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Bridging the Knowledge Gap in the Management of Dyslipidemia: A Quality Improvement Project.

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Bridging the Knowledge Gap in the Management of Dyslipidemia: A Quality Improvement Project.

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II. Abstract

Background: Dyslipidemia is a leading cause of death globally. In the United States, patient compliance with medical advice for the treatment of dyslipidemia is overlooked, exacerbating health complications for the patient. The lack of patient engagement with care has been traced back to a lack of provider knowledge and poor counseling of patients to foster participation in their care.

Aim: This quality improvement project aimed to educate providers about the proper management of dyslipidemia to improve their knowledge of the topic.

Methodology: A pre-/post-educational intervention design was used to evaluate the knowledge of healthcare providers working in convenient care clinics. Advanced Practice Providers (APPs) working in this setting voluntarily agreed to have their knowledge of the management of dyslipidemia assessed, to participate in an educational program, and to have their knowledge of the topic measured following educational intervention.

Results: n = 24 providers agreed to participate in the project. Of these a majority were women (n = 23, 96%) and of Latino race (n = 11, 46%). Mean knowledge scores were tabulated before (M = 5.5, SD = 3.48) and after (M = 13.5, SD = 4.41) the educational program. The results indicated an increase in knowledge that was found to be statistically significant, $t(23) = 5.33$, $p < .001$.

Implications: The results of this quality improvement project support the use of provider education to increase knowledge of proper management of dyslipidemia. Over time, increased provider knowledge should correlate with changes in practice that improve patient engagement with their care and outcomes for patient's health.

Keywords: dyslipidemia, healthcare provider, education, convenient care clinic

III. Table of Content

IV. Introduction-Problem Statement/Significance.

Dyslipidemia has emerged as a global public health issue, ranking second only to ischemic heart disease and stroke as the leading causes of death. Dyslipidemia is a primary cause of coronary artery disease. When compared to people with normal lipid levels, people with dyslipidemia have twice the chance of getting cardiovascular disease (CVD). Dyslipidemia-related complications, such as CVD, are common causes of death. Additionally, high levels of lipids raise the risk of atherosclerosis, which is a major risk factor for stroke, coronary heart disease, and peripheral vascular disease.

In the United States a medical research study accomplished by the Multi-Ethnic Study of Atherosclerosis (MESA) found that about a third of the patients had elevated low-density lipoprotein (LDL-C), while two-thirds had increased triglycerides (hypertriglyceridemia). Only 41% of individuals taking medication met the suggested LDL-C target of less than 77mg/dL (Borrayo-Sánchez, 2021).

The magnitude of this health problem is demonstrated by its prevalence in numerous countries. In Canada, 45 percent of persons aged 18 to 79 had no idea they had dyslipidemia, and only 19 percent had levels below the recommended range. Hypercholesterolemia affected 23.3 percent of people in France, even though only 7.2 percent received treatment. Along with patients taking secondary preventive medication, only 29.7 percent saw a reduction in lipid levels in a period of six-month treatment. In Mexico, according to a recent survey, the country's population has low levels of HDL-C, high LDL-C levels, and hypertriglyceridemia was present in half of the respondents. More than two-thirds of a middle-class urban population sample exhibited hypoalphalipoproteinemia, with one-third having cholesterol levels greater than 240 mg/dL and 36% having LDL-C levels greater than 130 mg/dL (Borrayo-Sánchez, 2021).

Sudden cardiac death (SCD) and acute myocardial infarction (AMI) happened because of atherosclerotic coronary artery disease (ASCAD) mainly to patients who have hereditary hyperlipidemia causing coronary plaque disturbance and acute coronary thrombosis. Because plaque builds up in the arteries, high LDL-C raises the risk of atherosclerotic coronary artery disease (Thompson et al., 2015). Untreated dyslipidemia raises the expense of healthcare for individuals in the long perspective. In 2021, direct costs as a percentage of total healthcare spending on all populations ranged from $17 to $259 million (Ferrara et al., 2021). As a result, treating the disease helps the country achieve its aim of providing safe, low-cost healthcare.

The delivery of high-quality and consistent services is a big hurdle in the healthcare system. Nurses comprise the largest group of healthcare providers (Debono et al., 2013). They have more contact with patients than any other healthcare professional. As a result, Advanced Practice Providers (APPs), are expected to keep updated with modern nursing practices that involve integrating evidence-based practices, and aware of most current theoretical and practical knowledge. Inadequate understanding in dyslipidemia management impedes proper treatment of the condition and increase patients' risks for developing chronic conditions such as stroke and coronary heart disease (CHD).

Similarly, Zhang et al. described that hyperlipidemia is a substantial risk factor for coronary artery disease (CAD) (Zhang et al., 2017). Lack of sufficient knowledge and skills among health care providers treating patients with dyslipidemia has been proven to raise patients' risks of acquiring chronic illnesses like coronary heart disease (CHD), which is a major cause of morbidity and death in the United States (Khammarnia et al., 2015). Abnormal cholesterol levels have been associated to a variety of cardiovascular problems. Stroke and hypertension, for example, are linked to high triglyceride (TG), total cholesterol (TC), and low-density lipoprotein

cholesterol (LDC-C) levels. There are modifiable risk factors (RFs) such as smoking, hypertension, obesity, dyslipidemia, and diabetes mellitus that play a major role in the development of CHD (Bucholz et al., 2018).

LDL-C is a critical focus of inquiry among lipid abnormalities since multiple studies have linked elevated serum LDL-C with increased cardiovascular disease morbidity and death (Kayani & Ballantyne, 2018; Yandrapalli et al., 2019). LDL-C levels above 190 mg/dL are indicative of familial hypercholesterolemia (Bulchoz et al., 2018). Statins are considered the first-line therapy to treat elevated cholesterol disorders because of their documented efficacy.

Nonetheless, the most recent data indicates that their prescription rates in young adults with severe dyslipidemia are moderate (Al-Kindi et al., 2017). It is critical to diagnose and overcome gaps in the diagnosis and treatment of severe dyslipidemia, especially with the introduction of novel agents such proprotein convertase subtilisin/Kexin type 9 (PCSK9) (Del Pinto et al., 2019).

There are significant gaps in management of dyslipidemia, as Barter et al. point out, that obstruct the management of dyslipidemia in people at high risk of atherosclerotic cardiovascular disease (ASCVD) (Barter et al., 2020). In the therapy of dyslipidemia, there are various areas of uncertainty. As an example, Barter et al. found out that the target low-density lipoprotein cholesterol (LDL-C) level recommended by physicians varied across countries participant: Colombia (80 mg/dL), the Philippines (85 mg/dL), Germany (86 mg/dL), and Japan (96 mg/dL), as well as discrepancies on the LDL-C target levels in individuals with peripheral artery disease, diabetes, or chronic kidney disease (CKD) or coronary heart disease, according to the doctors.

Another source of inconsistency is the pharmacotherapeutic alternatives for treating hypertriglyceridemia in patients with chronic kidney disease (CKD). While the four countries' pharmacotherapeutic choices for hypertriglyceridemia in chronic kidney disease (CKD) were similar (statins, fibrates, and omega-3 fatty acids), 30 percent of German doctors believed that the most recommended treatment for CKD was lifestyle change modifications alone. Physicians also expressed divergent views on the safety of low LDL-C levels, with the majority expressing concern about the risk of hemorrhagic stroke (Barter et al., 2020). Finally, doctors in the four nations raised concern about statins' negative effects on cognitive, renal, and hepatic function. Although the findings of Barter et al. s' study cannot be applied to all physicians and healthcare providers worldwide, they do provide important insight into the knowledge gaps in the management of dyslipidemia.

V. Summary of the literature review/Evidence related to the clinical question.

Managing dyslipidemia and hypercholesterolemia necessitates overcoming obstacles that frequently result in gaps in the practices of healthcare professionals. The primary goal of this literature review is to gather crucial information on these two medical diseases as well as the challenges they face in treatment. Heart disease is the leading cause of death in the United States, affecting men, women, and individuals of all races and ethnicities. Every year, around 659,000 people in the United States die from heart disease, accounting for one out of every four deaths (CDC, 2022). The United States spent $363 billion on heart disease between 2016 and 2017. Medical services, drugs, and lost production due to mortality are all included. Coronary heart disease, the most common type of heart disease, claimed the lives of 360,900 persons in 2019. Annually, about 805,000 people in the United States suffer a heart attack. A first heart attack affects 605,000 people, with 200,000 incidents involving persons who have already had a heart

attack. Medical disorders such as high blood pressure, high cholesterol, and smoking aggravate heart disease.

Cardiovascular disease (CVD) is the most common cause of hospitalization in the United States, accounting for 973,000 admissions for heart attacks alone. The annual rate of new myocardial infarction is estimated to be around 565,000. (Srikanth & Deedwania, 2016). Every year, over 500,000 people are estimated to experience a heart attack for the first time (Srikanth & Deedwania, 2016). In the United States, most dyslipidemias are hyperlipidemias (i.e., high lipid levels in the blood). The imbalance of cholesterol levels in the blood, including high-density lipoprotein cholesterol (HDL-C) and low-density lipoprotein cholesterol (LDL-C), is known as hyperlipidemia. This disorder is frequently linked to patient lifestyle and dietary habits. The amount of cholesterol in blood is measured by HDL-C and LDL-C levels, and an imbalance can increase the risk of cardiovascular events like stroke and myocardial infarction. LDC-C promotes plaque accumulation in the arteries, which is associated to a higher risk of stroke and coronary heart disease (Srikanth & Deedwania, 2016). The HDL-C works to lower cholesterol levels in the body, decreasing the risk of atherosclerotic cardiovascular disease (ASCD).

Atherosclerosis on the other hand, is a chronic inflammatory process that targets medium and large sized arteries. However, the condition is rapidly accelerated by a variety of genetic and environmental factors. The pathologic processes underlying the condition can be categorized into three progressive stages: fatty streak formation, plaque formation, and plaque disruption. Some of the biomarkers of the condition are C-reactive protein (CRP), hyperhomocysteinemia, and lipoprotein (Lilly, 2021). As a result, the biomarkers are regarded to as modifiable risk factors as they have a beneficial effect on the primary and secondary prevention of the diseases. A biomarker such as the lipoprotein relates to a variety of functions such as inhibition of

fibrinolysis by preventing the transformation of plasminogen to plasmin, enhanced capacity to traverse the arterial endothelium. and low affinity for the LDL-receptor.

According to Rodriguez et al., about 53 percent (100 million) of adults in the United States have elevated LDL-C values. Additionally, more than 31 million adults in the country have cholesterol levels of more than 240 mg/dL, putting them at a high risk of developing ASCVD (Rodriguez et al., 2014). However, only just about half of those with high LDL-C levels receive medication to reduce their levels. Furthermore, only about 35% of individuals who receive treatment obtain satisfactory therapy. (Srikanth & Deedwania, 2016).

Dyslipidemia is linked to a variety of risk factors. Obesity, smoking, sedentary lifestyle, and unhealthy dietary habits consuming foods dense in trans, or saturated fats are all modifiable risk factors. Hypothyroidism, high blood pressure, type 2 diabetes, chronic renal disease, and biliary obstruction are all secondary causes of elevated LDL-C. (Rodriguez et al., 2014). Some medications that can raise LDL-C levels include but not limited to glucocorticoids, cyclosporine, and diuretics. While gender and ethnicity have been demonstrated to play a role in hyperlipidemia development, the data on these factors has been mixed.

Genetics also play a critical role in developing increased cholesterol in the form of familial hypercholesterolemia (FH). FH is an autosomal trait characterized by increased LDL-C and total cholesterol levels from premature ASCVD and birth. It results from genetic mutations in the LDL receptor leading to decreased LDL metabolism (Rodriguez et al., 2014). Also, genetic mutations can occur in the apolipoprotein (apo) B gene, which decreases the binding of LDL receptors to the LDLR.

Lipids play an important role in living organisms as they act as a source of energy. In the western diets, lipid provide 30% to 40% of calories. In the human body, the small intestines are the main site of lipid transformation and absorption. Lipid transformation is aided by an enzyme known as chylomicrons which is also secreted in the small intestines. Chylomicrons are large lipoproteins very rich in lipids and are composed mainly of triglycerides. However, cholesterol levels may harden inside the body resulting from low-density lipoproteins (LDL) (Lilly, 2021). Increased level of LDL result from a deficiency of estrogens and thyroid hormones or genetic mutations of either the LDL receptor or Apo B-100.

Lipoproteins may take another maybe also found in the form of High-Density Proteins (HDLs) which have a protein concentration of 33% and help remove cholesterol from the periphery and transports it to the liver. The two most important subclasses of HDL express either Apo A-II alone or both Apo A-I and A-II. Researchers have suggested that high levels of HDL have a protective effect on the development of atherosclerosis (Lilly, 2021). Therefore, patients are advised to increase their HDL levels. Primary Hyperlipidemia results from single or multiple genetic mutations in the endogenous lipid pathways. As the disease progresses, some of the signs and symptoms that develop include obesity, lipemic plasma, and severe hypertriglyceridemia. In the United States, the Polygenic hypercholesterolemia is the most common form of hyperlipidemia with a prevalence of 25%.

Secondary hyperlipidemias are associated with primary underlying conditions such as obesity, diabetes, alcohol abuse, and hypothyroidism. along with polygenic hypercholesterolemia, atherogenic dyslipidemia is one of the most common forms of hyperlipemia’s. Patients with such diseases are treated with lifestyles changes aimed at weight reductions (Lilly, 2021). It can also be associated to medications including the use of estrogen

therapy, atypical antipsychotics, corticosteroids, and thiazides. Secondary hyperlipidemias with elevated cholesterol are the main dyslipidemia in patients with chronic renal failure and hypothyroidism.

Controlling dyslipidemia is critical for reducing its detrimental health consequences. Disproportionate triglycerides (TG), total cholesterol (TC), and LDL, as well as low high-density lipoprotein (HDL), all contribute to atherosclerosis. As a result of these imbalances, it leads to higher risk of atherosclerosis among patients with nephrotic syndrome (NS), which promotes the development of cardiovascular diseases (Tao et al., 2020). When patients with dyslipidemia do not take preventive measures seriously, the excessive cholesterol gradually deposit in the arterial intima promoting connective tissue hyperplasia causing arterial wall enharden leading to atherosclerotic plaque formation. As a result, Tao et al. (2020) assert that they may undergo plaque production enhancement, raising their risk of strokes, heart disease, and coronary artery disease (CAD).

According to Tao et al. (2020), chronic dyslipidemia can lead to thromboembolism, which affects 25 and 37 percent of adolescents and adults, respectively. As a result, when faced with the prospect of developing peripheral artery disease (PAD), one could claim that engaging in physical exercise is critical in reducing the illness's negative implications. Unfortunately, uncontrolled dyslipidemia can lead to additional diseases and mortality in the affected individuals.

To manage dyslipidemia, two main practices are used: lifestyle modification and medication therapy. These methods aid in lowering the risk of coronary heart disease (Jang et al., 2021). Cholesterol levels that are too high are a common modifiable risk factor. According to studies, lowering total cholesterol in the blood is connected to a lower risk of coronary heart

disease (CHD) (Jang et al., 2021). In the last two decades, LDL-C has been the principal target of lipid intervention in CHD prevention (Jang et al., 2021). The development of powerful medicines for lowering this lipid sub-fraction has been a focus of efforts to improve cholesterol controlling medication. Successful lipid control usually requires instruction by a dietitian or other knowledgeable healthcare professional. Recent genetic and molecular research advances, on the other hand, have improved our understanding of the complicated lipid metabolic processes.

After decades of recommending diets that limit cholesterol, saturated fat, and total fat intake, the American Heart Association (AHA) has lately established a nutritional strategy that focuses on the overall healthy eating pattern (Jang et al., 2021). The 2018 AHA/ACC guidelines use percentage reduction to estimate the efficacy of statin therapy with the goal being 50% or more. Additional guidelines have suggested a dietary pattern that emphasizes the intake of fruits and vegetables, reduce calories from trans-fat, allow for no more that 5% to 6% of calories from saturated fats and include low-fat dairy products (Virani et al., 2020).

The dietary recommendation includes targets for a healthy eating pattern, a healthy blood pressure, a healthy lipoprotein and cholesterol lipoprotein profile, and a healthy body weight (Jang et al., 2021). The goal of optimal body weight guidelines is to match energy intake to energy needs while adjusting achieve a healthy weight. Controlling foods high in cholesterol and saturated fat and replacing them with grains and unsaturated fats from nuts, legumes, seafood, and vegetables are some of the recommendations for achieving a healthy body weight. According to the AHA/ACC, for patients 75 years of age or younger with clinical ASCVD on high-intensity therapy, the target percentage LDL reduction should be 50% or greater. The guidelines recommend keeping a healthy body weight, reducing alcohol and salt intake, and

eating a diet rich in vegetables, fruits, and nonfat or low-fat dietary products to achieve optimal blood pressure (Virani et al., 2020). Recent secondary dyslipidemia preventative dietary trials have found that diets low in saturated and total fats and high in plant or fish omega-3 fatty acids reduce the occurrence of secondary dyslipidemia (Jang et al., 2021).

Controlling risk factors of dyslipidemia and lowering mortality and morbidity rates related to this health problem requires careful management. Dyslipidemia management was investigated by Arnold and Buelt (2021) to improve cardiovascular prevention. The researchers emphasized the importance of making appropriate treatment decisions based on 10-year risk calculators since they correspond to the individuals that frequently benefit from clinical trials.

Similar idea is shared by O'Malley et al. (2020). LDL-C levels have consistently been linked to cardiovascular morbidity and mortality in observational studies, focuses on the management of dyslipidemia to lower the risk of cardiovascular disease (CVD) (O'Malley et al., 2020). According to O'Malley et al., the use of target medication doses consistent with moderate stain doses, as evidenced in some clinical trials, it can manage the condition (O'Malley et al., 2020. While neither study found therapy to be successful, the authors indicated that a more comprehensive strategy could help alleviate the effects of dyslipidemia.

When it comes to managing dyslipidemia, another option is to change the diet. A proposed one, according to Arnold and Buelt (2021), is the Mediterranean diet that lowers incidence of cardiovascular events, stroke, type 2 diabetes, and all-cause mortality. The diet, as stated by O'Malley et al. (2020), is well appropriate to high-risk patients. The Mediterranean diet include high unsaturated–saturated fat ratio, high proportion of caloric intake from plant-based foods (fruits, vegetables, nuts, legumes, and grains), moderate consumption of fish and low-fat dairy products, and low intake of lean meat and red wine, according to O'Malley et al. (2020).

While the researchers advise patients to examine other diets with similar components, they emphasize that the Mediterranean diet is the only one that has been studied in a randomized controlled trial (RCT) with a primary focus on CVD outcomes.

The explanation includes the use of omega-3 fatty acids, which both Arnold and Buelt (2021) and O'Malley et al. (2020) agree are effective dietary supplements for lowering CVD risks. Despite significant studies on omega-3 acid supplementation, the researchers claim that there is no evidence that omega-3 supplements reduce cardiovascular risks. Moreover, while there is inadequate evidence to recommend specific meals, the existing research suggests that fiber, ginger, green tea, garlic, and red yeast are beneficial for dyslipidemia (Arnold & Buelt, 2021; O'Malley et al., 2020). Consequently, even though these sources promote dieting, the researchers found that, aside from the Mediterranean diet, it is still unclear if omega-3 fatty acids can aid in the management of the illness. Omega-3 fatty acids are abundant in fatty fish, walnuts, canola, and vegetable oils. However, Omega-3 polyunsaturated fatty acids are considered essential fatty acids because humans, as well as mammals, are unable to synthesize these compounds efficiently.

Physical activity is another management strategy. According to Arnold and Buelt (2021), it is a tried-and-true method for reducing cardiovascular events. Sedentary persons, they say, are the ones who profit the most from the process since they don't do enough aerobic physical activity. According to O'Malley et al. (2020), the Physical Activity Guidelines for Americans recommend 150 minutes of moderate-intensity or 75 minutes of intense physical activity each week (O'Malley et al., 2020). Arnold and Buelt (2021) discovered that participating in the method for eight weeks after revascularization or a cardiovascular event can avoid myocardial infarction and death for more than ten years. While insisting on the importance of the process,

O'Malley et al. (2020) contend that regular physical activity of any time and intensity is most consistent with the present research. While there is no consensus on the appropriate level of physical activity, it is obvious from the sources that implementing the strategy can help minimize the risk of dyslipidemia.

Statin medication are an important part of managing dyslipidemia, according to experts. In China, Chen et al. (2020) investigated condition management for the prevention of ischemic stroke recurrence. The researchers discovered that a study by the Stroke Prevention by Aggressive Reduction in Cholesterol Levels (SPARCL) had proven that statin lipid-lowering medication may reduce dyslipidemia in their meta-analysis methodology. The researchers confirmed that statin medication could prevent ischemic stroke with an odds ratio (OR) of 0.51, with a 95 percent confidence interval (CI) of 0.36-0.72, despite not prescribing it for older persons (Chen et al., 2020). Types of statins include simvastatin, lovastatin, pravastatin, fluvastatin, and pitavastatin. However, simvastatin has proven to be the most effective statin. Moderate-dose statin medication is also recommended as a primary preventative strategy by O'Malley et al. (2020). As stated, the percentage reduction in LDL levels is used to estimate the efficacy of statin therapy with a goal of 50 % reduction. In addition to the lipid-lowering actions of statins, studies suggest that there are pleiotropic effects such as modulation of endothelial function, decrease in vascular inflammation, neuroprotection, and immunomodulation of inhibition. Clinical trials suggest that moderate-dose statin medication for five years can reduce CVD risk by 20 to 30 percent for patients with a 10-year risk greater than 12 percent, according to the researchers' systematic review (O'Malley et al., 2020). Even though certain experts have advocated for the use of non-statin medicines, the latter claims that no one clinical research has proven that they can lower cardiovascular mortality. Administration of a statin with a bile acid-

binding resin produces 20% to 30% greater reductions in LDL than statin monotherapy. With this evidence, it is reasonable to believe that statin medication can help manage dyslipidemia.

O'Malley et al. (2020) assert in their comprehensive review that there is significant evidence that high-dose statin medication reduces cardiovascular morbidity but not mortality when compared to low- or moderate-dose statin therapy. This evidence comes primarily from higher-risk secondary prevention populations, such as those who have had a recent MI or acute coronary syndrome in the previous 12 months, recurrent acute coronary syndrome, MI, or stroke, or established CVD with additional major risk factors like current tobacco use, diabetes, peripheral artery disease, or previous coronary artery bypass graft surgery or percutaneous coronary intervention (O'Malley et al., 2020). With such occurrences, the researchers looked at other evidence and discovered that proprotein convertase subtilisin/Kexin type 9 (PCSK9) and ezetimibe inhibitors for higher-risk individuals can help improve their position by lowering cardiovascular morbidity (O'Malley et al., 2020). The researchers, however, criticized PCSK9 inhibitors for their unknown long-term safety and expensive cost, concluding that they should only be used as a last resort. Because of the information gathered from the three sources while there are several approaches to managing dyslipidemia, none of them can entirely produce better results than the others. Under lipid-lowering method, Nicotine Acid Derivatives, Niacin, also known as nicotinic acid or Vitamin B3 acts as an important cofactor in intermediary metabolism. It inhibits lipoproteins lipase and prevents triglyceride release from chylomicrons. Niacin has a low cost, a long history of clinical trials, and extensive use as a safe lipid-lowering drug, supported by evidence that is effective in the prevention of ASCVD. Health professionals questioned the processes' efficacy and their ability to change patients' situations because of their low acceptance.

There are gaps in dyslipidemia management in different nations as well. For example, Barter et al. (2020) investigated discrepancies in practice and beliefs in the management of the illness in four countries: the Philippines, Germany, Colombia, and Japan. Their systematic study, which mostly used data from a web-based physician survey, discovered that there is still debate over LDL-C targets, statins, and the safety of low LDL-C levels. When discussing the latter, Barter et al. (2020) stated that participant physicians from the four countries agreed that taking statins could raise a person's risk of hemorrhagic stroke by impairing renal and cognitive function. Furthermore, the evidence revealed a lack of agreement on the perceived need to lower the stain dose in patients with chronic kidney disease (CKD), the necessity for varied LDL-C target levels based on CKD stage, and the clinical benefits of treating hypertriglyceridemia in CKD patients (Barter et al., 2020). Likewise, they were unable to demonstrate the efficacy of PCSK9 inhibitors in the treatment of dyslipidemia, indicating that further study and education is required to develop the best management strategy for the disease.

There are unique barriers that prevent the processes from being achieved. Patients' limited adherence to existing drugs and other therapeutic options is a major stumbling block. Wändell et al. (2018) highlighted possible facilitators and particular impediments to cardiometabolic disease (CMD) selective prevention in primary care for healthcare workers. They used a systematic review approach and discovered that nine of the 28 trials showed minimal or no patient adherence to the prescribed practices. Alefishat et al. (2021) investigated factors associated with medication non-adherence in individuals with dyslipidemia. Many of the study participants stated that their lack of interest in cholesterol-lowering medications stemmed from the disruptions they made in their life, according to the researchers. Others expressed concern about becoming too reliant on the medications to the point where they couldn't function

without them (Alefishat et al., 2021). As a result of these claims, many patients have reduced their desire to follow the established rules.

One of the biggest obstacles to managing pain control for hospitalized patients is nurses' attitudes and expertise (Germossa et al., 2018). A technique for enhancing nurses' attitudes and understanding about pain treatment was established to be an educational program. Total of 111 nurses from the Jimma University Medical Center participated in a quasi-experimental study where they underwent to two days of rigorous pain management training, followed by a subsequent training session one month afterwards, and results were statistically significant in a substantial pain control management (Germossa et al., 2018).

Wändell et al. (2018) criticize health providers for dismissing accessible drugs as ineffective for patients. Others believe the methods are unsuccessful, owing to lower levels of adherence among the patients they see in medical institutions. Wändell et al. (2018) discovered that employees frequently find problems when counseling patients regarding alternative lifestyles in their study due to lack of counseling skills. They claimed that many people questioned their ability to persuade others to change their behaviors. Health professionals questioned the processes' efficacy and their ability to change patients' situations because of their low acceptance. Additionally, certain employees have shown biases, which has dissuaded people from seeking help (Wändell et al., 2018). Medical professionals have impeded the implementation of critical guidelines to control the disease because of these incidents.

The knowledge of health care providers is also critical for the acceptance of guidelines. Unfortunately, according to Wändell et al. (2018), five of their research found that professionals' lack of basic knowledge often leads to them failing to utilize existing strategies. They attribute the prevalence to the group's lack of effectively communicate risk and lifestyle information due

to insufficient education, training, or skills (Wändell et al., 2018). For example, the authors point to a lack of knowledge as a major factor in unsuccessful counseling, claiming that it reduces patients' motivation to cooperate during sessions. Besides, achieving an effective process necessitates medical experts motivating and encouraging patients to embrace accessible strategies such as offer a great deal in the way of lifestyle counselling. Wändell et al. (2018) point out that their participants have little motivation, which limits their capacity to follow the advised technique.

Ab et al. (2009) carried out a study investigating the factors underlying general practitioners' decisions not to prescribe lipid-lowering drugs to type 2 diabetes patients. The qualitative study involved semi-interviews using real cases to explore reasons for general practitioners not prescribing statins in most patients with diabetes (Ab et al., 2009). The study came up with reasons divided into physician and patient-attributed factors. According to the general practitioners, some patients do not comply with the prescribed medications, while others refuse to take lipid-lowering medications. Besides, the general practitioners perceived reservations for prescribing medications lipid-lowering levels. General practitioners sometimes suspend treatment because of other priorities (Ab et al., 2009). Barriers mentioned by general practitioners seem to have valid reasons indicating that non-compliance to prescribed medications can be rational. Conversely, the quality of treatment can be improved by addressing issues such as inadequate knowledge in managing dyslipidemia and lack of motivation of both general practitioners and the patient (Ab et al., 2009).

As a result of these challenges, the researchers concluded that overcoming dyslipidemia and hypercholesterolemia is typically difficult due to patients' lack of adherence, medical

personnel's negative attitudes and biases, and healthcare providers' insufficient awareness of the appropriate standards.

Since dyslipidemia is one of the major causes of mortality in the country, an evidence-based educational program to bridge knowledge gaps presents an opportunity to improve patient outcomes. Emparanza et al. (2015) also established that embracing evidence-based practice (EBP), characterized by weekly training sessions and journal clubs, led to more effective care. A notable improvement in patient outcomes was reduced mortality rates. Following the reconfiguration of the internal medicine unit to support EBP and the introduction of weekly training sessions, the risk of death declined from 7.75% to 6.27%. Also, the length of stay was shortened from 8.46 days to 6.01 days.

Another systematic evaluation of health interventions was carried out with the intention of gathering, evaluating, and synthesizing the currently available evidence of educational interventions on evidence-based in nursing. The educational interventions were generally similar, and created encouraging effects in participants, giving them the skills they needed to carry out each stage of the evidence-based in nursing, and a particular emphasis on using the evidence in patient care (Häggman-Laitila et al., 2016).

The studies by Wu et al. (2018) and Emparanza et al. (2015) show that the in-service training program for providers will enhance patient outcomes. The program will address the knowledge gaps pointed out by Barter et al. (2020). The training program will enhance uniformity in administering low-density lipoprotein cholesterol (LDL-C). The proper administration of LDL-C will minimize adverse drug events resulting from the uncertainty over the dose to be administered.

VI. Purpose/ PICO Clinical Questions/Objectives.

In the healthcare system, providing consistent and high-quality care is a major difficulty (Khammarnia et al., 2015). Modern nursing techniques, such as integrating evidence-based practice (EBP), are required for nurses. EBP is a revolutionary problem-solving approach to patient care that is based on the best available and valid research and leads to better treatment, lower costs, and professional growth for nurses and other healthcare providers (Chaghari et al., 2017). It is an important aspect of nursing care that must be incorporated into daily practice.

Nurses are the largest group of healthcare professionals, and they play an important role in providing care and promoting healthcare standards (Chaghari et al., 2017). As a result, they must stay current on both practical and theoretical knowledge in their field. In-service training is one method for keeping nurses up to date on current nursing techniques. Its goal is to keep nurses' professional skills and occupational knowledge up to date, as well as to develop best practices for carrying out various responsibilities and tasks. Nurses who receive in-service training are more likely to participate actively in such programs, resulting in more effective learning and professional growth.

“For advanced practice registered nurses (APRN), does the implementation of in-service training programs including seminars and workshops, in comparison to no in-service training improve the implementation of evidence-based dyslipidemia management knowledge in convenient care clinic setting within thirty days?”

P (population): advanced practice registered nurses (APRN)

I (intervention): implementation of in-service training programs

C (comparison): no in-service training programs

O (outcome): improved knowledge in management of dyslipidemia as per evidence-based practice

The project's goals for quality improvement will be distinctive in bridging knowledge gaps in the use of evidence-based guidelines in the management of dyslipidemia. The study will also investigate the suitability of an educational program based on the empowering education concept. This methodology takes a comprehensive approach to education. The program will have a long-term influence on Advanced Practice Providers' knowledge acquisition and retention when it is supplemented by follow-up interventions, consequently outstanding patient care.

VII. Definition of terms.

Atherosclerotic cardiovascular disease (ASCVD) refers to medical conditions such as coronary heart disease (CHD), cerebrovascular disease (CVD), peripheral artery disease (PAD), and aortic atherosclerotic disease (ASD), which are all caused by plaque formation in arterial walls.

Convenient Care Clinic Association is a nationwide trade association of businesses and health-care systems that offer consumers convenient, cheap, and high-quality healthcare in retail settings.

Dyslipidemia is described as a high amount of low-density lipoprotein cholesterol, as well as an increase in triglycerides (TGs) and plasma cholesterol, all of which contribute to the development of atherosclerosis. Dyslipidemia is the abnormal buildup of lipids in the blood, such as cholesterol and fat.

Evidence-based practice (EBP) is the reasonable, balanced, and appropriate implementation of current research and the best available data to shape policy and practice decisions that improve consumer outcomes.

Hypercholesterolemia is a kind of dyslipidemia characterized by high levels of cholesterol in the blood, usually 200 mg/dL or greater.

In-service training is a type of clinical education that aims to keep employees informed on current initiatives, technology, and therapeutic agents.

VIII. Conceptual Underpinning and Theoretical Framework of the Project.

The scope of Advanced Practice Providers requires clinicians to implement scientific evidence into practice (Ryder & Jacob, 2021). As demonstrated in the literature, this should be done with a theoretical and scientific foundation to help guide the process (Ryder & Jacob, 2021). With these issues in mind, it is necessary to identify a conceptual underpinning and theoretical framework that can be used for the proposed quality improvement project to provide in-service training for advanced practice nurses to improve evidence-based dyslipidemia management knowledge in a Convenient Care Clinic. For the purposes of this project, the Stetler Model was selected as the theoretical framework. Included in this section is an overview of the model and how it can be applied to the current project.

Overview of the Model

Scholars reviewing the Stetler Model for evidence-based practice was first introduced in 1976 and further refined in 1994 (Stetler, 2001). The model was developed to help reconcile the gap between clinical practice and research using critical thinking and decision-making steps that would facilitate the ability of the clinicians to make safe and effective choices regarding the

integration of research into practice (Stetler, 2001). The model is noted in the literature to be a clinician focused model that can be used to foster practice change (Indra, 2018). To accomplish this goal, the Stetler Model employs five steps which are intended to guide clinicians in their ability to apply research in practice (Stetler, 2001). These steps include preparation, validation, comparative evaluation/decision making, implementation, and execution (Parach et al., 2018).

A closer look at what is involved in each step of the Stetler Model provides additional insight regarding how the framework can be used to support the ability of the practitioner to utilize research effectively and efficiently. Indra (2018) provides a more complete review of the specific steps included in the Stetler Model noting that during preparation, efforts are made to define the purposes of the project and to search for sources of evidence that can be used to address the identified purpose. In the second step, validation, the specific evidence needed to address and potentially solve the problem is identified (Indra, 2018). This is followed by comparative evaluation and decision making in which the evidence is critiqued and is evaluated in the context of the internal and external factors that will shape project outcomes (Indra, 2018). During the fourth phase of the model, implementation of the evidence into practice is undertaken and refinements when applying the research are made to ensure that the project addresses external and internal needs to foster success. In the final stage of the model, evaluation occurs, and an effort is made to determine not only the outcomes that resulted but also the systemic implications of the practice change (Indra, 2018).

The Stetler Model has been used by various scholars to guide evidence-based practice change. For instance, Parach et al. (2018) note the use of the Stetler Model to undertake a clinical trial aimed at implementing evidence-based practice guidelines for removing arterial sheaths following angioplasty. In this study, the authors developed the evidence-based practice

guidelines based on the current literature and utilized the Stetler Model to guide the implementation of the guidelines in the clinical setting. To evaluate outcomes, the authors utilized 200 patients assigned to either care as usual or to the new treatment guidelines group. The steps of the Stetler Model were reviewed by the authors who noted that during preparation the problem of removing arterial sheaths was undertaken via an exhaustive literature search. In step two of the model the guideline was developed and validated based on the literature and expert review. During step three of the model, comparative study and decision making, the authors note working with nurses and residents to determine if the guideline was practical for use. This led to step four in which the refined guideline was used to train healthcare providers and to implement the guideline in practice. The final step in the model was completed through an evaluation of the outcomes of the trial which did indicate that the care as usual group had higher rates of bleeding, hematoma, vasovagal reactions, urinary retention, and back pain. Based on the results the authors recommend the use of the guideline to improve care of patients requiring the removal of an arterial sheath following angioplasty.

While the research provided by Parach et al. (2018) facilitates a greater understanding of how the Stetler Model can be applied in practice, it is worth noting that other scholars have utilized the model to foster practice change. For example, Toler et al. (2018) utilized the Stetler Model to implement a quality improvement project aimed at enhancing screening, treatment, and referral for women experiencing postpartum anxiety. The project involved identifying evidence to support the training of nurses, the implementation of the training in practice, and an evaluation of outcomes for postpartum women who were provided with enhanced screening, treatment, and referral (Toler et al., 2018). Additionally, Severine et al. (2016) employed the Stetler Model to guide a practice change focused on the use of the STOP-Bang Questionnaire among hospitalized

patients diagnosed with stroke to determine their risk for obstructive sleep apnea (OSA). In this project, the Stetler Model was used to guide the process of grounding practice change for patient assessment in the literature (Severine et al., 2016). Identification of the STOP-Bang Questionnaire for assessing OSA risk as well as providing nurses with training and implementing and evaluating the practice change were all included as part of operationalizing the Stetler Model (Severine et al., 2016).

Application of the Stetler Model to the Proposed Project

By reviewing the model and its application in past evidence-based practice project development detailed it is possible to consider how the model will be applied in the context of the current project to implement in-service training to increase knowledge of Advanced Practice Providers currently working in a convenient care clinic, supported by evidence-based dyslipidemia management. Below is included a summary of each of the steps in the model and how they will be met in the context of this project:

- Step 1, Preparation: Preparation was completed for this project through a review of the literature to identify the scope of the problem and potential solutions: i.e., provider education.
- Step 2, Validation: This step is being completed at the current time through a critique and evaluation of the literature in the context of the organization: i.e., a convenient care clinic. The strengths, weaknesses, opportunities, and threats analysis (SWOT) completed in this assessment provides a foundation for evaluating the evidence and its feasibility for application within the target organization.
- Step 3, Comparative Evaluation/Decision Making: This step will be accomplished through a synthesis of the evidence to develop an educational/training program for

Advanced Practice Providers currently working at the site. A comparison of content will be needed to determine what training should be provided to nurses.

- Step 4, Implementation: Based on the creation of the evidence-based training module, education will be provided to Advanced Practice Providers working at the convenient care clinic, following Institutional Review Board (IRB) approval of the project.
- Step 5, Evaluation: Evaluation for the project will occur through measuring knowledge improvements made by Advanced Practice Providers through a comparison of knowledge assessments completed before and following the educational intervention. Additionally, an effort will be made to review the outcomes of the project in terms of their systemic implications for patient health and maintaining the project at the site.

IX. Methodology.

The quality improvement project will be implemented at Convenient Care Clinics in retail pharmacies in South Florida. The clinics are committed to provide quality care to all people despite their ethnicity, age, religion, sexual orientation, gender, and economic status. The clinics strive to provide patient-centered care and alleviate human suffering by offering compassionate, high-quality care, transforming care, and leading life-changing through providers' education, innovative research, and prevention. As for vision, Convenient Care Clinics are determined to meet the health needs of their community by offering comprehensive care towards treatment of acute medical ailments like respiratory infections, skin rashes, immunizations, etc., and management and prevention of chronic health conditions, including hyperlipidemia, hypertension, diabetes, among other disorders.

Healthcare professionals specifically Advanced Practice Providers (APPs) at Convenient Care Clinics will be contacted through email with prior authorization by the Director of Clinical Operations and Advanced Practice Providers (APPs) Supervisor. The quality improvement project aims to educate at least 80% of these providers. While participation in this quality improvement program is voluntary, providers are highly encouraged to join in.

The Advanced Practice Providers (APPs) at Convenient Care Clinics will receive educational training material in a voice over PowerPoint format about best ways to manage, treat and prevent dyslipidemia to address the potential gap in knowledge. The participants will be provided with a link to access the pre and post-test questionnaires to evaluate their boost in knowledge at the end of the training.

1. Between July and October 2022, Advanced Practice Providers (APPs) from convenient care clinics will have online access to pre-test, educational module in a voice over PowerPoint format, and post-test activities.

2. Questionnaires will be developed to assess Advanced Practice Providers' knowledge of managing dyslipidemia and health conditions associated with this condition.

3. Educate at least 80% of Advanced Practice Providers (APPs) at Convenient Care Clinics by the end of the projected educational training intervention about best ways to manage, treat and prevent dyslipidemia.

In this quality improvement project, it is unlikely for the participants to encounter any risks that can adversely impact their social, physical, psychological, and economic health since no experiments in humans will occur. Advanced Practice Providers (APPs) will voluntarily participate in this project and will have the freedom to withdraw, or refuse participate at any

phase of its execution. All Advanced Practice Providers participating in the quality improvement project will be served with the investigators' contact information in the participant recruitment letter.

X. Results

The results from this quality improvement project were tabulated utilizing descriptive and inferential statistics. Descriptive statistics were used to tabulate the demographics of the sample and to assess the average pre- and post-intervention knowledge scores. The demographic data is summarized in Table 1. The results indicate that for this project a total of *n* = 24 participants were included. Of these 96% (*n* = 23) were female, 25% (n = 6) were White, 21% (*n* = 5) were African American, 46% (*n* = 11) were Latino, and 8% (*n* = 2) identified as "other" for race. Regarding age, most of the participants, 50% (*n* = 12) identified as being between the ages of 40 and >50.

Table 1

Demographic Data for Participants (n = 24)

Characteristic	Result: *n*(%)
Gender	
Female	23 (96%)
Male	1 (4%)
Race	
White	6 (25%)
African American	5 (21%)
Latino	11 (46%)
Other	2 (8%)
Age	
30 - 39 (Category 2)	6 (25%)

40 - 49 (Category 3)	6 (25%)
> 50 (Category 4)	12 (50%)

Descriptive statistics were also used to tabulate the mean knowledge score before and following the implementation of the educational module. To tabulate the mean scores, the number of questions answered correctly on the knowledge tests was scored for each participant. The scores were then averaged over the sample size of 24. Standard deviation was also calculated for both the pre- and post-test knowledge scores. The averages and standard deviations can be found in Table 2. A visual comparison of the pre- and post-test means are provided in Figure 1.

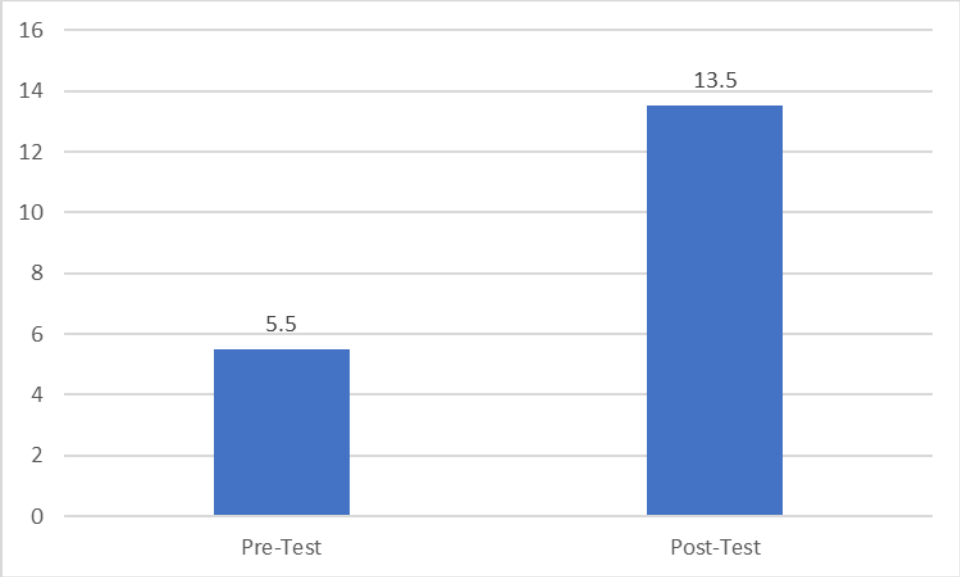
Table 2

Pre- and Post-Intervention Knowledge Test Scores

	Mean	Standard Deviation
Pre-Test Score	5.5	3.48
Post-Test Score	13.5	4.41

Figure 1

Visual Comparison of Mean Pre- and Post-Intervention Knowledge Scores



As noted in Table 2, the pre-intervention knowledge score was 5.5 before the educational module and increased to 13.5 following education. Figure 1 demonstrates that this is an increase in the scores, suggesting that knowledge increased following the educational module. Even though this does indicate an increase in knowledge scores for participants, the data presented in Table 2 and Figure 1 does not indicate if the results were statistically significant. To assess the statistical significance of the results, a paired t-test was used to compare the results inferentially. Results from the paired t-test indicated the following results, $t(23) = 5.33$, $p < .001$. Using an alpha value of 0.05, this indicates that the increase in knowledge scores that occurred following the educational intervention was statistically significant.

XI. Discussion

As noted, the results of this quality improvement project do indicate that there was an increase in knowledge scores for providers. This change in scores was noted to be statistically significant ($p < .001$). Provider knowledge gains made because of this quality improvement project are not surprising given the evidence base that was reviewed to support this project. For

example, Wändell et al. (2018) found that patient nonadherence with medical recommendations for the treatment of dyslipidemia was related to a lack of knowledge, education, and support provided by clinicians when treating the patient. According to Wändell and coauthors, the lack of counseling for patients regarding their condition and its management prevent patients from effectively engaging in their own self-care. This situation can be complicated when considering the unique needs of patients. Alefishat et al. (2021) found that patient knowledge of lipid lowering medications was lacking, often resulting in their lack of engagement in provider counseling and education to help regulate dyslipidemia.

Although the current quality improvement project did not measure the impact of education on outcomes for patients, the long-term implications of this project should be a change in practice. A review of the literature on provider education does indicate that this intervention can be quite helpful for strengthening care practices and clinical outcomes for patients. For instance, Zhang et al. (2019) investigated the use of a provider education program to increase preexposure prophylaxis prescribing among primary care providers. Outcomes measured in this project included changes in provider knowledge following education and increased prescribing for PrEP within the practice. The results of the study did indicate that provider education did lead to a concomitant change in practice. Further, Loots et al. (2021) examined provider education to help improve medication adherence in patients with severe mental illness, The results of this systematic review and meta-analysis indicated that across 28 different studies provider education was consistently linked with improving medication adherence in patients: $p = 0.29$; $I^2 = 19.9\%$. Provider education should, therefore, have marked implications for improving outcomes for patients, suggesting that the long-term benefits of this project will be attained because of providing education to clinicians on the topic.

Limitations

Although the results of this project do indicate that provider education was an effective intervention for improving provider knowledge of dyslipidemia management, the project is not without its limitations. The project was conducted at a same setting (Convenient Care Clinics) and utilized a small sample of 24 Advanced Practice Providers (APPs). The sample coupled with the selection of participants from a same setting will impact the generalizability of the findings. This indicates that while the findings are relevant and statistically meaningful for the practice setting where the educational program was provided, the same results may not be produced if the intervention was implemented in a different type of practice setting. Generalizability of the findings is needed to ensure that the project can be utilized by nurses in different healthcare settings and communities.

An additional limitation of the project is that it did not include a designated control group. This quality improvement project utilized a one-group study design which limits comparison of the results. In pure experimental research a control group is often utilized to provide a true comparison of groups to demonstrate the effect of an intervention (Khaldi, 2017). In the current project, it is not possible to state that the educational intervention caused an increase in knowledge. Without a separate control group in which to measure the same outcome and provide a comparison, causality cannot be proven. While it is reasonable to state that the change in knowledge was more than likely caused by the educational intervention because this is not experimental research, it is not possible to state with certainty that this is the case. This may influence the willingness of other providers and healthcare facilities to implement this type of quality improvement.

Limitations of the project also stem from the short duration of time to implement the project. The project was implemented over a three-month period and the results measured only focused on provider knowledge. If the project had been implemented over a longer time, it is possible that the impact of the intervention on provider practice and patient outcomes could have been measured. While it is assumed that provider education and increased provider knowledge will lead to a change in practice—as this hypothesis has been supported in the literature—there are no guarantees that this will occur. Consequently, while it is assumed that increases in provider knowledge will lead to improvements in practice and better outcomes for patients, this cannot be stated with certainty based on the results obtained from this quality improvement project.

XII. Implications for Advanced Practice Nursing

Dyslipidemia is a preventable condition that remains a significant public health issue in the United States. Effective management of dyslipidemia has become a challenge because of the knowledge gap about proper treatment practices among healthcare practitioners in the U.S. and the entire world (Chaghari et al., 2017). Health providers' knowledge is critical towards the treatment of diseases. However, studies indicate that lack of adequate knowledge among health care providers drives them to fail to implement proper mechanisms in preventing and managing dyslipidemia. Thus, health care providers need to receive continuous education to remain updated to modern medical practices.

An implementation of a quality improvement educational training about treatment and management of dyslipidemia will help Advanced Practice Providers enhanced knowledge of optimal treatment approach for their patients. At least 80% of Advanced Practice Providers (APPs) from Convenient Care Clinics should have completed the pre- and post-data

questionnaire to assess the success of the training and educational module by the end of the training. The educational intervention program is expected to improve the Advanced Practice Providers (APPs) knowledge of managing dyslipidemia, as well as the accurate prescription of dyslipidemia drugs and the use of evidence-based treatment approaches. Healthy lifestyles, better adherence to treatment methods among patients with dyslipidemia, and a decrease in new instances of dyslipidemia and its associated healthcare issues are among the other results.

XIII. Conclusions

Dyslipidemia is a treatable condition that requires expert healthcare provider knowledge to ensure optimal outcomes for the patient. Gaps in provider knowledge regarding this topic have resulted in the disengagement of patients in care, leading to their nonadherence with medical advice. While nonadherence can be shaped by myriad factors, current evidence indicates that the patient's lack of involvement in their care is, to some extent, impacted by a lack of healthcare provider knowledge on the topic. Provider education was demonstrated in this project to be highly effective for increasing provider knowledge of proper dyslipidemia management. The results, when reviewed in the context of the literature, do suggest that provider education should result in a change in provider behavior. This should, over the long-term, result in the application of evidence-based practice to patient care leading to better outcomes for patient and population health.

XIV. References

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XV. Appendix A: IRB Approval Letter.

FIU | FLORIDA INTERNATIONAL UNIVERSITY

Office of Research Integrity
Research Compliance, MARC 414

MEMORANDUM

To:	Dr. Eric Fenkl
CC:	Annery Diaz
From:	Elizabeth Juhasz, Ph.D., IRB Coordinator
Date:	June 22, 2022
Protocol Title:	**"Bridging the Knowledge Gap in the Management of Dyslipidemia: 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-22-0292	**IRB Exemption Date:**	06/22/22
TOPAZ Reference #:	112050		

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.
3) 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.

EJ

Appendix B: Support Letter from UHealth.

UHealth Clinic
UNIVERSITY OF MIAMI HEALTH SYSTEM
at Walgreens

06/02/2022

Eric A. Fenkl, PhD, RN, CNE
Clinical Professor
Nicole Wertheim College of Nursing & Health Sciences
Florida International University

Dr. Fenkl,

We have received the invitation to participate in the quality improvement project of Mrs. Annery Diaz. Mrs. Diaz's project titled *"Bridging the Knowledge Gap in the Management of Dyslipidemia"* will fulfill the requirements to obtain the Doctor in Nursing Practice degree at Florida International University.

As per the project proposal, Mrs. Diaz will develop her project in our setting at the UHealth Clinics at Walgreens. She will deliver an electronic invitation with the option to consent to participation in her project to our providers in the Walk-in Clinics. Additionally, a pre-test questionnaire, an educational intervention, and a post-test questionnaire will be sent online to prospective participants. The data collected will be kept confidential.

It is expected that Mrs. Diaz's activity will not interfere with the normal function of our clinics nor will it involve access to patients' medical records, following our clinics' standards of care and professional behavior. As Director of Clinical Operations at UHealth Clinic at Walgreens and Healthy Canes Clinics, I encourage the involvement of our walk-in Clinics in this initiative in order to promote the personal and professional development of our employees, as well as the well-being of our patients and the community.

Sincerely,

Sarah Flory MSN, APRN, FNP-BC
Director of Clinical Operations
UHealth Clinic at Walgreens and Healthy Canes Clinics
Ph: 954-483-4718
Email: swf22@med.miami.edu

FIU Nicole Wertheim College of Nursing & Health Sciences
FLORIDA INTERNATIONAL UNIVERSITY

Appendix C: Recruitment letter for "Bridging the Knowledge Gap in the Management of Dyslipidemia: A Quality Improvement Project".

Dear UHealth Clinic APRN Provider:

My name is Annery Diaz, and I am a Doctor of Nursing Practice (DNP) student from the Nicole Wertheim College of Nursing and Health Science, Graduate Department at Florida International University. The purpose of this letter is to invite you to participate in a Quality Improvement project that will be conducted to fulfill the requirements to obtain the Doctor in Nursing Practice (DNP) degree at Florida International University (FIU). In this project, how providers manage dyslipidemia will be assessed.

If you agree to participate, you will be asked to answer some questions about how you manage dyslipidemia in your patients. This will be done following a link that will be submitted by our Director of Clinical Operations. The process will have a pre-test, followed by an educational activity (voice-over PowerPoint presentation), and concluded with a post-test questionnaire. Each activity will take approximately 20-30 minutes of your time, in a 30-day period. Investigator will be the only individual collecting and analyzing the information, and no identifiable private information will be gathered. All information will be anonymous and handled electronically in a computer protected with a password. No hard copies.

Your participation is voluntary. If you decide to participate in this project, there is no risks associates with it. The potential benefits that participants may expect because of this project include more knowledge related to manage dyslipidemia and being in a better position to treat patients with this medical condition. Participation in this activity will not interfere with the normal function of our clinics, nor will it involve access to patients' medical records.

I want to thank you in advance for your time and desire to participate and support this academic activity. If you have any questions about the project, please feel free to contact me at adiaz013@fiu.edu, axd1226@miami.edu, or (786) 514-0483.

Thank you very much, sincerely

Annery Diaz

Appendix D: Educational Module: Pre- and Post-Test

1. Atherosclerotic cardiovascular disease (ASCVD) accounts for approximately what percentage of deaths in the United States?

A. 10%

B. 26%

C. 31%

D. 55%

2. Approximately what percentage of Americans 20 years of age or older have total blood cholesterol levels in excess of 240 mg/dL?

A. 5%

B. 8%

C. 12%

D. 15%

3. Which of these statements regarding atherosclerosis is TRUE?

A. Atherosclerosis is initiated during middle-age.

B. Atherosclerosis is a process that targets small sized arteries.

C. Atherosclerosis is rapidly accelerated by genetic and environmental factors.

D. All of the above

4. All of the following are progressive stages of atherosclerosis, EXCEPT:

A. plaque formation.

B. plaque disruption.

C. fatty streak formation.

D. high-density lipoprotein.

5. Which of the following is NOT considered a biomarker for ASCVD?

A. Age

B. Lipoprotein(a)

C. C-reactive protein

D. Hyperhomocysteinemia

6. Increased LDL levels can result from:

A. a deficiency of estrogens.

B. a deficiency of thyroid hormones.

C. genetic mutations of either the LDL receptor or Apo B-100.

D. All of the above

7. With an incidence greater than 25% in the United States, the most common form of secondary hyperlipidemia is:

A. atherogenic dyslipidemia.

B. familial hypertriglyceridemia.

C. familial hypercholesterolemia.

D. polygenic hypercholesterolemia (or nonfamilial hypercholesterolemia).

8. Secondary hyperlipidemias can be precipitated by the use of certain medication treatments. These treatments include estrogen therapy, atypical antipsychotics, corticosteroids, and

A. statins.

B. fibrates.

C. thiazides.

D. antioxidants.

9. The primary goal of lipid therapy in high-risk patients is to reduce LDL cholesterol by

A. 10%.

B. 25%.

C. 40%.

D. 50% or more.

10. The 2018 AHA/ACC guideline recommendations for a heart-healthy dietary pattern include all of the following, EXCEPT:

A. Low-fat dairy products

B. Increased calories from trans fats

C. Fruits, vegetables, and whole grains

D. No more than 5% to 6% of calories from saturated fats

11. Which of the following statements regarding lipid management through lifestyle change is TRUE?

A. Lipid lowering goals can usually be achieved on one's own.

B. Lipid lowering through diet and exercise will not reduce the risk for ASCVD and mortality.

C. Successful lipid control usually requires instruction by a dietitian or other knowledgeable healthcare professional.

D. In patients with high cardiovascular risk and/or very high LDL, medication therapy should be initiated if lifestyle changes are not effective within a two- to three- month period.

12. In addition to lowering lipid levels, statins are thought to have all of the following pleiotropic effects, EXCEPT:

A. neuroprotection.

B. modulation of endothelial function.

C. an increase in vascular inflammation.

D. immunomodulation by inhibition of major histocompatibility complex II expression.

13. Research has shown that moderate-to-high HDL levels may help to prevent ASCVD. The main goal for patients with hyperlipidemias should be to

A. increase HDL levels.

B. decrease LDL levels.

C. increase triglyceride levels.

D. All of the above

14. Niacin, or nicotinic acid, is also known as what vitamin?

A. Vitamin B3

B. Vitamin D2

C. Vitamin E2

D. Vitamin B12

15. Omega-3 fatty acids are abundant in what dietary sources?

A. Walnuts

B. Fatty fish

C. Canola oil

D. All of the above

Appendix E: Literature Matrix

First Author/Year	Purpose/ Problem/ Objective/ Aims	Study Design	Sample (Setting)	Data Collection Measures	Results	Strengths/ Limitations	Relationship to Project	Level of Evidence/ Quality Ranking
Ab et al. (2009)	To find out why healthcare practitioners don't provide lipid-lowering treatment to patients with type 2 diabetes-mellitus.	A qualitative study was conducted using semi-structured interviews to explore the reasons for not prescribing lipid-lowering drugs. The results were analyzed using an inductive analytic approach.	Seven general practitioners working in the Netherlands.	Individual semi-structured interviews that were transcribed and coded.	The study revealed patients and providers barriers in not prescribing lipid lowering medications. Treatment quality could improve if motivation and lack of knowledge are addressed.	**Strengths**: Results highlight provider obstacles and provide in-depth analysis. **Weaknesses:** No quantitative data, small sample size, inability to generalize the results.	This article demonstrates the barriers faced by providers in addressing high lipid levels. This is foundational to the problem being investigated in this quality improvement project.	Level III Quality B
Alefishat et al. (2021)	To assess medication adherence in patients with dyslipidemia and investigate the reasons that lead to non-adherence.	In this cross-sectional study, patients having a diagnosis of dyslipidemia for six months or longer and a prescription for at least one medicine to control blood lipids were recruited and a four-item medication adherence measure (questionnaire) was used.	A total of 228 patients with dyslipidemia who were being seen in a primary care practice in Jordan.	Data collection occurred through the Beliefs about Medicines Questionnaire which was used to assess patients' beliefs about medications	Most of the patients said they didn't take medications as prescribed. Modifiable factors associated to poor adherence were views about perceived risk, drug hazards, treatment length, and medication number. Simplifying prescription regimen by lowering the number of medications may enhance medication adherence and health-related outcomes.	**Strengths**: Quantitative data which highlights the problem, statistically significant results. **Weaknesses:** Non-experimental study, small sample size, no comparison/causality, lack of generalizability.	This study demonstrates the need for the current project, highlighting the fact that patients face notable barriers when it comes to medication adherence, which can make it difficult for providers to effectively improve patient lipid levels.	Level III Quality A
Barter et al. (2020)	To obtain a better understanding of physician views and behavior, and to identify uncertainty in dyslipidemia management across the Philippines, Colombia, Germany, and Japan.	This study used an online questionnaire and conducted a web-based survey involving physicians from the Philippines, Colombia, Germany, and Japan.	Web-based survey of 1758 physicians in Japan, Germany, Colombia, and the Philippines selected from specific databases.	Data collection occurred through a web-based survey of physicians. The survey covered dyslipidemia management, target low-density lipoprotein cholesterol (LDL-C) levels in different patient	The study gives a picture of the views and behaviors of physicians' participants who manage dyslipidemia patients in their daily practice. The findings point to crucial areas where more teaching and investigation are needed.	**Strengths**: Results are robust and demonstrate gaps in provider knowledge, quantifiable results, international sample. **Weaknesses**: Use of a non-experimental framework, small sample size, no comparison/causality, lack of generalizability.	This study demonstrates that providers have definitive and similar deficiencies in knowledge regarding the treatment of dyslipidemia, which is the problem noted for the project.	Level III Quality A

				groups, and statin safety.				
Chaghari et al. (2017)	To develop a new ideal in-service training model and improve the efficacy of this form of education for nurse personnel.	A qualitative study was undertaken using Grounded Theory to investigate the process of training nurses and theory formation to develop the best model for in-service nursing staff training.	The sample included 35 nurses.	Data were collected through interview, observation, and field notes. Data was analyzed through MAXQDA-10.	A new model for in-service nurse training, empowering education, can help nurses perform their jobs more effectively and master their professional abilities.	**Strengths**: Results highlight provider obstacles and provide in-depth analysis. **Weaknesses:** No quantitative data, small sample size, inability to generalize the results.	Article demonstrates the utility of training to improve nurse knowledge. This is the specific focus of the current quality improvement project.	Level III Quality A
Chen et at (2020)	To find if statins, fibrates, nicotinic acid, and ezetimibe, among other lipid-lowering drugs, lowered the risk of recurrent stroke in ischemic stroke patients, and if these findings could help guide treatment decisions for blood lipid-lowering drugs.	In a meta-analysis, the relative risk of stroke recurrence in groups of patients treated with either blood lipid-lowering regimens or placebo was calculated using a fixed effects model and linear and spline regression.	The sample included five studies that involved 4,999 patients.	Data were collected through PubMed, EMBASE, Cochrane Library and Chinese databases CNKI, Sino-Med, Wan Fang, and VIP. A PRISMA flow diagram was used along with a meta-analysis.	The incidence of ischemic stroke recurrence was considerably reduced when low-density lipoprotein cholesterol (LDL-C) was reduced by 50% or more. The overall positive benefit of statin medication in preventing ischemic stroke recurrence has been demonstrated.	**Strengths:** High level of evidence, statistically significant results. **Weaknesses**: Limited number of databases used for searching, results may be limited.	Article demonstrates the benefits of statins and indicates that providers need to be educated to provide this treatment for patients to help prevent adverse outcomes (stroke).	Level I Quality A
Emparanza et al. (2015)	To decide if EBP improves patient outcomes when compared to those who get standard medical care (SP).	This cross-sectional study sought to explore nursing students' beliefs and implementations of EBP, to examine the differences in students' beliefs and implementations by prior training of EBP, and to examine the relationship between the same.	A sample of 241 nursing students from two public universities.	A survey that contained questions regarding learning and teaching regarding evidence-based practice.	Nurses' beliefs regarding EBP influenced their implementation of it. Nurse had a low belief score and a much lower implementation score, suggesting that there are challenges in both areas.	**Strengths:** Quantitative data demonstrating the need for education to implement EBP, robust and relevant results. **Weaknesses**: Small sample, lack of generalizability, no comparison, nonexperimental approach.	Article highlights the importance of education to improve the implementation of evidence-based practice. This is the focus of the quality improvement project focused on dyslipidemia.	Level III Quality A
Germossa et al. (2018)	To find out how an in-service educational program affects nurses' knowledge and attitudes about pain management.	A quasi-experimental investigation was carried out. Two days of rigorous pain management education were offered, followed by a one-month follow-up training session. The impact of	A total of 111 nurses working Jimma University Medical Center at	The Knowledge and Attitudes Survey Regarding Pain (KASRP) was used for data collection.	Nurses' knowledge and attitudes about pain management increased because of the teaching program. Nurses may be able to control pain more effectively because of this.	**Strengths:** Experimental study, statistically significant results. **Weaknesses**: Small sample, no comparison group, lack of generalizability.	The article demonstrates the positive effect of nurse education. This quality improvement project is investigating nurse education to improve patient outcomes. This	Level II Quality A

		educational programs was measured using a tool.					article supports the project.	
Häggman-Laitila et al. (2016)	To collect, evaluate, and synthesize current evidence regarding educational interventions in evidence-based nursing (EBN).	The study is a systematic review based on the Centre for Reviews and Disseminations' protocol for performing health intervention reviews. Narrative synthesis was used to analyze the data, as well as qualitative content analysis.	Study included 13 studies reviewing 13 different educational interventions.	Data collected through evaluation of Cochrane, CINAHL and PubMed MEDLINE databases from January, 1, 2008 through February 26, 2015. Organized using a PRISMA Diagram.	Learners were prompted to critically assess and evaluate their practice because of the interventions. Participants' ability to recognize the need for research evidence in clinical practice was also improved.	**Strengths:** High level of evidence, statistically significant results. **Weaknesses:** Limited number of databases used for searching, results may be limited.	This high level of evidence demonstrates that the intervention selected for this quality improvement project is effective. This evidence justifies the selected intervention.	Quality I Level A
Wändell et al (2018)	To determine possible facilitators and barriers for health care workers to engage in selective cardiometabolic disease (CMD) prevention in primary care.	The current study is a systematic search and review of literature in primary health care with relevant material on targeted prevention of cardiometabolic disorders (CMD).	A total of 19 studies including 7 quantitative studies, 2 mixed methods studies, and 10 qualitative studies.	Articles selected from Medline, Embase, CINAHL and PubMed and organized using a PRISMA diagram.	Both qualitative and quantitative research highlighted structural, organizational, professional, social environment, and attitudinal challenges and facilitators of selective CMD preventive initiatives in primary care.	**Strengths:** High level of evidence, statistically significant results. **Weaknesses:** Limited number of databases used for searching, results may be limited.	This systematic review demonstrates the importance of managing dyslipidemia. This supports the problem of lack of provider knowledge to effectively manage this condition.	Level I Quality B