

Thriving Through The Ages: Nutrition and Exercise for Every Age Group  
A Developmental Wellness Approach

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### Acknowledgement

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### Abstract

America is on the rise. Our healthcare system and the financial costs are on the rise. Obesity, Type 2 diabetes, cardiovascular disease, cancer, and autoimmune issues continue to rise. Two-thirds of adult Americans ages 20 or older are now considered overweight or obese and 1 in 6 children are overweight or obese (CDC, 2010). 74 percent of American males are considered overweight or obese (CDC, 2010). Yearly, the numbers have increased with primary care providers diagnosing patients with an illness or disease. As part of treatment, patients are told to diet and exercise. Very little guidance is provided on how to do that effectively. As the body changes with time, so do the dietary needs and physical abilities. Understanding how the body works and the importance of diet and exercise throughout the life span will greatly enhance and encourage healthy living. Not only will a wellness approach help reverse many of these illnesses, it should be the first line of defense in preventing such illnesses.

## Thriving Through The Ages: Nutrition and Exercise for Every Age Group

### Introduction

The U. S. continues to see rises in obesity among both children and adults. Obesity is a major contributor to other health related issues such as developing diabetes mellitus (DM), cancer, cardiovascular disease (CVD), coronary heart disease (CHD), cerebral vascular disease (CV, i.e. stroke), and other autoimmune diseases (CDC, 2015). There are many factors involved that contribute to our nation's healthcare crisis. The scope of this paper is to address the various facets of obesity and lifestyle modifications through nutrition, exercise and stress management that can help reverse it. Understanding what is appropriate for the various developmental stages in regards to nutrition and exercise is a key factor for parents, educators, and healthcare providers. Providing education and practical material that can be utilized for all ages that promotes health and wellness will not only encourage living a healthy lifestyle but in doing so decrease the economic burden that obesity has placed on the healthcare system, employment and decrease the patient's comorbidities. It is time to get America's health back not only for ourselves but for our children and their future. Reforms are needed in healthcare and into a myriad of other areas such as physical activity and nutrition (Institute of Medicine, 2010; May, A., et. al. 2013).

### Methods

The following databases were used for research: [Academic Onefile](#), [PsychINFO](#), [PubPsych](#), [ProQuest Dissertations](#), [Cochrane Library](#), [GALE](#), [University of Illinois](#) NIMH, NIH, PubMed, Natural Medicines Databases and EBSCO host. A boon-lean search was made, articles less than 8 years old, peer reviewed, research articles, journals, clinical trials were accepted. Interviews by prominent specialists in the CAM field were also allowed for

background information. Studies that compared two or more of the topics were also considered.

Search terms included: nutrition and the following topics, or exercise and the following topics: CAM therapies, cost of healthcare, CVD, blood pressure, hypertension, diabetes, obesity, pregnancy, progressive muscle relaxation (PMR), relaxation, diet, athletes, cancer, adults, infants, children, stress and perceived stress. Studies that have compared any of the following: exercise, progressive muscle relaxation, yoga, and blood pressure, perceived stress and stress, health care and cost, obesity and American.

### **Review of Literature**

Healthcare is changing. According to the CDC obesity continues to rise and with that healthcare costs increase (Finkelstein, E., 2009). Not only are there more people who are overweight or obese but in conjunction with that have a greater risk of developing diabetes mellitus (DM), cancer, cardiovascular disease (CVD), coronary heart disease (CHD), cerebrovascular disease (CV, i.e. stroke), and other autoimmune diseases (CDC, 2015).

Obesity is putting an economic burden on the healthcare system. With the current changes in healthcare and more people living longer impacts both the private and public medical infrastructures are affected. Finkelstein, et. al. found that from 1998 to 2006 that a "\$40 billion of increased medical spending" was due to obese patients needing more care (Finkelstein, E., et. al. 2009). Dr. Dietz noted "obesity costs this country about \$150 billion a year or almost 10 percent of the national medical budget" (CDC, 2011). Tsai, A., Williamson, D. and Glick, H. (2009) has shown direct medical costs of both overweight and obese patients "combined is approximately 5-10% of the U.S. health care spending" (Tsai, et. al., 2009). This results in an additional cost of \$266 for the overweight person, \$1723 for the obese person, and \$3012 for the morbidly obese person (Tsai, A. et. al. 2011). Finkelstein found that obese people spent \$1429 more than normal

weight patients in 2006. This resulted in a 41.5% increase compared to their normal weight counterparts (Finkelstein, E. et. al. 2009). The additional costs for obesity are mainly due to treating confounding illnesses and diseases that arise from obesity and not that of surgery, prescription or medical interventions for obesity (Finkelstein, E. et. al., 2009). The economic cost of being overweight or obese also translates into missed days of work and or school, less productivity. The employer has an increased financial burden while the employee is out on sick leave. The business not only loses productivity but is also paying for sick leave and substitutes to fill in for the absent employee.

There are several health risks for Americans who are overweight or obese. Overweight is defined as having a BMI greater than 25 and less than 30. Obesity is defined as having a BMI equal to or greater than 30. Morbidly obese is defined as having a BMI of 40 or greater. For children, overweight and obesity are calculated based on the age and the sex specific growth chart. A child that is in the 85<sup>th</sup> percentile to 94<sup>th</sup> percentile is considered overweight, from the 95<sup>th</sup> percentile a child is considered obese and severely obese is 120% or greater on the sex-specific age to weight growth chart (CDC, 2015). In 1990, no state had less than 10% obese population but none of the states had more than 14% obesity rates among adults age 18 or older. “In 2010, no state had a prevalence of obesity less than 20%. Thirty-six states had a prevalence equal to or greater than 25%; 12 of these states (Alabama, Arkansas, Kentucky, Louisiana, Michigan, Mississippi, Missouri, Oklahoma, South Carolina, Tennessee, Texas, and West Virginia) had a prevalence equal to or greater than 30%” (CDC, 2015). The CDC reports several complications from being obese: sleep apnea, lung disease, liver disease, stroke, heart disease, diabetes, pancreatitis, gallstones, cancer, infertility and abnormal periods for women, arthritis, inflamed veins, and gout (CDC, 2010, May., A., et. al., 2013; Ogden, C. et. al. 2010). Not only

does it contribute to health issues it is estimated to take 9 years of life from having severe obesity.

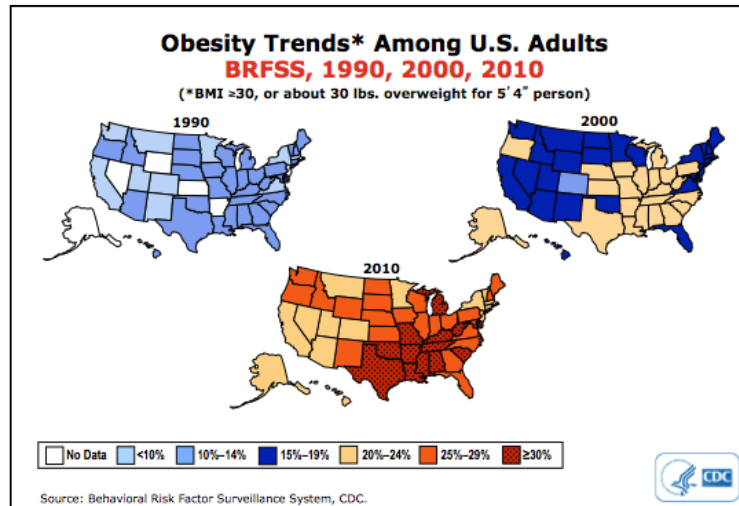


Figure 1: Obesity Trends Among U.S. Adults

There are many factors that contribute to overweight and obese individuals such as availability of fresh produce and meats, cost of foods, economics, genetics, environmental, addictions, hydration, stress, smoking, commuting, individual, familial, societal, and religious beliefs (WHO., 2014; Horta, B., et. al. 2007). Therefore, changes will need to be addressed on individual, local and national scales to help overcome this trend. Nutrition and exercise are two key factors in this equation (May, A., et. al., 2013; WHO, 2014; Horta, B. et. al., 2007).

Obesity continues to rise but not in proportion to socioeconomic levels. The CDC has noted that since 1960 the U.S. has nearly tripled obesity rates from 13% in 1960 to 36% in 2010. From the last two reporting periods, the rate of male obesity increased from 26.5% to 33.0%. Male college graduates had the lowest percentage of 25% however the rate increased to 35% for males who had some college. Male non-Hispanic black and male Mexican-Americans who had completed college had the highest rates of obesity (Ogden, C. et. al. 2010; May A., et. al. 2013).

Females increased from 32.4% to 34.9% from the previous reporting periods, which was not considered a significant difference. However, non-Hispanic black women had 51% rate of obesity that was 10% higher than Mexican-American women and 20% higher than non-Hispanic white women. Women who had completed college had 13-16% lower rates than women who did not (Ogden, C. et. al. 2010; May A., et. al. 2013). For children rates were based on head of household information. For children, those head of household who completed college were 15% less obese than those who did not complete college. Rates went down from 11% to 7% for girls whose head of household completed college. The converse was true for girls whose head of household did not complete high school; the rate went up from 17% in 1999-2002 to 23% for 2007-2010 reporting periods (Ogden, C. et. al. 2010; May A., et. al. 2013). Highest rates were among non-Hispanic black girls at 22%. Highest rates for boys were among Mexican-Americans at 24% (May, A., et. al. 2013; Ogden, C. et. al., 2010).

Childhood obesity is also rising and 1 in 6 preschoolers are obese (CDC, 2010). In a Canadian study, single parent mothers were three times more likely to have obese children than those who were married or with a partner (Rossiter, M. and Evers, S., 2013). Breastfeeding is inversely correlated to obesity and rate of illnesses compared to those who were bottle fed or given solid foods before 6 months of age (WHO, 2014; Horta, B. et. al. 2007). Many single mothers do not breastfeed or stop early because they need to go back to work. Low-income homes are impacted often by choosing empty calorie foods or fast foods as local fresh produce and meats are not available in their area (CDC, 2010). “Food deserts” are common in rural or low-income areas where fresh produce and meats are not readily available or affordable (WHO, 2007; WHO 2013). Obesity does not necessarily equate into over-nourishment but can be another form of mal-nourishment thereby creating a “double burden” on the child and healthcare system (WHO,



2014). Eating high calorie, low nutrient food items can leave or deplete a body of necessary nutrients. While the common view of a malnourished child is underweight, in high economic countries it can present as overweight or obese child. These children tend to be in lower income homes that are from high economic countries (WHO, 2015). However the rate of childhood “overweight and obesity are now on the rise in low- and middle- income countries, particularly in urban settings” (WHO, 2015, p. 2).

Obese children tend to have more severe disease risks factors as adults. This is in part from the body being taxed for longer periods of time in an unhealthy state. Prolonged obesity may have caused considerable or irreparable damage to the body (WHO, 2014). Childhood obesity is highly correlated to dyslipidemia, insulin resistance (IR), type 2 diabetes (T2D), hypertension (HTN), metabolic syndrome (MS), cardiovascular disease, low self-esteem, mental health issues, depression, fatty liver, gallstones, joint pain, breathing problems, apnea and asthma (CDC, 2015; Khadilkar, V. et. al., 2012; Martine, L. et. al. 2009). Possible reasons for the differences are cultural, societal, low income, breastfeeding, environmental and lack of physical activity (Caprio, s. et. al. 2008). The CDC recommends promoting physical activity, improving nutrition and seeking the help of society to change the rates of obesity (May, A., et. al. 2013; Caprio, S. et. al. 2008; WHO 2015).

The health risks and complications for both overweight and obese children and adults correlate to the many of the leading causes of death in the U.S. The majority of the leading causes of death are inflammatory conditions that can be modified through nutrition and exercise (Caprio,

**2013 Leading Causes of Deaths in the U.S.**

<b>Total deaths in 2013</b>	<b>2,596,993</b>
Diseases of heart	611,105
Malignant Neoplasms	584,881
Chronic Lower	
Respiratory Disease	149,205
Accidents	130,557
Cerebrovascular Disease	129,978
Alzheimer's	84,767
Diabetes Mellitus	75,578
Influenza & Pneumonia	55,979
Nephritis, Nephrosis	
Nephrotic syndrome	47,112
Chronic Liver Disease	36,427
Hypertension & Renal HTN	30,770
Parkinson's Disease	25,196
HIV	6,955
(CDC, 2015)	

S., et al. 2008; WHO, 2015).

Modifiable lifestyle factors are factors can be changed to help improve the well-being and health of an individual. As noted earlier, personal, religious and societal beliefs can affect the health of a person. For those helping people get healthy and lose weight, it is important to have a basic knowledge of local, regional and societal beliefs regarding food and weight. (Caprio, S. et al., 2008). Some cultures value being overweight or obese as a sign of wealth and fertility (Kanter, R. & Caballero, B. 2012). While at the same time, viewing being too thin as a sign of poverty or malnutrition (Kanter, R. & Caballero, B. 2012). Certain religions promote a vegan or vegetarian lifestyle. Therefore, understanding the basics of nutrition and how to use various foods to ensure a complete variety of nutrients are provided is essential when helping educate and encourage healthy eating (WHO, 2013; Khadilkar, V. et. al., 2012).

Dyslipidemia, high blood pressure, kidney issues, or metabolic syndrome often precludes Type 2 Diabetes (T2D). T2D is common with overweight or obese patients. T2D is an endocrine disorder where the body no longer responds appropriately to insulin thereby not allowing insulin to usher in glucose into the cells for energy. The body then created more insulin to achieve the results needed, over time the pancreas' performance slows and insulin is no longer made at adequate levels (Copstead, L. & Banasik, J., 2013). The complications of T2D are insulin resistance, heart disease, blindness, neuropathy and organ damage, kidney complications, headaches, slow healing, yeast infections, stroke, tooth decay and oral hygiene issues. The younger one is diagnose with T2D the greater risk for cardiovascular disease. T2D is the leading cause of kidney failure (Copstead, L. & Banasik, J., 2013). When the body cannot utilize the glucose for energy, it has to work harder to get the energy it needs. Diabetes damages blood vessels, depending on the location damage to nerves and organs can happen such as kidney

failure (NKF, 2015), retinopathy, slow wound healing, headaches, atherosclerosis, cardiovascular disease and cerebrovascular disease (Copstead, L. & Banasik, J., 2013). T2D is highly correlated to low physical activity and overweight. T2D can be managed through diet and exercise (WHO, 2014; NKF, 2015; Khadilkar, V. et al. 2012). In a RCT the use of *Aegele marmelos* coupled with diet and exercise showed significant improvements in fasting blood glucose, HbA1c and systolic blood pressure (Sharma, P & Sharma, S., 2013). *Aegele marmelos* promotes insulin sensitivity (Sharma, P. & Sharma, S., 2013). Insulin promotes cellular growth and maintenance of tissues, creation of lipids, triglycerides and proteins (Kharrazian, D., 2015). Therefore, when too much insulin is present in the blood stream it can create abnormal lipid profiles, trigger inflammation and destruction to tissues (Kharrazian, D., 2015). Insulin affects sodium retention therefore changes in kidney function will then affect blood pressure that in turn can affect the cardiovascular system. It is imperative to treat dyslipidemia, hypertension, pre-diabetes and metabolic syndrome before it becomes T2D, often times this can be achieved through nutrition and exercise (Copstead, L. & Banasik, J., 2013; Kharrazian, D., 2015).

In a study done by Khadilkar, V. et al. (2012) the use of multivitamins with zinc, lifestyle counseling and exercise were shown to improve cardiometabolic factors among overweight children than lifestyle and exercise alone. Khadilkar, V. noted that both obesity and metabolic syndrome are “considered oxidative stress related disorders” (Khadilkar, V., et al., 2012, p.125). Therefore the use of antioxidants may help protect or reverse the impact of oxidative stress. Khadilkar, V. et al. (2012), also noted that micronutrient deficiencies have not been examined in children but may prove to help overweight children reverse the effects on the cardiometabolic system. In adult studies, antioxidants such as zinc, vitamin C, E, beta-carotene have shown to improve function, strengthen blood vessel lining, and play a role in hypertension. Zinc has also

been shown to reduce insulin resistance, this coupled with dietary changes and exercise had significant changes in the children in reversing health issues.

Cardiovascular disease is the number one leading cause of death in the U.S. Obesity, lifestyle factors, physical activity, stress, genetics and metabolic syndrome can be the underlying causes for CVD (WHO, 2015). CVD encompasses a group of cardiac and vascular issues; coronary heart disease, cerebrovascular disease, peripheral artery disease, rheumatic heart disease, congenital heart disease, deep vein thrombosis, and pulmonary embolism (WHO, 2015; Copstead, L. & Banasik, J., 2013). Coronary heart disease is a disease of the blood vessels to the heart muscle. Cerebrovascular disease is damage of the blood vessels to the brain. Peripheral arterial disease is disease of the blood vessels to the arms and legs. A streptococcal bacterium that can cause rheumatic fever and damage the heart muscle and heart valves cause rheumatic heart disease. Congenital heart defects are heart conditions that a child is born with. Deep vein thrombosis and pulmonary embolism are blood clots that have the potential to dislodge and go to the heart or lungs (WHO, 2015; Copstead, L. & Banasik, J., 2013). Symptoms of heart disease often go unannounced until a major event presents itself. Common symptoms are increased blood pressure, increased cholesterol, overweight, increased blood glucose readings. Risk factors for CVD are an unhealthy diet, increased alcohol intake, smoking, decreased physical activity and being overweight. Many of the risk factors are modifiable by changing one's dietary habits, applying stress management skills, decreasing alcohol consumption, cessation of smoking, and increasing physical activity (WHO, 2015; Copstead, J. & Banasik, L., 2013; Kharrazian, D. 2015). Understanding of hereditary factors and epigenetics is important in the treatment of a patient with CVD. Inflammation is the underlying cause in many of the situations. A personalized approach to changing CVD is highly recommended where a person is counseled

on nutrition, health, physical activity and management of stress (Gustafson, C., 2013).

Mark Houston (2013) reviews the role of nutrition, vitamins, minerals and supplements in the treatment of hypertension. Houston noted the change in our ancestor's Paleolithic diet to the Standard American Diet (SAD) has left many with health conditions that are inflammatory and has "produced an epidemic of nutritionally related diseases. Hypertension, atherosclerosis, coronary heart disease (CHD) myocardial infarction (MI), congestive heart failure (CHF), cerebrovascular accidents (CVA), renal disease, type 2 diabetes mellitus (DM) metabolic syndrome (MS) and obesity are some of the diseases" (Houston, M., 2013, p. 33). Oxidative stress, autoimmune issues, genetics and environmental factors play a role in CVD and hypertension. Decreased physical activity, macro- and micro-nutrient deficiencies, and lifestyle choices such as smoking and excess alcohol intake can contribute to CVD and HTN. Deficiencies in omega-3 PUFA (poly unsaturated fatty acids) and increase in omega-6 PUFA, increased sodium intake, low intake of potassium and magnesium rich foods contribute to increased blood pressure and CVD. Houston recommends a diet rich in omega 3's, eating whole fresh fruits and vegetables that are rich in magnesium and potassium, vitamin C, calcium, zinc help reduce CVD and HTN (Houston, M., 2013). Lean protein, fiber, garlic, olive oil, green tea, seaweed have shown to reduce BP. Low Vitamin D has an increased risk of HTN. Vitamin D affects blood pressure through the calcium-phosphate channels. Vitamin D helps regulate blood pressure and insulin metabolism (Houston, M., 2013). Vitamin B6 has been shown to lower levels of homocysteine and CRP, they are inflammatory markers for CVD (Kharrazian, D. 2015). Vitamin B6 can cause anxiety in some patients; therefore a non-methylated form such as hydroxycobalamin is suggested for such patients (Kharrazian, D. & Culleton, T. 2015). To summarize, Houston's recommendations are a diet rich in whole foods, supplementation,

antioxidants, exercise, weight loss, reduced use of alcohol and caffeine and smoking cessation should be integrated in a patient's care in order to reduce the effects of hypertension (Houston, M., 2013; Alshuwaiyer, G. & Taylor, E., 2013).

Cancer is the second leading cause of death in the U.S. (CDC, 2015). Certain cancers are correlated to obesity (Ogden, C., et. al. 2010). Tobacco, nutrition, obesity, sun exposure and sexual exposure are lifestyle factors that can be prevented or encouraged to change to reduce the risk of certain cancers (Copstead, L. & Banasik, J., 2013). The American Society of Clinical Oncology recommends being physically active to reduce the risks of certain cancers "including postmenopausal breast cancer, colorectal cancer, uterine cancer, kidney cancer, pancreatic cancer, gallbladder cancer, thyroid cancer, and esophageal cancer" (Guh, D. et. al. 2009; Cancer.Net, 2013). Insulin resistance, inflammation, and obesity increase the risk of some cancers (Guh, D. et. al. 2009; Ogden, C., et. al., 2010). Some breast and uterine cancers use hormones to grow and spread. A sedentary lifestyle coupled with being overweight increases the risk for hormonal cancers to spread. Physical activity can reduce inflammation, improve insulin sensitivity, prevent obesity and improve hormone levels (Cancer.net, 2015). A diet high in fresh fruits, whole grains, vegetables and fiber has been shown to maintain a healthy weight thereby reducing the risk of cancer through nutrition (Branscum, P. & Sharma, M., 2014; Copstead, L. & Banasik, J., 2013).

The brain weighs approximately three pounds. The brain's preferred source of energy is glucose (Insel, P., Ross, D., McMahon, K., and Bernstein, M., 2014). The brain uses approximately 20-25% of the body's glucose supply (Insel, P. et al., 2014). In order to keep the brain healthy, it needs oxygen, glucose and stimulation (Kharrazian, D. 2015). The blood-brain-barrier helps protect the brain from foreign invaders, toxins, bacteria and inflammatory

responses. Diet can play a role in the health of the brain. Gluten and dairy products can cross the blood brain barrier and result in neuro-inflammation (Vojdani, A. et al., 2014; Ford, R. 2009). Neuro-inflammation can result in headaches, migraines, gluten ataxia, cerebellar ataxia, peripheral neuropathy, learning disabilities, ADD, ADHD and neurodegenerative disorders such as dementia, Alzheimer's disease and Parkinson's disease to name a few (Kharrazian, D., 2015; Volta, U. & DeGiorgio, 2010). There are several contributing factors such as environmental exposure, stress, and genetics that are worth noting but are beyond the scope of this paper (Vojdani, A., and Lambert, J., 2009).

The Gut-Brain Axis is well established in literature and is important in maintaining homeostasis and proper functioning of the GI tract (Leung, K. & Thuret, S., 2015). The health of the gut can have a direct affect on the brain and vice-versa. Therefore, when looking at cerebrovascular health it is important to consider the health of the gut and diet (Mayer, E., Knight, R. Mazmanian, S., Cyran, J. and Tillisch, K., 2014). Gluten sensitivity can also trigger neurological issues (Volta, U. & DeGiorgio, R., 2010). Damage to the gut due to celiac can also alter the how the GI tract not only absorbs nutrients but relays messages to the CNS. Damage to the gut due to celiac can also release inflammatory cytokines that can cross the blood-brain-barrier (BBB)(Hadjivassiliou, M., Sanders, D., Grunewald, N., Woodroffe, N., Boscolo, S. and Aeschlimann, D. 2010). The status of the gut microbiota and inflammation are predictive of health outcomes (Leung, K. & Thuret, S., 2015). Vojdani, A. et al (2014) demonstrated that “molecular mimicry between  $\alpha$ -gliadin, cerebellar peptide, milk butyrophilin, and MOG, and the simultaneous detection of antibodies against these protein in a small percentage of the population may have broader implications in the induction of neuroimmune disorders” (Vojdani, a., et al, 2014, p. 33). When wheat and milk are ingested and the subsequent antigens are produced in the

gut mucosa, it can also cross the BBB resulting in neuroimmune disorders (Vojdani, A., et al, 2014). The health of the gut is paramount on improving the health of a patient with gluten sensitivity. Removal of gluten, foods that mimic gluten and the introduction of probiotics, omega-3 and L-carnitine are recommended treatments (Vojdani, A., et al, 2014; Leung, K. & Thuret, S., 2015). Food sensitivities have been correlated to those with celiac and IBS, therefore evaluation of fecal assays and food sensitivities are warranted in patients with GI disorders (Carroccio, A., Brusca, I., Mansueto, P., Soresi, M., D'alcamo, A .... Di Fede, G.t. al. 2011).

Cerebrovascular events, Alzheimer's (AD) and Parkinson's disease (PD) are some of the top leading causes of deaths in the United States (CDC, 2015). Obesity, inflammation and blood sugar metabolism are factors in these conditions (Kharrazian, D. & Culleton, T., 2015). De la Monte, S. & Wands, J. (2008) reported in a postmortem and experimental animal models study that AD as Type 3 Diabetes Mellitus "corresponds to a chronic insulin resistance plus insulin deficiency state that is largely confined to the brain, but like NASH, can overlap with T2DM" (De la Monte, S. & Wands, J., 2008, p. 1102). Calorie restriction, autophagy and protein content can help improve brain plasticity and CNS function (Leung, K. & Thuret, S., 2015). Exercise and vagal nerve stimulation can produced positive responses in the gut-brain axis (Leung, K. & Thuret, S., 2015).

Food addiction is a controversial topic but worthy of investigating given the rate of obesity. High-fat high-sugar foods (HFHS) can act upon the neuronal pathways and trigger addiction similar to drug addiction (Hardman, et. al., 2015; Pivarunas, 2015). Constant exposure to HFHS can disrupt the balance and pathways in the brain. Emotional Dysregulation, impulsivity and addiction are main issues for someone who struggles with their weight. Negative urgency is the ability to act impulsively under stress; this is negatively correlated to bulimia nervosa (Pivarunas



& Conner, 2015). Food and drugs both activate the same brain regions- the amygdala, insula, orbitofrontal cortex and striatum. Both act on dopamine within the “nucleus accumbens and limbic system, in particular, and opiate systems” (Pivarunas & Conner, 2015; Kharrazian, D. & Brock, B., 2015). Food addiction is controversial in the medical community, part of the medical community does not want to send the message that “food addiction” is real in order to prevent an idea that “obesity is a disease” thereby removing personal choice and self-efficacy from the patient (Hardman, et. al., 2015). In a study done by Pivarunas & Conner (2015) evaluated 878 under-graduate students in regards to their beliefs and responses based on a battery of tests including the Yale Food Addiction Scale (YFAS). Negative urgency, emotional dysregulation were highly correlated to food addiction while premeditation was not. This study is limited in that it was given to undergraduates and may not translate across other socioeconomic distinctions (Pivarunas, B. & Conner, B. 2015). Hardman, C. et al. (2015) performed a blind study to evaluate whether self-diagnosis of food addiction correlated to food intake and YFAS. Two groups were given newspaper articles to read about food addiction. One group was given an article that “Food Addiction is Real” and the other group given an article about “Food addiction is a Myth.” 57% of the real group vs. 27% myth group was perceived to be food addicts. There was no significant difference in the amount of food consumed. Based on the YFAS, 8% were diagnosed as food addicts whereas 42% of the whole sample self diagnosed themselves as food addicts (Hardman, C., et al. 2015). It is proposed those in the myth group dismissed or did not honestly answer due to the bias of food addiction being a myth. Whereas, the real group may have exhibit similar behavior as “medical student syndrome” and inflated their answers based on the material received (Hardman, C., et al, 2015). A study done to evaluate public opinion of what food addiction means and the behaviors/beliefs associated was performed (Ruddock, H.,

Dickson, J, Field, M., Hardman, C., 2015). 210 participants were randomly divided into two groups and answered an online questionnaire that allowed for short responses to the questions. One group was given information on food addiction and the other was not. There was no significant difference between the two groups in regards to being identified as a food addict. Six main characteristics were identified for food addiction; “1) Reward-driven eating...2) A functional or psychological preoccupation with food, 3) A perceived lack of self-control, 4) Frequent food cravings, 5) Increased weight or an unhealthy diet, and 6) A problem with a specific type of food” (Ruddock, H., et al., 2015, p. 262). A study on weight loss patients found that food addiction was correlated to increased levels of depression, impulsivity, binge eating, low-self esteem, body shame and decreased emotional dysregulation (Burmeister, J, Hinman, N., Koball, A., Hoffmann, D. and Carels, R., 2012). These behavioral factors are important to consider as they could undermine efforts for weight loss and perpetuate an unhealthy lifestyle. This study is limited in that no physical or serological makers were taken to determine if there were biological processes that underlie various beliefs (Burmeister, J. et al., 2012). As noted earlier, food sensitivities, gluten and DM can contribute to cravings, depression and neurological issues (Leung, K. & Thuret, S., 2015). A study on T2D and food addiction, when administered the Yale Food Addiction Scale (YFAS) 70.7% scored positive for having a food addiction compared to the average population of 5-7% having a food addiction (Raymond, K & Lovell, G., 2012). Other findings of the study were BMI was greater in T2D food addicts (FA) than non-food addicts (NFA). FA and impulsivity, depression, stress, anxiety are significant in relation to BMI. FA and impulsivity had the strongest relation to BMI (Raymond, K. & Lovell, G., 2012). It was proposed that those who are overweight might have a genetic component that promotes food addiction thus contributing to T2D. Due to the comorbidities of T2D such as kidney

disease, cancer, vision, fatty liver, counseling, nutrition education and exercise education are crucial to help reverse T2D in these patients (Raymond & Lovell, 2015).

Behaviors and beliefs play a role in obesity. 13,857 adolescents were evaluated for risky weight-control behaviors such as taking diet pills, laxatives, vomiting or fasting. The study used the self-reported information from the Youth Risk Behavior Surveillance System (YRBSS), BMI calculations and questions about diet and exercise (Forrest, K. & Forrest, A., 2008). Results showed that close to one-third of the students viewed themselves as overweight while 28.7% were overweight based on BMI scores. 45.6% of the students sampled were trying to lose weight through exercise (60%), decreased food consumptions (40.7%), fasted 24 hours or longer (123%), used diet pills (6.3%) and either used laxatives or vomited (4.5%) (Forrest, K. & Forrest, A., 2008). Females were twice as likely to use risky weight control methods than males (22% vs. 10.6%) (Forrest, K. & Forrest, A., 2008). YRBSS showed that self-perception had a higher correlation of risky behaviors than actual weight/BMI. Dieters exhibited higher rates of alcohol consumption, tobacco use and being sexually active. It was noted that adolescent disordered dieting and eating had a “strong correlation with depression, suicidal ideation and substance abuse” (Forrest, K. & Forrest, A., 2008, p. 6). Therefore the researchers encourage schools to educate students on proper nutrition, weight management, physical activity and promoting a healthy body image as well as the effects of alcohol and tobacco use (Forrest, K. & Forrest, A., 2008). Boyle & LaRose looked at college student behaviors in regards to nutrition and exercise. They noted that approximately 36% of U.S. college students are overweight or obese. Boyle & LaRose propose that poor diet and decreased physical activity play a major role in it. 40% of the student sample was overweight or obese, however of that 40% only 51% recognized themselves to be overweight or obese, this can be a main factor in why students do

see a need for change (Boyle, J. & LaRosa, N., 2008). Of the students involved in the study only 3% ate the daily-recommended intake (DRI) for vegetables and 28% consumed DRI for fruit (Boyle, J. & LaRose, N., 2008). Self-efficacy was highly correlated to health, diet and physical activity (PA). In a qualitative study done by Suggs, McIntyre & Cowdrey, low self-efficacy, time and available resources were among the main barriers for physical activity (Suggs, L., McIntyre, C. and Cowdrey, J., 2010). Students who believed they could create a PA plan were more likely to be active. TV viewing had a negative correlation to PA. PA increased when the proximity PA campus centers were available for students (Boyle, J. & LaRose, N., 2008). Exercising brings negative connotations to many people, therefore presenting physical activity as a fun, positive way to be healthy is crucial to encouraging those with low self-efficacy (Suggs, L., McIntyre, C. and Cowdrey, J., 2010). Commuting is a common factor in the decrease of physical activity among college students and adults (Moczulski, V., McMahan, S., Weiss, J., Beam, W. and Chandler, L., 2007). Moczulski, V. et al. noted that for each additional 60 minutes of commuting increases the probability of additional 6% of being obese (Moczulski, et al., 2007). Colleges and universities are encouraged to educate students on health, nutrition, and provide on-campus physical activity centers or events to encourage students to live a healthy lifestyle. Such efforts can help curb the trend in obesity (Boyle, J. & LaRose, N., 2008).

Aging is a part of life however slower cognitive processes and immobility need not be. Proper nutrition, exercise and an active lifestyle can help keep the mind and body highly functioning (McCough, E. & Zumsteg, J., 2013). Physical activity can have positive benefits in reversing sarcopenia, increasing muscle mass, lowering body fat percentage, increasing mobility, improving cognitive function, and improving actions of daily living (Rosendahl, E., E., Lindelof, N., Littbrand, H., et al, 2006; Burge, E., Kuhne, N. et al., 2012, Ahlskog, J, et al., 2011). Studies

are replete showing the positive effects of exercise for reducing HTN, CVD, CHD, T2D, weight and stress (McCough, E. & Zumsteg, J., 2013; Burge, E., Kuhne, N. et al., 2012, Ahlskog, J, et al., 2011). Sarcopenia and dynapenia often occur in the elderly due to immobility and inflammation (Breen, L. & Phillips, S., 2012). Sarcopenia is muscle loss and dynapenia is loss of muscle strength. Weakness, low handgrip strength and loss of muscle are highly correlated to increased risks for falls, slower cognition and increase T2D, RA, OA, osteoporosis and vascular disease (Breen, L. & Phillips, S, 2012). Appropriate physical and nutritional interventions are needed for those who have lost too much muscle. Inclusion of quality protein in the diet and physical exercise is recommended to increase muscle mass and strength (Heyland, D., Stapleton, R, Mourtzakis, M., Hough, C., Morris, P. ...Needham, D., 2015; McCough, E. & Zumsteg, J., 2013; Breen, L. & Phillips, S., 2012). Daily physical activity is appropriate for all ages as it can have neuroprotective effects upon the brain, enhance mobility and increase strength. Age adjusted or adaptive exercise is beneficial for patients with limitations (Breen, L. & Phillips, S., 2012). Exercise is a stress therefore a patient with health issues should be evaluated by their PCP and counseled on appropriate types of exercise. It is important to find physical activities one enjoys to insure continued success and lifelong benefits (Ahlskog, J. et al., 2011).

Several studies have shown positive effects of nutrition and exercise on dementia and PD patients (McCough E., & Zumsteg, J., 2013; Rosendahl, E., et al., 2006; Swaminathan, A & Jicha, G., 2014; Ahlskog, J. et al., 2011; Burge, E., et al., 2012). Although there are no cures for dementia, AD or PD nutrition and physical activity can help curb the progression and potentially improve ADL's and quality of life. Burge, et al., (2012) found that incorporating PA in moderate to severe dementia patients were able to lose weight, slow the progression of the illness, increase ADL's, lessen the burden of the family and caregivers. Therefore, "Exercise should not be

overlooked as an important therapeutic strategy” (Ahlskog, J. et al, 2011, p.876).

Swaminathan & Jicha (2014) presented a meta-analysis of nutritional interventions for AD. The use of vitamins, minerals, and nutritional supplements can improve health and lower the healthcare cost. Discussion of metabolic syndrome and the Western diet foods high in omega-6s, and high calorie, low nutrient foods contribute to inflammation in the body. Therefore, eating whole foods rich in vitamins and minerals and adopting a Mediterranean type diet is encouraged (Swaminathan, A & Jicha, G, 2014). Antioxidants Vitamin E, C, CoQ10, Selenium is encouraged to be part of the diet along with lipoic acid, beta-carotene. Fatty acids play a major role throughout the body and are found in all cell membranes, help lower inflammation and lower cholesterol. DHA and EPA are two main fatty acids found in the body. The most prolific omega-3 in the brain is DHA (Swaminathan, A & Jicha, G, 2014). Regular use of fish oils has shown a decrease in the rate of AD in epidemiological studies (Jicha, G. & Markeberry, W., 2010). Nutritional supplements such as turmeric, resveratrol, Gingko Biloba and Huperzine A were also presented as having positive effects on AD (Swaminathan, A & Jicha, G, 2014). This advice not only applies to AD patients but to those who do not have a presenting problem. A diet high in nutrients, vitamins, minerals and void of inflammatory chemicals will benefit any one.

As noted throughout this paper, stress is a major factor in weight issues. Stress increases cortisol that triggers the sympathetic nervous system for a fight or flight response (Seaward, B., 2012). When the body is stressed it shunts energy away from certain organs in order to take care of the emergency. Cortisol raises blood pressure, increased sodium retention, releases glucose and fatty acids into the blood for needed energy (Copstead, L. & Banasik, J., 2013). It is hypothesized, when the body does not utilize these it will get stored as adipose tissue thus contributing to weight gain (Seaward, B., 2012). When the body stays under a constant stress it

enters and adaptive state that can trigger inflammation, illness or disease states. Therefore, it is important to learn how to manage stress as part of a healthcare program. Counseling, support groups, progressive muscle relaxation, T'ai chi, art therapy, mindful eating, music therapy, yoga have been shown to help reduce stress in individuals (McPherson, F. & McGraw, L., 2013; Seaward, B., 2012; Li, Y., Wang, R., Tang, J. et al. 2015; Caldwell, K., Baime, M. & Woliver, R., 2012; Martin, L. et al., 2009; Beebe, N., et al., 2012; Thoma, M. et al., 2013).

A methodological approach to preventing and treating obesity is key in making health changes. Understanding the basics of human development, what the necessary nutrient requirements each stage is and what is appropriate physical activity will help establish healthy guidelines for individuals (Insel, P. et al, 2014; Kanter, R. & Caballero, B., 2012). Patients have verbalized they are wanting their PCP's advice on nutrition and exercise and yet many do not receive it (Stockigt, B., Teut, M. & Witt, C., 2013; Ahlskog, J. et al., 2011). The World Health Organization in a policy brief on "Childhood Overweight" (WHO, 2014) recommends five main interventions to help reduce the rate of childhood overweight and obesity worldwide. The main interventions encompass nutrition education; developmental standards; improving community understanding and societal norms; addressing the marketing of foods to children; understanding and influencing the food system and its environment; and improving nutrition in neighborhoods (WHO, 2014). The CDC also has its own framework for addressing these issues (CDC, 2015). However, it has been noted that many times policy makers do not have control or influence over budgets and therefore many of the needed reforms do not take place on a national or state level but wind up being addressed at the local level (IOM, 2010). With this in mind, the researcher of this paper has created supplemental material that is based on a developmental wellness model to use for educating and encouraging persons in the area of nutrition, exercise and stress

management (WHO, 2014; Branscum & Sharma, 2014; Roman, A. 2014).

## **Conclusions**

Since 1990, the rate of obesity has increased yearly and does not appear to be slowing down both in the United States and worldwide. 68% of adult Americans are overweight or obese and one in six children are obese; the need for intervention has never been greater. Obesity is a multifactorial issue with several lifestyle modifications that can be addressed and changed. Obesity brings with it many comorbidities such as T2D, CVD, CHD, joint pain, gout, dyslipidemia, immobility, neurodegeneration. Such comorbidities not only place a burden on the individual but also society and healthcare. Modifiable lifestyle changes such as nutrition, exercise, stress management and relaxation therapies have shown to have a beneficial effect on promoting and restoring health.

Primary care providers (PCP) often tell patients they need to get healthy through diet and exercise. However, many times the patient is left with general guidelines that are either too vague or confusing for the patient to interpret and apply into their daily lives. Many leave the PCP's office unsure of how to incorporate their advice. It is estimated that patients rely on the doctor's knowledge level for nutrition and exercise and yet 50% of PCP's do not address it nor provide adequate material for the patient. The use of a CAM wellness model that approaches healthy lifestyle choices through nutrition and exercise should be the first line of defense. Not only can exercise and nutrition be preventive but also used as tool to reverse the affects of poor health, reduce the affects of aging, dementia, AD, and loss of ADL. Conversations with the patient and recommendations for the patient should include information on what they are interested in, any physical limitations to be aware of, S.M.A.R.T. goals, along with sound



nutritional and exercise advice that is age appropriate. It has been noted that practitioners should have handouts as well as online materials and resources that are appropriate for their patients.

Practitioners should be aware of the mental, emotional and religious aspects of food behaviors. Food addiction can have organic causes as well as mental health issues. History of abuse, trauma, or tragedy can be underlying causes for obesity. Understanding the various dietary rules or restrictions due to religious or personal beliefs will also help direct the practitioner on providing the patient with appropriate nutritional advice.

Economics, work and stress can contribute to obesity and/or unhealthy lifestyle choices. The CDC has shown that obesity in children is highest among single mothers with less education than those with a college degree. Low-income families have higher rates of obesity often times due to the inability to afford or find fresh fruits and vegetables or food deserts in their neighborhood. Commuting for long periods to work and school are correlated to higher rates of obesity. This has been attributed to eating in the fast food in the car as well of the stress of driving. Stress increases cortisol, which in turn encourages weight gain.

Physical activities (PA) have direct correlations to physical and mental health. PA has neuroprotective benefits and can help increase cognition and activities of daily living (ADL) in several populations such as dementia, AD, PD, the frail and elderly. ACSM recommends that children engage in physical activity each day for at least 60 minutes throughout the day (ACSM, 2009). ACSM recommends for adults to seniors 150 minutes per week or 30 min/5days per week of moderate activity or 60 minutes of high intensity exercise 3 times per week coupled with 2 days of flexibility and strength training (ACSM, 2009). PA can help increase strength and muscle mass in the aging population, help reduce the risks of falls and other comorbidities associated with a sedentary lifestyle.

Stress management can help relieve pain, promote healing, decrease stress hormones, and reduce homocysteine. Various methods such as progressive muscle relaxation, t'ai chi, art therapy, music therapy, meditation, gratitude journaling, cognitive behavioral therapy have been used to help decrease stress in patients. Referrals to counseling may be necessary depending on the issues presented by the patient.

### **Recommendations**

Providing patient education, attractive and easy to understand handouts based on developmental stages can help encourage the patient to live a healthy lifestyle in regards to both nutrition and exercise. Educating the patient/parent on what basic nutrition looks like, fun ways to involve the family with cooking and providing recipes for them to try are great ways to encourage lifestyle changes. Eating well-balanced meals, that are nutrient dense, low in saturated fats and sugars throughout a lifetime will promote health and decrease the risk of obesity and its comorbidities of metabolic syndrome, T2D, CVD, and CHD.

Understanding developmental stages and appropriate play for infants through seniors will provide a framework for physical activity. Discovering and participating in a “Fun, Sweaty Activity” has higher rates of success with continued participation in physical activity. PA has been shown to increase cardio-vascular health, cerebrovascular health, strength, balance and mobility. Engage in activities that promote familial bonds. Cross-generational activities are encouraged to help both young and old bridge the age of learning and communication.

Aging is expected, getting old is optional. If one wants to stay young at heart it is imperative for one to continue to play at heart. Be active, eat right, reduce stress, breathe deeply, learn new things, forgive others and self, be grateful, be creative, enjoy the best of each day and sleep well. All of these have protective and positive benefits to health.

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