

MODULE 3

PRINCIPLES OF HEALTHY AGING AND LONGEVITY

Learning Objectives:

1. List the factors for healthy aging and longevity described in the Blue Zones research
2. Describe the 7 dimensions of wellness
3. Discuss the dietary principles for disease prevention and reversal from epidemiological and intervention studies

Introduction

The oldest person ever whose age has been independently verified is Jeanne Calment (1875–1997) of France, who lived to the age of 122 years, 164 days. The oldest verified man ever is Jiroemon Kimura (1897–2013) of Japan, who lived to the age of 116 years, 54 days. It is estimated that there were a little over 550,000 centenarians in the world in 2020 and that number is expected to grow considerably over the next several decades. Most of this expected growth is simply due to there being more and more older people in general combined with the continued development of medical technology and medicines designed to keep people alive for longer. While some people are genetically predisposed to longevity, research has shown that lifestyle is a much more important factor for how well and how long a person lives. So, what are these factors? Epidemiological research from studies such as the Blue Zones provides some insight while disease intervention studies provide additional evidence. In this section we will review this evidence and focus especially on nutrition/dietary factors.

Factors for Disease Prevention

The first rule of living longer is simply “don’t die”. For adults who live past the age of 50 the greatest threat to life is the development of a chronic disease such as cardiovascular disease, diabetes, and cancers. There are four primary lifestyle factors that significantly contribute to risk of most major chronic diseases. These are simply:

- Tobacco Usage – Probably the worst thing a person can do to sabotage their health is smoking. Not only is it the most critical factor for the development of lung cancer and chronic obstructive pulmonary disease but it dramatically increases risk of the world’s leading killer – cardiovascular disease.
- Alcohol Consumption – Heavy alcohol consumption is associated with increased risk of a number of chronic diseases such as high blood pressure, cardiovascular disease, stroke, liver disease and many forms of cancer. Light to moderate alcohol consumption has been attributed to healthy outcomes but, according to the World Cancer Research Fund, no level of alcohol consumption is safe for cancer risk.
- Physical Activity Levels – Sedentary or insufficiently active lifestyles are associated with increased risk of many chronic diseases including cardiovascular disease, diabetes, several forms of cancer and obesity. Exercise studies demonstrate a dose-response relationship between activity levels and risk of disease meaning that higher levels of activity are associated with lower risk.
- Nutrition/Diet – There are numerous dietary factors that have been found to play a significant role in the development of major chronic disease. Increased meat, dairy and processed food consumption is associated with disease promotion while increased plant food consumption is associated with disease prevention and reversal.

While these four behaviors are important to prevent chronic disease, there are also other factors that are important for living a long healthy life that have been identified through research.

Lessons from the World’s Longest-Lived Peoples

One of the best ways to identify factors associated with longevity and good health is to study the individuals that have lived the longest. Blue Zones (also known as “longevity hotspots”) are areas of the world where there is a high concentration of nonagenarians (90+ years of age) and centenarians with very low rates of chronic disease. A large study funded by National Geographic sought to identify and study these populations. Five Blue Zones (Sardinia, Italy; Okinawa, Japan;

Loma Linda California, California; Ikaria, Greece; and Nicoya, Costa Rica) were originally identified and studied although several others have since been identified. These areas have the highest prevalence of 90 and 100-year-olds and some of the lowest rates of chronic disease in the world.

While these populations were different ethnicities; lived in different parts of the world; and had different cultural traditions, the researchers were able to distill some characteristics and behaviors that were common among them. There are 9 principles (known as The Power 9) divided into four categories (Source: <https://www.bluezones.com/2016/11/power-9/>):

Move

- 1) Move Naturally – The world’s longest-lived people don’t pump iron, run marathons or join gyms. Instead, they live in environments that constantly nudge them into moving without thinking about it. They grow gardens and don’t have mechanical conveniences for house and yard work.

Right Outlook

- 2) Purpose - The Okinawans call it “Ikigai” and the Nicoyans call it “plan de vida”; for both it translates to “why I wake up in the morning.” Knowing your sense of purpose is worth up to seven years of extra life expectancy
- 3) Downshift - Even people in the Blue Zones experience stress. Stress leads to chronic inflammation, associated with every major age-related disease. What the world’s longest-lived people have that we don’t are routines to shed that stress. Okinawans take a few moments each day to remember their ancestors, Adventists pray, Ikarians take a nap and Sardinians do happy hour.

Eat Wisely

- 4) 80% Rule - “Hara hachi bu” – the Okinawan, 2500-year old Confucian mantra said before meals reminds them to stop eating when their stomachs are 80 percent full. The 20% gap between not being hungry and feeling full could be the difference between losing weight or gaining it. People in the blue zones eat their smallest meal in the late afternoon or early evening and then they don’t eat any more the rest of the day.
- 5) Plant Slant - Beans, including fava, black, soy and lentils, are the cornerstone of most centenarian diets. Meat—mostly pork—is eaten on average only five times per month. Serving sizes are 3-4 oz., about the size of a deck of cards.
- 6) Wine at 5 - People in all blue zones (except Adventists) drink alcohol moderately and regularly. Moderate drinkers outlive non-drinkers. The trick is to drink 1-2

glasses per day (preferably Sardinian Cannonau wine), with friends and/or with food. And no, you can't save up all week and have 14 drinks on Saturday.

Connect

- 7) Belong - All but five of the 263 centenarians we interviewed belonged to some faith-based community. Denomination doesn't seem to matter. Research shows that attending faith-based services four times per month will add 4-14 years of life expectancy.
- 8) Loved Ones First - Successful centenarians in the blue zones put their families first. This means keeping aging parents and grandparents nearby or in the home (It lowers disease and mortality rates of children in the home too.). They commit to a life partner (which can add up to 3 years of life expectancy) and invest in their children with time and love (They'll be more likely to care for you when the time comes).
- 9) Right Tribe - The world's longest-lived people chose—or were born into—social circles that supported healthy behaviors, Okinawans created "moais"—groups of five friends that committed to each other for life. Research from the Framingham Studies shows that smoking, obesity, happiness, and even loneliness are contagious. So the social networks of long-lived people have favorably shaped their health behaviors.

These principles show that while nutrition and physical activity are important to longevity there are other relational, social, emotional and even spiritual factors that are also important. This wholistic view aligns with the concept of Active Aging. This concept has been proposed as a way to promote the benefits of an active lifestyle for increasing longevity and quality of life regardless of past experiences or current conditions. Active aging recognizes the importance of active engagement in life in multiple dimensions of wellness such as physical, emotional, social, spiritual, environmental, occupational and intellectual (see image below). The International Council on Active Aging (www.icaa.cc) has been instrumental in promoting the importance of active aging and its concepts including the Dimensions of Wellness model.



The wellness dimensions overlap and coordinate to provide rich environments for living. Wellness becomes a framework that is valuable for serving the wants and needs of a person engaged in life.

Emotional

Feelings are the lens through which people view the world, and the ability to be aware of and direct one's feelings helps to create balance in life. Coping with challenges and behaving in trustworthy and respectful ways signal emotional wellness, attributes that can be encouraged through peer counseling, stress management, humor/laughter and personal histories.

Intellectual, cognitive

Engaging in creative pursuits and intellectually stimulating activities is a proven approach to keeping minds alert and interested. There are many ways to stay intellectually active, including taking college courses, journaling, painting or joining a theater company, and challenging oneself with games and puzzles.

Physical

The goal of living independently is one shared by many people, and physical wellness is necessary to achieve this. Lifestyle choices that can maintain or improve health and functional ability include engaging in physical activity, choosing healthy foods with adequate nutrition, getting adequate sleep, managing stress, limiting alcohol intake, not smoking, making appointments for check-ups and following medical recommendations.

Professional, vocational

Work that utilizes a person's skills while providing personal satisfaction is valuable for society as well as the individual. Participating in the paid and unpaid workforce means maintaining or improving skills, and helping others. Older adults contribute to society as experienced professionals, caregiver, mentors, teachers and volunteers. Leisure-time vocations in the arts and through hobbies maintain vocational skills.

Social

Social interactions with family, friends, neighbors and chosen peer groups can be valuable for maintaining health. Personal contact by joining clubs, traveling, visiting friends and family, engaging in intergenerational experiences like making quilts with a elementary school children is beneficial for everyone who it touched.

Spiritual

Living with meaning and purpose in life, guided by personal values, is key to feelings of well-being and connection to the larger world. Group and individual faith-based activities, personal meditation, mindful exercise (yoga, tai chi) and experiencing nature can create the opportunity for spiritual growth.

Environmental

Surrounded by natural and man-made environments, good stewardship means respecting resources by choosing "green" processes that re-use and recycle goods. It also means looking at ways to bring people into the natural environment and encourage active living through urban and property designs

Fitness professionals who specialize in working with older adults should be familiar with these concepts and the importance of the non-physical factors that are important for healthy aging and longevity. However, the primary focus for most professionals will be on improving exercise and nutrition behavior. Let's explore nutritional factors in more detail.

Nutrition for Healthy Aging

The Blue Zones populations ALL follow a predominantly or exclusively whole food plant-based (WFPB) diet. While the types of foods differed due to being in different regions of the world and having different cultural traditions the diet was very similar in many key ways.

- 1) Animal foods, including meat (of any kind), dairy and eggs, were eaten very sparsely (if ever) and typically reserved for special occasions or used in very small amounts for flavoring.
- 2) Processed foods were rarely, if ever, consumed.
- 3) A wide variety of plant foods were consumed including legumes, nuts, seeds, vegetables, fruits and whole grains.
- 4) Plant foods were eaten as close to natural as possible with little to no processing.

Numerous longitudinal studies have been conducted on the residents of the Loma Linda, CA Blue Zone. This population is comprised of Seventh Day Adventists (a Christian church) who view healthy living as a central part of their Christian faith. This is a great population to study because while they are rather homogeneous in many ways (social support; socioeconomic status; access to health care; physical activity levels; etc.), their diet ranges from completely plant-based (e.g. vegan), to mostly plant-based (vegetarians) to somewhat plant-based (health-conscious omnivores). This allows researchers to analyze the effects of the diet without having to control for these other confounding factors. The studies consistently report a dose-response relationship between diet and several health outcomes such as cardiovascular disease, diabetes, hypertension, obesity and other risk factors with those following a more plant-based diet having lower risk and prevalence of these conditions.

Many other large-scale epidemiological studies support the health benefits of a plant-based diet to prevent chronic disease and reinforce the risks associated with eating animal products and processed foods. Clinical intervention studies have even demonstrated the ability of plant-based diets to not only prevent but to halt or even reverse several chronic diseases. We will review some of the evidence for a few of the most prevalent conditions: cardiovascular disease; diabetes; and cancers.

Cardiovascular Disease

Dean Ornish, MD was the first to publish studies documenting the reversal of cardiovascular disease through intensive lifestyle intervention that included a predominantly plant-based diet. His diet focuses on whole grains/starchy vegetables, vegetables, plant protein (legumes and tofu) and fruit. It allows for a minimal amount of egg white, low-fat dairy and refined carbohydrates. In a series of approximately 10 studies spanning about 25 years Ornish's research demonstrated that his Lifestyle Medicine Program (as it came to be known) to:

- Regress stenoses (arterial blockages) – thus reversing heart disease
- Significantly improve angina
- Improve myocardial blood flow
- Drastically decrease the need for further revascularization procedures
- Significantly improve cardiovascular outcomes of any kind including cardiac events and death
- Improve cardiovascular disease risk factors such as hypertension and dyslipidemia
- Reduce the need for medications
- Improve Left Ventricle Ejection Fraction (LVEF) in patients at risk of heart failure

Additional studies with thousands of subjects that put his program into practice in hospitals and businesses have documented immense health care cost savings due to the reduced need for future procedures. They also report improvements in depression, diabetes, weight loss and other variables related to quality of life. The Complete Health Improvement Program (CHIP) uses an Ornish-style program for employees and has published an incredible amount of research over the

past 20+ years documenting its effectiveness to improve health, reduce disease risk and improve outcomes for those with chronic disease.

A key finding from the Ornish research is that adherence matters. For example, after one year, the most adherent subjects achieved a reduction in stenosis diameter about 50% greater in the most adherent subjects compared to the medium adherent subjects and about 6 times greater than the least adherent subjects (Ornish et al, 1990). These same subjects were followed for 5 years and the differences between the groups were even greater with the most adherent subjects experiencing more than twice the amount of stenosis regression compared to the medium adherent subjects and 18 times greater regression compared to the least adherent subjects (Ornish et al, 1998). In addition, significant and meaningful improvements in cardiovascular disease risk factors, such as high blood pressure, high cholesterol, weight and triglycerides, can be achieved in 9 weeks or less. Dr. Ornish's Lifestyle Medicine Program is now approved for insurance reimbursement in the U.S. for hospitals that adopt it.

While Dean Ornish's program includes comprehensive lifestyle change that includes diet, exercise, stress management and social support, Caldwell Essylstein, MD demonstrated the ability of an exclusively plant-based diet to reverse cardiovascular disease without any other lifestyle changes. A renowned cardiologist at the Cleveland Clinic, Dr. Essylstein followed a group of 18 patients with severe coronary artery disease. After 5 years, 11 of the patients underwent angiography which showed that the disease had been arrested (did not worsen) in 3 and had regressed in 8 (Essylstein, 1995). After 12 years, 17 out of 18 remained adherent and had no further coronary events or interventions (Essylstein, 1998). To further these results, he followed 198 consecutive patients for, on average, 3.7 years after they had been counseled (in his clinic) to follow a plant-based diet.

Of the 198 patients, 177 were adherent and 21 were nonadherent (but who continued to receive usual medical care). In the adherent group there was a total of 1 cardiac event (stroke) while in the nonadherent group 13 patients experienced an adverse cardiac event. The adherent group had an event rate of 0.6% while the nonadherent group had an event rate of 62%.

Dr. Essylstein's "Heart Disease Reversal Diet" is "stricter" than Dr. Ornish's. It does not allow for any meat, dairy, caffeinated coffee, avocados or nuts, oil or refined sugar. It also requires patients to eat dark leafy greens six times per day in order to provide a large amount of nitric oxide which prevents inflammation in the arterial wall and causes the blood vessels to vasodilate easily. Dr. Essylstein's research included patients with advanced coronary artery disease so it was more important to be strict about their nutrition program – especially since they were not including other lifestyle behaviors such as exercise.

Diabetes

Type 2 diabetes is linked very closely with being overweight and/or obese. Numerous large-scale epidemiologic studies have established a strong link between diet and risk of type 2 diabetes as well. Satija (2016) conducted a meta-analysis from 3 prospective cohort studies (Nurses' Health Study 1; Nurses' Health Study 2; Health Professionals Follow-Up Study) and reported a significantly lower risk (34%) for those following a healthy plant-based diet low in animal foods. The Adventist Health Study 2 (Tonstad S, et al. 2009) reported decreasing prevalence of diabetes with increasing plant-based diets: 7.6% of nonvegetarians; 6.1% of semi-vegetarian; and 2.9% of vegans. Conversely, other studies have reported positive associations between type 2 diabetes and increasing consumption of meat (any kind).

Anderson and Ward (1979) were among the first to report reversal of type 2 diabetes following a high-carbohydrate, high-fiber (near vegetarian) diet. In less than 20 days 10 out of 26 subjects no longer needed insulin even though some had been diabetic for as long as 20 years. Dr. Neal Barnard conducted a series of studies demonstrating the benefits of a plant-based diet for type 2 diabetes. Following a 26-day residential program that included diet and exercise, 39% discontinued insulin and 71% discontinued oral medications while also reporting drops in fasting glucose levels (Barnard, et al 1994). In two randomized controlled trials (Barnard et al 2006; Barnard et al 2009) a low-fat vegan diet improved medication usage; glycemic control; body weight and lipids more than the American Diabetes Association diet. Similar studies have reported similar results. Several have also reported significant improvements or complete alleviation of neuropathic leg pain in type 2 diabetics with peripheral neuropathy (Crane et al, 1994; Bunner et al, 2015).

Some of the most impressive results reported in the literature have come from dietary interventions using a macrobiotic diet. This is a WFPB diet specifically designed to treat type 2 diabetes. There are several different versions of this diet but they are approximately 40-50% whole grains, 30-40% vegetables, 10% legumes and a small amount of other foods. Porrata (2009) reported a drop in Hemoglobin A1c (a measure of average blood sugars over several months) from a mean of 12.6 to 5.73 after 6 months on a macrobiotic diet. All 16 participants in the study were able to eliminate insulin and 75% were able to get off all medications entirely. Pooled data from four studies in different countries (Porrata-Maury 2014) reported a 40% improvement in fasting blood sugar and 27% drop in LDL cholesterol. Soare (2014) reported significantly greater improvements in fasting blood glucose, Hemoglobin A1c, LDL cholesterol and medication usage from following a macrobiotic diet compared to a healthy Mediterranean diet after only 21 days.

Cancers

Collectively, cancers are the second leading killer in the U.S. Besides lung cancer, which is primarily due to tobacco use, breast cancer is the leading killer in females; prostate is the leading killer in males; and colorectal cancers are the second leading killer in males and females.

- Dietary factors are linked to many forms of cancer. The American Institute for Cancer Research estimates that around 40% of cancers could be prevented through healthy lifestyle choices including nutrition;
- The World Health Organization determined processed meat (e.g. sausage, pepperoni, salami) to be a Group 1 (definite) carcinogen and red meat (beef, pork, lamb) to be a Group 2 (probable) carcinogen;
- Red and processed meats are specifically linked to increased risk of colorectal cancers;
- Dairy consumption is associated with increased risk of prostate cancer;
- The World Cancer Research Fund and the American Institute for Cancer Research both recommend a diet rich in whole grains, vegetables, fruits and beans while limiting consumption of red and processed meat;
- Increased consumption of animal protein is associated with increased risk of cancer while increased consumption of plant protein is associated with decreased risk of cancer;
- Soy foods do not increase risk of breast cancer but rather their consumption is associated with decreased risk and increased survivorship after breast cancer diagnosis;
- Alcoholic drinks of any kind raise cancer risk (American Institute for Cancer Research);
- All 21 foods on the American Institute for Cancer Research's "Foods that Fight Cancer" list are plant foods;
- Numerous intervention studies have shown significant improvements in markers of growth with several forms of cancer following a plant-based diet including even halting the disease progression;

Conclusions

It is clear that lifestyle behaviors are the most important determinant for living a long, healthy life. Staying physically active and eating a WFPB diet are two key behaviors along with avoiding tobacco and avoiding or severely limiting alcohol consumption. In order to maximize success with older clients it is best to take a holistic approach that addresses more behaviors than just exercise. Below are some resources to help you increase your knowledge, skills and abilities in these other areas:

- [Center for Nutrition Studies Certificate in Plant-Based Nutrition](#)
- [One Day to Wellness Certification](#)
- www.nutritionfacts.org
- [Plant Based Health Professionals UK](#)
- www.bluezones.com
- [International Council on Active Aging](#)