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Introducing Clinicians to the Six Pillars of Lifestyle Medicine (SPoLM) for Managing Chronic Disease

Lisabeth Maria Alvarez
Florida International University, lalva153@fiu.edu

Deana Goldin
Florida International University

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By

Lisabeth M. Alvarez, DNPs, FNP-BC, DipACLM

Supervised By

Dr. Deana Goldin, PhD, DNP, FNP-BC, PMHNP-BC

DocuSigned by:
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Abstract

Chronic disease (CD) is a major cause of disability and death globally and current practice methods are insufficient to address the needs of affected individuals. Clinicians are well equipped to improve CD management and outcomes by integrating the Six Pillars of Lifestyle Medicine (SPoLM) in practice. This quality improvement (QI) initiative serves to address the chiasm in lifestyle behavior education that currently exists in the prevention and management of CD among adult patients. The SPoLM are an evidence-based practice guideline that supports behavior change through person-centered techniques and is considered an effective addition to chronic disease health care delivery.

This deficiency in quantitative data supporting the application of the SPoLM in clinical practice can be attributed to lack of short-term financial incentive for counseling on lifestyle behaviors. The lack of peer-reviewed sources which expand on counseling methods for lifestyle medicine (LM) patient education also reflects those barriers which hinder successful counseling in practice, including but not limited to reimbursement, medical education, and systemic barriers.

Lifestyle factors are associated with the progression of CD includes cardiovascular disease, diabetes, dementia, and cancer among others. By incorporating LM counseling, HCPs can address the root cause of disease and provide patients with evidence-based methods to combat illness and improve health.

Keywords: lifestyle medicine, lifestyle behaviors, six pillars of lifestyle medicine, chronic disease, behavior counseling, social determinants of health

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Introducing Clinicians to the Six Pillars of Lifestyle Medicine (SPoLM) for Managing Chronic Disease

Section 1: Introduction to the Problem

CD is a cause for global concern in today's patient population. CD is characterized by any health condition that is noncommunicable, persists for at least 3 months or more, and leads to a prolonged course of illness often making way for other health conditions (Bernell & Howard, 2016). Consensus on the definition of CD arrives at the conclusion that repercussions of chronic conditions are often debilitating, burdensome, and disabling for sufferers (Bernell & Howard, 2016). In the 1980's, the prevalence of CD surged from 40% to 150% and as a result, healthcare expenditure tripled almost overnight (Holman, 2020). Cardiovascular disease, type 2 diabetes mellitus, chronic obstructive pulmonary disease, dementia, and cancer disproportionally affect older patients as aging is the primary factor for the increased incidence of CD (Atella et al., 2019).

Clinicians, or healthcare practitioners (HCPs), are tasked to prevent, treat, and ultimately slow the progression of disease related complications through evidence-based treatment recommendations primarily based on pharmaceutical therapies. When care demand exceeds supply, however, it becomes difficult to deliver appropriate care and even more challenging to focus efforts on improving overall patient outcomes. In 2018, approximately 39% of primary care provider (PCP) visits centered around complications and maintenance of non-communicable cardiovascular, respiratory, and metabolic disorders, which was greater than the percentage of visits addressing preventive services and acute care needs combined (Ashman et al., 2021, p.5).

Because of the inherent nature of CDs, it is not uncommon for more than one condition to coexist. In fact, approximately 1 in 3 Americans suffer from two or more chronic conditions

simultaneously, leading to “multi-morbidity”, a twenty-four-fold increase in healthcare expenditure, and overutilization of specialist services due to increasingly complex patient needs that far exceed the capacity of current HCPs (Hajat & Stein, 2018). Multiple chronic conditions (MCC’s) elicit more pressing concerns with regards to the sustainability of today’s health care delivery system and even sheds light on the inadequacies of medical education, which remains centered on diagnosis and treatment of acute needs rather than the complete management of medically complex patients which make up more than 50% of U.S. population (Holman, 2020, p. 1).

An important element which contributes to the issue of CD is patient self-efficacy and patient motivation to change. Self-efficacy is defined briefly as “behavior-specific self-confidence” (Linke et al., 2014, p.5) and relates to an individual’s ability to independently achieve a desired outcome or task. In the case of translating lifestyle behavior recommendations in the clinical setting, HCPs must consider the patient’s level of self-efficacy with adhering to healthier lifestyle recommendations that can improve his or her symptoms, health outcome, and disease-related quality of life. According to the Health Belief Model (HBM), self-efficacy is heavily influenced by individual perceptions and “cues to action,” which are factors that initiate behavior change (Linke et al., 2014, p.5). These cues can be internal or external, and social scientist Gretchen Rubin argues in her theoretical phenomenon that an individual’s “tendency,” which suggests his or her propensity to adhere to internal expectations, external expectations, both, or neither, is innate and difficult change (Rubin, 2017). Because of their role and expertise, HCPs are in ideal position to harness the skills required for understanding human behavior and implement measures for counseling on lifestyle related health behaviors effectively in CD management.

Problem Statement

Problem Identification

CD, also known as non-communicable disease (NCD), is a leading cause of morbidity, mortality, and poor quality of life in men, women, and even children today. Upon the emergence of the industrial revolution, advances in medicine have led to a plethora of effective and evidence-based recommendations, treatments and procedures born from clinical trials for sustaining life amidst less-than-ideal conditions. Communicable diseases such as tuberculosis, polio, and cholera have been cured and mostly eradicated owing to modern medicine. As a result, life-expectancy has steadily increased throughout the 20th century (Holman, 2020). Contemporary medicine has contributed substantially to positive outcomes for patients who have suffered from myocardial infarctions, cerebrovascular accidents, diabetic ketoacidosis crises, asthma exacerbations, and metastatic cancers among others. Nonetheless, today's medicine has not made as notable of an impact in reducing or even reversing these conditions, making CD the modern world's leading cause of disability and death. Not only have pharmaceuticals and state-of-the-art treatments had poor success in eradicating NCD's, but life-expectancy predictions have officially been on the decline since 2020 (Shmerling, 2022).

With the rise of CD as a primary cause of death worldwide, HCPs are facing challenging conditions in the clinical setting. These conditions as imposed on by today's health care system where demand exceeds supply leaves out a vital piece of the puzzle in CD management: what patients do to promote their health and how they do it. Introducing HCPs to the SPoLM for chronic disease management, an evidence-based approach to manage and empower patients to take control over their disease progression, may provide HCPs with the knowledge and skillset to change their practice attitudes and behaviors required to integrate behavioral, environmental, and

motivational principles into clinical practice. For individuals with CD, the SPoLM fosters a patient-centered clinical environment by providing patients with the information required to create sustainable, healthier lifestyle habits that optimize their physical and mental health and improve overall quality of life (Frates, 2019).

Background of Chronic Disease

The manifestation of CD is multifactorial. The emergence of the Human Genome Project in the early 21st century shed light on the importance of genetics as a "roadmap" for accurately predicting an individual's health status. With greater understanding of the mechanisms that underly gene expression, it has been discovered that an individual's genotype does not necessarily decide their medical fate. Epigenetics is the study if "heritable changes in gene expression" in response to specific environmental factors that contribute to the adaptation of genes and the evolution of species (Sanusi et al., 2021). In the example of cancer, it has been identified that only 5% of DNA mutations that make cancer development more likely are "hereditary," or passed down from generation to generation, while a more substantial 29% are affected by environmental factors including lifestyle behaviors (Abe & Abe, 2019). This means that a patient's propensity to develop cancer can be heavily related to what they do to prevent it.

Similarly, the role of nutrition is being studied as a major contributing factor to DNA methylation and genetic expression. Nutrition influences major gene expression modifiers and regulation of the epigenome overall (Sanusi et al., 2021). The nutritional components in today's highly packaged and processed food supply have been directly linked to NCD's. For example, diets that are rich in polyunsaturated fats commonly found in corn oil and soybean oil create oxidation which can alter gene expression (Sanusi et al., 2021). Similarly, high quality and nutrient-dense foods such as fruits and vegetables contain antioxidative properties and have been

associated with lower levels of inflammatory markers and improvements in metabolic disorders associated with diabetes mellitus and atherosclerosis (Gonzalez-Becerra et al., 2019; Sanusi et al., 2021; Sailani et al., 2019).

An in-depth analysis of the root-cause of NCDs reveals that many of these are attributable to poor health choices rather than predetermined patterns of inheritance. Lifestyle-related disease (LRD) and CD often overlaps and an astonishing majority of deaths from chronic disease are attributable to three basic lifestyle factors: diet, physical activity, and substance use including alcohol and tobacco use (CDC, 2022). Like diet, physical activity may upregulate or downregulate genetic expression that is protective against disease and aging. Low-intensity endurance exercise, for example, may modify genes that lead to the prevention of metabolic disorders such as insulin resistance, obesity, and type 2 diabetes mellitus (Sanusi et al., 2021). It has become crucial in this age of modern medicine to increase efforts which address and treat the root-cause of CD. Lifestyle behaviors are well cited to be heavily related to chronic disease onset, progression, and complexity. These lifestyle behaviors can be narrowed down to six general practice areas including diet, physical activity, quality of sleep, mental health, social circle, and harmful substance use (Clarke et al., 2017).

Social Determinants of Health

CD onset and progression are also related to those factors that are indirectly related to health and wellness but form part of every patient's environment. These social determinants of health (SDoH) include five primary domains as outlines by the U.S. Office of Disease Prevention and Health Promotion: Economic stability, access to and quality of education, access to and quality of health care, surrounding environment and infrastructure, and social community (Office of Disease Prevention and Health Promotion). The conditions of these five foundational elements

of daily living may be conducive to or serve as a hindrance to adopting and sustaining healthy lifestyle practices. A parent's income ultimately affects economic priorities which may mean leaving children in after-school programs until the end of their shift rather than enrolling them in extra-curricular activities that promote exercise. Additionally, low-income communities may not offer students the same education which may affect opportunities to learn more about healthy behaviors. Urban housing and crowded living conditions affect air quality, which lead to increased incidence of acute and chronic respiratory problems. Lack of neighborhood health centers or preventive care clinics forces patients to seek most of their care from emergency rooms and community hospitals, which may address acute care needs but neglect important counseling and education on managing chronic conditions. Finally, economic circumstances may not leave room for fostering social and community connection, a crucial and underestimated element of health and wellness (McDonald, 2022).

Identification of SDoH is a crucial early step for developing and delivering lifestyle-based recommendations for managing chronic disease. Without considering each patient's sphere of influence, counseling and education cannot be tailored appropriately to meet their precise needs. It is no coincidence that NCDs disproportionality affect the those that are low-income, ethnic minorities, and/or marginalized populations. Approximately 77% of deaths associated with NCDs occur in low-income and middle-income countries (Kabir et al., 2022). Ethnic minorities are more likely to develop chronic conditions. For example, in the United Kingdom, type 2 diabetes mellitus is six-times more common in South Asians and three-times more common in Black Africans and Black Caribbeans compared to White citizens when cultural and epigenetic differences are accounted for (Patel, 2017). HCPs are in ideal positions to assess any barriers to health and wellness that require mediation while facilitating opportunity for growth

and improved health practices. Through advocacy, HCPs can promote health equity, defined as the "principle underlying a commitment to reduce and ultimately, eliminate disparities in health and in its determinants, including social determinants" (Krishnaswami et al., 2019).

Individual Determinants of Health

Aside from the social determinants of a patient's environment that may facilitate or impede adoption of ideal lifestyle behaviors, many individual characteristics may also act as a barrier for providers to overcome when eliciting behavior change in patients with chronic disease. For instance, engrained social or cultural norms may dictate the patient's perception of the appropriateness of certain standards or behaviors. In a qualitative study among religious parishioners in Uganda, jogging was considered a "childish" activity that adults did not participate in (Ndejjo et al., 2022). In the United States, similar beliefs are held by ethnic minorities. Among Asians, knowledge is valued over physical activity, therefore activities such as reading are more acceptable pastimes. Also, among some Latin American women, they regard their roles as strictly domestic, which leaves little time for exercise and leisure (Kelly et al., 2016). Adherence to healthy diet patterns were also regarded as more difficult due to social pressures, such as being served unhealthy foods at parish events (Ndejjo et al., 2022) or at family or holiday gatherings (Kelly et al., 2016). An individual's susceptibility to social pressures is often exploited in marketing campaigns, including advertisements for food products, a strategy that plant-based food companies are attempting to employ to increase consumer interest in healthier meal options (Jahn et al., 2021).

Another important factor to adherence is patient self-efficacy (Ndejjo et al., 2022; Peterson & Bredow, 2017; Kelly et al., 2016; Linke et al., 2014). Self-efficacy is established as a construct in various frameworks for understanding health behaviors (Linke et al., 2014). The

Health Belief Model (HBM) is one such model that places an emphasis on individual perceptions and self-confidence as crucial for sustaining healthier lifestyle behaviors. Motivation to eat healthier, exercise more often, and prioritize sleep are heavily based on an individual's perceived benefits and barriers to sustaining these as compared to his or her perceived susceptibility to illness and severity of the latter (Linke et al., 2014). Moreover, it is cited that some components of individual personalities and temperaments are closely related to adherence with lifestyle recommendations and chronic disease treatment (Kirk et al., 2017). As HCPs establish rapport with their patients who are affected by chronic disease, considering personal factors that help or hinder their ability to follow medical advice is not only a patient-centered approach, but a person-centered one.

Significance of the Problem

CD statistically accounts for most of the world's deaths, disability, lost productivity, and health care expenditures. Approximately three in every five global deaths are attributed to four major non-communicable diseases: cardiovascular disease, chronic lung disease, diabetes mellitus, and cancer (Hajat & Stein, 2018). Although advancements in medicine have improved survival rates for many chronic conditions such as ischemic heart disease, the incidence of the latter has steadily increased, leading to an exponential increase in the prevalence and burden of disability (Hajat & Stein, 2018). The burden of CD is economically multifaceted. While longevity and quality of life are affected, loss of productivity among those who are ill, recovering, or in remission amounts to approximately $147 billion for heart disease alone (Benjamin et al., 2018). As of 2018, about 90% of a total $4.1 trillion dollars spent annually on health care is ascribed to preventable chronic physical and mental health (CDC, 2018, p.1).

Quality of life (QoL) in patients is also greatly affected by the burden of isolated chronic and multiple coexisting chronic diseases. QoL is briefly defined as "an individual's impression of their place in life" (Al Dawsari, 2023). CD often creates dependence on behalf of those affected as they can lead to debilitating symptoms and often long-term disability. Reportedly, patients with CD feel dependent on caregivers and society in general to perform activities of daily living (ADLs) and instrumental activities of daily living (IADLs). ADLs include feeding, dressing, bathing, grooming, toileting, and moving. IADLs are more complex tasks and include cooking, shopping, paying bills, and many other functions that are not inherently essential but are important (Maresova et al., 2019). This dependency creates the impression to the chronically ill patient that they are a "burden" to their families, caregivers, and society which greatly affects quality of life. Interestingly however, QoL was reported to be better when patients were surrounded by a strong social support which fostered connection and acceptance (Al Dawsari, 2023), demonstrating the importance of social connection and environmental factors on health and health outcomes.

Current Healthcare Practitioner Knowledge, Attitudes, and Practice Behaviors

A representative sample of U.S. physicians were surveyed by the John's Hopkins School of Medicine to determine the readiness of HCPs for managing the increasing population of chronically ill patients. Findings concluded that although physicians felt equipped to make positive impacts in chronically ill patients along ten major competencies, they lacked sufficient educational preparation to execute this level of care adequately (Darer et al., 2004). Among the ten competencies were "educating patients with chronic disease" and "providing adequate nutritional guidance," two factors that heavily impact patient lifestyle (Darer et al., 2004). Other barriers to addressing lifestyle factors include lack of HCP knowledge or comfortability with

lifestyle, time constraints imposed by productivity demands, and reimbursement requirements that make it nearly impossible to address the lifestyle behaviors that so heavily influence health, wellness, and QoL (Hajat & Stein, 2018).

The Six Pillars of Lifestyle Medicine

Defining Lifestyle Medicine

Lifestyle medicine (LM) is defined as the "evidence-based practice of assisting individuals and families adopt and sustain behaviors that can improve health and quality of life" (Clarke et al., 2017, p.1). LM has emerged as a specialty in recent years, but it's origins date back to the time of Hippocrates who believed that food was as valuable of a medicine for healing the body of ailments as any remedy (Minich & Bland, 2013). The focus of LM is to prevent and treat disease, including CD, in conjunction with contemporary medicine as appropriate for the purpose of minimizing complications and sequela and ultimately reversing disease processes to decrease the need for pharmaceuticals or surgical intervention. The literature cites the success achieved in preventing, treating, and managing CD through evidence-based lifestyle behaviors (Frates, 2019).

Over 80% of CD can be avoided with application of optimal lifestyles comprised of each patient's health beliefs, behaviors, and environmental factors (Bodai et al., 2018). LRD is directly linked to poor choices and can be managed and even reversed by encouraging patients to accommodate healthier ones. The principles of the success of LM rely on the interaction between the patient and his or her trusted HCP, assessing the patient's current practices and readiness adopt better ones, tailoring the methods of delivering the information to each patient, identifying barriers and facilitators to behavioral change, and evaluating the patient's ability to sustain the advised lifestyle changes (Frates, 2019). LM addresses "basic recommendations" that can allow

patients to live longer, healthier, less disabled, and with better quality of life. A reported 80% of patients want to live healthier but have trouble determining how to achieve overall wellness (Bodai et al., 2018). According to Monye & Adelowo (2020, p. 4), healthy lifestyle behaviors are the key steps that an individual can adopt in order to naturally keep the immunity robust and healthy. This is believed to be true because the systems of the human body, including the immune system, function best when they work in balance, protected from environmental assaults, and bolstered by healthy lifestyle behaviors (Monye & Adewolo, 2020). The primary lifestyle behaviors that ultimately affect health can be summarized into "Six Pillars" that are comprehensive yet condensed to be implemented with ease at each patient-clinician encounter.

The Six Pillars

The SPoLM seek to address the primary, modifiable causes of CD and encourage patients to increase healthy behaviors to improve their health and QoL. These six principles include the following: diet, exercise, sleep, stress management, social connection, and substance use (Frates, 2019). An extensive repository of research demonstrates the positive effects of LM practices on patient's perceived wellness, longevity, and outcomes when attention is paid to how each of these six pillars is regarded and applied in daily living. For instance, data collected from the Chicago Health and Aging Project (CHAP) and the Rush Memory and Aging Project (MAP) associate a healthy lifestyle with lower incidence of Alzheimer's and dementia (Dhana et al., 2020). LM physician and pioneer Dr. Dean Ornish demonstrated in his longitudinal "Lifestyle Heart Trial" (1998) that intense behavioral changes in patients with diagnosed coronary artery disease not only decreased the incidence of coronary events as compared to controls but reversed coronary artery stenosis in patients with severe disease (Ornish et al., 1998). In-depth analysis on

the key findings of each domain of health can give insight into the underlying process of CD that is not sufficiently managed or addressed by contemporary medicine alone.

Nutrition. Nutrition has been strongly correlated with health and health outcomes in every known CD. In fact, it has replaced tobacco use as a leading cause of premature death in Americans today (Murray et al., 2018). Processed, packaged, and refined foods remove the natural nutrients, fibers, antioxidants, and minerals of the foods that our body needs (Abe & Abe, 2019). The American Heart Association (AHA), the American Cancer Association (ACA), and the American Diabetes Association (ADA) recommendations for daily nutrient intake overlap with those offered by the American College of Lifestyle Medicine (ACLM) and other major organizations that have pioneered LM as a specialty (Minich & Bland, 2013). Maintaining a whole-food, plant predominant diet that is made up of a variety of fruits, vegetables, legumes, sources of whole grains, nuts, and seeds can ensure a diet which is nutrient dense and free of harmful substance that cause inflammation and disease (Frates, 2019). Sources of protein may vary depending on cultural and personal preferences, however consensus notes that minimizing animal protein such as chicken, beef, and pork may be beneficial for some (Minich & Bland, 2013). The primary takeaway is to increase nutritious foods that may deliver important micronutrients to combat and prevent illness and promote health (Minich & Bland, 2013).

Physical Activity. Physical activity is an important pillar for safeguarding health and preventing or managing disease (Bullard et al., 2019). Although it may depend on the individual, general guidelines recommend 150 minutes a week of moderately intense aerobic physical activity (Minich & Bland, 2013) and others suggest that in addition to aerobic activity for 5 days a week, another 2-3 days should be indicated to moderately intense weight-bearing exercise to help with muscle and bone strength (Frates, 2019). Studies show that increasing physical activity

improves a plethora of health factors such as weight, muscle and bone mass, balance, mental health, and QoL (Bullard et al., 2019). Moreover, physical activity maintains muscle mass into aging and alters DNA methylation to improve insulin resistance and weight control long-term (Sailani et al., 2019). Exercise prescriptions that follow the S.M.A.R.T. goals framework, a method for achieving goal-oriented action, can improve patient centered recommendations and patient compliance with physical activity recommendations, a form of complementary medicine that is invaluable to managing CD such as cardiovascular disease, diabetes, and cancer (Frates, 2019). S.M.A.R.T. goals will be discussed in more detail in a later section.

Sleep. Sleep is an essential element of normal bodily function. It is not uncommon for individuals with chronic diseases to have difficulty initiating or maintaining sleep, often suffering from early morning awakening and/or non-restorative sleep abnormalities. Poor sleep quality increases risk of deleterious health outcomes including metabolic disorders, cardiovascular disease, and other physical and mental health conditions (Frates, 2019). Sleep is often regarded as an "off switch" to the body's conscious routine, however sleep is essential to many metabolic processes that occur after the day ends as it has been cited that humans can survive longer without food than they can without sleep (Abe & Abe, 2019). Restorative sleep is associated with increased ability to focus, daytime productivity, and happiness. Even more groundbreaking is the role of sleep-in physical well-being. For instance, poor sleep quality and daytime drowsiness is associated with higher risk of myocardial infarction. Additionally, sleeping less than the ideal number of hours per day increases cortisol levels, leads to insulin resistance, and increases the risk of diabetes (Frates, 2019). Basic recommendations for sleep hygiene include avoiding bright light emitting devices 30 minutes prior to rest and to avoid eating 2 to 3 hours before bedtime to avoid uncomfortable symptoms such as reflux (Frates,

2019). Often, patients are prescribed sleep supplements or pharmaceuticals to help with sleep onset and maintenance but are not advised on the importance of sleep, the effects of sleep quality, and the non-pharmaceutical methods of attaining restful, restorative sleep.

Stress Reduction and Modification. Mental health is extremely important for overall well-being. "Emotional resilience" is defined as "one's ability to respond to an adverse situation and […] a return to the 'pre-event' baseline state of health" (Bodai et al., 2018). Mental illness such as depression is largely correlated with the onset, prevalence, and complexity of CD. For example, depression is highly correlated with obesity which is a leading cause of diabetes, cardiovascular disease, cancer, and chronic pain among other conditions. Additionally, the incidence of cardiovascular disease is doubled in patients with depression and outcomes for patient's whose depression is untreated are worse (Bodai et al., 2018). Stress manifests physically in many forms and educating patients on stress management equips them with the ability to develop resilience despite socio-economic or individual factors that predisposes them to complex CD. Methods that can be applied to ameliorate the effects of stress in patients with chronic conditions include group counseling sessions, application of 'mind-body medicine' teaching at patient visits and identifying coping mechanisms among others (Abe & Abe, 2019).

Social Connectedness. Human beings are social creatures and therefore are inclined and they lean to create and preserve relationships with others. The availability of social support and positive social connections can foster resilience such as in patients with cancer (Bodai et al., 2018). Additionally, healthy relationships can increase patient compliance with lifestyle recommendations when positive lifestyle behaviors among friends and colleagues are shared (Frates, 2019). It is no wonder that patients of HCPs who practice healthy lifestyles also do so themselves (McDonald, 2022).

Risky Substance Use. Counseling on risk reduction, especially the reduction of smoking and alcohol consumption, makes up a very small portion of patient-clinician encounters today (Noordman et al., 2013). This is alarming considering that a majority of the world's leading cause of premature cancer and death is tobacco use (Abe & Abe, 2019). Alcohol use is also a major risk factor for many types of cancer including but not limited to oral cancer, pharyngeal cancer, laryngeal cancer, esophageal cancer, liver cancer, colorectal cancer, and breast cancer (Abe & Abe, 2018). LM does not solely seek to council on the negative effects of substance abuse, its' intention is to determine the underlying cause of stress that leads to the patient's desire for resorting to risky substance use in the first place (Frates, 2019).

Interaction of Lifestyle Behaviors

Addressing all SPoLM individually, in pairs, or collectively serves as an adjunct to contemporary medicine for "promoting good health," not just treating and managing disease. These "low risk" lifestyle behaviors as described have been developed through countless years of research which have analyzed what contributes to wellness and what doesn't (Kushner & Sorensen, 2013). Multiple determinants to adherence must be considered and mediated by HCPs who are knowledgeable in positive lifestyle behaviors. In the European Investigation into Cancer and Nutrition (EPIC) study, over 20,000 participants from Germany between ages 35 and 65 were followed up for shy of 8 years to determine the correlation between behavior and disease. It was found that four principal behaviors were associated with a 78% lower risk of chronic disease overall. These behaviors were abstaining from tobacco use, exercising at least 3.5 hours or 150 minutes a week, a high intake of fruits, vegetables, and legumes while limiting meat intake, and maintaining a body mass index (BMI) of less than 30 kg/m^2 (Kushner & Sorensen, 2013). Studies show that only a small number of individuals adhere to these low-risk behaviors

(Kushner & Sorensen, 2013), leaving HCPs with endless opportunities to take part in the LM education and counseling that can change the way that medicine is currently practiced.

The Role of Healthcare Practitioners

All HCPs, regardless of role or specialty, are in ideal positions to address lifestyle factors and integrate evidence-based recommendations at each patient encounter. Determining whether the information provided will be well received is the first step. By implementing the 5 A's of behavioral assessment into practice, HCPs can determine what patient behaviors need additionally support. The 5 A's comprise the following: "Ask, Advise, Assess, Assist, and Arrange" (Frates, 2019). Determining what each patient's current practices, knowledge, motivations, barriers, and resources are crucial elements to long-term success with intensive lifestyle changes. Likewise, identifying what the patient's readiness level for adopting and sustaining behavioral change is can guide HCP efforts to improve his or her patient's behaviors.

HCPs are also encouraged to become competent in evidence-based lifestyle recommendations in order to translate this information into practice within his or her scope and area of specialty or expertise. Various sources cite a consensus regarding the lack of comfortability or medical education about current recommendations for dietary recommendations, exercise counseling, and other lifestyle behaviors (Hajat & Stein, 2018). Other sources allude to time constraints as a barrier to counseling regarding best LM practice. A study among Dutch general practitioners and advanced practice nurses in primary care observed the quality of time spent counseling patients about importance lifestyle factors such as diet, exercise, alcohol consumption, and smoking cessation. HCPs spent an average of 1.5 minutes or less counseling each patient on their lifestyle behaviors, with alcohol use being the least addressed. Most interactions involved general advice regarding the harmful effects of poor diet,

immobility, and substance abuse to overall health and were not tailored to meet each patient's individual needs and risk profiles. Additionally, most of the brief conversation was in fact to commend improved behaviors and reprimand poor ones without regards to how better lifestyle habits can be achieved (Noordman et al., 2013).

Finally, the role of HCP's personal health choices cannot be underestimated. It is well known that patients are more likely to adopt healthier lifestyles if his or her advising HCP also follows the same recommendations to sustain their personal health (McDonald, 2022; Malatskey et al., 2017). Likewise, HCPs who are educated on the SPoLM and apply these principles to their own life are more satisfied and fulfilled with the care they provide and ameliorate the effects of 'burnout' associated with poor stress management under pressing and demanding working conditions (Merlo & Rippe, 2021). LM practitioners participate in a "partnership" with his or her patients that is mutually beneficial and gratifying (Clarke et al., 2017).

Methodical Approach to Counseling

In a randomized control trial comparing two widely accepted diets for achieving weight loss, neither diet was statistically more successful than the other. Instead, concept of a methodical approach to encouraging and preserving a healthier diet was more important (Gardner et al., 2018). Multiple determinants to adherence must be considered and mediated by HCPs who are knowledgeable in positive lifestyle behaviors. As previously mentioned, a person's self-efficacy, or their behavior-specific self-confidence, is heavily influenced by individual perceptions and "cues to action," which are factors that initiate change behavior (Linke et al., 2013).

As a strategy to promote SPoLM in clinical practice, Gretchen Rubin's Four Tendencies personality framework was introduced to HCPs. The Four Tendencies personality framework

classifies patients into four distinct categories; (1) the upholder, (2) the questioner, (3) the obliger and, (4) the rebel, when faced by their HCP to make a commitment to a healthier lifestyle change (Rubin, 2018). In this framework, the upholder patient is motivated by meeting their own and others' expectations for lifestyle behaviors, whereas questioner patients may have doubt and judgement about medical recommendations (Rubin, 2018). Obligers patients work hard to meet his or her HCPs, gym partners, and other's expectations for their behavior and put aside individual priorities (Rubin, 2018). Finally, the rebel does not respond positively to task assignation by themselves or others, even HCPs and health experts (Rubin, 2018). When HCPs gain an understanding of how individual patients comprehend and operationalize information, it helps HCPs effectively communicate, provide patient-centric care, and can improve compliance of healthier lifestyle behaviors.

Summary

CD is a global issue leading to increased morbidity and mortality and those affected. The incidence of MCCs is rising amid advancements in modern medicine that increase longevity, while increasing incidence of prevalence of CD in the aging population. However, contemporary medicine has yet to eradicate NCD's. At least 24 well-known CDs are attributable to poor lifestyle decisions and are therefore completely preventable (Kushner & Sorensen, 2013). CD persists due to several factors including patient inability to sustain optimal health behaviors due to various personal and social factors and barriers which deter HCPs from counseling on important lifestyle factors that contribute to disease (Krishnaswami et al., 2019).

The acknowledgment of lifestyle factors as key components which underlie the onset, progression, complication, and mortality of CD is crucial. LM is a specialty of medicine that highlights the importance of personal behaviors and self-efficacy on CD (Abe and Abe, 2019).

LM highlights six major contributing factors to health and wellness which includes nutrition, exercise, sleep, stress management, social connection, and substance use. These “Six Pillars” are cited as key influencers to health, longevity, and quality of life (Frates, 2019).

HCPs of all backgrounds, specialties, and scope of practice are in ideal positions to counsel patients on important lifestyle modifications (McDonald, 2022). Competence regarding evidence-based recommendations of lifestyle factors is crucial to implementing effective education in clinical practice and achieving better patient outcomes. Likewise, application of best practice and lifestyle modalities of health on behalf of HCPs in his or her own life can help achieve better compliance among patients and improve job satisfaction and joy among HCPs (Merlo & Rippe, 2021). Preventable disease accounts for 80% of global deaths (CDC, 2018, p.1), and with the emergence of LM, the hopes of better patient outcomes and enhanced quality of life remain attainable.

Section 2: Literature Review

LM is a foundational science that seeks to address the causative factors that underly all chronic, noncommunicable disease. CD is commonly defined as any disease that persists for longer than three months and is accompanied by recurrent symptoms and ongoing health related issues (Bernell & Howard, 2016). Over 80% of all CDs are preventable with appropriate lifestyle behaviors (Bodai et al., 2018). These lifestyle behaviors include six major areas of health: nutrition, physical activity, sleep, stress management, social connection, and risky substance use (Frates, 2019). The methods in which patients implement these six key areas into their daily life dictates their health and wellbeing, so much so that it has been cited that genetic expression of disorders that were once considered solely hereditary can be altered through modifiable personal behaviors (Gonzalez-Becerra et al., 2019).

CD has become a primary cause of death and disability worldwide, which leads to costly and inefficient care. To worsen the problem, HCPs are inadequately trained to counsel, motivate, and lead lifestyle changes in patients due to several barriers (Clarke et al., 2017). In lieu of the growing concern the burden of CD on many levels, including socially and financially, and the complexity of care required by patients with single and at times MCC's, the current practice of healthcare delivery is lacking important foundational and practical approaches to disease management. By integrating the SPoLM into clinical practice, HCPs can be better equipped to elicit positive behavioral practices in chronically ill patients and shift today's healthcare focus from treating disease to improving lives.

PICO Question

Does informing healthcare practitioners on evidence-based practice methods for implementing the Six Pillars of Lifestyle Medicine in patient encounters improve knowledge, attitudes, and practice behaviors for managing chronic disease?

Literature Search Process

Methods

Search Strategy. All database sources used for the research project were accessed via the online library for Florida International University (FIU). Databases reviewed for this literature search includes FIU Library, Google Scholar, Cochrane Library, Medline, PubMed, and SagePub. These databases were chosen due to the relevancy of their topics and their peer-reviewed and verified content. Terms included in this literature search include lifestyle medicine, lifestyle behaviors, SPoLM, lifestyle factors, integrative medicine, preventive medicine, chronic disease, chronic illness, noncommunicable disease, chronic disease management, primary care,

quality of life, knowledge, attitudes, practice behaviors, epigenetics, health equity, and social determinants of health.

Inclusion Criteria. Studies for this literature review were evaluated and chosen according to the constructed PICO question and objectives of the project. Inclusion criteria consisted of studies written in, or translated to English, with full-text availability, published between 2017 to 2023 in peer-reviewed journals, peer-reviewed manuscripts and texts, public health websites, and government agency published literature.

Exclusion Criteria. Studies were not included in this literature review on several grounds. Articles that were not peer-reviewed were strictly excluded. Articles written before 2017 were scrupulously analyzed and only included if they provided information that was deemed essential to establishing LM as an effective treatment modality for combatting CD. Seeing the relative novelty in the literature of applying LM to practice, expert opinion pieces were excluded to emphasize the scrutiny of the literature search and improve reliability.

Search Limitations

A plethora of recent literature is cited in this emerging field, but limitations include deficiency in randomized-control trials that demonstrate the efficacy of lifestyle management of CDs for determining efficacy and patient outcomes. Limitations in the surveying of providers on their current knowledge and practice behaviors related to LM in managing patients with CD is also evident.

Literature Appraisal and Matrix

The initial search, using the inclusion and exclusion criteria, generated 730 (n=730), 688 (n=688) articles amongst various journals. To further narrow the literature search, randomized trials, retrospective studies, and observational studies were selected for inclusion. Duplicates

articles were removed. The abstracts of articles were reviewed. Of these, ten (n=10) met the criteria and were selected for a full text review due to their relevancy and their role in scaffolding the foundation of this quality improvement project.

Included in this literature review for the quality improvement project "An Intervention for Integrating the Six Pillars of Lifestyle Medicine in Chronic Disease Management" are ten major sources of information that contribute to the principal themes of the project. Level 1 sources of evidence including randomized control trials were cited as primary sources of evidence on the efficacy of lifestyle modification as a modality for managing patients with CD. Various sources of evidence of Level 2 and Level 3 quality serve as comprehensive reviews of current evidence and practice regarding LM for treating and preventing CD. Finally, several sources of evidence of Level 5 quality review the literature for common themes and areas where further research is required (Dang et al., 2019). The literature matrix (Table B) provides a summary of the included literature.

Characteristics of the Included Literature

Source 1

Al Dawsari et al., (2023) compiled an integrative review, a Level 5 source of evidence (Dang et al., 2021), that analyzes quantitative studies which focused on the effects of CD on quality of life (QoL) indices in patients in Saudi Arabia. A total of 12 quantitative studies were included after extensive application of inclusion and exclusion criteria over variety of peer-reviewed databases. In conclusion, it was summarized that patients who suffer from CD suffer from diminished quality of life. Strengths include the use of reliable and valid tools to measure quality of life and a common definition of CD, which included hypertension and diabetes among

other illnesses. Limitations include the use of cross-sectional studies rather than randomized-control trials and the sampling of studies which aimed for convenience.

Source 2

This longitudinal observational data set, a Level 3 nonexperimental study (Dang et al., 2021), conducted by Atella et al. (2019) collected vital information on millions of patients across 900 general practitioners in Italy between 2005 and 2014 to determine the economic and healthcare burden of CD among Italians. It was summarized that CD incidence increased in a span of ten years, leading to a 26% increase in prescriptions, 27% increase in lab and diagnostic testing, and as a result an increase in overall cost and utilization. The strengths of this study were the sample size and the area where the population was located, where approximately 87% of total healthcare costs are provided by the public sector and not by private insurance, leading to a detailed summary of utilization statistics for the government. Socioeconomic status of subjects was not recorded, however, posing a major limitation.

Source 3

Bullard et al. (2019) sought to determine the achievability of physical exercise goals in patients with one of three major CD's: Cancer, cardiovascular disease, or diabetes. This systematic review made up of randomized control trials is a Level 1 source of evidence (Dang et al., 2021) given the application of tools to determine study eligibility and overall rigor. A total of 30 studies between 2000 and 2018 were selected for review from various databases. Results showed that persons diagnosed with these CDs could adhere to a prescribed physical exercise regimen most of the time, achieving an average of 77% of their total activity goal. Given the benefits of physical exercise in these patients, it is an important foundational statistic for implementing LM prescriptions. Strengths of this systematic review include the rigor of search

and the use of randomized-control trials. Limitations include the lack of robust research on other determinants of adherence to physical activity in this population.

Source 4

This pilot survey amongst interdisciplinary healthcare trainees led by Clarke et al. (2017) serves to shed light on the current knowledge and behaviors of HCPs regarding LM. As a qualitative survey, this study is a Level 3 source of evidence (Dang et al., 2021). Of 37 registered subjects, a total of 22 surveys were completed and reviewed. Results point to the lack of sufficient instruction in medical training courses on the LM competences, including nutrition and exercises, despite recognizing the importance of these elements in patient health and wellbeing. A strong interest was expressed for further training on LM and behavior counseling, an important factor in obtaining patient compliance with prescribed recommendations. Strengths of this survey include the variety of the sample, although sample size poses a significant limitation to this pilot survey.

Source 5

Dhana et al. (2020) conducted a study to combine findings from to quantitative longitudinal studies to determine the health behaviors associated with lower incidence of Alzheimer dementia. This Level 2 source of evidence (Dang et al., 2021) includes a random-effect meta-analysis of two large populations, the Chicago Health and Aging Project (CHAP) and the Rush Memory and Aging Project (MAP). A total of 2,765 adults over the age of 65 were included in the study and behavior statistics synthesized over a span of 5.8 years and 6 years respectively to determine a “lifestyle score”. In conclusion, there was a significantly low incidence and risk of Alzheimer dementia with a higher lifestyle score. A major strength of this study is the accurate diagnosis of dementia in all subjects based on frequent testing and

evaluation of participants. The limitation of this study involves the potential for reverse causality due to the long prodrome which varies in individuals with Alzheimer dementia.

Source 6

The Diet Intervention Examining the Factors Interacting the Treatment Success (DIETFITS) Trial led by Gardner et al. (2018) is a randomized-control trial, therefore a Level 1 source of evidence (Dang et al., 2021). A total of 481 adults without comorbidities or medications aged 18 to 65 with a body mass index (BMI) of 28 to 40 were randomized to one of two diets, a healthy low-fat diet or a healthy low-carbohydrate diet and reassessed at 3, 6, and 12 months. Additionally, genetic variants for insulin resistance and other factors contributing to obesity were collected and analyzed. In conclusion, both groups achieved weight loss and there was no statistical significance in either group based on genetic predisposition. This signals the importance of accountability for healthy behaviors rather than type of diet. Strengths for this study include the study design and the representativeness of the sample. Limitations include the lack of generalizability due to the geographic area limited to the sample.

Source 7

This systematic review and meta-analysis conducted by Gonzalez-Becerra et al. (2019) is a Level 2 source of evidence (Dang et al., 2021). A total of 38 studies were included in the review between 2010 and 2017 which outlined the epigenetic factors that influence CD development. It was concluded that epigenetics plays a major role to disease onset and severity and various fatty acids affect DNA methylation, transcription, and phenotypic alternations which display as CDs. Strengths of this systematic review include the detailed search criteria and strong evidence analysis, although limitations cited include the lack of completeness of the evidence regarding specific gene pathways that regulate disease.

Source 8

This narrative review compiled by Hajat and Stein (2018) is a Level 5 source of evidence (Dang et al., 2021) which outlines the burden of CD and particularly, the problem of MCCs on today's society and economy. Data was sourced through various reputable databases across diverse regions demographics, and diseases. In conclusion, much was learned about the incidence of MCCs, most of which are leading causes of death and disability and have surpassed communicable disease in this matter. The economic burden of MCCs is well-cited, and little is being done about the root-cause of CD which is easily contributed to environmental factors and a lack of emphasis on disease prevention and lifestyle behaviors. Strengths of this narrative review includes the breadth of date included, however the scarcity of literature studying the associated effects of MCCs was noted.

Source 9

Ornish et al. (1998) spearheaded a monumental effort to legitimize lifestyle intervention as a key component of treatment in chronically ill patients, particularly those with advanced and "irreversible" heart disease. In this randomized-control trial, a Level 1 experimental study (Dang et al., 2021), Dr. Dean Ornish and colleagues sought to determine the efficacy of intensive behavioral therapy on heart disease and risk of myocardial infarct by randomizing 48 total participants into a lifestyle change versus control groups over a 5-year period. Results demonstrated that intense lifestyle changes led to diminished incidence of coronary artery events and a regression of established coronary atherosclerosis as seen by coronary angiogram. Strengths of this study include randomized methods and rigorous interventions protocols. Limitations include sample size which was not representative.

Source 10

Patel et al. (2017) sought to outline the barriers and facilitators to healthy lifestyle practices among minority groups, who are often underrepresented in all realms of medical research. This Level 5 source of evidence (Dang et al., 2017) proposes to determine the knowledge and barriers of minority individuals with CD in the United Kingdom. After a thorough search of the literature, 34 articles were included that review three major themes: knowledge and attitudes of diabetes risk among minorities, current behaviors and knowledge about diet and physical activity, and barriers and facilitators to living a healthy lifestyle. In conclusion, minority groups experience a disproportionate incidence of CD, in particular Type 2 diabetes mellitus, compared to white counterparts. It is also noted that social norms, cultural norms, cultural pressions, perceptions of health, language barriers, and geographic barriers all influenced lifestyle and health behaviors. Strengths of this narrative review include a broad perspective on the topic, however strong limitations were exhibited by the lack of a representative sample as most minorities in the UK are of South Asian descent and a lack of rigor when selecting studies for review.

Synthesis of the Literature

Burden of Chronic Disease

CD, as defined by a condition which persist for longer than 3 months characterized by deteriorating health and returning symptoms, is a major cause of disability and death today (Bernell and Howard, 2016). Not only does CD pose a uniquely personal burden to each patient and their caregivers, but has also repeatedly strained society, the healthcare system, and the economy. Al Dawsari et al. (2023) discusses the incidence of diminished quality of life and mental illness among persons suffering from one or more CDs. As the prevalence of MCC rises, Hajat and Stein (2018) cite the complexity of care when MCCs overlap and the overwhelming

strain on the economy and healthcare system. As the population continues to age, the incidence of CD rises (Atella et al., 2019). Little is being done to slow the progression of CD and the current healthcare system does not appropriately meet the demands of this population.

Current Knowledge and Application of Lifestyle Medicine

A major contributor to the onset and progression of CD are modifiable. Six major factors have been cited to influence health and wellbeing: nutrition, physical activity, sleep, stress management, social connection, and substance use (Frates et al. 2019). For example, the incidence of Alzheimer's dementia is associated with poor diets, stationary lifestyles, poor sleep habits, and lack of healthy relationships (Dhana et al., 2020). Ornish et al. (1998) spearheaded efforts to shed light on the influence of lifestyle factors in preventing coronary disease and even reversing established coronary atherosclerosis. Even though lifestyle behaviors are accepted by experts as important factors for determining health, a relative lack of formal instruction and training is cited (Clarke et al., 2017). Furthermore, social inequities and cultural norms may influence an individual's ability to adopt and sustain healthy lifestyle practices (Patel, et al., 2017), which leads to the poorly managed CDs and disproportionately affected patients.

The Role of Lifestyle Medicine for Improving Care

LM is the application of evidence-based interventions based on modifying behavioral determinants of health for treating and managing medical conditions, namely noncommunicable and CD (Frates, 2019). Clarke et al. (2017) recognizes HCP interest in learning more about LM to improve practice behaviors and patient health. Additionally, knowledge of the effective methods for translating LM information to clinical practice and motivating patients to adopt and sustain healthier behaviors is crucial (Clarke et al., 2017). In a randomized control trial comparing two widely accepted diets for achieving weight loss, neither diet was statistically

more successful than the other. Instead, concept of a methodical approach to encouraging and preserving a healthier diet was more important (Gardner et al., 2018). LM is the cornerstone of health. In a study with a sample of 23,000 participants, adherence to four lifestyle recommendations including no smoking, 150 minutes of exercise weekly, a BMI of less than 30, and a healthy diet was associated with lower risk of type 2 diabetes, myocardial infarction, and cancer (Bodai et al., 2018). As CD continues to be a leading cause of death amongst Americans, the current healthcare system must evolve and assign LM counseling as a major treatment modality to achieve health.

Summary

The literature points to LM as a potential solution to the ongoing problem of CD in the nation and worldwide. Randomized control trials demonstrate the effectiveness of LM as compared to standard care for improving patient health and event preventing CD in the first place. Experts also affirm the role of lifestyle factors as a major indicator of health for a variety of noncommunicable diseases. CD poses significant threats to population, system, and economic health (Bodai et al., 2018). As lifestyle behaviors are cited as major contributors to disease onset, progression, and complexity, more should be done on behalf of HCPs and healthcare systems to address the topic at each encounter or opportunity, both inpatient and outpatient. Frates (2019) assures that practicing LM in the clinical setting will not only improve patient health, but will also enhance population, healthcare system, and economic well-being. Implementing LM tailored to the needs and preferences of distinct populations with lifestyle-related CD more concretely into practice will require logistical and theoretical change in current processes. According to Bodai et al. (2018), “the time to make this change is now” (pp. 1).

Section 3: Quality Improvement Purpose and Objectives

QI methodology is integral to successful improvement of clinical practice methods and performance. No one method to conducting a QI intervention is superior, but several themes coincide over several effective tools. A compilation of evidence and research on implementing lifestyle-behavior recommendations in clinical practice is required for adoption of new standards. Leadership hierarchy must be clear before applying a single method over a large practice, multiple practices, or a system. Training of parties and staff must take place regarding the QI project and how it supports practice. Measures chosen to evaluate performance must be appropriate for the intervention. Encouraging staff participation and input in the QI project fosters engagement. Using structured methods can facilitate performance tracing, evaluation, and ongoing improvement. Finally, establishing a cycle of learning and improving coordinates efforts to achieve the desired outcome (Adams, 2018).

This QI intervention aims to address the primary goal, introduced below, by a coordinated effort to educate HCPs of patients with CD on best practices for introducing the SPoLM into each clinical encounter. It also serves to establish future practice protocols in the hopes of standardizing methods for integrating more counseling on the root-cause of disease. S.M.A.R.T. goals further break down individual efforts of the QI intervention. Serving as a foundation for this methodology, the Health Belief Model (HBM) and Gretchen Rubin's Four Tendencies theory seek to explain and give insight to what influences healthy behavior adoption on behalf of patients to further guide HCPs in their counseling methods. Finally, methods for educating HCPs and collecting data are introduced and explained.

QI Project Goal

Spath and Kelly (2017) emphasize that "strategic goals provide direction for decision making" (pp. 108). A QI project evokes a complex understanding of system-wide knowledge,

attitudes, and behaviors before addressing gaps that warrant better practices. For this reason, a unified purpose facilitates a common focus, organized methods, and superior outcomes. Much like a mission or a vision, an overarching goal forms the foundation of a QI project (Gregory, 2015). The proposed QI intervention seeks to improve knowledge, attitudes, and practice behaviors among HCPs on lifestyle modality practices for managing CD. The project's comprehensive aim is to facilitate educational encounters among patients and HCPs regarding evidence-based practice methods for modifying health related behaviors to sustain behavioral change and improve the health of patients with underlying CD.

The primary intent of this QI study was to determine the impact of a structured LM education session on HCP knowledge, attitudes, and practice behaviors. The study's secondary aim was to deliver an education program designed to impart knowledge and practical education to HCPs on the SPLoM to facilitate integrative CD management practice behaviors. Practical strategies for identifying patient-specific facilitators or barriers to lifestyle-behavior adoption to integrate LM principles into CD management were also included.

S.M.A.R.T. Goals

Goal setting is an essential part of any QI project, especially system wide efforts to enact change and sustain improved practices. The "S.M.A.R.T. Goals" framework provides a tool to formulate effective aims and ease goal setting. S.M.A.R.T. stands for *specific, measurable, attainable, realistic,* and *time sensitive*, elements of any goal that prove essential to address (Spath & Kelly, 2017). Goals that are specific facilitate efforts that are clearly defined and have direction. Measurable goals enhance the ability to determine the efficacy of an intervention within a QI project and among other similar efforts. Attainability ensures that the intervention is appropriate for the short-term and long-term aims. Realistic goals facilitate QI project integrity.

Finally, the timeliness of any QI effort presents the opportunity to translate and apply findings into current practice while promoting ongoing improvement of efforts to meet patient and HCP expectations (Spath & Kelly, 2017).

Goal 1. Identify the knowledge, attitudes, and practice behaviors of HCPs and HCPs in primary and specialty outpatient care settings within the context of the Six Pillars of Lifestyle Medicine by utilizing a questionnaire issued to participants by May 30, 2023.

Goal 2. Conduct a comprehensive educational intervention regarding how best to facilitate the Six Pillars of Lifestyle Medicine into clinical practice and patient encounters by July 25, 2023.

Goal 3. Identify the knowledge, attitudes, and practice behaviors among HCPs in primary and specialty outpatient care settings who participated in the QI educational intervention regarding implementation of the Six Pillars of Lifestyle Medicine by October 15, 2023.

Section 4: Definition of Terms

The following are terms used frequently in this QI intervention:

- Chronic disease (CD) - a health condition that is not contagious, persists for at least 3 months or more, and leads to a prolonged course of illness often making way for other health conditions (Bernell & Howard, 2016).
- Multiple chronic conditions (MCC) – having more than two chronic conditions which require attention and constant management by primary practitioners and at times, multiple specialists (Holman, 2020).
- Lifestyle medicine (LM) – the “evidence-based practice of assisting individuals and families adopt and sustain behaviors that can improve health and quality of life” (Clarke et al., 2017, p.1).

- Six Pillars of Lifestyle Medicine (SPoLM) –lifestyle behaviors include six major areas of health: nutrition, physical activity, sleep, stress management, social connection, and risky substance use (Frates, 2019).
- Lifestyle related disease (LRD) – health conditions that are related and mostly caused by modifiable factors pertaining to lifestyle behaviors including diet, physical activity, and substance abuse such as tobacco or alcohol use (CDC, 2022).
- Health care practitioners (HCPs) – any medical professional directly involved inpatient care, including physicians, pharmacists, physical therapists (PT's), advanced practice providers (APP's) such as nurse practitioners and physician associates, nurses, medical assistants, and medical technicians.
- Healthy – state of complete physical, mental, and social welfare (Al Dawsari, 2023, p. 39).
- Quality of life (QoL) – "an individual's impression of their place in life" (Al Dawsari, 2023, p.40).
- Social determinants of health (SDoH) – factors that are indirectly related to health and wellness but form part of every patient's environment, including economic stability, access to and quality of education, access to and quality of health care, surrounding environment and infrastructure, and social community (Office of Disease Prevention and Health Promotion).
- Tendency – person's inclination to follow-through with internal motivations, external motivations, both, or neither according to Gretchen Rubin's framework for "The Four Tendencies." There are four tendencies, including the "Upholder," the "Obliger," the "Questioner," and the "Rebel" (Rubin, 2017).

Section 5: Conceptual Underpinning and Theoretical Framework

The Health Belief Model

Pertinent to the implementation of the SPoLM education in this initiative, a translational theory will be used to guide the process. Translational theories focus on the interrelationships and complex organizational dimensions that are relevant to the translation and research of new knowledge into clinical practice. The Health Belief Model (HBM), developed by social psychologists in 1975, was originally intended to determine cause of poor engagement in preventive health services on behalf of healthy communities (Peterson & Bredow, 2017). The HBM is helpful in understanding what influences a patient's motivation to adopt and sustain healthy behaviors. This is important for HCPs to know prior to addressing these six key factors. Counseling should be patient-centered, focusing on those factors in which the patient is most willing and able to improve while determining how the patient feels about currently health practices and their ability to forgoes unhealthy behaviors for improved ones.

The HBM attempts to describe the human condition as it pertains to the likelihood of adopting recommended behavioral changes that benefits their health in the scope of any primary, secondary, or tertiary preventive effort. This middle-range theory proposes that patients take action to prevent, treat, or improve illness which they believe they are susceptible to and have the personal ability to make a positive change (Peterson & Bredow, 2017). Five primary components to the HBM include perceived severity of the disease, perceived susceptibility to the disease, perceived benefits of preventing or managing the disease, perceived barriers to preventing or managing the disease, cues to action, and personal self-efficacy (Peterson & Bredow, 2017). In summary, the theory suggests that "perceived benefits minus perceived barriers to behavioral change affect an individual's likelihood to action" (Peterson & Bredow, 2017, pp. 218).

Perceived Severity

Perceived severity describes the patient's personal knowledge of the gravity of his or her health condition or the condition to which they are predisposed to by modifiable and nonmodifiable factors (Peterson & Bredow, 2017). One's perception of the "seriousness" of a disease is influenced by personal knowledge or experience, expert education, sociocultural factors, and other means.

Perceived Susceptibility

Perceived susceptibility refers to a patient's discernment of their risk of developing a particular disease or condition. For an individual who is already ill, it also includes his or her belief regarding the likelihood that his or her condition may progress (Peterson & Bredow, 2017).

Perceived Barriers

Perceived barriers outline the hurdles that the patient believes must be overcome to achieve health rather than fall to illness. Barriers can be physical or metaphysical and their level of influence can also be considered more or less threatening based on personal factors (Peterson & Bredow, 2017).

Cues to Action

Any external factor that serves to motivate individual beliefs and behaviors that favor healthy practices are cues to action. This can be an HCP's educational intervention, media coverage on a particular disease or intervention or personal experience with disease onset or progression among others (Peterson & Bredow, 2017).

Self-Efficacy

Self-efficacy is an important component which determines health behaviors. It is defined briefly as "behavior specific self-confidence" (Linke et al., 2014, pp. 5). Self-efficacy is linked to an individual's perception of their own ability to adopt, achieve, and sustain healthy behaviors amidst threats and barriers to health for the purpose of achieving personal definitions of health and wellness (Peterson & Bredow, 2017). Self-efficacy can also be linked to how well a patient has performed a task or behavior in the past and the perception of barriers or facilitators for achieving healthy behaviors (Linke et al., 2014).

The Four Tendencies

An important concept in self-efficacy is internal and external motivators or barriers. One conceptual model, "The Four Tendencies," was created by observational and qualitative researcher and writer Gretchen Rubin, JD, who sought to discover what personal attributes underly what humans do and why they do it (Rubin, 2017). The framework builds on the idea that people are either intrinsically motivated, extrinsically motived, both intrinsically and extrinsically motived, or not motived by neither of the two. In her theory, adherence to medical recommendations by HCPs lies in discovering which "tendency" his or her patient is inclined to (Rubin, 2017). This knowledge can be applied in this QI intervention as a way of providing insight to HCPs regarding barriers to adherence which he or she may face in clinical encounters. These four tendencies include the Upholders, the Obligers, the Questioners, and the Rebels and will be explained further in the context of this QI initiative.

The Upholders

Upholders respond favorably to intrinsic and extrinsic motivation. Patients who are Upholders meet internal and external goals readily and feel energized when goals are met. They "follow-through" well with recommendations, including advise on best health practices, and may

formulate their own task list to meet these accomplishments (Rubin, 2017). For any HCP, LM recommendations for an Upholder are best structured as a schedule or a list which the patient can complete on their own (Rubin, 2017).

The Obligers

The most common of the four theoretical tendencies is the Obliger, which favors external motivations easily but may ignore or disregard internal forces of change. A key area to consider when counseling and managing the CD of an Obliger is that they require external accountability, often meeting deadlines and timed goals with ease but struggling when these goals are created independent from the provider (Rubin, 2017). It is difficult to get the Obliger to eat a certain way or exercise, however when a S.M.A.R.T. goal is provided, it may be easier for the HCP to expect change at the next visit.

The Questioners

Questioners respond readily to internal motivations, but often require explanations on why they should comply with an "arbitrary" recommendation. However, they respond well to research and advice that is evidence-based and sensical (Rubin, 2017). The HCP must keep this in mind when counseling on any of the SPoLM, making sure to include the reasoning behind each key point and how his or her CD and overall health will respond to the positive change.

The Rebels

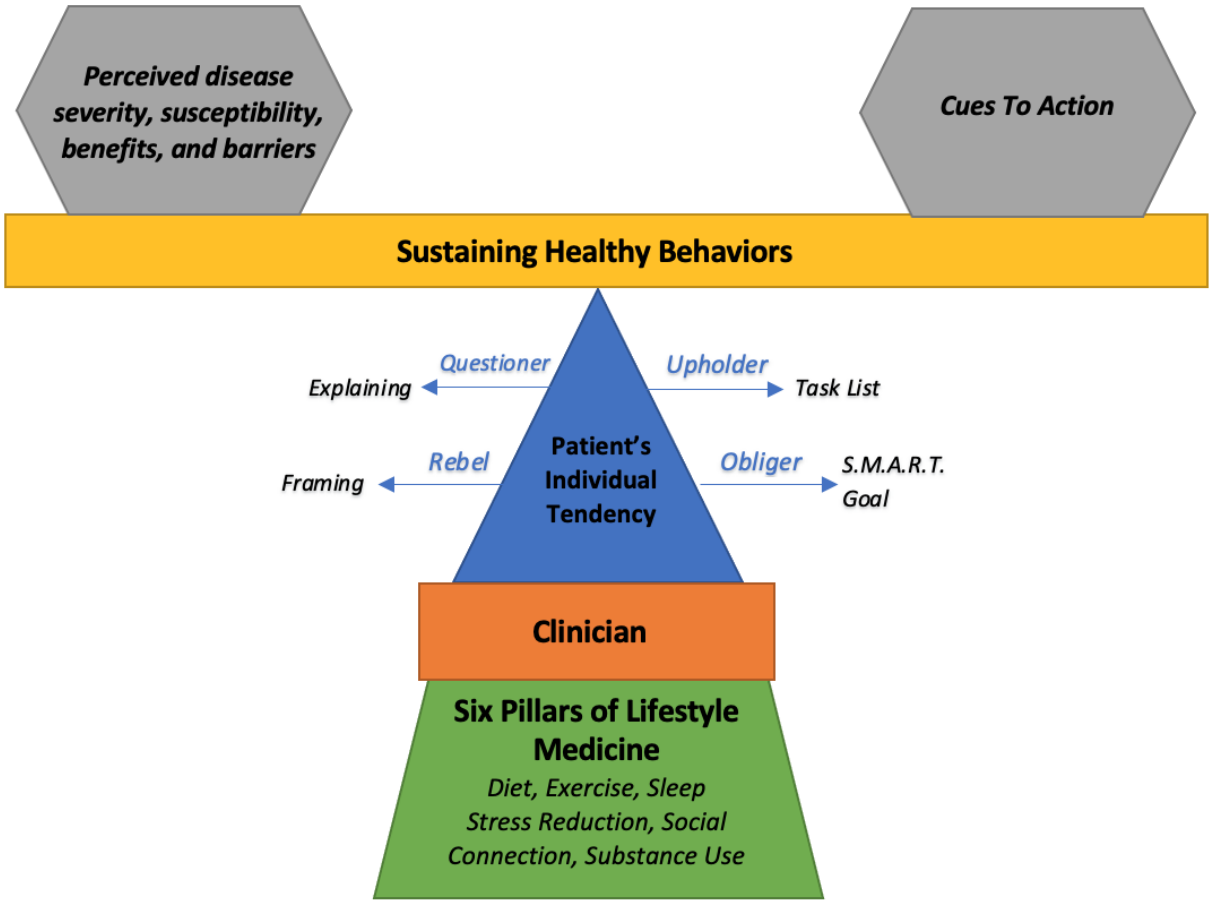
Rebels, as their nomenclature suggests, do not easily fall to the pull of internal or external motivations. Instead, they often shy away from advice, suggestions, and recommendations all together, particularly those that do not arise from their own intensions. These may be the most difficult patients to illicit change in because it is a challenge to steer them in any direction in which they do not want to go. In this case, HCPs must frame their evidence-based

recommendations on LM practices as challenges which they can meet "in their own way…[and]…at their own time" (Rubin, 2017, pp. 154).

Conceptual Model

Figure 1 depicts a conceptual model for the constructs of this study. The proposed intervention suggests that HCPs play a crucial role in influencing patients to adopt and sustain healthy behaviors in alignment with the SPoLM, which are well cited to improve management of patients with CD (Frates, 2019) and make up the foundation of the other concepts important to this QI project. A combination of internal and external factors may influence patient behaviors which lead them to ultimately achieving optimal level of health. These are described as the patient's individual tendency. On the balance of health behaviors, a patient's perceived disease severity, disease susceptibility, perceived benefits of healthy behaviors, and perceived barriers counters those cues to action. Together, they keep the scale even and help patients decide to sustain recommended behaviors that support their personal health goals.

Figure 1



Section 6: Quality Improvement Project Methodology and Procedures

Quality Improvement Project Methods

Design, Participants and Setting

QI is a formal approach to enhance clinical outcomes that incorporates evidence with best practices to exam HCPs' performance and follows a structured approach to enhance health outcomes[4] . A comparative pre and post-test design using web-based surveys was conducted. A convenience sample of 27 (n=27) multidisciplinary participants were included in this study. They consisted of 4 medical doctors, 3 nurse practitioners, 1 psychologist, 15 registered nurses, 3

medical assistants, and 1 sonographer. The setting was an outpatient cardiovascular and primary care medical office in South Florida.

Procedures

Following approval from the Institutional Review Board, recruitment occurred via email and both printed and electronic flyers that included project's purpose, informed consent, and the principal investigator's contact information. Upon agreement to participate, informed consent was obtained via email and Qualtrics surveys were distributed. The pre-test was used to obtain the participants' demographic information and the pre-test survey also included HCPs' baseline knowledge, attitudes, and practice behaviors regarding lifestyle management of CDs. Participants' data was identified using unique 4-digit code-numbers to ensure confidentiality and anonymity. The digital data collected from the pre-tests and post-tests were housed in Qualtrics and secured on a password encrypted computer. The post-test survey was distributed two weeks following the educational intervention.

The educational intervention was conducted in person and online via a YouTube link according to the participant's availability. The training lasted approximately 1 hour for both in-person and online participants. The training included a background of the current CD epidemic, the role of LM in CD management, evidence-based recommendations as summarized by the SPoLM framework, methods for practical application of LM, an introduction to Gretchen Rubin's Four Tendencies framework, and future implications of improving LM counseling in CD care.

Measures

Data analysis followed the collection of all the data and was held over a 4-month period. Demographics were collected to determine the sample's variability. Demographics included age,

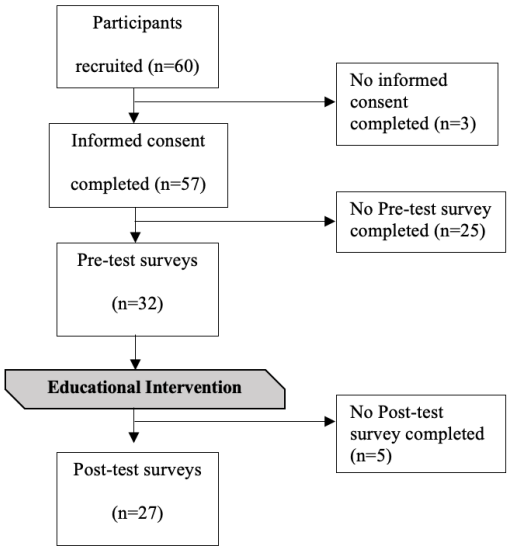
sex, race, and education. The pre-test and post-test surveys were developed for this study by the researchers and reviewed for face validity. The survey questions were divided into three categories, (1) knowledge, (2) attitudes, and (3) practice behaviors and consisted of Likert-type questions with five response options. After data points were organized by unique 4-digit identifiers, pre-test and post-test surveys were scored and compared to measure the educational intervention's success. Incomplete and unidentifiable surveys were not scored.

Quality Improvement Project Procedures

Participant Recruitment

A total of 60 HCP participants (n=60) were recruited via email or in-person to participate in this QI intervention. 90% (n=57) of participants completed informed consents and 32 participants (n=32) completed pre-surveys. A total of 27 participants (n=27), or 45% of participants completed the QI intervention in its entirety and these were used to analyze the response to QI aims. **Figure 2** depicts a diagram of the participation, attrition rate, and sample size.

Figure 2



Quality Improvement Project Implementation

The design of this intervention was a quasi-experimental, mixed-methods research study with quantitative data which will collect important points for subsequent interventions. The design included pre-test and post-test surveys. Following approval from the Institutional Review Board, recruitment occurred via email and both printed and electronic flyers that included project's purpose, informed consent, and the principal investigator's contact information. Upon agreement to participate, informed consent was obtained via email and Qualtrics surveys were distributed. The pre-test was used to obtain the participants' demographic information and the pre-test survey also included HCPs' baseline knowledge, attitudes, and practice behaviors regarding lifestyle management of CDs. Pre-test surveys required about 10 minutes to complete. Participants' data was identified using unique 4-digit code-numbers to ensure confidentiality and anonymity.

The training included a background of the current CD epidemic, the role of LM in CD management, evidence-based recommendations as summarized by the SPoLM framework, methods for practical application of LM, an introduction to Gretchen Rubin's Four Tendencies framework, and future implications of improving LM counseling in CD care. Post-test surveys were distributed approximately 2 weeks after the educational intervention. Post-test surveys required about 10 minutes to complete. Data analysis followed the collection of all the data and was held over a 4-month period. The digital data collected from the pre-test and post-tests were housed in Qualtrics and secured on a password encrypted computer.

Data Analysis

The pre-test and post-test surveys were developed for this study by the researchers and reviewed for face validity. The survey questions were divided into three categories, (1)

knowledge, (2) attitudes, and (3) practice behaviors and consisted of Likert-type questions with five response options. After data points were organized by unique 4-digit identifiers, pre-test and post-test surveys were scored and compared to measure the educational intervention's success. Incomplete and unidentifiable surveys were not scored.

Protection of Human Subjects

The Institutional Review Board (IRB) makes the determination of any risks to potential participants. Participants consented via Qualtrics, with the opportunity and right to withdraw their consent at any time. Benefits of participation included the improvement of knowledge in lifestyle behavior counseling for patients with CDs to improve clinical flow, treatment, disease management, and patient outcomes. No identifiable data was collected during this project. Only their educational background, specialty if applicable, and scope of practice are relevant. Sex, race, and ethnicity will also shed light on the variability of the subjects and will also be included in the final data evaluation. A benefit of this research is to increase the participant's knowledge and improve attitudes and clinical practice methods for counseling chronically ill patients on lifestyle behaviors that could improve their health and quality of life. There is minimal risk associated with this QI project since the likelihood of participants experiencing any physical, psychological, social, or economic harm is minimal. Appendix B depicts the IRB approved consent form used in this QI initiative.

Section 7: Quality Improvement Project Results

Participant Demographics

Of 27 HCP participants, 22% were male and 78% were female. Over 66% of participants were 20 to 30 years old. About 34% of participants were older than 31 years old. Over 62% of participants identified as Hispanic, 33% identified as White, and just under 4% of participants

identified as Black. Over 55% of participants were registered nurses, making up the largest professional group. Almost 15% of participants were medical doctors, and 11% of participants were nurse practitioners. The remaining 15% of participants were psychologists, medical assistants, or sonographers. Over 66% of participants reported practicing less than 5 years in the medical field. The remaining 34% practiced for more than 5 years. **Tables 1 through 5** display this data visually.

.**Table 1**

Gender	
Male	22.22% (n=6)
Female	77.78% (n=21)

Table 2

Age	
20 to 30 years old	66.7% (n=18)
31 to 40 years old	18.5% (n=5)
41 to 50 years old	0% (n=0)
61 or more years old	14.8% (n=4)

Table 3

Race/Ethnicity	
White	33.3% (n=9)
Black/African American	3.7% (n=1)
Hispanic/Latino	62.3% (n=17)

Table 4

Role/Title	
Medical Doctor	14.81% (n=4)
Psychologist	3.70% (n=1)
Nurse Practitioner	11.11% (n=3)
Registered Nurse	55.56% (n=15)
Medical Assistant	11.11% (n=3)
Sonographer	3.70% (n=1)

Table 5

Years of Practice	
0 to 5 years	66.7% (n=18)
5 to 10 years	11.1% (n=3)
10 to 20 years	7.4% (n=2)
20 or more years	14.8% (n=4)

Reported Percentage of Patients with Chronic Disease

Participants were surveyed on the distribution of patients with chronic disease in their respective settings. All participants worked directly with patients who had 1 or more CD's. Consensus among participants identified an approximate 70% of total patient population required intricate care for his or her CD. **Table 6** displays this data visually.

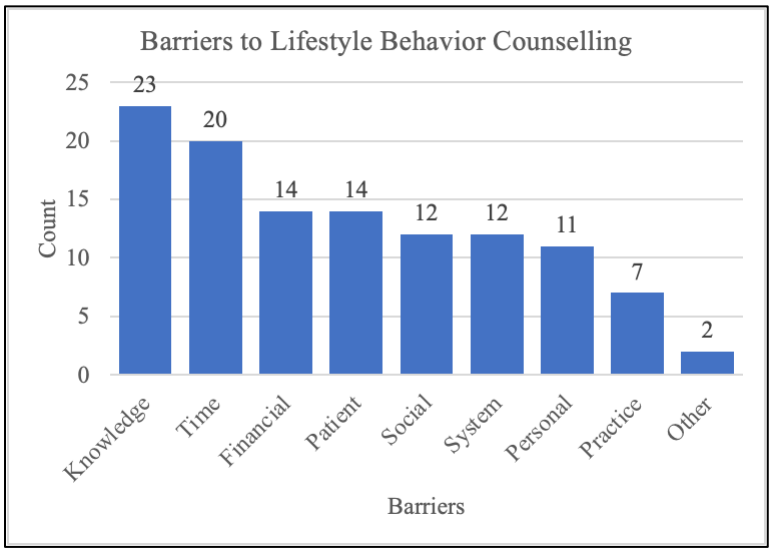
Table 6

Percentage of Daily Population with Chronic Disease	
Mean	63.41%
Median	70%
Mode	100%
Range	97%

Reported Barriers to Lifestyle Behavior Counseling

Participants were inquired on the perceived barriers to lifestyle behavior counseling in their respective practice settings and patient populations. Participants were asked to select all barriers that applied from the following list: Knowledge, financial barriers, patient barriers, social barriers, time barriers, practice barriers, system barriers, personal barriers, or other barriers. **Figure 3** displays participant responses. Those who responded with "other barriers" cited "language" and "patient motivation" to be significant hurdles for counseling on lifestyle behavior practices.

Figure 3



Note: Free text responses for "other" category; Language (n=1), Patient motivation (n=1).

Participant Knowledge

Participant knowledge was collected from a 9-item Likert scale questionnaire. A total of 27 participant (n=27) responses were analyzed. Likert scale ranged from 1 to 5, and participants were asked to rate his or her baseline "familiarity" with CD, the SPoLM, and Gretchen Rubin's Four Tendencies Theory by indicating one of the following per item: 1 = Not familiar, 2, 3 = Somewhat familiar, 4, and 5 = Very familiar. Maximum achievable score based on sum of Likert scale responses for this 9-item section on participant knowledge was a total of 1215 (100%).

For pre-test responses, the average among the data set was 2.88 (M = 2.88), and the standard deviation was 1.29 (SD = 1.29). Total score among participants for the pre-test questionnaire was 701/1215 (58%).

For post-test responses, the average among the data set was 4.48 (M = 4.48), and the standard deviation was 0.69 (SD = 0.69). Total score among participants for the post-test questionnaire was 1090/1215 (90%). **Table 7.1** demonstrates the t-scores and statistical significance of the data. A t score of 5.683 indicates that the results are statistically significant and increase in the mean is not by chance but demonstrates meaningful change. The p-value represents the data's relationship to the hypothesis. According to a p value of less than 0.0001 indicates support of the hypothesis. **Table 7.2** groups the 9-item pre-test and post-test questionnaires by item to evaluate for meaningful change in knowledge based on total scores. **Figure 4** depicts the change in the average between pre-test and post-test survey responses.

Table 7.1

Two-Tailed Paired Samples t-Test: Difference Between Pre-Intervention and Post- Intervention Knowledge of SPoLM Scores

Pre-Test*		**Post-Test***				
M	SD	M	SD	*t*	*p*	*d**
2.88	1.29	4.48	0.69	5.6830	< .0001	1.55

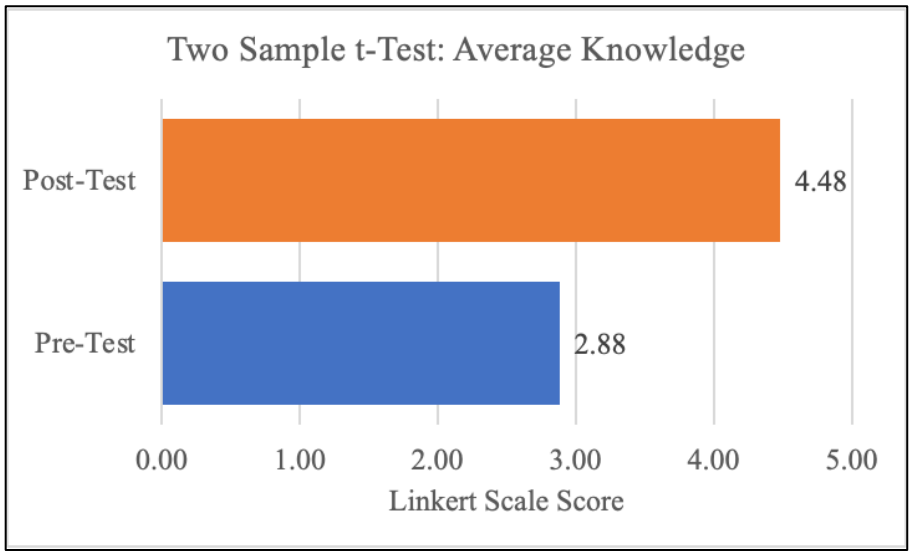
**Note: n = 27. Degrees of Freedom for the t-statistic = 39.7516. d represents Cohen's d, effect size.*

Table 7.2

Question	**Pre-Intervention**	**Post-Intervention**	**% Change**
1. How familiar are you with the implications (medical and non-medical) of chronic disease?	104 (77%)	125 (93%)	*16* ↑
2. How familiar are you with lifestyle behaviors as the root cause of chronic disease?	103 (76%)	125 (93%)	*17* ↑
3. How familiar are you in evidence-based practice lifestyle behavior interventions?	85 (63%)	119 (88%)	*25* ↑
4. How familiar are you with identifying each of the "Six Pillars of Lifestyle Medicine?"	64 (47%)	123 (91%)	*44* ↑

5. How familiar are you with methods for applying the "Six Pillars of Lifestyle Medicine" in clinical practice?	63 (47%)	123 (91%)	*44* ↑
6. Rate your level of familiarity in addressing each of the "Six Pillars of Lifestyle Medicine" in clinical practice.	61 (45%)	120 (89%)	*44* ↑
7. How familiar are you with barriers of patients with chronic disease for adopting and sustaining lifestyle behavior change?	86 (64%)	121 (90%)	*26* ↑
8. How familiar are you with the concept of "self-efficacy?"	95 (70%)	125 (93%)	*13* ↑
9. Rate your familiarity with "The Four Tendencies?"	40 (30%)	109 (81%)	*51* ↑
Total Scores	**701 (58%)**	**1090 (90%)**	***32*** ↑

Figure 4



Participant Attitudes

Participant attitudes was collected from a 6-item Likert scale questionnaire. A total of 27 participant (n=27) responses were analyzed. Likert scale ranged from 1 to 5, and participants were asked to rate his or her baseline sense of "personal importance" with CD, the SPoLM, and Gretchen Rubin's Four Tendencies Theory by indicating one of the following per item: 1 = Not important, 2, 3 = Somewhat important, 4, and 5 = Very important. Maximum achievable score based on sum of Likert scale responses for this 6-item section on participant knowledge was a total of 810 (100%).

For pre-test responses, the average among the data set was 4.10 (M = 4.10), and the standard deviation was 1.21 (SD = 1.21). Total score among participants for the pre-test questionnaire was 665/810 (82%).

For post-test responses, the average among the data set was 4.77 (M = 4.77), and the standard deviation was 0.54 (SD = 0.54). Total score among participants for the post-test questionnaire was 772/810 (95%). **Table 8.1** demonstrates the t-scores and statistical significance of the data. A t score of 2.6274 indicates that the results are statistically significant

and increase in the mean is not by chance but demonstrates meaningful change. The p-value represents the data's relationship to the hypothesis. A p value of 0.0126 indicates support of the hypothesis. **Table 8.2** groups the 6-item pre-test and post-test questionnaires by item to evaluate for meaningful change in knowledge based on total scores. **Figure 5** depicts the change in the average between pre-test and post-test survey responses.

Table 8.1

Two-Tailed Paired Samples t-Test: Difference Between Pre-Intervention and Post- Intervention Attitudes of SPoLM Scores

Pre-Test*		**Post-Test***				
M	SD	M	SD	*t*	*p*	*d**
4.10	1.21	4.77	0.54	2.6274	0.0126	0.72

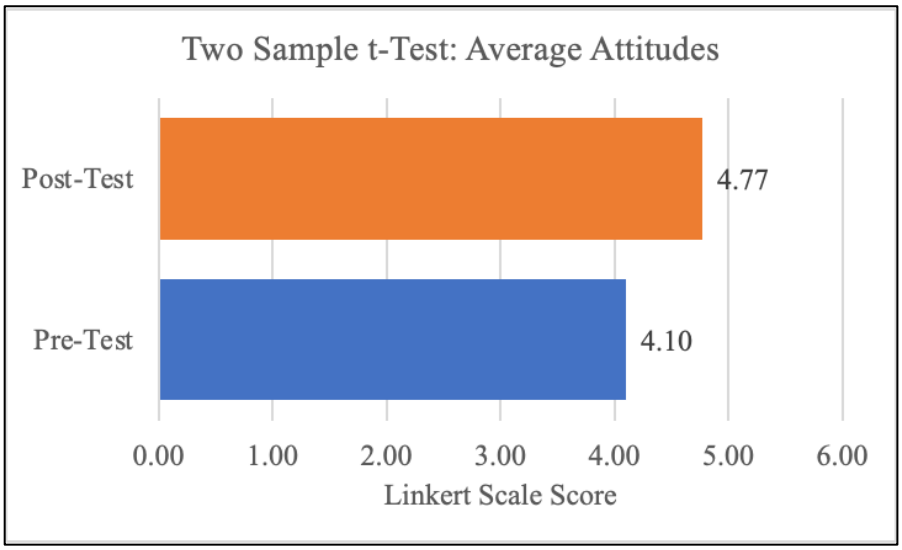
**Note: n = 27. Degrees of Freedom for the t-statistic = 35.9615. d represents Cohen's d, effect size.*

Table 8.2

Question	**Pre-Intervention**	**Post-Intervention**	**% Change**
1. How do you feel about improving chronic disease management?	121 (90%)	133 (99%)	*9* ↑
2. How do you feel about the role that lifestyle behaviors have on chronic disease onset, severity, and progression?	122 (90%)	132 (98%)	*8* ↑
3. How do you feel about integrating the "Six Pillars of Lifestyle Medicine"	101 (75%)	128 (95%)	*20* ↑

teaching into each patient visit?			
4. How do you feel about prescribing evidence-based lifestyle behaviors instead of/in additional to standard treatment for chronic disease management?	106 (79%)	125 (93%)	*23* ↑
5. How do you feel about using patient-specific characteristics such as their "tendency" to improve adherence to lifestyle behavior interventions?	111 (82%)	128 (95%)	*13* ↑
6. How do you feel about the applying the "Six Pillars of Lifestyle Medicine" for your own personal health?	104 (77%)	126 (93%)	*16* ↑
Total Scores	**665 (82%)**	**772 (95%)**	***13*** ↑

Figure 5



Participant Practice Behaviors

Participant practice behaviors were collected from a 9-item Likert scale questionnaire. A total of 27 participant (n=27) responses were analyzed. Likert scale ranged from 1 to 5, and participants were asked to rate "how often" lifestyle behavior counseling and application of the SPoLM was applied in practice by indicating one of the following per item: 1 = Not often, 2, 3 = Somewhat often, 4, and 5 = Very often. Maximum achievable score based on sum of Likert scale responses for this 9-item section on participant knowledge was a total of 1215 (100%).

For pre-test responses, the average among the data set was 3.27 (M = 3.27), and the standard deviation was 1.25 (SD = 1.25). Total score among participants for the pre-test questionnaire was 794/1215 (65%).

For post-test responses, the average among the data set was 4.19 (M = 4.19), and the standard deviation was 0.99 (SD = 0.99). Total score among participants for the post-test questionnaire was 1018/1215 (84%). Table 9.1 demonstrates the t-scores and statistical significance of the data. A t score of 2.998 indicates that the results are statistically significant and increase in the mean is not by chance but demonstrates meaningful change. The p-value

represents the data's relationship to the hypothesis. According to a p value of 0.0004 indicates support of the hypothesis. **Table 9.2** groups the 9-item pre-test and post-test questionnaires by item to evaluate for meaningful change in knowledge based on total scores. **Figure 6** depicts the change in the average between pre-test and post-test survey responses.

Table 9.1

Two-Tailed Paired Samples t-Test: Difference Between Pre-Intervention and Post- Intervention Practice Behaviors of SPoLM Scores

Pre-Test*		**Post-Test***				
M	SD	M	SD	*t*	*p*	*d**
3.27	1.25	4.19	0.99	2.998	0.0004	0.82

**Note: n = 27. Degrees of Freedom for the t-statistic = 49.4077. d represents Cohen's d, effect size.*

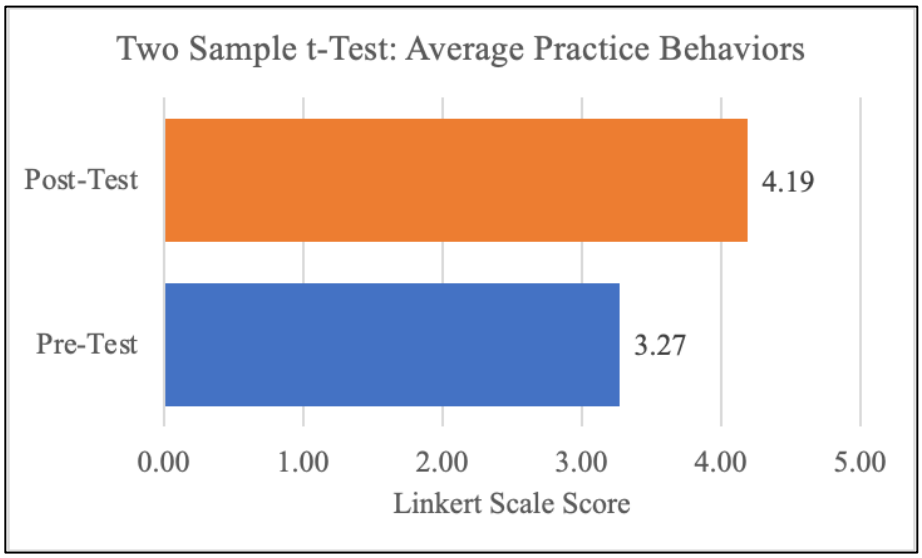
Table 9.2

Question	**Pre-Intervention**	**Post-Intervention**	**% Change**
1. How often do you ask patients with chronic disease what his or her **diet** is like?	88 (65%)	112 (83%)	*18* ↑
2. How often do you ask that patients with chronic disease what his or her **physical activity** is like?	95 (70%)	116 (86%)	*16* ↑
3. How often do you ask that patients with chronic disease what his or her **sleep** is like?	93 (69%)	112 (83%)	*14* ↑

4. How often do you ask that patients with chronic disease what he or she does to modify **stress**?	84 (62%)	108 (80%)	*18* ↑
5. How often do you ask that patients with chronic disease what his or her **social life** is like?	72 (53%)	105 (78%)	*25* ↑
6. How often do you ask that patients with chronic disease if he or she uses **tobacco/alcohol/drugs**?	107 (79%)	128 (95%)	*16* ↑
7. How often do you assess your patient's personal/social/cultural/knowledge/or other barriers to adopting healthier habits?	82 (61%)	109 (81%)	*20* ↑
8. How often do you adjust your method of counseling patients based on their personal attributes or "tendency?"	84 (62%)	112 (83%)	*21* ↑
9. How often do you apply evidence-based practice methods for lifestyle behaviors to your own life?	89 (66%)	116 (86%)	*20* ↑

Total Scores	**794 (65%)**	**1018 (84%)**	***19*** ↑

Figure 6



Section 8: Quality Improvement Project Discussion

An in-depth synopsis of this QI intervention's results sheds light on the current state of LM counseling for patients who have been diagnosed with CD's. Among participant, a reported average of 63% of patients had one or more CD's, which is a fairly accurate representation of the incidence of CD in the country. It is cited in the literature that health care clinicians do not possess adequate knowledge, confidence, or the ability to counsel patients on lifestyle behavior in practice (Clarke et al., 2017; Darer et al., 2004). Indeed, knowledge was the largest reported barrier to counseling among this QI sample, which emphasizes need for educational aims that seek to improve the latter.

Kiestra et al., (2020) reports that lifestyle behaviors are discussed in only a minority of consultations and there is a significant variation in counseling topics and methods. Furthermore, while the importance of assessing lifestyle behaviors in the clinical setting was clear, clinicians were still less likely to participate in counseling and goal setting due to barriers such as lack of time, lack of reimbursement, perceived skill, and perceived patient motivation (Kiestra et al., 2020). Time was the second largest barrier reported by participants in the QI intervention, followed by financial and patient barriers which were tied for third.

This QI intervention aimed to address HCP baseline knowledge, personal attitudes, and practice behaviors by introducing an evidence-based, feasible, and effective method of counseling which would scaffold efforts to counsel in busy practice settings where a large majority of the patients are heavily burdened by CD. **Figures 7, 8, and 9** portray the difference in pre-test and post-test responses for each of the three measures for this QI project. Responses in each measure will be discussed at length.

Figure 7

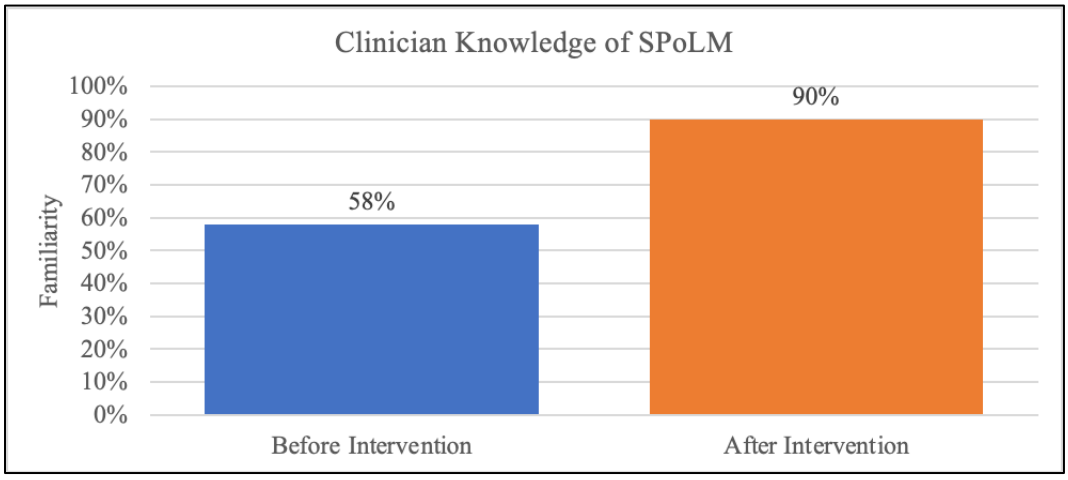


Figure 8

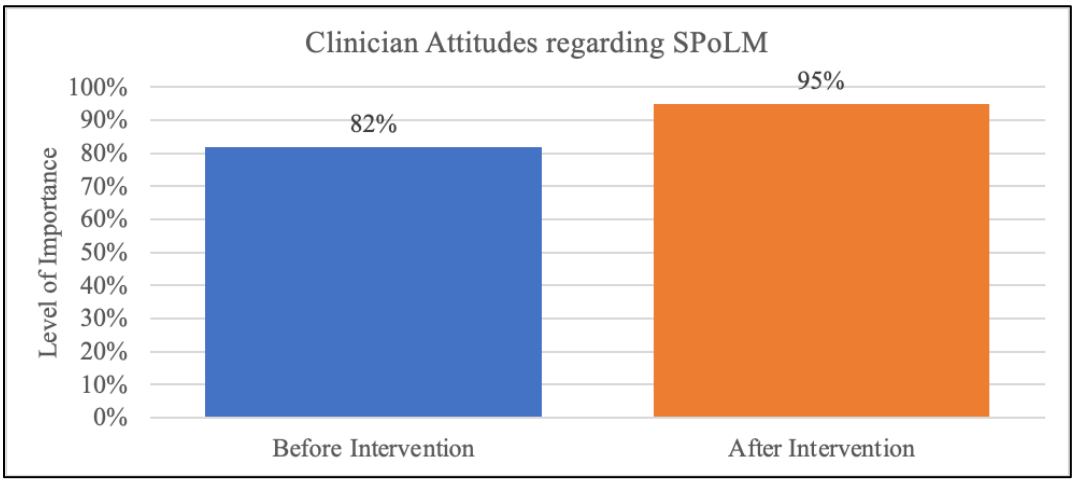
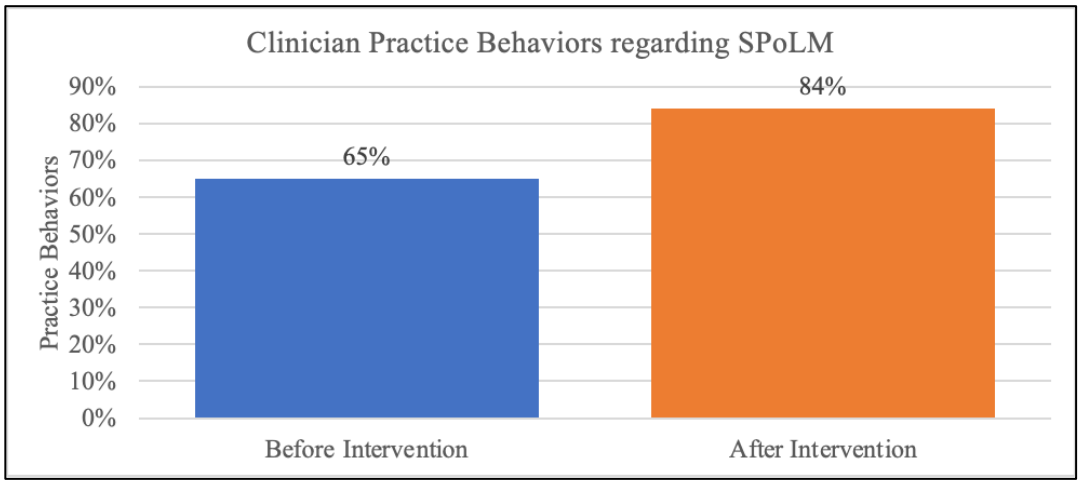


Figure 9



Participant Knowledge

Clinicians were surveyed on their baseline knowledge of CD management, lifestyle behaviors, the SPoLM model, and Gretchen Rubin's Four Tendencies theory. Likert scale analysis allowed to correlate improvement in knowledge with a higher overall score. The QI educational session improved baseline knowledge of the discussed topics an astounding 32%.

Particularly, participants reported a 44% greater familiarity with each of the following topics: what the SPoLM are, how to address each of these six lifestyle pillars, and methods for addressing these behaviors with his or her patients.

Additionally, familiarity with Gretchen Rubin's Four Tendencies theory of personal motivation increased 51%. Before the intervention, participants reported 70% familiarity with the concept of "self-efficacy", however baseline knowledge of The Four Tendencies theory scored only 30%. This novel theory which was formulated as a construct for identifying patterns of behavior based on self-directed actions and personal motivation. Patient motivation is cited as a significant barrier to adoption of lifestyle behaviors (Jahn et al., 2021; Kiestra et al., 2020; Frates, 2019; Kirk et al., 2017; Linke et al., 2014). Therefore, introducing HCPs to this model of self-efficacy may serve useful when counseling patients on one or more of the SPoLM.

Participant Attitudes

Participants were asked to rate their personal attitudes regarding lifestyle behavior counseling in clinical practice. Overall, participants felt positively about improving the current standard for chronic disease management before the intervention was applied. Participants also acknowledged an average score of 90% to the construct that lifestyle behavior counseling was important for managing and mediating the severity of chronic disease prior to learning more about the SPoLM. These values suggest that HCPs understand and value the role of LM behavior counseling in clinical practice. Confidence in integrating the SPoLM and prescribing evidence-based lifestyle behaviors increased by 20% and 23% respectively after the intervention, suggesting that HCPs can engage in counseling practices that are deemed necessary and valuable when equipped with the proper skills.

Participants scored an average of 82% when surveyed about the importance of counseling patients in a way most-fitting to their individual temperament or "tendency" as Rubin's theory defines. After being introduced to the constructs of the Four Tendencies theory and methods for counseling patients who may fall in 1 of 4 "tendencies," scores increased to 95%, suggesting the theory may be fitting to addressing lifestyle behaviors in a more patient-centered manner.

The evidence cites a correlation between the health of the HCP and that of his or her patients, suggesting that HCPs who engage personally in healthier practices often translate these values into practice, subsequently improving the health of his or her patients (McDonald, 2022; Malatskey et al., 2017). Prior to the intervention, participants reported a level of comfortability of 77% for applying the SPoLM in their health. After the intervention, participants scored personal application of the SPoLM at 93%. Therefore, there was a meaningful 16% increase in positive change amongst HCPs to adopt and sustain healthier lifestyle practices themselves. This suggests that educating HCPs on the SPoLM and on LM counseling modalities goes far beyond improving patient health outcomes, but HCP health outcomes as well.

Participant Practice Behaviors

Participants were surveyed on the frequency in which they addressed each of the SPoLM in clinical encounters. Post-test surveys were distributed 2-weeks after the educational intervention, therefore significant increase in practice behaviors were not expected. However, participants reported addressing patient lifestyle behaviors and counseling 19% more often in the 2 weeks following the intervention than prior. Social life and stress were the two least addressed aspects of health prior to the intervention, with average scores of 53% and 62% respectively. After the intervention, HCPs reported addressing each of the six pillars more frequently by at least 15% or greater.

There was also a 20% improvement in addressing patient barriers to adopting and sustaining meaningful lifestyles changes after the intervention. Likewise, participants reported adjusting their method of counseling to patient's individual needs and temperaments 21% more often after the intervention. Of notable importance, there was a reported 20% increase in personal adoption of lifestyle behaviors on behalf of HCPs. These improved measures suggest increased awareness, increased practice, and increased HCP motivation to address foundational lifestyle factors which influence chronic disease.

Quality Improvement Project Limitations

The small sample size was a notable limitation of this study; additionally, a convenience sample of HCPs from a single healthcare clinic, limits generalizability to other healthcare groups or settings. Attrition was observed after pre-test surveys were distributed, after the intervention was conducted, and after post-test surveys were distributed. Since the survey was developed by the research team, further research must be conducted to establish the reliability and validity of the survey. This suggests that time was a principal factor, and the lengthiness of the study could have been a major cause of attrition amongst busy, practicing HCPs.

Translation of Evidence to Practice

Research findings are only as valuable as their ability to effect essential and transformative change in practice. Practical application of LM recommendations for managing and treating patients with chronic disease is crucial to improving the health and wellbeing of the aging population globally. Additionally, it emphasizes prevention of illness in patients who are seemingly at risk for developing chronic diseases. The literature cites the efficacy of lifestyle behavior change, however various steps must take place before enacting systemic change.

Translating evidence into practice first requires an in-depth understanding of the practice or system being changed. Via an organizational assessment, barriers and facilitators to QI methods can be identified (Spath & Kelly, 2017). An organizational assessment includes insight into system operations, leadership model and responsibilities, strategies for employing action, intended audience or customer demographics, strategic mission and action plans, key processes, and performance measures (Spath & Kelly, 2017). After the environment is well known, a Plan-Do-Study-Act process can be employed for identifying needs, implementing change, and evaluating performance (Spath & Kelly, 2017).

This intervention aims to develop an evidence-based educational intervention for improving the knowledge, attitudes, and practice behaviors of HCPs in primary and specialty care settings that care for persons with chronic diseases. It is cited that HCPs are not well versed in LM modalities of care (Clarke et al., 2017). Additionally, the capability of patients with chronic disease is underestimated, therefore underdressed as is cited when adherence to physical activity recommendations were analyzed among a group of patients with chronic disease (Bullard et al., 2019). The proposed intervention suggests emphasizing lifestyle behavior interventions for managing disease, particularly chronic disease, and will propose evidence-based tools that are easy for HCPs to communicate, feasible, emotionally appealing, and strategically aligned with the practice. Table A provides a timeline of the key events of this QI initiative.

Implications to Advanced Nursing Practice

APP's such as nurse practitioners are increasingly involved in the care of patients with complex, chronic disease. In one study, 68% of nurse practitioners reported caring for patients with intricate medical needs, drawing upon their advanced communication and coordination

skills (Fraze et al., 2020). A study conducted by the Centers for Medicare and Medicaid Services (CMS) on the role of the NP in current practice identified a 70% increase in the presence of NPs in ambulatory care from 2012 to 2017 (Fraze et al., 2020). According to the CMS, approximately 37.9% of CMS patients seen by an NP had 1 to 2 chronic diseases, 18.4% had 3 to 5 chronic conditions, and still 7.6% of patients had 6 or more chronic diseases (Fraze et al., 2020).

Considering not only the alarming increase in the incidence and prevalence of chronic disease in the United States, partly due to the aging population, it is ever more crucial to provide nurse practitioners with the necessary skills to improve knowledge, confidence, and motivation to implement lifestyle behavior counseling in clinical practice to address the complex needs of patients with chronic disease. Not to mention, meaningful counseling on lifestyle behaviors can mediate social determinants of health (Krishnaswami et al., 2019) and ameliorate the effects of burnout that are so readily seen among NPs according to their practice conditions (Abraham et al., 2021). It is projected that by 2030, about one third of primary care HCPs will be NPs (Abraham et al., 2021). As NPs take the center stage in healthcare, they must be equipped with foundational understanding of the latest in evidence-based practice LM that can prevent disease, treat the whole person, and ultimately reverse the physical and emotional damage inflicted on patients diagnosed with chronic disease.

Section 9: Conclusion

Chronic disease is a major, global contributor to premature death. More importantly, chronic disease has been cited to be widely preventable due to nature of most of these conditions, including cardiovascular disease, metabolic disorders, dementia, and cancer (Abe & Abe, 2019; Bodai et al., 2018; CDC, 2022; Dhana et al., 2020; Frates, 2019). Contributing lifestyle behaviors to chronic disease include poor diet, sedentary lifestyle, poor sleep, stress, social

isolation, and substance abuse. The six pillars denote effective methods for optimizing each of these crucial behaviors to guide HCPs to accommodate effective LM counseling into daily practice (Frates, 2019).

Educating HCPs on effective LM counseling is fundamental to improving chronic disease management. HCPs report lack of adequate knowledge, confidence, and ability to counsel on lifestyle behavior changes in the clinical setting (Clarke et al., 2017; Darer et al., 2004). With the incidence of chronic disease on the rise, it is more important than ever to standardize counseling on lifestyle factors which underly disease onset, severity, and complications. Providing HCPs with the tools to translate LM behaviors into practice effectively in lieu of potential system barriers, knowledge barriers, and patients' motivation to change allows for ease of translating what is known about the SPoLM into action.

Table A

QI Project Timeline	
Date	**Milestone**
April 15, 2023	DNP Project Proposal
May 26, 2023	IRB Approval Obtained
June 5, 2023	DNP Project Design Finalized
June 21, 2023	Informed Consent and Pre-Survey Distributed
June 26, 2023	Online On-Demand Educational Intervention Distributed
July 7, 2023	Final Informed Consents and Pre-surveys Collected
July 10, 2023	Educational Intervention Conducted Live
July 28, 2023	Final Post-Test Surveys Collected
September 18, 2023	Data Organization, Analysis, and Interpretation
September 28, 2023	Professional Organization Presentation
December 1, 2023	Florida International University's DNP Symposium

Table B: Literature Matrix

Author/Date	Title	Level of Evidence	Conclusion	Themes
Al Dawsari et al. (2023)	Quality of life among patients with chronic diseases: Integrative review	Level 5	Patients who suffer from chronic disease suffer from diminished quality of life.	Quality of life, chronic disease, chronic illness, ageing
Atella et al. (2019)	Trends in age-related disease burden and healthcare utilization	Level 3	Chronic disease incidence increased in a span of 10 years, leading to a 26% increase in prescriptions, 27% increase in lab and diagnostic testing, and as a result an increase in overall cost and utilization.	Chronic disease, healthcare system, healthcare utilization, burden of chronic disease, expense, prescriptions
Bullard et al. (2019)	A systematic review and meta-analysis of adherence to physical activity interventions among three chronic conditions: Cancer, cardiovascular disease, and diabetes	Level 1	Persons diagnosed with these chronic diseases could adhere to a prescribed physical exercise regimen most of the time, achieving an average of 77% of their total activity goal.	Chronic disease, physical activity, adherence, cancer, cardiovascular disease, diabetes
Clarke et al. (2017)	Lifestyle medicine professionals in training: A survey of	Level 3	Cite is a lack of sufficient instruction in medical training courses on the lifestyle medicine competences, including nutrition and exercises, despite	Provide behaviors, provider knowledge, health counseling, lifestyle medicine, competencies, medical training, medical education

	behaviors, knowledge and needs		recognition of the importance of these elements in patient health and wellbeing	
Dhana et al. (2020)	Healthy lifestyle and the risk of Alzheimer dementia: Findings from two longitudinal studies	Level 2	There was a significantly low incidence and risk of Alzheimer dementia with a higher lifestyle score.	Alzheimer, dementia, lifestyle medicine, lifestyle practices, risk stratification, incidence of dementia, prevalence of dementia
Gardner et al. (2020)	Effect of low-fat vs low-carbohydrate diet on 12-month weight loss in overweight adults and the association with genotype pattern or insulin secretion: The DIETFITS randomized clinical trial	Level 1	Both groups randomized to a healthy low-fat diet (HLF) or a health low-carbohydrate diet (HLC) achieved weight loss and there was no statistical significance in either group or based on genetic predisposition. This signals the importance of accountability for healthy behaviors rather than type of diet.	Obesity, diet, nutrition, counseling, weight reduction, disease prevention, body mass index, genetics, genetic predisposition, epigenetics
González-Becerra et al. (2019)	Fatty acids, epigenetic mechanisms, and chronic diseases: A systematic review	Level 2	Epigenetics plays a major role to disease onset and severity and various fatty acids affect DNA methylation, transcription, and phenotypic alternations which display as chronic diseases.	Epigenetics, genomics, chronic disease, nutrition, obesity, cance
Hajat & Stein (2018)	The global burden of multiple chronic	Level 5	The incidence of multiple chronic conditions is increasing, most of which are leading causes of death and disability	Chronic disease, death, disability, burden, lifestyle medicine, lifestyle factors, disease

	conditions: A narrative review		and have surpassed communicable disease in this matter. The economic burden of MCCs is well-cited, and little is being done about the root-cause of chronic disease which is easily contributed to environmental factors and a lack of emphasis on disease prevention and lifestyle behaviors	prevention, multiple chronic conditions, root cause of disease
Ornish et al. (1998)	Intensive lifestyle changes for reversal of coronary heart disease	Level 1	Results demonstrated that intense lifestyle changes led to diminished incidence of coronary artery events and a regression of established coronary atherosclerosis as seen by coronary angiogram.	Cardiovascular disease, coronary atherosclerosis, chronic disease, lifestyle medicine, lifestyle practices, diet, exercise, sleep, stress, social connection, tobacco, substance use
Patel et al. (2017)	Barriers and facilitators to healthy lifestyle changes in minority ethnic populations in the UK: A narrative review	Level 5	Minority groups experience a disproportionate incidence of chronic disease, in particular Type 2 diabetes mellitus, compared to white counterparts. It is also noted that social norms, cultural norms, cultural pressions, perceptions of health, language barriers, and geographic barriers all influenced lifestyle and health behaviors.	Social determinants of health, diabetes, minority, barriers, norms, cultural competency

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Appendix A: Participant Recruitment Letter

Dear Colleague,

My name is Lisabeth Alvarez, and I am a student from the Graduate Nursing Department at Florida International University. I am writing to invite you to participate in my quality improvement project about implementing evidence-based lifestyle behavior education for patients with chronic disease. You are eligible to participate in this quality improvement project by working with patients who are diagnosed with one or more chronic diseases.

Participation is completely voluntary. There will be no costs associated with participation. There will be no compensation offered for participation. If you decide to participate in this project, you will be asked to complete a pre-test questionnaire and a post-test questionnaire once you have attended an evidence-based educational session that will aim to improve your clinical practice behaviors surrounding lifestyle behavior optimization. Questionnaires are expected to take between 10 minutes to complete and the educational session is expected to take approximately 60 minutes.

If you would like to participate, please click on the links provided to complete the informed consent forms electronically and access the pre-test questionnaire. If you have any questions about this study, do not hesitate to contact me at lalva153@fiu.edu.

Thank you,

Lisabeth M. Alvarez

Lisabeth M. Alvarez, APRN, FNP-BC, DipACLM

Appendix B: IRB Consent Form

IRB CONSENT FORM

Introducing Clinicians to the Six Pillars of Lifestyle Medicine (SPoLM) for Managing Chronic Disease

Hello, my name is Lisabeth M. Alvarez, APRN, FNP-BC, DipACLM.

You have been chosen to be participate in a quality improvement project for Florida International University at an outpatient clinical practice in South Florida.

PURPOSE OF THE PROJECT

The purpose of the project is to investigate the impact of an educational intervention for healthcare providers to provide an evidence-based presentation that introduces health care practitioners (HCPs) to the Six Pillars of Lifestyle Medicine (SPoLM) and provides guidance in integrating lifestyle medicine principles into everyday clinical practice to help manage and empower chronically ill patients over their disease progression, improve quality of care and patient health outcomes.

NUMBER OF PARTICIPANTS

If you decide to be in this project, you will be one of 40 healthcare providers that have been selected to participating in this quality improvement project.

DURATION OF THE PROJECT

This project will run for about 6 weeks. Participation in this study will take about 45 minutes of your time. This will include completion a pre and post-test questionnaire (10 minutes), 1 live classroom style or online educational session (25 minutes) and a post-test questionnaire (10 minutes).

PROCEDURES

If you choose to participate in the project, I will ask you to do the following things:

1. Complete the pre-test questionnaire one week before participation in the intervention.

2. Attend an educational intervention that will be 25 minutes long including a Q & A session.

3. Complete the post-test questionnaire which will be distributed two weeks after participation in the intervention and will be expected to be completed within 1 week.

RISKS AND/OR DISCOMFORTS

There are no foreseeable risks for participating in this study and participation in the project will not interfere with normal office performance.

BENEFITS

There are various foreseeable benefits for participation including improvement of knowledge, attitudes, and clinical practice behaviors for utilizing the SPoLM to manage patients with chronic disease. It is expected that this project will benefit clinical practice and population health by standardizing education on lifestyle behaviors in clinical practice for HCCs who provide care to persons diagnosed with one or more chronic condition. This would ultimately improve the treatment and outcomes for this population and healthcare delivery.

ALTERNATIVES

There are no known alternatives available to you other than not taking part in this study. Any significant new findings developed during the project which may relate to your willingness to continue participation will be provided to you.

CONFIDENTIALITY

The records of this project including the pre-test and post-test questionnaire will be kept private and will be protected to the fullest extent provided by law. In any sort of report, we might publish, we will not include any information that will make it possible to identify you. Research records will be stored securely, and only the project team will have access to the records. However, your records may be inspected by authorized University or other agents who will also keep the information confidential.

USE OF YOUR INFORMATION

Your information collected as part of the project will not be used or distributed for future research studies even if identifiers are removed.

COMPENSATION AND COSTS

There is no cost or payment for participating in this project.

RIGHT TO DECLINE OR WITHDRAW

Your participation in this project is voluntary. You are free to participate in the project or withdraw your consent at any time during the project. You will not lose any benefits if you decide not to participate or if you quit the project early. The investigator reserves the right to remove you without your consent at such time that he feels it is in the best interest. Please carefully read the entire document before agreeing to participate. You may keep a copy of this form for your records.

INVESTIGATOR CONTACT INFORMATION

If you have any questions about the purpose, procedures, or any other issues relating to this quality improvement project you may contact Lisabeth M. Alvarez, APRN, FNP-BC, DipACLM at (305) 321-7688, lalva153@fiu.edu; or Dr. Deana Goldin at (305) 348-2958, degoldin@fiu.edu.

IRB CONTACT INFORMATION

If you would like to talk with someone about your rights of being a subject in this quality improvement plan or about ethical issues with this project, you may contact the FIU Office of Research Integrity by phone at 305-348-2494 or by email at ori@fiu.edu.

PARTICIPANT AGREEMENT

I have read the information in this consent form and agree to participate in this project. I have had a chance to ask any questions I have about this project, and they have been answered for me. I understand that I will be given a copy of this form for my records.

_____ _____ _____

Signature of Participant Date Printed Name of Participant

_____ _____

Signature of Person Obtaining Consent Date

Appendix C: Pre-Test Survey

Please provide a unique 4-digit code for ease of analysis between pre-survey and post-survey. This will be your unique, anonymous identifier.		
# _____ _____ _____ _____		
Demographics		
Sex: *Male / Female / Prefer not to say*	Age: *20 to 30 y/o 31 to 40 y/o 41 to 50 y/o 51 to 60 y/o 61+ y/o*	
Race/Ethnicity (select all that apply): *White / Black / Asian / American Indian / Alaskan Native / Non-Hispanic / Hispanic or Latino / Other* *If other, please specify:* _____		
Highest Level of Education:	Practice Specialty (if applicable):	Years of Practice: *0-5 years 5-10 years* *10-20 years. 20+ years*
Practice Information		
Do you work directly with patients? *Yes / No*	How many hours a day do you work directly with patients? *Less than 4 hours* *4 to 8 hours* *More than 8 hours*	Do you work with patients who suffer from "chronic disease?" *Yes / No*
	Is it challenging to council patients on lifestyle behaviors for managing their "chronic disease?" *Yes / No*	If yes, approximately what percentage of your patient population suffers from 1"chronic disease?" _____%

	If yes, what barriers can you identify in your practice that limits your ability to council patients with "chronic disease" on "lifestyle behaviors?" Select all that apply. *Knowledge / Time / Financial* *Social / Personal / Practice* *Patient / Other*	Approximately what percentage of your patient population suffers from more than 1 "chronic disease?" _____%
	If "other" was chosen above, please elaborate here.	

I. Knowledge		
Likert Scale **1** **2** ***Not Familiar***	**3** **4** ***Somewhat Familiar***	**5** ***Very Familiar***
1. How familiar are you with the implications (medical and non-medical) of chronic disease? _____	2. How familiar are you with lifestyle behaviors as the root cause of chronic disease? _____	3. How familiar are you in evidence-based practice lifestyle behavior interventions? _____
4. How familiar are you with identifying each of the "Six Pillars of Lifestyle Medicine?" _____	5. How familiar are you with methods for applying the "Six Pillars of Lifestyle Medicine" in clinical practice? _____	6. Rate your level of familiarity in addressing each of the "Six Pillars of Lifestyle Medicine" in clinical practice. _____
7. How familiar are you with barriers of patients with chronic disease for adopting and sustaining lifestyle behavior change? _____	8. How familiar are you with the concept of "self-efficacy?" _____	9. Rate your familiarity with "The Four Tendencies?" _____
II. Attitudes		
Likert Scale **1** **2** ***Not Important***	**3** **4** ***Somewhat Important***	**5** ***Very Important***
10. How do you feel about improving chronic disease management? _____	11. How do you feel about the role that lifestyle behaviors have on chronic disease onset, severity, and progression?	12. How do you feel about integrating the "Six Pillars of Lifestyle Medicine" teaching into each patient visit?

	_____	_____
13. How do you feel about prescribing evidence-based lifestyle behaviors instead of/in additional to standard treatment for chronic disease management? _____	14. How do you feel about using patient-specific characteristics such as their "tendency" to improve adherence to lifestyle behavior interventions? _____	15. How do you feel about the applying the "Six Pillars of Lifestyle Medicine" for your own personal health? _____
III. Practice Behaviors **Likert Scale** **1** **2** **3** **4** **5** ***Not Often*** ***Somewhat Often*** ***Very Often***		
16. How often do you ask patients with chronic disease what his or her **diet** is like? _____	17. How often do you ask that patients with chronic disease what his or her **physical activity** is like? _____	18. How often do you ask that patients with chronic disease what his or her **sleep** is like? _____
19. How often do you ask that patients with chronic disease what he or she does to modify **stress**? _____	20. How often do you ask that patients with chronic disease what his or her **social life** is like? _____	21. How often do you ask that patients with chronic disease if he or she uses **tobacco/alcohol/drugs**? _____
22. How often do you assess your patient's personal/social/cultural/knowledge/or other barriers to adopting healthier habits? _____	23. How often do you adjust your method of counseling patients based on their personal attributes or "tendency?" _____	24. How often do you apply evidence-based practice methods for lifestyle behaviors to your own life? _____

Appendix D: Post-test Survey

General Information		
Participant 4-digit Code: # _____ _____ _____ _____		
I. Knowledge **Likert Scale** **1** **2** **3** **4** **5** ***Not Familiar*** ***Somewhat Familiar*** ***Very Familiar***		
1. How familiar are you with the implications (medical and non-medical) of chronic disease? _____	2. How familiar are you with lifestyle behaviors as the root cause of chronic disease? _____	3. How familiar are you in evidence-based practice lifestyle behavior interventions? _____
4. How familiar are you with identifying each of the "Six Pillars of Lifestyle Medicine?" _____	5. How familiar are you with methods for applying the "Six Pillars of Lifestyle Medicine" in clinical practice? _____	6. Rate your level of familiarity in addressing each of the "Six Pillars of Lifestyle Medicine" in clinical practice. _____
7. How familiar are you with barriers of patients with chronic disease for adopting and sustaining lifestyle behavior change? _____	8. How familiar are you with the concept of "self-efficacy?" _____	9. Rate your familiarity with "The Four Tendencies?" _____
II. Attitudes **Likert Scale** **1** **2** **3** **4** **5** ***Not Important*** ***Somewhat Important*** ***Very Important***		
10. How do you feel about improving chronic disease management? _____	11. How do you feel about the role that lifestyle behaviors have on chronic disease onset, severity, and progression? _____	12. How do you feel about integrating the "Six Pillars of Lifestyle Medicine" teaching into each patient visit? _____
13. How do you feel about prescribing evidence-based lifestyle behaviors instead of/in additional to standard treatment for chronic disease management? _____	14. How do you feel about using patient-specific characteristics such as their "tendency" to improve adherence to lifestyle behavior interventions? _____	15. How do you feel about the applying the "Six Pillars of Lifestyle Medicine" for your own personal health? _____
III. Practice Behaviors **Likert Scale** **1** **2** **3** **4** **5** ***Not Often*** ***Somewhat Often*** ***Very Often***		

16. How often do you ask patients with chronic disease what his or her **diet** is like? _____	17. How often do you ask that patients with chronic disease what his or her **physical activity** is like? _____	18. How often do you ask that patients with chronic disease what his or her **sleep** is like? _____
19. How often do you ask that patients with chronic disease what he or she does to modify **stress**? _____	20. How often do you ask that patients with chronic disease what his or her **social life** is like? _____	21. How often do you ask that patients with chronic disease if he or she uses **tobacco/alcohol/drugs**? _____
22. How often do you assess your patient's personal/social/cultural/knowledge/or other barriers to adopting healthier habits? _____	23. How often do you adjust your method of counseling patients based on their personal attributes or "tendency?" _____	24. How often do you apply evidence-based practice methods for lifestyle behaviors to your own life? _____

Appendix E: Letter of Support

Date: 04/10/23
Deana Goldin, PhD, DNP, APRN
Clinical Professor
Nicole Wertheim College of Nursing & Health Sciences
Florida International University

Dear Dr. Goldin,

Thank you for inviting the office of Abella Heart to participate in the DNP Project of Lisabeth M. Alvarez. I understand that this student will be conducting this project as part of the requirements for the Doctor of Nursing Practice program at FIU. After reviewing the proposal of the project titled "Introducing Clinicians to the Six Pillars of Lifestyle Medicine (SPoLM) for Managing Chronic Disease." I have warranted her permission to conduct the project in this company.

Education of healthcare providers has been shown to be one of the most effective strategies to improve the screening and diagnosis of various conditions and illnesses. This proposed quality improvement project seeks to investigate and synthesize the latest evidence on educational interventions for healthcare providers to apply lifestyle medicine teaching in clinical practice for patients with chronic disease. There is clearly a need for a quality improvement that will consolidate all the available information on strategies for management of the root cause of chronic disease which is poor lifestyle choices.

We are understanding that the project will be develop in our setting and will occur for about 4 months. We are also aware of our department participation in supporting the student to complete this project, including warrant the student access to our primary and specialty care departments, give written consent, deliver the pre-test questionnaire, provide the educational intervention and three weeks after providing the post-test to the recruited participants. We will provide a peaceful environment to safeguard our participant privacy as well as adequate area to conduct the SPoLM teaching. The educational intervention will be classroom in-person or online formats according to participant availability, will last for 1 hour, and an educational handout will be provided to each participant receiving the class. Any data collected by Lisabeth M. Alvarez will be kept confidential and she will store the data in a password protected device.

We expect that Lisabeth M. Alvarez will not interfere with the normal office performance, behaving in a professional manner and following the office standards of care. As owner and principal clinician at the office of Abella Heart, I support the participation of our primary and specialty care departments in this project and look forward to working with you.

Sincerely,

Dr. Manuel E. Abella

Abella Heart
8200 SW 117th Ave, Suite 414
Miami, FL 33183
(305) 221 - 6161

Appendix F: IRB Approval Letter

FIU | Research & Economic Development
FLORIDA INTERNATIONAL UNIVERSITY

MEMORANDUM

To: Dr. Deana Goldin

CC: Lisabeth Alvarez

From: Carrie Bassols, BA, IRB Coordinator CeB

Date: May 26, 2023

Proposal Title: "Introducing Clinicians to the Six Pillars of Lifestyle Medicine for Managing Chronic Disease: A Quality Improvement Project"

The Florida International University Office of Research Integrity has reviewed your research study for the use of human subjects and deemed it Exempt via the **Exempt Review** process.

IRB Protocol Exemption #:	IRB-23-0290	**IRB Exemption Date:**	05/26/23
TOPAZ Reference #:	113200		

As a requirement of IRB Exemption you are required to:

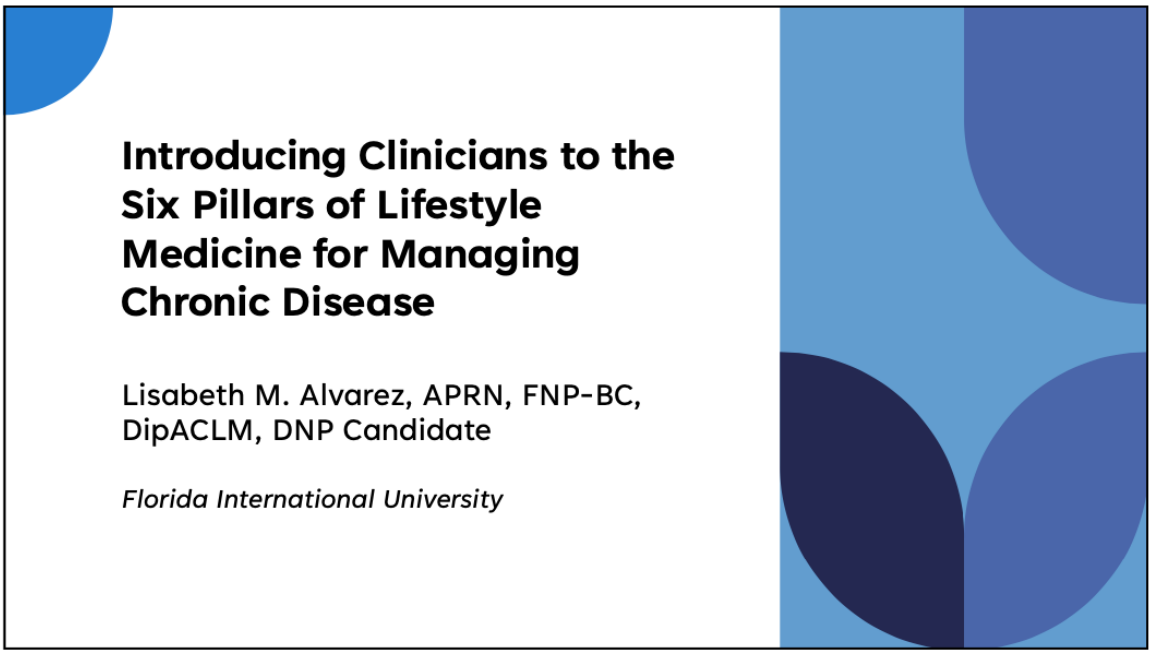
1) Submit an IRB Exempt Amendment Form for all proposed additions or changes in the procedures involving human subjects. All additions and changes must be reviewed and approved prior to implementation.
2) Promptly submit an IRB Exempt Event Report Form for every serious or unusual or unanticipated adverse event, problems with the rights or welfare of the human subjects, and/or deviations from the approved protocol.
1) Submit an IRB Exempt Project Completion Report Form when the study is finished or discontinued.

Special Conditions: N/A

For further information, you may visit the IRB website at http://research.fiu.edu/irb.

Appendix G: Recruitment Electronic Flyer

Appendix H: Educational PowerPoint Presentation Handout



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Agenda

- Defining the Problem of Chronic Disease
- Introduction to Lifestyle Medicine
- Implementing the Six Pillars to Clinical Practice
- Benefits of Lifestyle Medicine
- The Four Tendencies
- Overcoming Barriers to Change
- Summary
- Q & A

3

Informed Consent Link

4

Pre-Survey Link

6/17/23 Six Pillars of Lifestyle Medicine to Manage Chronic Disease 5

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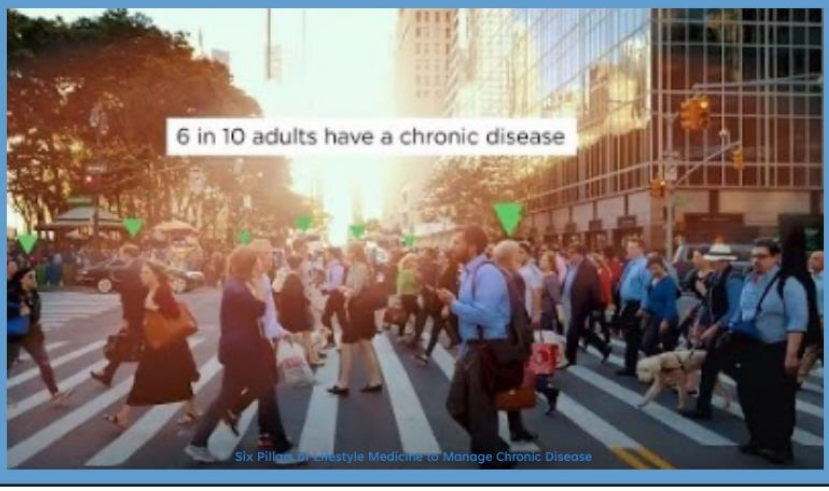
Chronic Disease - CDC



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Introduction

Chronic disease encompasses **billions** of deaths and disabilities and costs **trillions** of dollars worldwide to treat. Of the top 10 leading causes of death reported by the CDC, 70% are attributed to chronic illness. An astounding 80% of these diseases are **100% preventable and/or modifiable** through optimization of helpful lifestyle behaviors.

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Chronic Disease

Chronic illness is defined as disease that occurs for 1 year or longer which requires ongoing medical attention and/or impedes activities of daily living.

6 in 10 Americans have **1** chronic illness.

4 in 10 Americans have **2** or more.

Activities of daily living include eating, bathing, dressing, transferring, and toileting independently.

- Reportedly, 72% of persons with a chronic illness rely on others on a daily basis.

8

Burden of Chronic Disease

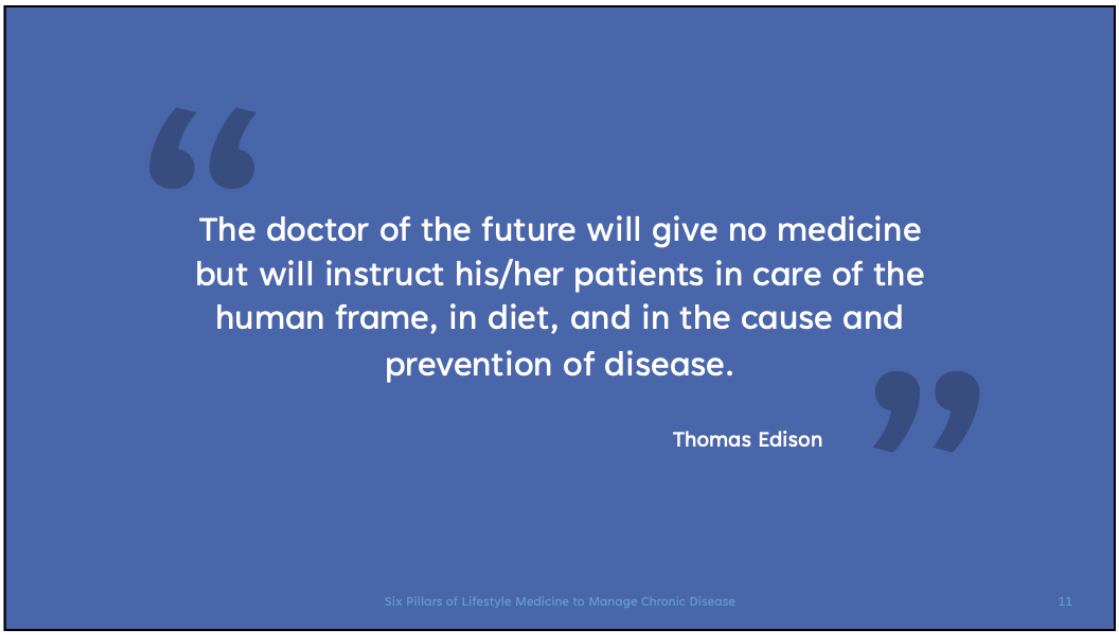
- Three out of five deaths are caused by:
  - Cardiovascular disease
  - Chronic lung disease
  - Diabetes
  - Cancer
- Financial burdens of chronic disease
  - Trillions of dollars in health care spending
  - Millions of dollars in lost productivity
- Reduced quality of life

9

The Role of HCP's

- The 5 A's
  - Assess
  - Advise
  - Agree
  - Assist
  - Arrange
- Conveying the latest in evidence-based medicine
- Leading by example

10


The doctor of the future will give no medicine but will instruct his/her patients in care of the human frame, in diet, and in the cause and prevention of disease.
Thomas Edison
Six Pillars of Lifestyle Medicine to Manage Chronic Disease
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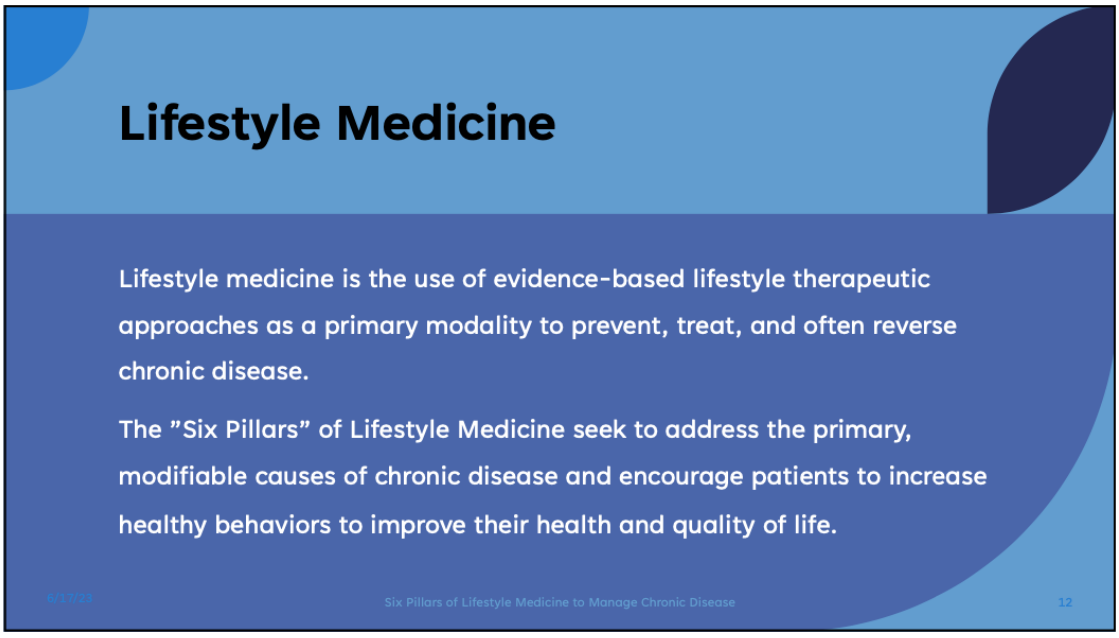
11


Lifestyle Medicine
Lifestyle medicine is the use of evidence-based lifestyle therapeutic approaches as a primary modality to prevent, treat, and often reverse chronic disease.
The "Six Pillars" of Lifestyle Medicine seek to address the primary, modifiable causes of chronic disease and encourage patients to increase healthy behaviors to improve their health and quality of life.
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What is Lifestyle Medicine?

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Six Pillars of Lifestyle Medicine

Diet	Exercise	Sleep	Stress Reduction	Social Connection	Avoid Substance Abuse
Emphasize a whole-food, plant predominant, and colorful diet	Avoid sedentary time and maximize daily activity as tolerated	Promote quality, restful, and restorative sleep	Ameliorate stress via a multi-modal approach	Foster and maintain positive relationships	

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Diet

Emphasize a whole-food, plant predominant, and colorful diet

1

- Poor diet has replaced tobacco as the leading cause of premature death in Americans.
- Nutrition can alter gene expression.
- The more varied the diet, the wider the array of nutrients and disease-fighting antioxidants offered.
- ThePlantricianProject.Org

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Diet

Emphasize a whole-food, plant predominant, and colorful diet

1

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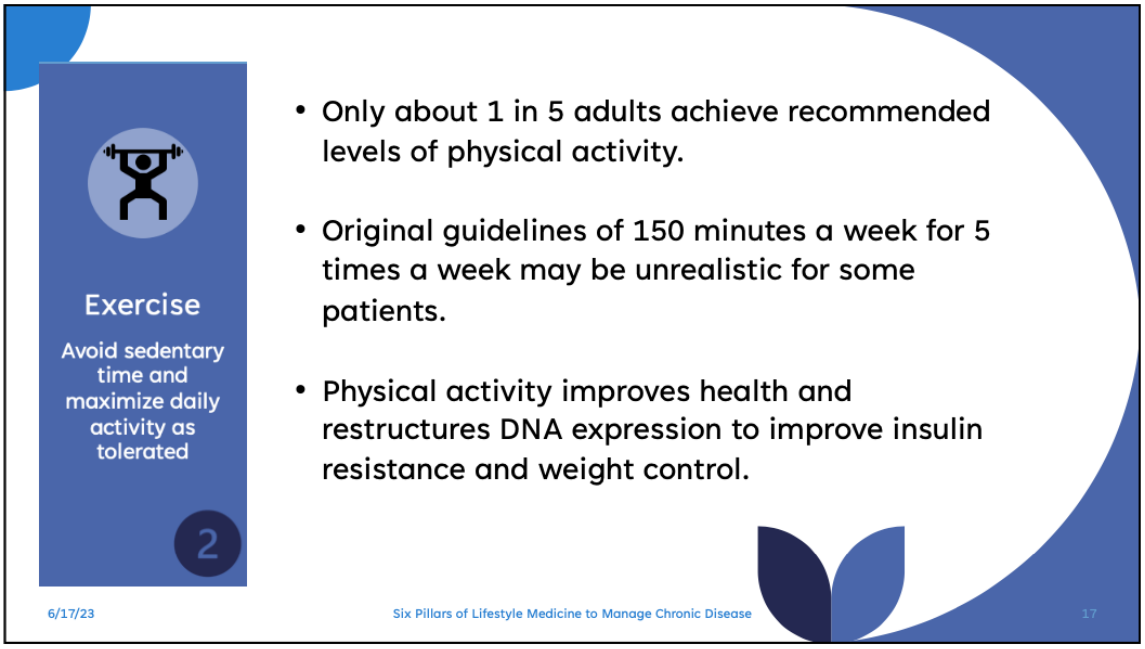
Exercise
Avoid sedentary time and maximize daily activity as tolerated
2
• Only about 1 in 5 adults achieve recommended levels of physical activity.
• Original guidelines of 150 minutes a week for 5 times a week may be unrealistic for some patients.
• Physical activity improves health and restructures DNA expression to improve insulin resistance and weight control.
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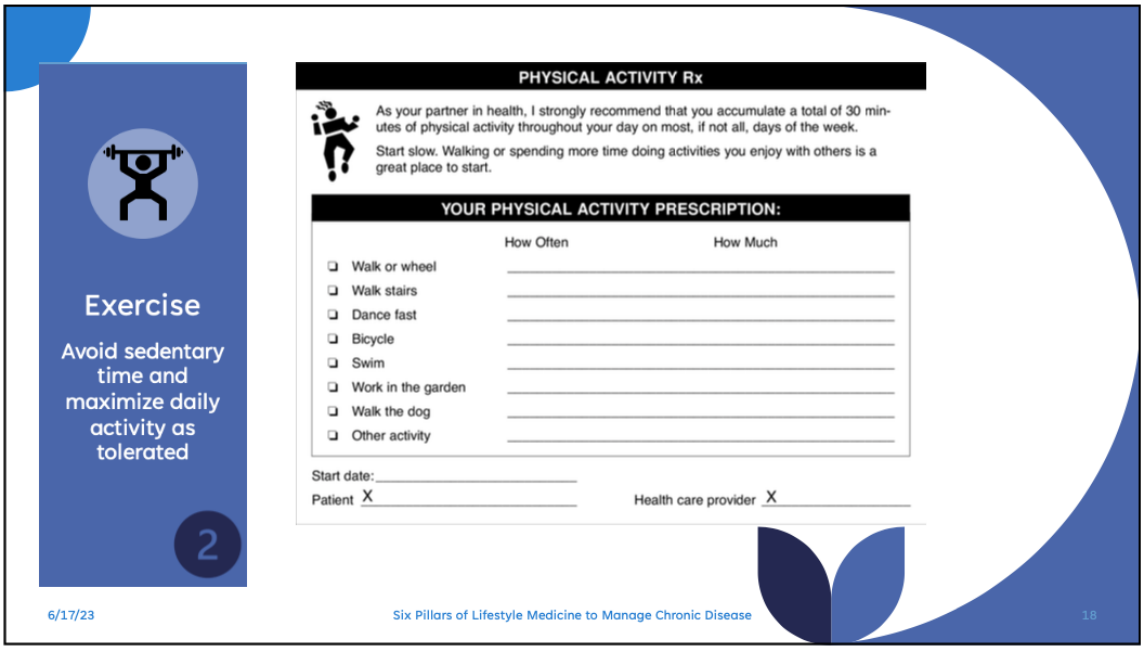
Exercise
Avoid sedentary time and maximize daily activity as tolerated
2
PHYSICAL ACTIVITY Rx
As your partner in health, I strongly recommend that you accumulate a total of 30 minutes of physical activity throughout your day on most, if not all, days of the week.
Start slow. Walking or spending more time doing activities you enjoy with others is a great place to start.
YOUR PHYSICAL ACTIVITY PRESCRIPTION:
How Often
How Much
Walk or wheel
Walk stairs
Dance fast
Bicycle
Swim
Work in the garden
Walk the dog
Other activity
Start date:
Patient X
Health care provider X
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Sleep

Promote quality, restful, and restorative sleep

3

- Poor sleep increases risk of heart attacks, strokes, obesity, diabetes, depression, dementia, and cancer.
- Poor sleep duration and quality leads to cortisol spike, lower daytime leptin, and increase need for calories (about 300 kcal more)!
- 7-8 hours of sleep each night are essential, even for older adults.

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Sleep

Promote quality, restful, and restorative sleep

3

20

Stress Reduction

Ameliorate stress via a multi-modal approach

4

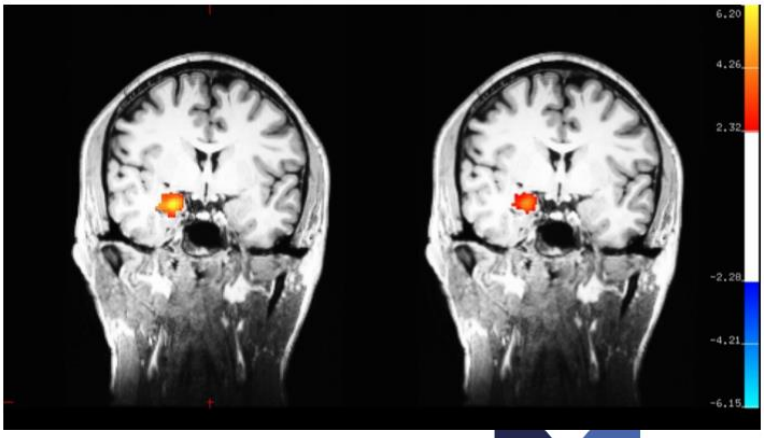
- Chronic stress is linked to chronic disease.
- Stress weakens atherosclerotic plaque.
- Stress impairs homeostasis.
- Defining emotional resilience
- Promoting emotional resilience

21

Stress Reduction

Ameliorate stress via a multi-modal approach

4



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Social Connection

Foster and maintain positive relationships

5

- Quarantine highlighted the importance of social connection for physical and mental health.
- Healthy friends share healthy habits. Healthy clinicians motivate healthy patients.
- The CDC shares that social connectedness helps combat chronic disease.
- Risk of death for those with heart disease who live alone are higher.

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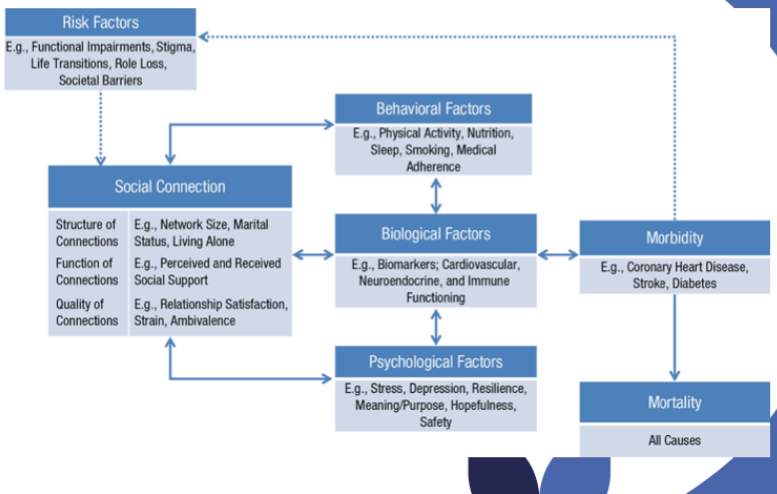
Social Connection

Foster and maintain positive relationships

5



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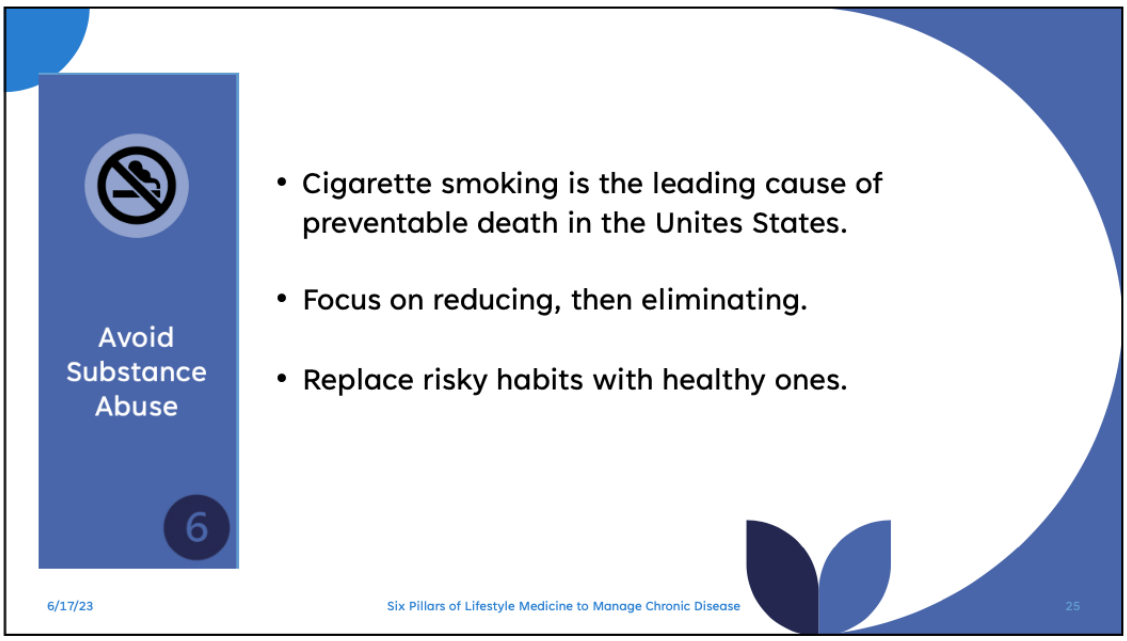
Avoid Substance Abuse
6
• Cigarette smoking is the leading cause of preventable death in the Unites States.
• Focus on reducing, then eliminating.
• Replace risky habits with healthy ones.
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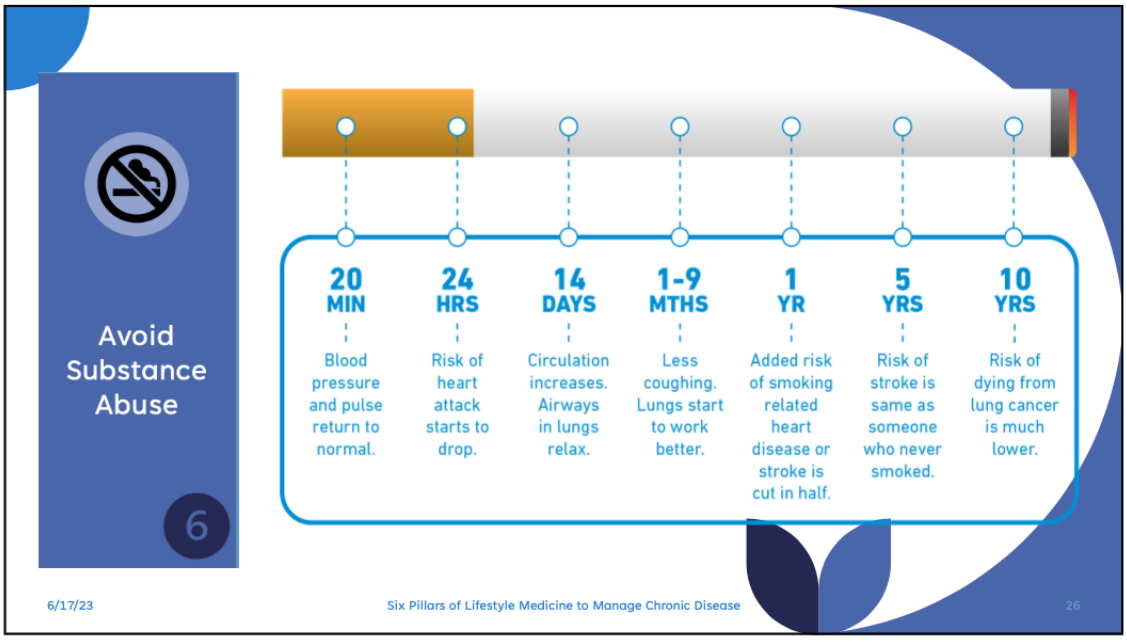
25


Avoid Substance Abuse
6
20 MIN
Blood pressure and pulse return to normal.
24 HRS
Risk of heart attack starts to drop.
14 DAYS
Circulation increases. Airways in lungs relax.
1-9 MTHS
Less coughing. Lungs start to work better.
1 YR
Added risk of smoking related heart disease or stroke is cut in half.
5 YRS
Risk of stroke is same as someone who never smoked.
10 YRS
Risk of dying from lung cancer is much lower.
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Six Pillars of Lifestyle Medicine to Manage Chronic Disease
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Barriers to Lifestyle Changes

Clinician Specific

- Knowledge
- Attitudes
- Practice Behaviors

Patient-Specific

- Patient motivation
- Disease severity
- Knowledge
- Cultural
- Financial

Systematic Barriers

- Fee-for-service vs. Value based care
- Time
- Reimbursement
- "Junk food" subsidies
- Work-life balance

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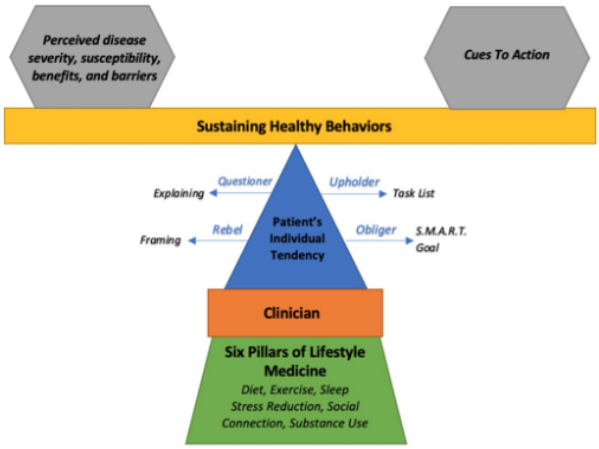
Successful Application of Lifestyle Medicine Pillars



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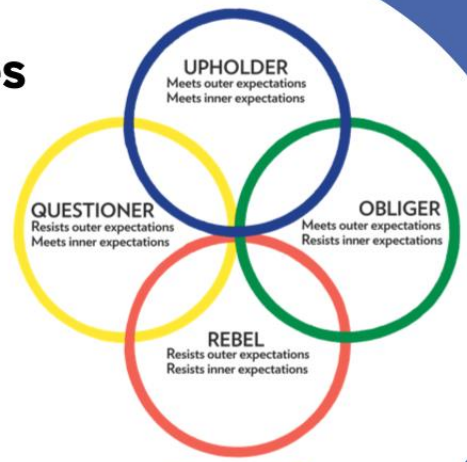
The Four Tendencies

Gretchen Rubin's Social Framework

- Expectations/motivation is regarded as the why we do and don't do
- Internal expectations vs. External expectations
- **Can categorizing patients by his or her "Tendency" make our counselling methods more effective and patient-centered?**



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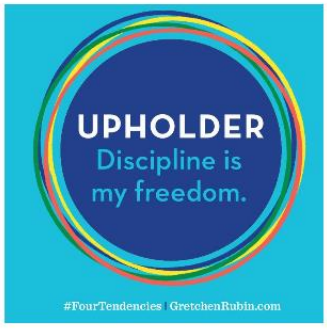
Upholder

- Meets outer expectations
- Meets inner expectations
- Ideal patient type
- Task with a "To Do List"
- Very little clinician involvement required except as knowledge expert



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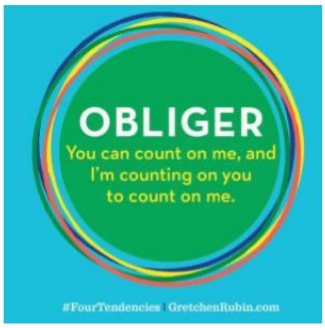
Obliger

- Meets outer expectations
- Neglects inner expectations
- "People-pleasing"
- Requires accountability
- Clinician can construct S.M.A.R.T. goals and establish follow ups to improve adherence



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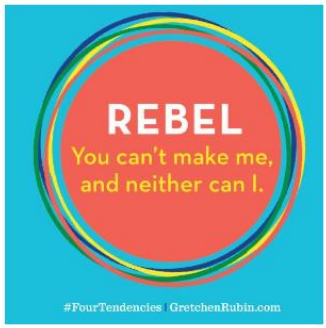
Rebel

- Disregards outer expectations
- Shies from inner expectations
- Feels as if recommendations are being "imposed"
- Clinicians are encouraged to suggest and recommend, giving patients options of how and when they can meet expectations on their own



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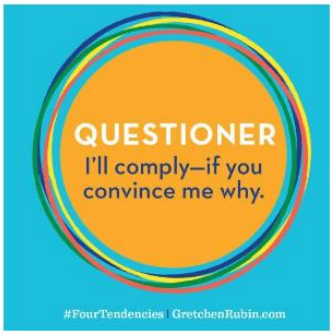
Questioner

- Disregards outer expectations
- Prioritizes inner expectations
- Readily follows advice that he or she qualifies as sensical
- Make informed decisions with logical reasoning
- Clinicians may provide sufficient information so as to satisfy patient's doubt



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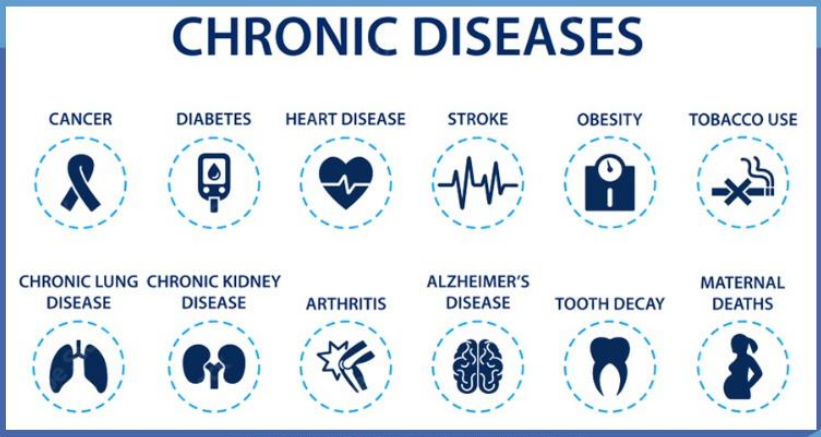
Summary



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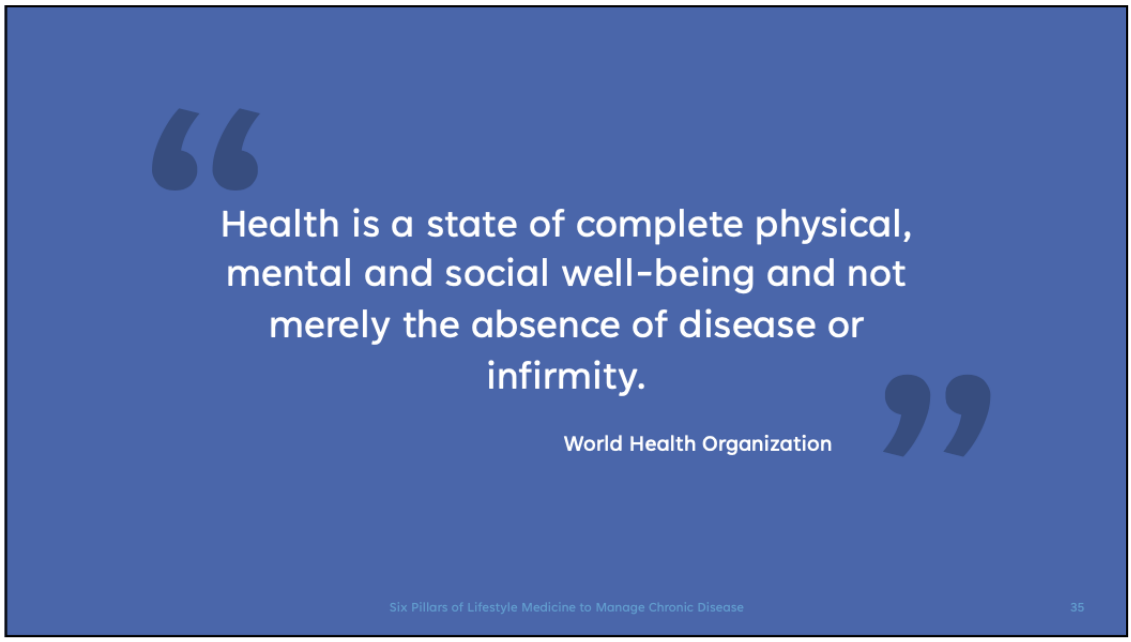
Health is a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity.
World Health Organization
Six Pillars of Lifestyle Medicine to Manage Chronic Disease
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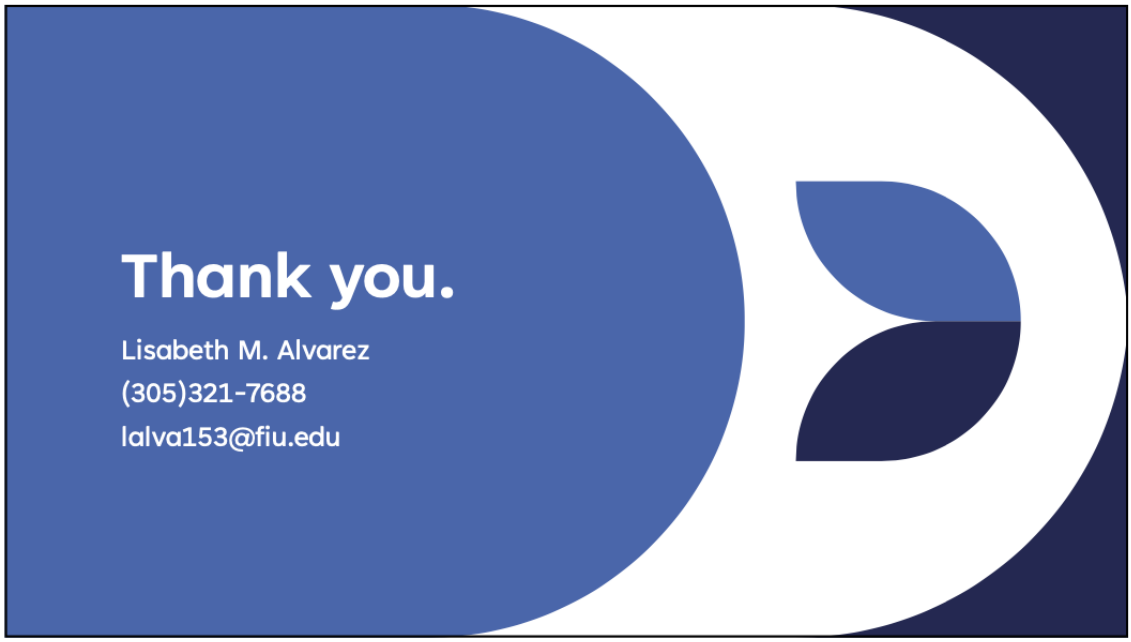
Thank you.
Lisabeth M. Alvarez
(305)321-7688
lalva153@fiu.edu

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