary care physician or provider should they feel their health is at risk. If the principal investigator is not readily available, subjects will be instructed to cease their participation until contacting the principal investigator. Should particular foods be disagreeable to the subject, there is a wide variety of foods available on a heart healthy diet, so the subject should be able to switch foods and maintain the diet. Should a particular nutritional supplement be disagreeable to the subject, there are several natural alternatives available. Should a participant develop chest pain while taking L-arginine, that person should stop taking the supplement, inform his primary care physician of the chest pain and that he is taking L-arginine. There is limited risk that L-arginine can potentate the effects of organic nitrates if taken concomitantly. Therefore, any severity, duration, or likelihood of harm to a subject should be limited, if at all.

The risks and inconveniences associated with this study are minimal and reasonable in relation to the anticipated benefits to the subject. The risks of particular foods or supplements not agreeing with the subject or the inconvenience of the change in diet is minimal to the potential benefit of regaining their sexual potency and the knowledge of the intimate relationship between their nutritional level and their sexual performance.

Scope and Limitations

During the intervention motivation and cooperation of the selected individuals may be an issue as their adherence to their diet will not be enforceable or observable. The completion of the IIEF, the primary tool being utilized for measuring effectiveness of the protocol, is based on self-reporting and honesty in the responses.

The intervention is investigating the mixed variable impact of diet and supplementation. To best measure and validate results the following groups are required: a control group; a group changing only their diet; a group taking only the supplements; and the group changing diet and taking supplements. Additional studies could also isolate specific supplements for evaluation.

The intervention is only addressing dietary and supplementation factors. No lifestyle modifications are required for participation in the study. These factors, such as use of tobacco products, alcohol, recreational drugs, and exercise are risk factors for erectile dysfunction. These factors should be explored in subsequent studies along with diet and nutritional factors.

In summary, there are several potential problems with the proposed study. The first concern is that subjects appropriately disclose medical diagnoses and prescription medications that will exclude them from the intervention. A second concern is the motivation and cooperation of the subjects to follow the dietary guidelines and supplement recommendations throughout the sixty day period. A third concern is that of psychological distress related to the erectile dysfunction. A fourth concern is that a sufficient number of subjects present themselves for the study. At that point alternative recruitment methods will have to be employed to complete the research.

Summary

This is the first study to approach the issue of erectile dysfunction as a preventable occurrence and explore the relationship of nutrition to erectile dysfunction. The use of a survey to develop indices to measure nutrition, lifestyle, and erectile functioning is also a new approach. This study incorporates the scientific work of many others who have established the association between specific risk factors and erectile dysfunction. This study shows the association between poor nutrition and those specific risk factors that are related to erectile dysfunction. It also shows evidence that erectile dysfunction can be reduced through behavior modification related to the specific risk factors. Thus, it rejects the two null hypotheses: 1) There is no relationship between the nutritional quality of a man's diet and his experience of erectile dysfunction; and 2) There is no relationship between eating a healthy diet supported by nutritional supplements and restoring erectile function in men previously suffering from erectile dysfunction. And, it accepts the two research hypotheses: 1) Men with poor nutrition are more likely to suffer

from erectile dysfunction than men with good nutrition across all age groups; and 2) Satisfactory erectile function can be restored through positive dietary changes and nutritional supplementation.

This study is important for men of all ages as it provides information to encourage a healthy diet and lifestyle to prevent erectile dysfunction and to improve erectile functioning for those suffering from erectile dysfunction. It helps them to understand what the body needs for successful completion of the erection process and encourages behavior modifications at the present time to prevent future occurrences.

With the completion of this study: 1) men are better educated regarding risk factors for erectile dysfunction and behavior modifications to reduce those risk factors; 2) men are informed how to improve erectile function for increased physical and mental health; and 3) men understand how health care costs associated with erectile dysfunction can be reduced.

APPENDIX

APPENDIX A: SURVEY INSTRUMENT

The following survey is research for my dissertation to complete the requirements for a Doctor of Philosophy in Holistic Nutrition from Clayton College. It will take approximately 10 minutes to complete. The topic of my dissertation is Nutrition and Erectile Dysfunction. The study is researching how these may be related. The survey asks questions regarding diet, nutrition, lifestyle and erectile function. It is personal in nature. For that reason, you can be assured that all responses will be kept private, confidential and anonymous. I will keep all facts about you private. However, persons other than those doing the study may look at study records. Those with the right to look at the study records include the Clayton College IRB. Records can also be opened by court order. I will keep all records private to the extent allowed by law. I do request if you are willing to participate that all your responses are truthful. Thank you for your time. Please note the INSTRUCTIONS in each section.

Basic Information:

1. What is your height? ____ Feet ____ inches
2. What is your weight? _____
3. What is your age? _____
4. What is your ethnicity?
 - African or African-American
 - Asian, Asian American or Pacific Islander
 - Caucasian
 - Latino or Hispanic
 - Native American
 - Other
5. What state do you live in? _____

Diet and Nutrition Questions:

INSTRUCTIONS: In answering the following questions use the **past six months** as your reference or time frame.

6. How many meals do you eat out at restaurants during a typical week? (Please include carry outs.)
 - None
 - 1-3
 - 4-6
 - 7-10
 - More than 10

7. Of the meals you eat out during a typical week, how many are at fast food restaurants? (Fast food restaurants include any establishment where you order your food at a counter or drive through window and the food is delivered to you at the counter or the window, such as McDonald's, Subway, Panera Bread, Kentucky Fried Chicken, Taco Bell.)

- None
- 1-3
- 4-6
- 7-10
- More than 10

8. How much do you agree or disagree with the following statements?

	Strongly disagree	Disagree	Agree	Strongly agree
a. I eat a healthy diet.				
b. I would like to eat a healthier diet.				
c. My diet directly impacts my current state of health.				
d. My diet directly impacts my future state of health.				

9. I believe I eat (too much, the right amount, not enough) of:

	Too much	The right amount	Not enough
a. Meat			
b. Vegetables			
c. Grains			
d. Dairy (milk, cheese, ice cream)			
e. Desserts			

10. Which of the following beverages do you drink on most days or every day?

- regular coffee
- decaffeinated coffee
- regular black tea
- regular green tea
- regular herbal tea
- any type of decaffeinated tea
- regular soft drink
- diet soft drink
- water
- whole milk
- 2% milk
- 1% or skim milk
- soy milk
- fruit or vegetable blended drinks

11. Are you a vegetarian or vegan?

- Yes – vegetarian
- Yes – vegan
- No

17. My answers to the above questions regarding food consumption are:

- A new diet for me.
- Typical of my diet over the past few years.
- Typical of my diet over the last 5-7 years.
- Typical of my diet over most of my adult life.

18. Please mark the appropriate response for how often you will buy these foods organic.

	Never	Sometimes	Usually	Always
a. Fruits and Vegetables				
b. Meat				
c. Dairy				
d. Boxed/Canned/Frozen Foods				

19. Do you take vitamin or herbal supplements?

- Yes
- No. Please go to Question 22.

20. Please list the supplements you take on a regular basis.

21. Please list the brands of supplements you use most often.

Lifestyle Questions:

INSTRUCTIONS: In answering the following questions use the **past six months** as your reference or time frame.

22. At home, I watch television or use the computer (this includes live programs, recorded programs, DVDs, games) an average of:

- Less than 1 hour per day
- 1-2 hours per day
- 3-4 hours per day
- More than 4 hours per day

23. I exercise:

- I do not exercise (Please go to Question 26.)
- 1-2 days per week
- 3-5 days per week
- 6-7 days per week

24. If you do exercise, please indicate in which forms of exercise you participate.

- Aerobics
- Bicycle riding
- Martial arts
- Stationary bicycle
- Pilates
- Running

- Swimming
- Treadmill
- Walking
- Weight training
- Yoga
- Other

25. On days that I exercise my workout is usually:

- Less than 30 minutes
- 30 – 60 minutes
- 1-2 hours
- More than 2 hours

26. During a typical day at home and at work the **total** time I will be sitting (at my desk, in a meeting, in a chair, on a couch) is:

- Less than 1 hour
- 1-2 hours
- 3-5 hours
- 6-9 hours
- More than 10

27. Do you smoke cigarettes or use other tobacco products?

- Yes
- No

28. For the purposes of the following question a drink is considered to be a 12-ounce beer, a four ounce glass of wine, or a shot of hard liquor. On an average day I have:

- No drinks
- 1 drink
- 2 drinks
- More than 2 drinks

29. I use recreational or illegal drugs:

- Never
- Rarely
- Occasionally
- Frequently

30. For the following conditions, please indicate if you have been diagnosed with and/or are currently taking prescription medications for that condition.

Condition	Diagnosed with	Currently taking medications
a. Cardiovascular disease		
b. Depression		
c. Diabetes		
d. Erectile dysfunction		

e. Hypertension		
f. Impaired renal function		
g. Pelvic trauma		
h. Prostatic disease		

31. Please list all prescription and non-prescription medications that you currently take on a regular basis.

Erectile Function Questions (International Index of Erectile Function):

INSTRUCTIONS: Please mark the appropriate response option to indicate how you were feeling over the **past four (4) weeks**.

32. How often were you able to get an erection during sexual activity?

- No sexual activity
- Almost never/never
- A few times (much less than half the time)
- Sometimes (about half the time)
- Most times (much more than half the time)
- Almost always/always

33. When you had erections with sexual stimulation, how often were your erections hard enough for penetration?

- No sexual activity
- Almost never/never
- A few times (much less than half the time)
- Sometimes (about half the time)
- Most times (much more than half the time)
- Almost always/always

34. During sexual intercourse, how often were you able to maintain your erection after you had penetrated (entered) your partner?

- Did not attempt intercourse
- Almost never/never
- A few times (much less than half the time)
- Sometimes (about half the time)
- Most times (much more than half the time)
- Almost always/always

35. During sexual intercourse, how difficult was it to maintain your erection to completion of intercourse?

- Did not attempt intercourse
- Extremely difficult
- Very difficult
- Difficult
- Slightly difficult
- Not difficult

36. When you attempted sexual intercourse, how often was it satisfactory for you?

- Did not attempt intercourse
- Almost never/never
- A few times (much less than half the time)
- Sometimes (about half the time)
- Most times (much more than half the time)
- Almost always/always

37. How would you rate your level of sexual desire?

- Very low/none at all
- Low
- Moderate
- High
- Very high

38. How do you rate your confidence that you could get and keep an erection?

- Very low
- Low
- Moderate
- High
- Very high

I will be conducting a follow up study to observe the impact of nutritional changes on erectile dysfunction. The study will involve eating specific foods and taking specific supplements that I will recommend based upon my research. The study will begin next February. Participants will be asked to follow the recommended diet and supplementation guidelines for a period of sixty (60) days. If you would like to learn more about participating in the follow up study please provide your first name and e-mail address or phone number in the box below or send a separate e-mail to me at bernie@brwellnes.com. Please be assured that all correspondence will be kept private, confidential and anonymous. I will keep all facts about you private. However, persons other than those doing the study may look at study records. Those with the right to look at the study records include the Clayton College IRB. Records can also be opened by court order. I will keep all records private to the extent allowed by law. I will use your initials rather than your name on study records where I can. Your name and other facts that might point to you will not appear when I present this study or publish its results. For your safety and protection, the study will have the approval of the Clayton College of Natural Health Institutional Review Board for the Protection of Human Subjects.

Thank you again for participating in the survey.

APPENDIX B: SURVEY INSTRUMENT WITH SCORING

The following survey is research for my dissertation to complete the requirements for a Doctor of Philosophy in Holistic Nutrition from Clayton College. It will take approximately 10 minutes to complete. The topic of my dissertation is Nutrition and Erectile Dysfunction. The study is researching how these may be related. The survey asks questions regarding diet, nutrition, lifestyle and erectile function. It is personal in nature. For that reason, you can be assured that all responses will be kept private, confidential and anonymous. I will keep all facts about you private. However, persons other than those doing the study may look at study records. Those with the right to look at the study records include the Clayton College IRB. Records can also be opened by court order. I will keep all records private to the extent allowed by law. I do request if you are willing to participate that all your responses are truthful. Thank you for your time. Please note the INSTRUCTIONS in each section.

Basic Information:

1. What is your height? ____ Feet ____ inches (*convert to inches*)
2. What is your weight? _____ (*Questions 1 and 2 used to determine BMI.*)
3. What is your age? _____
4. What is your ethnicity?
 - African or African-American
 - Asian, Asian American or Pacific Islander
 - Caucasian
 - Latino or Hispanic
 - Native American
 - Other
5. What state do you live in? _____

Diet and Nutrition Questions:

INSTRUCTIONS: In answering the following questions use the **past six months** as your reference or time frame.

6. How many meals do you eat out at restaurants during a typical week? (Please include carry outs.)

	<i>(Questions 6 and 7 are combined for max score of 5.)</i>	
<input type="radio"/> None	5	<i>Healthy = 4</i>
<input type="radio"/> 1-3	4	
<input type="radio"/> 4-6	2	
<input type="radio"/> 7-10	1	
<input type="radio"/> More than 10	0	

7. Of the meals you eat out during a typical week, how many are at fast food restaurants? (Fast food restaurants include any establishment where you order your food at a counter or drive through window and the food is delivered to you at the counter or the window, such as McDonald's, Subway, Panera Bread, Kentucky Fried Chicken, Taco Bell.)

- None 1
- 1-3 0
- 4-6 0
- 7-10 0
- More than 10 0

8. How much do you agree or disagree with the following statements?

	Strongly disagree	Disagree	Agree	Strongly agree
a. I eat a healthy diet.	1	2	3	4
b. I would like to eat a healthier diet.	1	2	3	4
c. My diet directly impacts my current state of health.	1	2	3	4
d. My diet directly impacts my future state of health.	1	2	3	4

9. I believe I eat (too much, the right amount, not enough) of:

	Too much	The right amount	Not enough
a. Meat	3	2	1
b. Vegetables	3	2	1
c. Grains	3	2	1
d. Dairy (milk, cheese, ice cream)	3	2	1
e. Desserts	3	2	1

10. Which of the following beverages do you drink on most days or every day?

- regular coffee (1) *Max score = 5*
- decaffeinated coffee 0 *Healthy = 4*
- regular black tea 1
- regular green tea 1 *If respondent has score of 5, 1 point deducted for regular coffee, regular soft drink, and/or diet soft drink.*
- regular herbal tea 1
- decaffeinated tea 1
- regular soft drink (1) *Respondent can not have 5 score if drinking these beverages.*
- diet soft drink (1)
- water 5
- whole milk 0
- 2% milk 0 *Each item is two variables:*
- 1% or skim milk 0 *Variable 1 = Y/N*
- soy milk 0 *Variable 2 = score*
- fruit or vegetable blended drinks 3

11. Are you a vegetarian?

- Yes – vegetarian 5
- Yes – vegan 2
- No 0

The following questions explore your average or typical food consumption. Please indicate how often you eat the following foods using the **past six months** as your time frame:

12. GRAINS	Never	<1x/ wk	1-3 x/wk	4-6 x/wk	Every day	2-3 x/day	4-5 x/day	>6x/ day
a. Bread, tortilla, roll, biscuit, muffin, English muffin or bagel	5	4	3	2	0	0	-	-
b. Bowl of cooked or cold cereal	0	1	3	4	5	3	-	-
c. Serving of white rice or white pasta	5	4	2	1	0	0	-	-
d. Serving of brown rice, whole wheat pasta, or other whole grains (such as quinoa, buckwheat, amaranth, millet, barley)	0	1	3	4	5	4	1	-

Max score for grains is 20, Healthy = 11

13. FRUITS AND VEGETABLES	Never	<1x/ wk	1-3 x/wk	4-6 x/wk	Every day	2-3 x/day	4-5 x/day	>6x/ day
a. Serving of vegetables	0	1	2	3	4	5	5	5
b. Salad (such as house salad, Caesar salad, or other leafy green salad)	0	1	2	3	5	5	-	-
c. Potato	5	4	2	1	0	0	-	-
d. French fries	5	3	1	0	0	0	-	-
e. Piece of fruit or serving of berries or raisins	0	1	2	3	4	5	5	-

Max score for fruits and vegetables is 25, Healthy = 15

14. DAIRY	Never	<1x/ wk	1-3 x/wk	4-6 x/wk	Every day	2-3 x/day	4-5 x/day	>6x/ day
a. Cheese (hard cheese, cream cheese)	5	4	3	2	1	0	0	-
b. Yogurt or cottage cheese	0	1	3	4	5	4	-	-
c. Ice cream	5	4	2	0	0	0	-	-
d. Margarine	5	4	1	0	0	0	0	-
e. Butter	3	4	4	3	3	0	0	-
f. Soy based "dairy" products	0	2	3	2	2	0	-	-

Max score for dairy is 27, Healthy = 20

15. MAIN MEAL	Never	<1x/ wk	1-3 x/wk	4-6 x/wk	Every day	2-3 x/day	4-5 x/day	>6x/ day
a. Red meat (beef, bison, pork)	5	4	2	1	0	0	-	-
b. Poultry (chicken, turkey, duck)	2	3	4	2	1	1	-	-
c. Fish or seafood	1	1	3	4	5	1	-	-
d. Pasta (such as lasagna or spaghetti) with meat sauce	5	4	2	1	0	0	-	-
e. Vegetable or soy based main dish	0	1	3	4	5	5	-	-
f. Pizza	5	4	1	0	0	0	-	-
g. Eggs	0	1	3	4	4	0	-	-

Max score for main meal is 33, Healthy = 23

16. SWEETS AND SNACKS	Never	<1x/ wk	1-3 x/wk	4-6 x/wk	Every day	2-3 x/day	4-5 x/day	>6x/ day
a. Sweet roll, doughnut, pie, cake or cookies	5	4	2	0	0	0	0	0
b. Candy or candy bar	5	4	1	0	0	0	0	0
c. Salty snacks (chips, pretzels, crackers)	5	4	2	1	0	0	0	0

Max score for sweets and snacks is 15, Healthy = 12

17. My answers to the above questions regarding food consumption are:

- A new diet for me. 4 (*for categorization*)
- Typical of my diet over the past few years. 3
- Typical of my diet over the last 5-7 years. 2
- Typical of my diet over most of my adult life. 1

18. Please mark the appropriate response for how often you will buy these foods organic.

	Never	Sometimes	Usually	Always
a. Fruits and Vegetables	0	1	3	5
b. Meat	0	1	3	5
c. Dairy	0	1	3	5
d. Boxed/Canned/Frozen Foods	0	1	3	5

Max score for organic is 20, Healthy = 10

19. Do you take vitamin or herbal supplements?

- Yes 2
- No. Please go to Question 22. 0

20. Please list the supplements you take on a regular basis. (*Record number of vitamins and herbal supplements used.*)

21. Please list the brands of supplements you use most often. (*Record type of vitamin used – synthetic, whole foods, or combination.*)

Lifestyle Questions:

INSTRUCTIONS: In answering the following questions use the **past six months** as your reference or time frame. (*Max score on each lifestyle question is 5.*)

22. At home, I watch television or use the computer (this includes live programs, recorded programs, DVDs, games) an average of:

- Less than 1 hour per day 5
- 1-2 hours per day 3
- 3-4 hours per day 1
- More than 4 hours per day 0

23. I exercise:

- I do not exercise (Please go to Question 26.) 0
- 1-2 days per week 1
- 3-5 days per week 3
- 6-7 days per week 5

24. If you do exercise, please indicate in which forms of exercise you participate.

- Aerobics
- Bicycle riding
- Martial arts
- Stationary bicycle

- Pilates
- Running
- Swimming
- Treadmill
- Walking
- Weight training
- Yoga
- Other

25. On days that I exercise my workout is usually:

- Less than 30 minutes 0
- 30 – 60 minutes 3
- 1-2 hours 4
- More than 2 hours 5

26. During a typical day at home and at work the **total** time I will be sitting (at my desk, in a meeting, in a chair, on a couch) is:

- Less than 1 hour 5
- 1-2 hours 4
- 3-5 hours 3
- 6-9 hours 1
- More than 10 0

27. Do you smoke cigarettes or use other tobacco products?

- Yes 0
- No 5

28. For the purposes of the following question a drink is considered to be a 12-ounce beer, a four ounce glass of wine, or a shot of hard liquor. On an average day I have:

- No drinks 5
- 1 drink 3
- 2 drinks 1
- More than 2 drinks 0

29. I use recreational or illegal drugs:

- Never 5
- Rarely 2
- Occasionally 1
- Frequently 0

30. For the following conditions, please indicate if you have been diagnosed with and/or are currently taking prescription medications for that condition.

Condition	Diagnosed with	Currently taking medications
a. Cardiovascular disease	Y=1,N=0	Y=1,N=0
b. Depression	Y=1,N=0	Y=1,N=0

c. Diabetes	Y=1,N=0	Y=1,N=0
d. Erectile dysfunction	Y=1,N=0	Y=1,N=0
e. Hypertension	Y=1,N=0	Y=1,N=0
f. Impaired renal function	Y=1,N=0	Y=1,N=0
g. Pelvic trauma	Y=1,N=0	Y=1,N=0
h. Prostatic disease	Y=1,N=0	Y=1,N=0

31. Please list all the prescription medications and non-prescription medications that you currently take on a regular basis.

Erectile Function Questions (International Index of Erectile Function):

INSTRUCTIONS: Please mark the appropriate response option to indicate how you were feeling over the **past four (4) weeks**.

32. How often were you able to get an erection during sexual activity?

- No sexual activity 0
- Almost never/never 1
- A few times (much less than half the time) 2
- Sometimes (about half the time) 3
- Most times (much more than half the time) 4
- Almost always/always 5

33. When you had erections with sexual stimulation, how often were your erections hard enough for penetration?

- No sexual activity 0
- Almost never/never 1
- A few times (much less than half the time) 2
- Sometimes (about half the time) 3
- Most times (much more than half the time) 4
- Almost always/always 5

34. During sexual intercourse, how often were you able to maintain your erection after you had penetrated (entered) your partner?

- Did not attempt intercourse 0
- Almost never/never 1
- A few times (much less than half the time) 2
- Sometimes (about half the time) 3
- Most times (much more than half the time) 4
- Almost always/always 5

35. During sexual intercourse, how difficult was it to maintain your erection to completion of intercourse?

- Did not attempt intercourse 0
- Extremely difficult 1
- Very difficult 2
- Difficult 3

- Slightly difficult 4
- Not difficult 5

36. When you attempted sexual intercourse, how often was it satisfactory for you?

- Did not attempt intercourse 0
- Almost never/never 1
- A few times (much less than half the time) 2
- Sometimes (about half the time) 3
- Most times (much more than half the time) 4
- Almost always/always 5

37. How would you rate your level of sexual desire?

- Very low/none at all 1
- Low 2
- Moderate 3
- High 4
- Very high 5

38. How do you rate your confidence that you could get and keep an erection?

- Very low 1
- Low 2
- Moderate 3
- High 4
- Very high 5

I will be conducting a follow up study to observe the impact of nutritional changes on erectile dysfunction. The study will involve eating specific foods and taking specific supplements that I will recommend based upon my research. The study will begin next February. Participants will be asked to follow the recommended diet and supplementation guidelines for a period of sixty (60) days. If you would like to learn more about participating in the follow up study please provide your first name and e-mail address or phone number in the box below or send a separate e-mail to me at bernie@brwellness.com. Please be assured that all correspondence will be kept private, confidential and anonymous. I will keep all facts about you private. However, persons other than those doing the study may look at study records. Those with the right to look at the study records include the Clayton College IRB. Records can also be opened by court order. I will keep all records private to the extent allowed by law. I will use your initials rather than your name on study records where I can. Your name and other facts that might point to you will not appear when I present this study or publish its results. For your safety and protection, the study will have the approval of the Clayton College of Natural Health Institutional Review Board for the Protection of Human Subjects.

Thank you again for participating in the survey.

APPENDIX C: NUTRITION INDEX DIET SCORES

Question(s)	Maximum Score	Healthy Diet Score	Intervention Diet Score	Ornish Diet Score	Diabetes Food Pyramid Score
6 and 7	5	4	4	5	3
10	5	4	5	5	3
12a	5	3	3	3	3
12b	5	3	4	3	3
12c	5	2	5	5	2
12d	5	3	4	5	3
13a	5	4	5	5	5
13b	5	2	2	5	5
13c	5	2	4	2	0
13d	5	3	5	5	5
13e	5	4	5	5	5
14a	5	3	5	5	2
14b	5	3	4	0	2
14c	5	4	5	5	2
14d	5	4	5	5	2
14e	4	4	3	3	4
14f	3	2	2	3	3
15a	5	4	4	5	2
15b	4	4	4	2	4
15c	5	3	4	1	3
15d	5	2	5	5	2
15e	5	3	4	5	3
15f	5	4	5	5	1
15g	4	3	3	0	2
16a	5	4	5	5	2
16b	5	4	5	5	1
16c	5	4	5	5	2
18	20	10	12	0	0
Total	150	99	126	107	74

APPENDIX D: FREQUENCY AND CROSSTABULATION TABLES

Table D1

Ethnicity of Respondent

Ethnicity	Frequency	Percent	Valid Percent	Cumulative Percent
African or African American	3	1.2	1.2	1.2
Asian, Asian American or Pacific Islander	2	.8	.8	2.0
Caucasian	230	91.6	91.6	93.6
Latino or Hispanic	10	4.0	4.0	97.6
Other	6	2.4	2.4	100.0
Total	251	100.0	100.0	

Table D2

State of Residence of Respondent

State of residence	Frequency	Percent	Valid Percent	Cumulative Percent
No response	4	1.6	1.6	1.6
AZ	2	.8	.8	2.4
CA	17	6.8	6.8	9.2
CO	3	1.2	1.2	10.4
CT	3	1.2	1.2	11.6
DC	1	.4	.4	12.0
DN	1	.4	.4	12.4
FL	13	5.2	5.2	17.5
GA	2	.8	.8	18.3
HI	3	1.2	1.2	19.5
IA	1	.4	.4	19.9
IL	16	6.4	6.4	26.3
IN	1	.4	.4	26.7
MA	5	2.0	2.0	28.7
MD	3	1.2	1.2	29.9
MI	7	2.8	2.8	32.7
MN	3	1.2	1.2	33.9
NC	7	2.8	2.8	36.7
NJ	3	1.2	1.2	37.8
NV	1	.4	.4	38.2
NY	10	4.0	4.0	42.2
OH	2	.8	.8	43.0
OR	1	.4	.4	43.4
PA	4	1.6	1.6	45.0
RI	1	.4	.4	45.4
SC	3	1.2	1.2	46.6
TX	4	1.6	1.6	48.2
UK	2	.8	.8	49.0
VT	2	.8	.8	49.8
WA	2	.8	.8	50.6
WI	124	49.4	49.4	100.0
Total	251	100.0	100.0	

Table D3

Height in Inches of Respondent

Height (inches)	Frequency	Percent	Valid Percent	Cumulative Percent
60	1	.4	.4	.4
61	1	.4	.4	.8
62	1	.4	.4	1.2
64	1	.4	.4	1.6
65	5	2.0	2.0	3.6
66	9	3.6	3.6	7.2
67	16	6.4	6.4	13.5
68	22	8.8	8.8	22.3
69	34	13.5	13.5	35.9
70	44	17.5	17.5	53.4
71	34	13.5	13.5	66.9
72	35	13.9	13.9	80.9
73	14	5.6	5.6	86.5
74	18	7.2	7.2	93.6
75	9	3.6	3.6	97.2
76	2	.8	.8	98.0
77	1	.4	.4	98.4
78	3	1.2	1.2	99.6
80	1	.4	.4	100.0
Total	251	100.0	100.0	

Mean = 70.4

Table D4

Weight in Pounds of Respondent

Weight (pounds)	Frequency	Percent	Valid Percent	Cumulative Percent
105	1	.4	.4	.4
124	1	.4	.4	.8
125	1	.4	.4	1.2
126	1	.4	.4	1.6
130	1	.4	.4	2.0
135	2	.8	.8	2.8
137	1	.4	.4	3.2
140	3	1.2	1.2	4.4
142	1	.4	.4	4.8
145	5	2.0	2.0	6.8
148	1	.4	.4	7.2
150	5	2.0	2.0	9.2
151	1	.4	.4	9.6
152	3	1.2	1.2	10.8
153	1	.4	.4	11.2
154	1	.4	.4	11.6
155	6	2.4	2.4	13.9
156	1	.4	.4	14.3
157	1	.4	.4	14.7
158	1	.4	.4	15.1
160	9	3.6	3.6	18.7
161	3	1.2	1.2	19.9
162	2	.8	.8	20.7
164	1	.4	.4	21.1
165	5	2.0	2.0	23.1
167	2	.8	.8	23.9
169	1	.4	.4	24.3
170	9	3.6	3.6	27.9
172	4	1.6	1.6	29.5
173	2	.8	.8	30.3
174	1	.4	.4	30.7
175	16	6.4	6.4	37.1

(table continues)

Weight (pounds)	Frequency	Percent	Valid Percent	Cumulative Percent
176	1	.4	.4	37.5
178	1	.4	.4	37.8
180	18	7.2	7.2	45.0
181	1	.4	.4	45.4
182	2	.8	.8	46.2
183	3	1.2	1.2	47.4
185	15	6.0	6.0	53.4
186	1	.4	.4	53.8
188	3	1.2	1.2	55.0
189	2	.8	.8	55.8
190	14	5.6	5.6	61.4
191	1	.4	.4	61.8
192	1	.4	.4	62.2
195	9	3.6	3.6	65.7
200	9	3.6	3.6	69.3
201	1	.4	.4	69.7
205	9	3.6	3.6	73.3
210	6	2.4	2.4	75.7
212	1	.4	.4	76.1
215	5	2.0	2.0	78.1
218	1	.4	.4	78.5
220	13	5.2	5.2	83.7
225	2	.8	.8	84.5
230	4	1.6	1.6	86.1
232	1	.4	.4	86.5
233	1	.4	.4	86.9
235	3	1.2	1.2	88.0
240	2	.8	.8	88.8
241	1	.4	.4	89.2
245	4	1.6	1.6	90.8
248	1	.4	.4	91.2
250	2	.8	.8	92.0
254	1	.4	.4	92.4
255	1	.4	.4	92.8
260	2	.8	.8	93.6

(table continues)

Weight (pounds)	Frequency	Percent	Valid Percent	Cumulative Percent
264	1	.4	.4	94.0
270	3	1.2	1.2	95.2
275	3	1.2	1.2	96.4
280	1	.4	.4	96.8
285	1	.4	.4	97.2
290	1	.4	.4	97.6
295	1	.4	.4	98.0
305	1	.4	.4	98.4
325	1	.4	.4	98.8
350	2	.8	.8	99.6
470	1	.4	.4	100.0
Total	251	100.0	100.0	

Mean = 193.3

Table D5

BMI Classification of Respondent

BMI Classification	Frequency	Percent	Valid Percent	Cumulative Percent
Normal	69	27.5	27.5	27.5
Overweight	116	46.2	46.2	73.7
Obese	59	23.5	23.5	97.2
Extreme Obesity	7	2.8	2.8	100.0
Total	251	100.0	100.0	

Table D6

Age of Respondent

Age	Frequency	Percent	Valid Percent	Cumulative Percent
30	3	1.2	1.2	1.2
31	6	2.4	2.4	3.6
32	6	2.4	2.4	6.0
33	4	1.6	1.6	7.6
34	5	2.0	2.0	9.6
35	7	2.8	2.8	12.4
36	8	3.2	3.2	15.5
37	7	2.8	2.8	18.3
38	11	4.4	4.4	22.7
39	8	3.2	3.2	25.9
40	8	3.2	3.2	29.1
41	9	3.6	3.6	32.7
42	13	5.2	5.2	37.8
43	8	3.2	3.2	41.0
44	5	2.0	2.0	43.0
45	9	3.6	3.6	46.6
46	6	2.4	2.4	49.0
47	10	4.0	4.0	53.0
48	9	3.6	3.6	56.6
49	4	1.6	1.6	58.2
50	8	3.2	3.2	61.4
51	6	2.4	2.4	63.7
52	9	3.6	3.6	67.3
53	10	4.0	4.0	71.3
54	6	2.4	2.4	73.7
55	2	.8	.8	74.5
56	9	3.6	3.6	78.1
57	10	4.0	4.0	82.1
58	6	2.4	2.4	84.5
59	6	2.4	2.4	86.9
60	2	.8	.8	87.6
61	5	2.0	2.0	89.6
62	3	1.2	1.2	90.8

(table continues)

Age	Frequency	Percent	Valid Percent	Cumulative Percent
63	3	1.2	1.2	92.0
64	2	.8	.8	92.8
65	1	.4	.4	93.2
66	1	.4	.4	93.6
67	5	2.0	2.0	95.6
69	3	1.2	1.2	96.8
71	2	.8	.8	97.6
72	1	.4	.4	98.0
73	1	.4	.4	98.4
74	1	.4	.4	98.8
75	1	.4	.4	99.2
77	1	.4	.4	99.6
78	1	.4	.4	100.0
Total	251	100.0	100.0	

Mean = 47.7

Table D7

Age Group

Age Group	Frequency	Percent	Valid Percent	Cumulative Percent
30-39	65	25.9	25.9	25.9
40-49	81	32.3	32.3	58.2
50-59	72	28.7	28.7	86.9
60-69	25	10.0	10.0	96.8
70-79	8	3.2	3.2	100.0
Total	251	100.0	100.0	

Table D8

Agreement with "I eat a healthy diet"

Eat a healthy diet	Frequency	Percent	Valid Percent	Cumulative Percent
Strongly Agree	42	16.7	16.7	16.7
Agree	139	55.4	55.4	72.1
Disagree	56	22.3	22.3	94.4
Strongly disagree	14	5.6	5.6	100.0
Total	251	100.0	100.0	

Table D9

Agreement with "I would like to eat a healthier diet"

Would like to eat healthier	Frequency	Percent	Valid Percent	Cumulative Percent
Strongly Agree	62	24.7	24.7	24.7
Agree	153	61.0	61.0	85.7
Disagree	30	12.0	12.0	97.6
Strongly disagree	6	2.4	2.4	100.0
Total	251	100.0	100.0	

Table D10

Agreement with "My diet directly impacts my current state of health"

Diet impacts current health	Frequency	Percent	Valid Percent	Cumulative Percent
Strongly Agree	106	42.2	42.2	42.2
Agree	119	47.4	47.4	89.6
Disagree	18	7.2	7.2	96.8
Strongly disagree	8	3.2	3.2	100.0
Total	251	100.0	100.0	

Table D11

Agreement with “My diet directly impacts my future state of health”

Diet impacts future health	Frequency	Percent	Valid Percent	Cumulative Percent
Strongly Agree	133	53.0	53.0	53.0
Agree	105	41.8	41.8	94.8
Disagree	6	2.4	2.4	97.2
Strongly disagree	7	2.8	2.8	100.0
Total	251	100.0	100.0	

Table D12

Respondent Perception of Amount of Meat Consumed

Amount of meat consumed	Frequency	Percent	Valid Percent	Cumulative Percent
Not enough	10	4.0	4.0	4.0
The right amount	208	82.9	82.9	86.9
Too much	33	13.1	13.1	100.0
Total	251	100.0	100.0	

Table D13

Respondent Perception of Amount of Vegetables Consumed

Amount of vegetables consumed	Frequency	Percent	Valid Percent	Cumulative Percent
Not enough	156	62.2	62.2	62.2
The right amount	95	37.8	37.8	100.0
Total	251	100.0	100.0	

Table D14

Respondent Perception of Amount of Grains Consumed

Amount of grains consumed	Frequency	Percent	Valid Percent	Cumulative Percent
Not enough	57	22.7	22.7	22.7
The right amount	156	62.2	62.2	84.9
Too much	38	15.1	15.1	100.0
Total	251	100.0	100.0	

Table D15

Respondent Perception of Amount of Dairy Consumed

Amount of dairy consumed	Frequency	Percent	Valid Percent	Cumulative Percent
Not enough	24	9.6	9.6	9.6
The right amount	183	72.9	72.9	82.5
Too much	44	17.5	17.5	100.0
Total	251	100.0	100.0	

Table D16

Respondent Perception of Amount of Desserts Consumed

Amount of desserts consumed	Frequency	Percent	Valid Percent	Cumulative Percent
Not enough	13	5.2	5.2	5.2
The right amount	143	57.0	57.0	62.2
Too much	95	37.8	37.8	100.0
Total	251	100.0	100.0	

Table D17

Diet Type of Respondent

Diet type	Frequency	Percent	Valid Percent	Cumulative Percent
Not vegetarian	234	93.2	93.2	93.2
Vegan	6	2.4	2.4	95.6
Vegetarian	11	4.4	4.4	100.0
Total	251	100.0	100.0	

Table D18

Average Weekly Meals Eaten Out of the Home

Number of meals eat out	Frequency	Percent	Valid Percent	Cumulative Percent
More than 10 meals out	8	3.2	3.2	3.2
7-10 meals out	26	10.4	10.4	13.5
4-6 meals out	71	28.3	28.3	41.8
1-3 meals out	134	53.4	53.4	95.2
No meals out	12	4.8	4.8	100.0
Total	251	100.0	100.0	

Table D19

Respondent Eats Meals at Fast Food Restaurants

Eat fast food meals out	Frequency	Percent	Valid Percent	Cumulative Percent
Yes	152	60.6	60.6	60.6
No	99	39.4	39.4	100.0
Total	251	100.0	100.0	

Table D20

Respondent Drinks Regular Coffee

Drinks regular coffee	Frequency	Percent	Valid Percent	Cumulative Percent
Yes	157	62.5	62.5	62.5
No	94	37.5	37.5	100.0
Total	251	100.0	100.0	

Table D21

Respondent Drinks Decaffeinated Coffee

Drinks decaf coffee	Frequency	Percent	Valid Percent	Cumulative Percent
Yes	21	8.4	8.4	8.4
No	230	91.6	91.6	100.0
Total	251	100.0	100.0	

Table D22

Respondent Drinks Regular Black Tea

Drinks black tea	Frequency	Percent	Valid Percent	Cumulative Percent
Yes	21	8.4	8.4	8.4
No	230	91.6	91.6	100.0
Total	251	100.0	100.0	

Table D23

Respondent Drinks Regular Green Tea

Drinks green tea	Frequency	Percent	Valid Percent	Cumulative Percent
Yes	27	10.8	10.8	10.8
No	224	89.2	89.2	100.0
Total	251	100.0	100.0	

Table D24

Respondent Drinks Regular Herbal Tea

Drinks herbal tea	Frequency	Percent	Valid Percent	Cumulative Percent
Yes	27	10.8	10.8	10.8
No	224	89.2	89.2	100.0
Total	251	100.0	100.0	

Table D25

Respondent Drinks Decaffeinated Tea

Drinks decaf tea	Frequency	Percent	Valid Percent	Cumulative Percent
Yes	8	3.2	3.2	3.2
No	243	96.8	96.8	100.0
Total	251	100.0	100.0	

Table D26

Respondent Drinks Regular Soft Drinks

Drinks regular soft drinks	Frequency	Percent	Valid Percent	Cumulative Percent
Yes	35	13.9	13.9	13.9
No	216	86.1	86.1	100.0
Total	251	100.0	100.0	

Table D27

Respondent Drinks Diet Soft Drinks

Drinks diet soft drinks	Frequency	Percent	Valid Percent	Cumulative Percent
Yes	70	27.9	27.9	27.9
No	181	72.1	72.1	100.0
Total	251	100.0	100.0	

Table D28

Respondent Drinks Water

Drinks water	Frequency	Percent	Valid Percent	Cumulative Percent
Yes	220	87.6	87.6	87.6
No	31	12.4	12.4	100.0
Total	251	100.0	100.0	

Table D29

Respondent Drinks Whole Milk

Drinks whole milk	Frequency	Percent	Valid Percent	Cumulative Percent
Yes	11	4.4	4.4	4.4
No	240	95.6	95.6	100.0
Total	251	100.0	100.0	

Table D30

Respondent Drinks 2% Milk

Drinks 2% milk	Frequency	Percent	Valid Percent	Cumulative Percent
Yes	36	14.3	14.3	14.3
No	215	85.7	85.7	100.0
Total	251	100.0	100.0	

Table D31

Respondent Drinks 1% or Skim Milk

Drinks 1% or skim milk	Frequency	Percent	Valid Percent	Cumulative Percent
Yes	73	29.1	29.1	29.1
No	178	70.9	70.9	100.0
Total	251	100.0	100.0	

Table D32

Respondent Drinks Soy Milk

Drinks soy milk	Frequency	Percent	Valid Percent	Cumulative Percent
Yes	25	10.0	10.0	10.0
No	226	90.0	90.0	100.0
Total	251	100.0	100.0	

Table D33

Respondent Drinks Blended Fruit and Vegetable Drinks

Drinks blended fruit/vegetable	Frequency	Percent	Valid Percent	Cumulative Percent
Yes	72	28.7	28.7	28.7
No	179	71.3	71.3	100.0
Total	251	100.0	100.0	

Table D34

Beverage Score Component of Nutrition Index

Beverage score	Frequency	Percent	Valid Percent	Cumulative Percent
5	65	25.9	25.9	25.9
4	97	38.6	38.6	64.5
3	63	25.1	25.1	89.6
2	4	1.6	1.6	91.2
1	2	.8	.8	92.0
0	20	8.0	8.0	100.0
Total	251	100.0	100.0	

Table D35

Refined Grain Consumption Component of Nutrition Index

Bread, tortilla, roll, biscuit, muffin, English muffin, bagel	Frequency	Percent	Valid Percent	Cumulative Percent
<1/wk	17	6.8	6.8	6.8
1-3x/wk	37	14.7	14.7	21.5
4-6x/wk	60	23.9	23.9	45.4
Every day	96	38.2	38.2	83.7
2-3x/day	34	13.5	13.5	97.2
4-5x/day	7	2.8	2.8	100.0
Total	251	100.0	100.0	

Table D36

Bowl of Cooked or Cold Cereal Consumption Component of Nutrition Index

Bowl of cooked or cold cereal	Frequency	Percent	Valid Percent	Cumulative Percent
Never	33	13.1	13.1	13.1
<1/wk	49	19.5	19.5	32.7
1-3x/wk	72	28.7	28.7	61.4
4-6x/wk	51	20.3	20.3	81.7
Every day	46	18.3	18.3	100.0
Total	251	100.0	100.0	

Table D37

White Rice or White Pasta Consumption Component of Nutrition Index

White rice or white pasta	Frequency	Percent	Valid Percent	Cumulative Percent
Never	20	8.0	8.0	8.0
<1/wk	75	29.9	29.9	37.8
1-3x/wk	139	55.4	55.4	93.2
4-6x/wk	9	3.6	3.6	96.8
Every day or more	8	3.2	3.2	100.0
Total	251	100.0	100.0	

Table D38

Whole Grain Consumption Component of Nutrition Index

Whole grains	Frequency	Percent	Valid Percent	Cumulative Percent
Never	35	13.9	13.9	13.9
< 1/wk	92	36.7	36.7	50.6
1-3x/wk	82	32.7	32.7	83.3
4-6x/wk	29	11.6	11.6	94.8
Every day	10	4.0	4.0	98.8
2-3x/day	2	.8	.8	99.6
4-5x/day	1	.4	.4	100.0
Total	251	100.0	100.0	

Table D39

Vegetable Consumption Component of Nutrition Index

Vegetables	Frequency	Percent	Valid Percent	Cumulative Percent
<1/wk	10	4.0	4.0	4.0
1-3x/wk	44	17.5	17.5	21.5
4-6x/wk	74	29.5	29.5	51.0
Every day	73	29.1	29.1	80.1
2-3x/day or more	50	19.9	19.9	100.0
Total	251	100.0	100.0	

Table D40

Salad Consumption Component of Nutrition Index

Salad	Frequency	Percent	Valid Percent	Cumulative Percent
Never	6	2.4	2.4	2.4
<1/wk	39	15.5	15.5	17.9
1-3x/wk	104	41.4	41.4	59.4
4-6x/wk	69	27.5	27.5	86.9
Every day or more	33	13.1	13.1	100.0
Total	251	100.0	100.0	

Table D41

Potato Consumption Component of Nutrition Index

Potato	Frequency	Percent	Valid Percent	Cumulative Percent
Never	16	6.4	6.4	6.4
<1/wk	77	30.7	30.7	37.1
1-3x/wk	130	51.8	51.8	88.8
4-6x/wk	24	9.6	9.6	98.4
Every day or more	4	1.6	1.6	100.0
Total	251	100.0	100.0	

Table D42

French Fries Consumption Component of Nutrition Index

French Fries	Frequency	Percent	Valid Percent	Cumulative Percent
Never	49	19.5	19.5	19.5
<1/wk	131	52.2	52.2	71.7
1-3x/wk	64	25.5	25.5	97.2
4-6x/wk	7	2.8	2.8	100.0
Total	251	100.0	100.0	

Table D43

Fruit Consumption Component of Nutrition Index

Fruit	Frequency	Percent	Valid Percent	Cumulative Percent
Never	2	.8	.8	.8
<1/wk	29	11.6	11.6	12.4
1-3x/wk	78	31.1	31.1	43.4
4-6x/wk	52	20.7	20.7	64.1
Every day	56	22.3	22.3	86.5
2-3x/day or more	34	13.5	13.5	100.0
Total	251	100.0	100.0	

Table D44

Cheese Consumption Component of Nutrition Index

Cheese	Frequency	Percent	Valid Percent	Cumulative Percent
Never	12	4.8	4.8	4.8
<1/wk	29	11.6	11.6	16.3
1-3x/wk	106	42.2	42.2	58.6
4-6x/wk	61	24.3	24.3	82.9
4-6x/wk	38	15.1	15.1	98.0
2-3x/day or more	5	2.0	2.0	100.0
Total	251	100.0	100.0	

Table D45

Yogurt or Cottage Cheese Consumption Component of Nutrition Index

Yogurt or cottage cheese	Frequency	Percent	Valid Percent	Cumulative Percent
Valid Never	56	22.3	22.3	22.3
<1/wk	84	33.5	33.5	55.8
1-3x/wk	61	24.3	24.3	80.1
4-6x/wk	30	12.0	12.0	92.0
Every day	20	8.0	8.0	100.0
Total	251	100.0	100.0	

Table D46

Ice Cream Consumption Component of Nutrition Index

Ice cream	Frequency	Percent	Valid Percent	Cumulative Percent
Never	40	15.9	15.9	15.9
<1/wk	138	55.0	55.0	70.9
1-3x/wk	61	24.3	24.3	95.2
4-6x/wk	10	4.0	4.0	99.2
Every day	2	.8	.8	100.0
Total	251	100.0	100.0	

Table D47

Margarine Consumption Component of Nutrition Index

Margarine	Frequency	Percent	Valid Percent	Cumulative Percent
Never	131	52.2	52.2	52.2
<1/wk	47	18.7	18.7	70.9
1-3x/wk	35	13.9	13.9	84.9
4-6x/wk	19	7.6	7.6	92.4
Every day	14	5.6	5.6	98.0
2-3x/day	5	2.0	2.0	100.0
Total	251	100.0	100.0	

Table D48

Butter Consumption Component of Nutrition Index

Butter	Frequency	Percent	Valid Percent	Cumulative Percent
Never	44	17.5	17.5	17.5
<1/wk	63	25.1	25.1	42.6
1-3x/wk	67	26.7	26.7	69.3
4-6x/wk	42	16.7	16.7	86.1
Every day	31	12.4	12.4	98.4
2-3x/day	4	1.6	1.6	100.0
Total	251	100.0	100.0	

Table D49

Soy "Dairy" Consumption Component of Nutrition Index

Soy "dairy" products	Frequency	Percent	Valid Percent	Cumulative Percent
Never	157	62.5	62.5	62.5
<1/wk	45	17.9	17.9	80.5
1-3x/wk	20	8.0	8.0	88.4
4-6x/wk	18	7.2	7.2	95.6
Every day	9	3.6	3.6	99.2
2-3x/day	2	.8	.8	100.0
Total	251	100.0	100.0	

Table D50

Red Meat Consumption Component of Nutrition Index

Red meat (beef, bison, pork)	Frequency	Percent	Valid Percent	Cumulative Percent
Never	25	10.0	10.0	10.0
<1/wk	39	15.5	15.5	25.5
1-3x/wk	134	53.4	53.4	78.9
4-6x/wk	43	17.1	17.1	96.0
Every day	5	2.0	2.0	98.0
2-3x/day	5	2.0	2.0	100.0
Total	251	100.0	100.0	

Table D51

Poultry Consumption Component of Nutrition Index

Poultry (chicken, turkey, duck)	Frequency	Percent	Valid Percent	Cumulative Percent
Never	17	6.8	6.8	6.8
<1/wk	12	4.8	4.8	11.6
1-3x/wk	145	57.8	57.8	69.3
4-6x/wk	69	27.5	27.5	96.8
Every day	6	2.4	2.4	99.2
2-3x/day	2	.8	.8	100.0
Total	251	100.0	100.0	

Table D52

Fish or Seafood Consumption Component of Nutrition Index

Fish or seafood	Frequency	Percent	Valid Percent	Cumulative Percent
Never	22	8.8	8.8	8.8
<1/wk	74	29.5	29.5	38.2
1-3x/wk	129	51.4	51.4	89.6
4-6x/wk	23	9.2	9.2	98.8
Every day	2	.8	.8	99.6
2-3x/day	1	.4	.4	100.0
Total	251	100.0	100.0	

Table D53

Pasta with Meat Sauce Consumption Component of Nutrition Index

Pasta with meat sauce	Frequency	Percent	Valid Percent	Cumulative Percent
Never	34	13.5	13.5	13.5
<1/wk	114	45.4	45.4	59.0
1-3x/wk	98	39.0	39.0	98.0
4-6/wk or more	3	1.2	1.2	99.2
Every day or more	2	.8	.8	100.0
Total	251	100.0	100.0	

Table D54

Vegetable or Soy Main Dish Consumption Component of Nutrition Index

Vegetable or soy main dish	Frequency	Percent	Valid Percent	Cumulative Percent
Never	64	25.5	25.5	25.5
<1/wk	91	36.3	36.3	61.8
1-3x/wk	62	24.7	24.7	86.5
4-6x/wk	19	7.6	7.6	94.0
Every day	9	3.6	3.6	97.6
2-3x/day	6	2.4	2.4	100.0
Total	251	100.0	100.0	

Table D55

Pizza Consumption Component of Nutrition Index

Pizza	Frequency	Percent	Valid Percent	Cumulative Percent
Never	19	7.6	7.6	7.6
<1/wk	155	61.8	61.8	69.3
1-3x/wk	75	29.9	29.9	99.2
4-6/wk or more	2	.8	.8	100.0
Total	251	100.0	100.0	

Table D56

Egg Consumption Component of Nutrition Index

Eggs	Frequency	Percent	Valid Percent	Cumulative Percent
Never	16	6.4	6.4	6.4
<1/wk	72	28.7	28.7	35.1
1-3x/wk	123	49.0	49.0	84.1
4-6x/wk	26	10.4	10.4	94.4
Every day	14	5.6	5.6	100.0
Total	251	100.0	100.0	

Table D57

Baked Sweets Consumption Component of Nutrition Index

Sweet roll, doughnut, pie, cake or cookies	Frequency	Percent	Valid Percent	Cumulative Percent
Never	24	9.6	9.6	9.6
<1/wk	82	32.7	32.7	42.2
1-3x/wk	93	37.1	37.1	79.3
4-6/wk or more	52	20.7	20.7	100.0
Total	251	100.0	100.0	

Table D58

Candy Consumption Component of Nutrition Index

Candy or candy bar	Frequency	Percent	Valid Percent	Cumulative Percent
Never	48	19.1	19.1	19.1
<1/wk	92	36.7	36.7	55.8
1-3x/wk	77	30.7	30.7	86.5
4-6/wk or more	34	13.5	13.5	100.0
Total	251	100.0	100.0	

Table D59

Salty Snack Consumption Component of Nutrition Index

Salty snacks	Frequency	Percent	Valid Percent	Cumulative Percent
Never	19	7.6	7.6	7.6
<1/wk	67	26.7	26.7	34.3
1-3x/wk	100	39.8	39.8	74.1
4-6x/wk	46	18.3	18.3	92.4
Every day or more	19	7.6	7.6	100.0
Total	251	100.0	100.0	

Table D60

Food consumption pattern

Food consumption pattern	Frequency	Percent	Valid Percent	Cumulative Percent
Typical of diet over most of adult life	70	27.9	27.9	27.9
Typical of diet over last 5-7 years	58	23.1	23.1	51.0
Typical of diet over the past few years	101	40.2	40.2	91.2
A new diet for me	22	8.8	8.8	100.0
Total	251	100.0	100.0	

Table D61

Buys Organic (Fruits and Vegetables) Component of Nutrition Index

Buys organic fruits and vegetables	Frequency	Percent	Valid Percent	Cumulative Percent
Always	9	3.6	3.6	3.6
Usually	51	20.3	20.3	23.9
Sometimes	103	41.0	41.0	64.9
Never	88	35.1	35.1	100.0
Total	251	100.0	100.0	

Table D62

Buys Organic (Meat) Component of Nutrition Index

Buys organic meat	Frequency	Percent	Valid Percent	Cumulative Percent
Always	10	4.0	4.0	4.0
Usually	21	8.4	8.4	12.4
Sometimes	64	25.5	25.5	37.8
Never	156	62.2	62.2	100.0
Total	251	100.0	100.0	

Table D63

Buys Organic (Dairy) Component of Nutrition Index

Buys organic dairy	Frequency	Percent	Valid Percent	Cumulative Percent
Always	20	8.0	8.0	8.0
Usually	28	11.2	11.2	19.1
Sometimes	67	26.7	26.7	45.8
Never	136	54.2	54.2	100.0
Total	251	100.0	100.0	

Table D64

Buys Organic (Boxed/Canned/Frozen) Component of Nutrition Index

Buys organic boxed/canned/frozen foods	Frequency	Percent	Valid Percent	Cumulative Percent
Always	6	2.4	2.4	2.4
Usually	33	13.1	13.1	15.5
Sometimes	83	33.1	33.1	48.6
Never	129	51.4	51.4	100.0
Total	251	100.0	100.0	

Table D65

Nutrition Index Raw Scores

Nutrition Index	Frequency	Percent	Valid Percent	Cumulative Percent
44	2	.8	.8	.8
46	3	1.2	1.2	2.0
47	1	.4	.4	2.4
48	2	.8	.8	3.2
49	2	.8	.8	4.0
50	1	.4	.4	4.4
51	1	.4	.4	4.8
52	2	.8	.8	5.6
53	3	1.2	1.2	6.8
54	4	1.6	1.6	8.4
55	1	.4	.4	8.8
56	4	1.6	1.6	10.4
57	2	.8	.8	11.2
58	4	1.6	1.6	12.7
59	3	1.2	1.2	13.9
60	11	4.4	4.4	18.3
61	6	2.4	2.4	20.7
62	10	4.0	4.0	24.7
63	5	2.0	2.0	26.7
64	5	2.0	2.0	28.7
65	3	1.2	1.2	29.9
66	6	2.4	2.4	32.3
67	6	2.4	2.4	34.7
68	7	2.8	2.8	37.5
69	8	3.2	3.2	40.6
70	7	2.8	2.8	43.4
71	5	2.0	2.0	45.4
72	4	1.6	1.6	47.0
73	3	1.2	1.2	48.2
74	5	2.0	2.0	50.2
75	4	1.6	1.6	51.8
76	5	2.0	2.0	53.8
77	8	3.2	3.2	57.0

(table continues)

Nutrition Index	Frequency	Percent	Valid Percent	Cumulative Percent
78	6	2.4	2.4	59.4
79	5	2.0	2.0	61.4
80	5	2.0	2.0	63.3
81	3	1.2	1.2	64.5
82	9	3.6	3.6	68.1
83	4	1.6	1.6	69.7
84	4	1.6	1.6	71.3
85	2	.8	.8	72.1
86	2	.8	.8	72.9
87	9	3.6	3.6	76.5
88	2	.8	.8	77.3
89	4	1.6	1.6	78.9
90	3	1.2	1.2	80.1
91	4	1.6	1.6	81.7
92	5	2.0	2.0	83.7
93	5	2.0	2.0	85.7
94	2	.8	.8	86.5
95	3	1.2	1.2	87.6
96	3	1.2	1.2	88.8
97	4	1.6	1.6	90.4
98	1	.4	.4	90.8
99	1	.4	.4	91.2
100	1	.4	.4	91.6
101	1	.4	.4	92.0
102	3	1.2	1.2	93.2
103	1	.4	.4	93.6
104	1	.4	.4	94.0
105	2	.8	.8	94.8
106	1	.4	.4	95.2
107	2	.8	.8	96.0
108	1	.4	.4	96.4
109	2	.8	.8	97.2
110	1	.4	.4	97.6
111	1	.4	.4	98.0

(table continues)

Nutrition Index	Frequency	Percent	Valid Percent	Cumulative Percent
112	1	.4	.4	98.4
114	1	.4	.4	98.8
116	1	.4	.4	99.2
122	2	.8	.8	100.0
Total	251	100.0	100.0	

Mean = 75.78

Table D66

Nutrition Index Group Classification of Respondents

Nutrition Index Group	Frequency	Percent	Valid Percent	Cumulative Percent
Very healthy diet	2	.8	.8	.8
Healthy diet	21	8.4	8.4	9.2
Unhealthy diet	79	31.5	31.5	40.6
Very unhealthy diet	149	59.4	59.4	100.0
Total	251	100.0	100.0	

Table D67

Respondent Takes Vitamins or Herbal Supplements

Takes vitamins or herbs	Frequency	Percent	Valid Percent	Cumulative Percent
Yes	143	57.0	57.0	57.0
No	108	43.0	43.0	100.0
Total	251	100.0	100.0	

Table D68

Time Respondent Spends Watching Television or on Computer at Home Component of Lifestyle Index

Time spent watching television or on computer at home	Frequency	Percent	Valid Percent	Cumulative Percent
Less than one hour per day	31	12.4	12.4	12.4
1-2 hours per day	108	43.0	43.0	55.4
3-4 hours per day	71	28.3	28.3	83.7
More than 4 hours per day	41	16.3	16.3	100.0
Total	251	100.0	100.0	

Table D69

Time Respondent Spends Sitting During the Day Component of Lifestyle Index

Time spent sitting during the day	Frequency	Percent	Valid Percent	Cumulative Percent
Less than one hour	6	2.4	2.4	2.4
1-2 hours	20	8.0	8.0	10.4
3-5 hours	89	35.5	35.5	45.8
6-9 hours	106	42.2	42.2	88.0
More than 10 hours	30	12.0	12.0	100.0
Total	251	100.0	100.0	

Table D70

Number of Days Per Week Respondent Exercises Component of Lifestyle Index

Days per week exercising	Frequency	Percent	Valid Percent	Cumulative Percent
6-7 days per week	51	20.3	20.3	20.3
3-5 days per week	84	33.5	33.5	53.8
1-2 days per week	68	27.1	27.1	80.9
Does not exercise	48	19.1	19.1	100.0
Total	251	100.0	100.0	

Table D71

Exercise Workout Duration Component of Lifestyle Index

Exercise workout length	Frequency	Percent	Valid Percent	Cumulative Percent
More than 2 hours	6	2.4	2.4	2.4
1-2 hours	43	17.1	17.1	19.5
30-60 minutes	124	49.4	49.4	68.9
Less than 30 minutes	78	31.1	31.1	100.0
Total	251	100.0	100.0	

Table D72

Respondent Does Aerobics For Exercise

Aerobics	Frequency	Percent	Valid Percent	Cumulative Percent
Yes	34	13.5	13.5	13.5
No	217	86.5	86.5	100.0
Total	251	100.0	100.0	

Table D73

Respondent Rides Bicycle For Exercise

Bicycle	Frequency	Percent	Valid Percent	Cumulative Percent
Yes	48	19.1	19.1	19.1
No	203	80.9	80.9	100.0
Total	251	100.0	100.0	

Table D74

Respondent Does Martial Arts For Exercise

Martial arts	Frequency	Percent	Valid Percent	Cumulative Percent
Yes	12	4.8	4.8	4.8
No	239	95.2	95.2	100.0
Total	251	100.0	100.0	

Table D75

Respondent Rides Stationary Bicycle For Exercise

Stationary bicycle	Frequency	Percent	Valid Percent	Cumulative Percent
Yes	34	13.5	13.5	13.5
No	217	86.5	86.5	100.0
Total	251	100.0	100.0	

Table D76

Respondent Does Pilates For Exercise

Pilates	Frequency	Percent	Valid Percent	Cumulative Percent
Yes	4	1.6	1.6	1.6
No	247	98.4	98.4	100.0
Total	251	100.0	100.0	

Table D77

Respondent Runs For Exercise

Running	Frequency	Percent	Valid Percent	Cumulative Percent
Yes	53	21.1	21.1	21.1
No	198	78.9	78.9	100.0
Total	251	100.0	100.0	

Table D78

Respondent Does Swimming For Exercise

Swimming	Frequency	Percent	Valid Percent	Cumulative Percent
Yes	19	7.6	7.6	7.6
No	232	92.4	92.4	100.0
Total	251	100.0	100.0	

Table D79

Respondent Does Treadmill For Exercise

Treadmill	Frequency	Percent	Valid Percent	Cumulative Percent
Yes	54	21.5	21.5	21.5
No	197	78.5	78.5	100.0
Total	251	100.0	100.0	

Table D80

Respondent Walks For Exercise

Walking	Frequency	Percent	Valid Percent	Cumulative Percent
Yes	113	45.0	45.0	45.0
No	138	55.0	55.0	100.0
Total	251	100.0	100.0	

Table D81

Respondent Does Weight Training For Exercise

Weight training	Frequency	Percent	Valid Percent	Cumulative Percent
Yes	78	31.1	31.1	31.1
No	173	68.9	68.9	100.0
Total	251	100.0	100.0	

Table D82

Respondent Does Yoga For Exercise

Yoga	Frequency	Percent	Valid Percent	Cumulative Percent
Yes	41	16.3	16.3	16.3
No	210	83.7	83.7	100.0
Total	251	100.0	100.0	

Table D83

Respondent Does Other From of Exercise

Other exercise	Frequency	Percent	Valid Percent	Cumulative Percent
Yes	56	22.3	22.3	22.3
No	195	77.7	77.7	100.0
Total	251	100.0	100.0	

Table D84

Respondent Smokes Cigarettes Component of Lifestyle Index

Smokes cigarettes	Frequency	Percent	Valid Percent	Cumulative Percent
No	214	85.3	85.3	85.3
Yes	37	14.7	14.7	100.0
Total	251	100.0	100.0	

Table D85

Respondent Alcohol Consumption Component of Lifestyle Index

Number of alcoholic drinks	Frequency	Percent	Valid Percent	Cumulative Percent
No drinks	145	57.8	57.8	57.8
1 drink	63	25.1	25.1	82.9
2 drinks	27	10.8	10.8	93.6
More than two drinks	16	6.4	6.4	100.0
Total	251	100.0	100.0	

Table D86

Respondent Use of Recreational Drugs Component of Lifestyle Index

Uses recreational drugs	Frequency	Percent	Valid Percent	Cumulative Percent
Never	210	83.7	83.7	83.7
Rarely	30	12.0	12.0	95.6
Occasionally	7	2.8	2.8	98.4
Frequently	4	1.6	1.6	100.0
Total	251	100.0	100.0	

Table D87

Respondent Diagnosed with Cardiovascular Disease

Cardiovascular disease diagnosis	Frequency	Percent	Valid Percent	Cumulative Percent
Valid Yes	24	9.6	9.6	9.6
No	225	89.6	90.4	100.0
Total	249	99.2	100.0	
Missing System	2	.8		
Total	251	100.0		

Table D88

Respondent Currently Taking Medication for Cardiovascular Disease

Cardiovascular disease medication		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	21	8.4	8.4	8.4
	No	228	90.8	91.6	100.0
	Total	249	99.2	100.0	
Missing	System	2	.8		
Total		251	100.0		

Table D89

Respondent Diagnosed with Depression

Depression diagnosis		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	30	12.0	12.0	12.0
	No	219	87.3	88.0	100.0
	Total	249	99.2	100.0	
Missing	System	2	.8		
Total		251	100.0		

Table D90

Respondent Currently Taking Medication for Depression

Depression medication		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	21	8.4	8.4	8.4
	No	228	90.8	91.6	100.0
	Total	249	99.2	100.0	
Missing	System	2	.8		
Total		251	100.0		

Table D91

Respondent Diagnosed with Diabetes

Diabetes diagnosis		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	12	4.8	4.8	4.8
	No	237	94.4	95.2	100.0
	Total	249	99.2	100.0	
Missing	System	2	.8		
Total		251	100.0		

Table D92

Respondent Currently Taking Medication for Diabetes

Diabetes medication		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	10	4.0	4.0	4.0
	No	239	95.2	96.0	100.0
	Total	249	99.2	100.0	
Missing	System	2	.8		
Total		251	100.0		

Table D93

Respondent Diagnosed with Erectile Dysfunction

Erectile dysfunction diagnosis		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	31	12.4	12.4	12.4
	No	218	86.9	87.6	100.0
	Total	249	99.2	100.0	
Missing	System	2	.8		
Total		251	100.0		

Table D94

Respondent Currently Taking Medication for Erectile Dysfunction

Erectile dysfunction medication		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	22	8.8	8.8	8.8
	No	227	90.4	91.2	100.0
	Total	249	99.2	100.0	
Missing	System	2	.8		
Total		251	100.0		

Table D95

Respondent Diagnosed with Hypertension

Hypertension diagnosis		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	34	13.5	13.7	13.7
	No	215	85.7	86.3	100.0
	Total	249	99.2	100.0	
Missing	System	2	.8		
Total		251	100.0		

Table D96

Respondent Currently Taking Medication for Hypertension

Hypertension medication		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	25	10.0	10.0	10.0
	No	224	89.2	90.0	100.0
	Total	249	99.2	100.0	
Missing	System	2	.8		
Total		251	100.0		

Table D97

Respondent Diagnosed with Impaired Renal Function

Impaired renal function diagnosis		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	4	1.6	1.6	1.6
	No	245	97.6	98.4	100.0
	Total	249	99.2	100.0	
Missing	System	2	.8		
Total		251	100.0		

Table D98

Respondent Currently Taking Medication for Impaired Renal Function

Impaired renal function medication		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	2	.8	.8	.8
	No	247	98.4	99.2	100.0
	Total	249	99.2	100.0	
Missing	System	2	.8		
Total		251	100.0		

Table D99

Respondent Diagnosed with Pelvic Trauma

Pelvic trauma diagnosis		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	249	99.2	100.0	100.0
Missing	System	2	.8		
Total		251	100.0		

Table D100

Respondent Currently Taking Medication for Pelvic Trauma

Pelvic trauma medication		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	249	99.2	100.0	100.0
Missing	System	2	.8		
Total		251	100.0		

Table D101

Respondent Diagnosed with Prostatic Disease

Prostatic disease diagnosis		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	15	6.0	6.0	6.0
	No	234	93.2	94.0	100.0
	Total	249	99.2	100.0	
Missing	System	2	.8		
Total		251	100.0		

Table D102

Respondent Currently Taking Medication for Prostatic Disease

Prostatic disease medication		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	6	2.4	2.4	2.4
	No	243	96.8	97.6	100.0
	Total	249	99.2	100.0	
Missing	System	2	.8		
Total		251	100.0		

Table D103

Lifestyle Index Raw Scores

Lifestyle Index	Frequency	Percent	Valid Percent	Cumulative Percent
5	1	.4	.4	.4
8	3	1.2	1.2	1.6
9	1	.4	.4	2.0
10	3	1.2	1.2	3.2
11	2	.8	.8	4.0
12	3	1.2	1.2	5.2
13	5	2.0	2.0	7.2
14	10	4.0	4.0	11.2
15	5	2.0	2.0	13.1
16	14	5.6	5.6	18.7
17	13	5.2	5.2	23.9
18	14	5.6	5.6	29.5
19	13	5.2	5.2	34.7
20	15	6.0	6.0	40.6
21	21	8.4	8.4	49.0
22	15	6.0	6.0	55.0
23	33	13.1	13.1	68.1
24	11	4.4	4.4	72.5
25	25	10.0	10.0	82.5
26	12	4.8	4.8	87.3
27	7	2.8	2.8	90.0
28	9	3.6	3.6	93.6
29	8	3.2	3.2	96.8
30	2	.8	.8	97.6
32	4	1.6	1.6	99.2
33	1	.4	.4	99.6
35	1	.4	.4	100.0
Total	251	100.0	100.0	

Mean = 21.16

Table D104

Lifestyle Index Group Respondent Classification

Lifestyle Index Group	Frequency	Percent	Valid Percent	Cumulative Percent
Very healthy lifestyle	6	2.4	2.4	2.4
Healthy lifestyle	63	25.1	25.1	27.5
Unhealthy lifestyle	154	61.4	61.4	88.8
Very unhealthy lifestyle	28	11.2	11.2	100.0
Total	251	100.0	100.0	

Table D105

How Often Able to Get an Erection Component of Erectile Function Index

Able to get an erection	Frequency	Percent	Valid Percent	Cumulative Percent
Valid Almost always/always	189	75.3	76.5	76.5
Most times (much more than half the time)	21	8.4	8.5	85.0
Sometimes (about half the time)	11	4.4	4.5	89.5
A few times (much less than half the time)	7	2.8	2.8	92.3
Almost never/never	5	2.0	2.0	94.3
No sexual activity	14	5.6	5.7	100.0
Total	247	98.4	100.0	
Missing System	4	1.6		
Total	251	100.0		

Table D106

How Often Erections Hard Enough for Penetration Component of Erectile Function Index

Erections hard enough for penetration		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Almost always/always	188	74.9	76.1	76.1
	Most times (much more than half the time)	22	8.8	8.9	85.0
	Sometimes (about half the time)	10	4.0	4.0	89.1
	A few times (much less than half the time)	8	3.2	3.2	92.3
	Almost never/never	5	2.0	2.0	94.3
	No sexual activity	14	5.6	5.7	100.0
	Total	247	98.4	100.0	
Missing	System	4	1.6		
Total		251	100.0		

Table D107

How Often Able to Maintain Erection Component of Erectile Function Index

Able to maintain erection		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Almost always/always	180	71.7	72.9	72.9
	Most times (much more than half the time)	22	8.8	8.9	81.8
	Sometimes (about half the time)	13	5.2	5.3	87.0
	A few times (much less than half the time)	9	3.6	3.6	90.7
	Almost never/never	3	1.2	1.2	91.9
	Did not attempt intercourse	20	8.0	8.1	100.0
	Total	247	98.4	100.0	
Missing	System	4	1.6		
Total		251	100.0		

Table D108

Difficulty in Maintaining Erection Component of Erectile Function Index

Difficulty in maintaining erection		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Not difficult	183	72.9	74.1	74.1
	Slightly difficult	26	10.4	10.5	84.6
	Difficult	12	4.8	4.9	89.5
	Very difficult	2	.8	.8	90.3
	Extremely difficult	3	1.2	1.2	91.5
	Did not attempt intercourse	21	8.4	8.5	100.0
	Total	247	98.4	100.0	
Missing	System	4	1.6		
Total		251	100.0		

Table D109

Satisfaction with Sexual Intercourse Component of Erectile Function Index

Satisfaction with sexual intercourse		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Almost always/always	156	62.2	63.2	63.2
	Most times (much more than half the time)	46	18.3	18.6	81.8
	Sometimes (about half the time)	18	7.2	7.3	89.1
	A few times (much less than half the time)	2	.8	.8	89.9
	Almost never/never	3	1.2	1.2	91.1
	Did not attempt intercourse	22	8.8	8.9	100.0
	Total	247	98.4	100.0	
Missing	System	4	1.6		
Total		251	100.0		

Table D110

Level of Sexual Desire Component of Erectile Function Index

Level of sexual desire		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Very high	66	26.3	26.7	26.7
	High	77	30.7	31.2	57.9
	Moderate	82	32.7	33.2	91.1
	Low	17	6.8	6.9	98.0
	Very low/none at all	5	2.0	2.0	100.0
	Total	247	98.4	100.0	
Missing	System	4	1.6		
Total		251	100.0		

Table D111

Confidence Can Get and Keep an Erection Component of Erectile Function Index

Confidence can get and keep an erection		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Very high	134	53.4	54.3	54.3
	High	50	19.9	20.2	74.5
	Moderate	39	15.5	15.8	90.3
	Low	12	4.8	4.9	95.1
	Very low	12	4.8	4.9	100.0
	Total	247	98.4	100.0	
Missing	System	4	1.6		
Total		251	100.0		

Table D112

Erectile Function Index Raw Scores

	Erectile Function Index	Frequency	Percent	Valid Percent	Cumulative Percent
Valid	2	1	.4	.4	.4
	3	2	.8	.8	1.2
	4	1	.4	.4	1.6
	6	2	.8	.8	2.4
	7	1	.4	.4	2.8
	8	2	.8	.8	3.6
	9	1	.4	.4	4.0
	10	1	.4	.4	4.5
	11	6	2.4	2.4	6.9
	12	2	.8	.8	7.7
	13	1	.4	.4	8.1
	14	1	.4	.4	8.5
	15	1	.4	.4	8.9
	17	4	1.6	1.6	10.5
	18	3	1.2	1.2	11.7
	19	1	.4	.4	12.1
	20	4	1.6	1.6	13.8
	21	2	.8	.8	14.6
	22	4	1.6	1.6	16.2
	23	2	.8	.8	17.0
	24	2	.8	.8	17.8
	25	3	1.2	1.2	19.0
	26	8	3.2	3.2	22.3
	28	5	2.0	2.0	24.3
	29	4	1.6	1.6	25.9
	30	8	3.2	3.2	29.1
	31	18	7.2	7.3	36.4
	32	30	12.0	12.1	48.6
	33	42	16.7	17.0	65.6
	34	39	15.5	15.8	81.4
	35	46	18.3	18.6	100.0
	Total	247	98.4	100.0	
Missing	System	4	1.6		
Total		251	100.0		

Mean = 29.4

Table D113

Erectile Function Index Group Respondent Classification (All Respondents)

Erectile Function Index Group		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No dysfunction	157	62.5	63.6	63.6
	Occasional erectile dysfunction	54	21.5	21.9	85.4
	Consistent erectile dysfunction	25	10.0	10.1	95.5
	No sexual activity	11	4.4	4.5	100.0
	Total	247	98.4	100.0	
Missing	System	4	1.6		
Total		251	100.0		

Table D114

Erectile Function Index Group Adjusted for Respondents Without Sexual Activity

Adjusted Erectile Function Index Group		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No erectile dysfunction	154	61.4	64.4	64.4
	Occasional erectile dysfunction	54	21.5	22.6	87.0
	Consistent erectile dysfunction	31	12.4	13.0	100.0
	Total	239	95.2	100.0	
Missing	System	12	4.8		
Total		251	100.0		

Table D115

Eating Out Score Component of Nutrition Index

Eating out score	Frequency	Percent	Valid Percent	Cumulative Percent
5	87	34.7	34.7	34.7
4	59	23.5	23.5	58.2
3	19	7.6	7.6	65.7
2	57	22.7	22.7	88.4
1	21	8.4	8.4	96.8
0	8	3.2	3.2	100.0
Total	251	100.0	100.0	

Mean = 3.44

Table D116

Grain Score Component of Nutrition Index

Grain score	Frequency	Percent	Valid Percent	Cumulative Percent
16	3	1.2	1.2	1.2
15	5	2.0	2.0	3.2
14	7	2.8	2.8	6.0
13	7	2.8	2.8	8.8
12	20	8.0	8.0	16.7
11	24	9.6	9.6	26.3
10	34	13.5	13.5	39.8
9	26	10.4	10.4	50.2
8	45	17.9	17.9	68.1
7	22	8.8	8.8	76.9
6	28	11.2	11.2	88.0
5	11	4.4	4.4	92.4
4	12	4.8	4.8	97.2
3	5	2.0	2.0	99.2
2	1	.4	.4	99.6
1	1	.4	.4	100.0
Total	251	100.0	100.0	

Mean = 8.74

Table D117

Vegetable and Fruit Score Component of Nutrition Index

Vegetable and fruit score	Frequency	Percent	Valid Percent	Cumulative Percent
25	1	.4	.4	.4
24	1	.4	.4	.8
23	2	.8	.8	1.6
22	4	1.6	1.6	3.2
21	9	3.6	3.6	6.8
20	11	4.4	4.4	11.2
19	13	5.2	5.2	16.3
18	16	6.4	6.4	22.7
17	15	6.0	6.0	28.7
16	18	7.2	7.2	35.9
15	26	10.4	10.4	46.2
14	24	9.6	9.6	55.8
13	25	10.0	10.0	65.7
12	22	8.8	8.8	74.5
11	21	8.4	8.4	82.9
10	21	8.4	8.4	91.2
9	9	3.6	3.6	94.8
8	3	1.2	1.2	96.0
7	6	2.4	2.4	98.4
6	1	.4	.4	98.8
5	3	1.2	1.2	100.0
Total	251	100.0	100.0	

Mean = 14.32

Table D118

Dairy Score Component of Nutrition Index

Dairy score	Frequency	Percent	Valid Percent	Cumulative Percent
24	1	.4	.4	.4
23	1	.4	.4	.8
22	6	2.4	2.4	3.2
21	9	3.6	3.6	6.8
20	15	6.0	6.0	12.7
19	32	12.7	12.7	25.5
18	24	9.6	9.6	35.1
17	29	11.6	11.6	46.6
16	28	11.2	11.2	57.8
15	23	9.2	9.2	66.9
14	22	8.8	8.8	75.7
13	11	4.4	4.4	80.1
12	15	6.0	6.0	86.1
11	11	4.4	4.4	90.4
10	13	5.2	5.2	95.6
9	5	2.0	2.0	97.6
8	5	2.0	2.0	99.6
7	1	.4	.4	100.0
Total	251	100.0	100.0	

Mean = 15.81

Table D119

Main Meal Score Component of Nutrition Index

Main meal score	Frequency	Percent	Valid Percent	Cumulative Percent
30	1	.4	.4	.4
29	1	.4	.4	.8
28	1	.4	.4	1.2
27	4	1.6	1.6	2.8
26	2	.8	.8	3.6
25	8	3.2	3.2	6.8
24	6	2.4	2.4	9.2
23	14	5.6	5.6	14.7
22	15	6.0	6.0	20.7
21	21	8.4	8.4	29.1
20	18	7.2	7.2	36.3
19	35	13.9	13.9	50.2
18	20	8.0	8.0	58.2
17	23	9.2	9.2	67.3
16	25	10.0	10.0	77.3
15	13	5.2	5.2	82.5
14	20	8.0	8.0	90.4
13	12	4.8	4.8	95.2
12	8	3.2	3.2	98.4
11	1	.4	.4	98.8
10	1	.4	.4	99.2
9	2	.8	.8	100.0
Total	251	100.0	100.0	

Mean = 18.43

Table D120

Sweets and Snacks Score Component of Nutrition Index

Sweets and snacks score	Frequency	Percent	Valid Percent	Cumulative Percent
15	8	3.2	3.2	3.2
14	5	2.0	2.0	5.2
13	11	4.4	4.4	9.6
12	25	10.0	10.0	19.5
11	11	4.4	4.4	23.9
10	35	13.9	13.9	37.8
9	12	4.8	4.8	42.6
8	21	8.4	8.4	51.0
7	26	10.4	10.4	61.4
6	16	6.4	6.4	67.7
5	29	11.6	11.6	79.3
4	13	5.2	5.2	84.5
3	11	4.4	4.4	88.8
2	14	5.6	5.6	94.4
1	12	4.8	4.8	99.2
0	2	.8	.8	100.0
Total	251	100.0	100.0	

Mean = 7.68

Table D121

Organic Score Component of Nutrition Index

Organic score	Frequency	Percent	Valid Percent	Cumulative Percent
20	2	.8	.8	.8
16	4	1.6	1.6	2.4
15	2	.8	.8	3.2
14	5	2.0	2.0	5.2
12	9	3.6	3.6	8.8
11	2	.8	.8	9.6
10	11	4.4	4.4	13.9
9	3	1.2	1.2	15.1
8	14	5.6	5.6	20.7
7	5	2.0	2.0	22.7
6	9	3.6	3.6	26.3
5	3	1.2	1.2	27.5
4	27	10.8	10.8	38.2
3	24	9.6	9.6	47.8
2	20	8.0	8.0	55.8
1	34	13.5	13.5	69.3
0	77	30.7	30.7	100.0
Total	251	100.0	100.0	

Mean = 3.75

Table D122

Age and Nutritional Quality of Diet are Independent

Age Group		Nutrition Index Group				Total
		Very healthy diet	Healthy diet	Unhealthy diet	Very unhealthy diet	
30 - 39	Count	0	6	21	38	65
	% within Age Group	.0%	9.2%	32.3%	58.5%	100.0%
	% within Nutrition Index Group	.0%	28.6%	26.6%	25.5%	25.9%
	% of Total	.0%	2.4%	8.4%	15.1%	25.9%
40 - 49	Count	1	6	27	47	81
	% within Age Group	1.2%	7.4%	33.3%	58.0%	100.0%
	% within Nutrition Index Group	50.0%	28.6%	34.2%	31.5%	32.3%
	% of Total	.4%	2.4%	10.8%	18.7%	32.3%
50 - 59	Count	1	6	23	42	72
	% within Age Group	1.4%	8.3%	31.9%	58.3%	100.0%
	% within Nutrition Index Group	50.0%	28.6%	29.1%	28.2%	28.7%
	% of Total	.4%	2.4%	9.2%	16.7%	28.7%
60 - 69	Count	0	1	6	18	25
	% within Age Group	.0%	4.0%	24.0%	72.0%	100.0%
	% within Nutrition Index Group	.0%	4.8%	7.6%	12.1%	10.0%
	% of Total	.0%	.4%	2.4%	7.2%	10.0%
70 - 79	Count	0	2	2	4	8
	% within Age Group	.0%	25.0%	25.0%	50.0%	100.0%
	% within Nutrition Index Group	.0%	9.5%	2.5%	2.7%	3.2%
	% of Total	.0%	.8%	.8%	1.6%	3.2%
Total	Count	2	21	79	149	251
	% within Age Group	.8%	8.4%	31.5%	59.4%	100.0%
	% within Nutrition Index Group	100.0%	100.0%	100.0%	100.0%	100.0%
	% of Total	.8%	8.4%	31.5%	59.4%	100.0%

Chi-Square Tests: Pearson Chi-Square 6.150, df=12, p=.908 (two-tailed)

Table D123

The More Unhealthy the Diet the Greater the Likelihood of Erectile Dysfunction

Adjusted Erectile Function Index Group		Adjusted Nutrition Index Group			Total
		Healthy or very healthy diet	Unhealthy diet	Very unhealthy diet	
Consistent erectile dysfunction	Count	3	6	22	31
	% within Erectile Function Index	9.7%	19.4%	71.0%	100.0%
	% within Nutrition Index Group Adj	13.6%	8.1%	15.4%	13.0%
	% of Total	1.3%	2.5%	9.2%	13.0%
Occasional erectile dysfunction	Count	2	12	40	54
	% within Erectile Function Index	3.7%	22.2%	74.1%	100.0%
	% within Nutrition Index Group Adj	9.1%	16.2%	28.0%	22.6%
	% of Total	.8%	5.0%	16.7%	22.6%
No erectile dysfunction	Count	17	56	81	154
	% within Erectile Function Index	11.0%	36.4%	52.6%	100.0%
	% within Nutrition Index Group Adj	77.3%	75.7%	56.6%	64.4%
	% of Total	7.1%	23.4%	33.9%	64.4%
Total	Count	22	74	143	239
	% within Erectile Function Index	9.2%	31.0%	59.8%	100.0%
	% within Nutrition Index Group Adj	100.0%	100.0%	100.0%	100.0%
	% of Total	9.2%	31.0%	59.8%	100.0%

Chi-Square Tests: Pearson Chi-Square 10.298, df=4, p=.036 (two-tailed)

Table D124

Respondents with Healthier Diets More Likely to Take Vitamins or Herbal Supplements

Nutrition Index Group		Takes vitamins or herbal supplements		
		No	Yes	Total
Very healthy diet	Count	0	2	2
	% within Nutrition Index Group	.0%	100.0%	100.0%
	% within Takes vitamins or herbal supplements	.0%	1.4%	.8%
	% of Total	.0%	.8%	.8%
Healthy diet	Count	6	15	21
	% within Nutrition Index Group	28.6%	71.4%	100.0%
	% within Takes vitamins or herbal supplements	5.6%	10.5%	8.4%
	% of Total	2.4%	6.0%	8.4%
Unhealthy diet	Count	30	49	79
	% within Nutrition Index Group	38.0%	62.0%	100.0%
	% within Takes vitamins or herbal supplements	27.8%	34.3%	31.5%
	% of Total	12.0%	19.5%	31.5%
Very unhealthy diet	Count	72	77	149
	% within Nutrition Index Group	48.3%	51.7%	100.0%
	% within Takes vitamins or herbal supplements	66.7%	53.8%	59.4%
	% of Total	28.7%	30.7%	59.4%
Total	Count	108	143	251
	% within Nutrition Index Group	43.0%	57.0%	100.0%
	% within Takes vitamins or herbal supplements	100.0%	100.0%	100.0%
	% of Total	43.0%	57.0%	100.0%

Chi-Square Tests: Pearson Chi-Square 5.827, df=3, p=.120 (two-tailed)

Table D125

No Relationship Evident Between Erectile Dysfunction and Vitamin or Herb Consumption

Adjusted Erectile Function Index Group		Takes vitamins or herbal supplements		
		No	Yes	Total
Consistent erectile dysfunction	Count	12	19	31
	% within Erectile Function Index	38.7%	61.3%	100.0%
	% within Takes vitamins or herbal supplements	11.2%	14.4%	13.0%
	% of Total	5.0%	7.9%	13.0%
Occasional erectile dysfunction	Count	21	33	54
	% within Erectile Function Index	38.9%	61.1%	100.0%
	% within Takes vitamins or herbal supplements	19.6%	25.0%	22.6%
	% of Total	8.8%	13.8%	22.6%
No erectile dysfunction	Count	74	80	154
	% within Erectile Function Index	48.1%	51.9%	100.0%
	% within Takes vitamins or herbal supplements	69.2%	60.6%	64.4%
	% of Total	31.0%	33.5%	64.4%
Total	Count	107	132	239
	% within Erectile Function Index	44.8%	55.2%	100.0%
	% within Takes vitamins or herbal supplements	100.0%	100.0%	100.0%
	% of Total	44.8%	55.2%	100.0%

Chi-Square Tests: Pearson Chi-Square 1.887, df=2, p=.389 (two-tailed)

Table D126

A Weak Association is Evident Between Erectile Dysfunction and Lifestyle

Adjusted Erectile Function Index Group		Adjusted Lifestyle Index Group			Total
		Healthy or very healthy lifestyle	Unhealthy lifestyle	Very unhealthy lifestyle	
Consistent erectile dysfunction	Count	7	20	4	31
	% within Erectile Function Index	22.6%	64.5%	12.9%	100.0%
	% within Lifestyle Index Adj	10.9%	13.6%	14.3%	13.0%
	% of Total	2.9%	8.4%	1.7%	13.0%
Occasional erectile dysfunction	Count	13	31	10	54
	% within Erectile Function Index	24.1%	57.4%	18.5%	100.0%
	% within Lifestyle Index Adj	20.3%	21.1%	35.7%	22.6%
	% of Total	5.4%	13.0%	4.2%	22.6%
No erectile dysfunction	Count	44	96	14	154
	% within Erectile Function Index	28.6%	62.3%	9.1%	100.0%
	% within Lifestyle Index Adj	68.8%	65.3%	50.0%	64.4%
	% of Total	18.4%	40.2%	5.9%	64.4%
Total	Count	64	147	28	239
	% within Erectile Function Index	26.8%	61.5%	11.7%	100.0%
	% within Lifestyle Index Adj	100.0%	100.0%	100.0%	100.0%
	% of Total	26.8%	61.5%	11.7%	100.0%

Chi-Square Tests: Pearson Chi-Square 6.646, df=6, p=.355 (two-tailed)

Table D127

There is No Relationship Evident Between Age Group and BMI

BMI Group		Age Group					Total
		30 - 39	40 - 49	50- 59	60-69	70 - 79	
Normal	Count	22	20	21	4	2	69
	% within BMI Group	31.9%	29.0%	30.4%	5.8%	2.9%	100.0%
	% within Age Group	33.8%	24.7%	29.2%	16.0%	25.0%	27.5%
	% of Total	8.8%	8.0%	8.4%	1.6%	.8%	27.5%
Overweight	Count	27	41	33	9	6	116
	% within BMI Group	23.3%	35.3%	28.4%	7.8%	5.2%	100.0%
	% within Age Group	41.5%	50.6%	45.8%	36.0%	75.0%	46.2%
	% of Total	10.8%	16.3%	13.1%	3.6%	2.4%	46.2%
Obese	Count	15	17	16	11	0	59
	% within BMI Group	25.4%	28.8%	27.1%	18.6%	.0%	100.0%
	% within Age Group	23.1%	21.0%	22.2%	44.0%	.0%	23.5%
	% of Total	6.0%	6.8%	6.4%	4.4%	.0%	23.5%
Extreme Obesity	Count	1	3	2	1	0	7
	% within BMI Group	14.3%	42.9%	28.6%	14.3%	.0%	100.0%
	% within Age Group	1.5%	3.7%	2.8%	4.0%	.0%	2.8%
	% of Total	.4%	1.2%	.8%	.4%	.0%	2.8%
Total	Count	65	81	72	25	8	251
	% within BMI Group	25.9%	32.3%	28.7%	10.0%	3.2%	100.0%
	% within Age Group	100.0	100.0	100.0	100.0	100.0	100.0%
	% of Total	25.9%	32.3%	28.7%	10.0%	3.2%	100.0%

Chi-Square Tests: Pearson Chi-Square 12.710, df=12, p=.390 (two-tailed)

Table D128

Respondents with Greater BMI Have Greater Likelihood and Increased Severity of Erectile Dysfunction

BMI Group		Adjusted Erectile Function Index Group			Total
		Consistent erectile dysfunction	Occasional erectile dysfunction	No erectile dysfunction	
Normal	Count	6	11	48	65
	% within BMI Group	9.2%	16.9%	73.8%	100.0%
	% within Erectile Function Index	19.4%	20.4%	31.2%	27.2%
	% of Total	2.5%	4.6%	20.1%	27.2%
Overweight	Count	14	28	71	113
	% within BMI Group	12.4%	24.8%	62.8%	100.0%
	% within Erectile Function Index	45.2%	51.9%	46.1%	47.3%
	% of Total	5.9%	11.7%	29.7%	47.3%
Obese	Count	9	14	32	55
	% within BMI Group	16.4%	25.5%	58.2%	100.0%
	% within Erectile Function Index	29.0%	25.9%	20.8%	23.0%
	% of Total	3.8%	5.9%	13.4%	23.0%
Extreme Obesity	Count	2	1	3	6
	% within BMI Group	33.3%	16.7%	50.0%	100.0%
	% within Erectile Function Index	6.5%	1.9%	1.9%	2.5%
	% of Total	.8%	.4%	1.3%	2.5%
Total	Count	31	54	154	239
	% within BMI Group	13.0%	22.6%	64.4%	100.0%
	% within Erectile Function Index	100.0%	100.0%	100.0%	100.0%
	% of Total	13.0%	22.6%	64.4%	100.0%

Chi-Square Tests: Pearson Chi-Square 6.059, df=6, p=.417 (two-tailed)

Table D129

Very Strong Association Evident Between Age and Erectile Dysfunction

Adjusted Age Group		Adjusted Erectile Function Index Group			Total
		Consistent erectile dysfunction	Occasional erectile dysfunction	No erectile dysfunction	
30 - 39	Count	2	10	51	63
	% within Age Group Adj	3.2%	15.9%	81.0%	100.0%
	% within Erectile Function Index	6.5%	18.5%	33.1%	26.4%
	% of Total	.8%	4.2%	21.3%	26.4%
40 - 49	Count	7	15	54	76
	% within Age Group Adj	9.2%	19.7%	71.1%	100.0%
	% within Erectile Function Index	22.6%	27.8%	35.1%	31.8%
	% of Total	2.9%	6.3%	22.6%	31.8%
50 - 59	Count	12	18	40	70
	% within Age Group Adj	17.1%	25.7%	57.1%	100.0%
	% within Erectile Function Index	38.7%	33.3%	26.0%	29.3%
	% of Total	5.0%	7.5%	16.7%	29.3%
60 - 79	Count	10	11	9	30
	% within Age Group Adj	33.3%	36.7%	30.0%	100.0%
	% within Erectile Function Index	32.3%	20.4%	5.8%	12.6%
	% of Total	4.2%	4.6%	3.8%	12.6%
Total	Count	31	54	154	239
	% within Age Group Adj	13.0%	22.6%	64.4%	100.0%
	% within Erectile Function Index	100.0%	100.0%	100.0%	100.0%
	% of Total	13.0%	22.6%	64.4%	100.0%

Chi-Square Tests: Pearson Chi-Square 29.767, df=6, p=.000 (two-tailed)

Table D130

Number of Diseases Respondent Diagnosed With

	Number of diseases diagnosed	Frequency	Percent	Valid Percent	Cumulative Percent
Valid	5	1	.4	.4	.4
	4	5	2.0	2.0	2.4
	3	7	2.8	2.8	5.2
	2	25	10.0	10.0	15.3
	1	54	21.5	21.7	36.9
	0	157	62.5	63.1	100.0
	Total	249	99.2	100.0	
Missing	System	2	.8		
Total		251	100.0		

Table D131

The More Diseases a Respondent is Diagnosed With, the Greater the Likelihood of Erectile Dysfunction

Diseases diagnosed with		Adjusted Erectile Function Index Group			Total Consistent erectile dysfunction
		Consistent erectile dysfunction	Occasional erectile dysfunction	No erectile dysfunction	
0	Count	8	27	117	152
	% within Diseases diagnosed with	5.3%	17.8%	77.0%	100.0%
	% within Erectile Function Index	25.8%	50.0%	76.0%	63.6%
	% of Total	3.3%	11.3%	49.0%	63.6%
1	Count	7	15	29	51
	% within Diseases diagnosed with	13.7%	29.4%	56.9%	100.0%
	% within Erectile Function Index	22.6%	27.8%	18.8%	21.3%
	% of Total	2.9%	6.3%	12.1%	21.3%
2	Count	8	8	8	24
	% within Diseases diagnosed with	33.3%	33.3%	33.3%	100.0%
	% within Erectile Function Index	25.8%	14.8%	5.2%	10.0%
	% of Total	3.3%	3.3%	3.3%	10.0%
3	Count	4	3	0	7
	% within Diseases diagnosed with	57.1%	42.9%	.0%	100.0%
	% within Erectile Function Index	12.9%	5.6%	.0%	2.9%
	% of Total	1.7%	1.3%	.0%	2.9%
4	Count	3	1	0	4
	% within Diseases diagnosed with	75.0%	25.0%	.0%	100.0%
	% within Erectile Function Index	9.7%	1.9%	.0%	1.7%
	% of Total	1.3%	.4%	.0%	1.7%

(table continues)

Diseases diagnosed with		Adjusted Erectile Function Index Group			Total
		Consistent erectile dysfunction	Occasional erectile dysfunction	No erectile dysfunction	Consistent erectile dysfunction
5	Count	1	0	0	1
	% within Diseases diagnosed with	100.0%	.0%	.0%	100.0%
	% within Erectile Function Index	3.2%	.0%	.0%	.4%
	% of Total	.4%	.0%	.0%	.4%
Total	Count	31	54	154	239
	% within Diseases diagnosed with	13.0%	22.6%	64.4%	100.0%
	% within Erectile Function Index	100.0%	100.0%	100.0%	100.0%
	% of Total	13.0%	22.6%	64.4%	100.0%

Chi-Square Tests: Pearson Chi-Square 63.741, df=10, p=.000 (two-tailed)

Table D132

Respondents Diagnosed with Cardiovascular Disease Have Greater Incidences of Erectile Dysfunction

		Adjusted Erectile Function Index Group			Total	
		Consistent erectile dysfunction	Occasional erectile dysfunction	No erectile dysfunction	Consistent erectile dysfunction	
Diagnosed with cardiovascular disease	No	Count	22	49	145	216
		% within Diagnosed with cardiovascular disease	10.2%	22.7%	67.1%	100.0%
		% within Erectile Function Index	71.0%	90.7%	94.2%	90.4%
		% of Total	9.2%	20.5%	60.7%	90.4%
Yes	Count	9	5	9	23	
		% within Diagnosed with cardiovascular disease	39.1%	21.7%	39.1%	100.0%
		% within Erectile Function Index	29.0%	9.3%	5.8%	9.6%
		% of Total	3.8%	2.1%	3.8%	9.6%
Total	Count	31	54	154	239	
		% within Diagnosed with cardiovascular disease	13.0%	22.6%	64.4%	100.0%
		% within Erectile Function Index	100.0%	100.0%	100.0%	100.0%
		% of Total	13.0%	22.6%	64.4%	100.0%

Chi-Square Tests: Pearson Chi-Square 15.964, df=2, p=.000 (two-tailed)

Table D133

Respondents Diagnosed with Depression Have Greater Incidences of Erectile Dysfunction

		Adjusted Erectile Function Index			Total
		Group			
Diagnosed with depression		Consistent erectile dysfunction	Occasional erectile dysfunction	No erectile dysfunction	Consistent erectile dysfunction
No	Count	26	44	142	212
	% within Diagnosed with depression	12.3%	20.8%	67.0%	100.0%
	% within Erectile Function Index	83.9%	81.5%	92.2%	88.7%
	% of Total	10.9%	18.4%	59.4%	88.7%
Yes	Count	5	10	12	27
	% within Diagnosed with depression	18.5%	37.0%	44.4%	100.0%
	% within Erectile Function Index	16.1%	18.5%	7.8%	11.3%
	% of Total	2.1%	4.2%	5.0%	11.3%
Total	Count	31	54	154	239
	% within Diagnosed with depression	13.0%	22.6%	64.4%	100.0%
	% within Erectile Function Index	100.0%	100.0%	100.0%	100.0%
	% of Total	13.0%	22.6%	64.4%	100.0%

Chi-Square Tests: Pearson Chi-Square 5.420, df=2, p=.067 (two-tailed)

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