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An Analysis Of The Cause, Effect & Control Of Hyperlipidemia From A Nursing Perspective

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AN ANALYSIS OF THE
CAUSE, EFFECT & CONTROL OF HYPERLIPIDEMIA
FROM A NURSING PERSPECTIVE

Melissa Rodgers

An Analysis of the
Cause, Effect, and Control of Hyperlipidemia
From a Nursing Perspective
by
Melissa Rodgers

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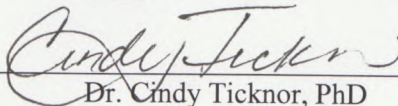
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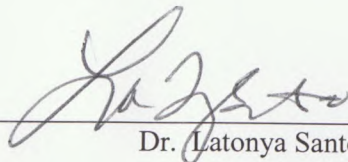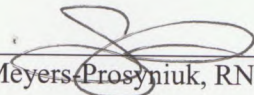## Abstract

Two of the top four causes of death worldwide, heart disease and stroke, are related to hyperlipidemia, elevated cholesterol levels; these two illnesses account for approximately seventeen million deaths each year (World Health Organization, 2014). In order to combat the prevalence of these illnesses, the National Cholesterol Educational Panel has issued guidelines regarding cholesterol management. Extensive research has been published concerning cholesterol management. However, a gap remains between evidenced-based practice and community awareness of this phenomenon. This manuscript compiles research from peer-reviewed nursing journals and acclaimed government and national organizations to express the cause, effect, and control of hyperlipidemia while identifying prevention strategies to decrease the incidence and prevalence of hyperlipidemia.

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An Analysis of the Cause, Effect, and Control of Hyperlipidemia

Worldwide cardiovascular disease has posed a major threat to health; in fact, it remains the leading cause of death among men and women regardless of race or ethnicity (Dembowski & Davidson, 2009). Approximately 53% of adults in the United States of America suffer from hyperlipidemia, also known as hypercholestremia; furthermore, hyperlipidemia accounts for more than four million deaths globally (Joffres, Shields, Tremblay, & Connor Gorber, 2013). In fact, nearly 62% of individuals in their fifties suffer from hyperlipidemia (National Institute of Health, 2012). Reducing cholesterol levels is the primary intervention in decreasing the occurrence of cardiovascular disease, a classification for diseases of the blood vessels and/ or heart (Dembowski & Davidson, 2009). This manuscript analyzes the cause, effect, and control of hyperlipidemia while identifying prevention strategies to decrease the incidence and prevalence of hyperlipidemia worldwide.

What is Hyperlipidemia?

Hyperlipidemia is an elevation of low-density lipoproteins and/or decrease in high-density lipoproteins within the body, determining an individual's cholesterol level. Cholesterol is a fatty compound synthesized in the liver and found in animal tissues (Cholesterol, 2013; National Institute of Health, 2012). Cholesterol performs a variety of functions throughout the body which include: "building and maintaining cell membranes; assisting in the manufacture of androgens, estrogens, and aldosterone; aiding in the production of bile; assisting the synthesis of vitamin D; helping metabolize fat-soluble vitamins; and insulating nerve fibers" (Murphy, 2011, p. 1). However, the human body is incapable of efficiently breaking down cholesterol into a usable form of energy; therefore, it has no caloric value (Dudek, 2010).

Lipoproteins transport cholesterol to the body tissue to preserve body functions and to the liver for excretion; lipoproteins are divided into two categories: low-density lipoproteins and high density- lipoproteins (Thorton-Miller, 2008). In order to determine one's total cholesterol level, the amount of high-density lipoproteins is calculated in addition to the amount of low-density lipoproteins with 20% of the triglyceride level (American Heart Association, 2013a). Ideally, this calculation should be less than 200 milligrams per deciliter (American Heart Association, 2013a).

The body utilizes high-density lipoproteins to carry the low-density lipoproteins to the liver in order to excrete low-density lipoproteins out of the body on a daily basis, preserving healthy bodily functions (American Heart Association, 2013a). Low-density lipoproteins transport cholesterol molecules to the body's tissue. Unfortunately, low-density lipoproteins may also act as a barrier to the blood vessels. It is widely recognized that triglycerides are the most prevalent lipid found within the body. The collection of these lipoproteins results in an accumulation of fatty plaque, which is known as atherosclerosis (Cholesterol, 2013). Triglycerides can accelerate the development of atherosclerosis (American Heart Association, 2013a). As a result, the vessels become obstructed and hardened, eventually scaring the tissue, which narrows the vessels and prevents efficient circulation of blood and vital nutrients throughout the body. Additionally, "…[cholesterol] is associated with enhanced expression of proinflammatory mechanisms leading to increased levels of proinflammatory cytokines, cellular adhesion molecules and inflammation sensitive plasma proteins" (Ramaraju, Krishnamurthy, Maamidi, Kaza, & Balasubramaniam, 2013, p. 295).

Ideally, low-density lipoproteins should be restricted to 130 milligrams per deciliter (mg/dL), high-density lipoproteins should be greater than 60 mg/dL, and triglycerides should be

limited to 150 mg/dL to prevent atherosclerosis (Woods, 2010). The process of balancing lipoproteins is constantly stimulating various bodily functions while maintaining homeostasis; unfortunately, there are instances when this system becomes weakened and/or fails. In these circumstances, patients develop hyperlipidemia, sometimes referred to as dyslipidemia or hypercholesterolemia. These terms are defined as an elevation of low-density lipoproteins and/or decrease in high-density lipoproteins within the body.

Hyperlipidemia Awareness

The importance of primary prevention methods cannot be over-emphasized, when endeavoring to effectively reduce the number of deaths related to hyperlipidemia and enhance the health of the population. Often, individuals become ill because they are unaware of how, and to what extent, their lifestyle affects their health. Most often, when people hear the terminology cholesterol, they habitually presume that it is hazardous to their health. Others tend to disregard the importance of cholesterol measurement altogether since it is not directly visible on a weight scale. It is important to educate these individuals on the delicate balance that must be maintained between high-density lipoproteins and low-density lipoproteins as opposed to eliminating cholesterol from the diet or underestimating the effects that abnormal cholesterol levels have on the body.

Risk Factors

In addition to promoting primary prevention methods, secondary prevention is necessary in order to encourage early intervention to prevent further progression of the disease process. Health screenings are performed to identify a patient's risk for illness or disease; the screening, for hyperlipidemia, should include the patient's height, weight, age, body mass index, blood pressure, total cholesterol, triglycerides, and high-density lipoprotein levels (Potera, 2010).

Obesity, peripheral artery disease, and an inactive lifestyle can greatly increase a patient's risk

for hyperlipidemia (Mayo Clinic, 2013). In addition, a family history of heart disease, diabetes,

and/or hypertension are risk factors for heart disease (Potera, 2010). Lifestyle behaviors such as

smoking or sleeping less than six hours per day can alter normal cholesterol values as well

(Mayo Clinic, 2013; Mosca & Aggarwal, 2012). Essentially, genetics determine approximately

30% to 60% of the low-density lipoprotein particle size; the remainder is based on lifestyle

behaviors (Thorton-Miller, 2008).

Not only are there risk factors for hypercholestremia, but also hypercholestremia serves

as a risk factor for other severe conditions. In fact, hypercholestremia has been linked to heart

disease and stroke, two of the top four causes of death in America; therefore, management of

cholesterol is of the utmost importance when attempting to reduce these numbers and save lives

(Griffin, 2012). According to Oguejiofor, Onwukwe, and Odenigbo (2012) "…dyslipidemia

accounted for 18% of ischemic heart disease, 56% of stroke, and more than 4 million deaths per

year globally" (p. 198). The increased incidence of hemorrhagic stroke suggests that

maintaining low-density lipoproteins levels at 100 mg/dL may be a safe target for individuals at

risk of cerebrovascular events (Schwertz & Badellino, 2008). In addition, hypercholestremia has

been identified as a risk factor for Parkinson's disease in individuals between the age of 25 and

54-years-old (Macready, 2009). Because of its inflammatory properties, hypercholestremia has

been linked as a risk factor for asthma, an inflammation of the airway passages, but once a

patient is diagnosed with asthma, research shows that cholesterol levels have no effect on the

disease process (Ramaraju et al., 2013). However, merely a decline by one milligram per

deciliter in low-density lipoprotein concentration can decrease one's risk for a cardiovascular

event by 21% and risk for mortality by 12% (McLain & Edlund, 2012).

In addition, the production of estrogen has been linked to increasing levels of high-density lipoproteins within the body, which have beneficial effects on the body (American Heart Association, 2013b). After menopause, women's estrogen levels begin to decline, decreasing its protecting capabilities; therefore, older women have an increased risk for hyperlipidemia. In pregnant women, Dey, Arora, Narayan, and Kumar (2013) suggested that hyperlipidemia is a risk factor for pre-eclampsia; therefore, they recommended having a lipid profile completed at 8 to 20 weeks of gestation to encourage pro-active treatment for pre-eclampsia. Regardless of age, cardiovascular disease remains the number one cause of death in women; therefore, education is vital in reducing the incidence and prevalence of this devastating disease. Caboral (2013) reported that in a study of 2,300 women that only 54% of the sample identified cardiovascular disease as the leading cause of death in women. Often, hyperlipidemia is associated with men; however, it affects men and women alike. In fact, in 2008, 7% more deaths occurred in women than men following a heart attack (Caboral, 2013). Therefore, it should be emphasized to health care professionals that there is a similar need to assess females for hyperlipidemia as well.

Assessment

"The major difficulty in treating dyslipidemia is detection" (O'Donovan, Sahm, Shannon, & Byrne, 2011, p. 22). Hyperlipidemia yields no symptoms unless damage to an organ system has occurred (Griffin, 2012). Although hyperlipidemia lacks symptoms, it is important to recognize the symptoms when the body is in distress. In men, a heart attack typically presents with chest pain; however, in women, more subtle signs occur, such as shortness of breath, diaphoresis, epigastric pain, and fatigue (Caboral, 2013). Comparatively, men are assessed and treated for these symptoms more frequently than women, which displays a slight bias in the medical field; furthermore, this bias carries over into the research field where studies are

conducted with predominantly male populations (Caboral, 2013). A health care provider should

ensure that each patient receives the proper care needed by eliminating this disparity,

encouraging a reduction in the death of women and men with heart disease alike. Furthermore,

Macready (2009) reported that a sudden decrease in total cholesterol concentration may be an

indication of imminent Alzheimer's disease or Parkinson's disease.

Mayo Clinic (2012) stated there are no symptoms associated with hyperlipidemia.

Nevertheless, researchers have found a few similarities among patients that may be indicative of

hyperlipidemia. For example, Mosca and Aggarwal (2012) concluded that, "snoring was a

significant predictor of low high-density lipoprotein cholesterol level regardless of gender or

ethnicity and was likely mediated by obesity" (p. 266). Although snoring may be a subtle

indicator used to identify a hyperlipidemic patient before organ damage has occurred, this is not

an infallible sign. Nevertheless, any abnormal symptoms should not be disregarded. The health

care provider should be notified in order to complete a focused assessment.

Analysis

Since hyperlipidemia presents no symptoms before it damages the body, screening is

paramount when education is ineffective or sparsely available. "The widely accepted National

Cholesterol Education Program (NCEP) guidelines recommend measuring lipid concentrations

every 5 years when cardiovascular risk factors are absent and every year when any

cardiovascular risk factor is present" (Mendez-Gonzalez, Bonet-Marques & Ordonez-Llanos,

2010, p. 102). Therefore, the health care staff must emphasize the importance of screening to

encourage early intervention, especially to individuals that present with risk factors for

hyperlipidemia.

Point-of-care is a device that punctures the lateral edge of the finger pad utilizing a small amount of blood to analyze blood serum concentrations. It is a low-cost and convenient apparatus used to interpret the cholesterol levels in the body within minutes (Barrett, Huffman, & Johnson, 2011). However, Mendez-Gonzalez et al. (2010) questioned the validity of three point-of-care devices: Accutrend GCT, Accutrend Plus, and CardioChek. Comparably, the Accutrend products proved more reliable than CardioChek: Accutrend Plus yielded 8.5% error, Accutrend GCT generated 8.9% error, and CardioChek presented with 25.1% error (Mendez-Gonzalez et al., 2010). NCEP guidelines standardized an acceptable margin of error at 9.0%; CardioChek failed to meet these guidelines (Mendez-Gonzales et al., 2010). In spite of numerous studies supporting the use of Point-of-Care devices, Barrett et al. further stated that although it is an acceptable method in determining one's risk for hyperlipidemia, it is not meant to be used as a diagnostic tool for a medical condition- a more accurate means of testing should be established to verify the results before a diagnosis can be made (Barrett et al., 2011). With comparison, Accutrend is the most acceptable point-of-care device for immediate results; however, it is not nearly as precise as an automated analyzer (Mendez-Gonzalez et al., 2010). The capabilities of point-of-care devices are limited to measuring total cholesterol levels while an automated analyzer is able to measure the individual levels of lipoproteins and triglycerides within the body.

Thorton- Miller (2008) emphasized the use of nuclear magnetic resonance (NMR) spectroscopy lipoprofiles to analyze the amount of low-density lipoprotein particles as opposed to the concentration of cholesterol within each particle. Small dense low-density lipoproteins are capable of passing through the arterial wall, increasing the concentrations in circulation, while the larger particles become trapped within the tissue, resulting in no damage to the vessels

(Thorton-Miller, 2008). Point-of-care devices measure the concentration of low-density lipoproteins within the body; however, NMR lipoprofiles measure the particle count within the blood stream, making it a more accurate means of testing one's risk for secondary diseases (Thorton-Miller, 2008). The avoidance of ingesting food or liquid 9 to 12 hours prior is recommended to ensure the greatest reliability from the results (American Heart Association, 2013a). Moreover, Medicare insures the cost of NMR lipoprofiles (Thorton-Miller, 2008).

Planning Care

In order to develop a care plan, the health care provider must differentiate between the patient's diagnosis of primary or secondary hyperlipidemia. If there is a defect within the patient's genetic deoxyribonucleic acid (DNA) altering the body's ability to naturally balance the cholesterol levels, then the patient has primary dyslipidemia, but if the patient developed hyperlipidemia secondary to another disease process (i.e. hepatic disease and diabetes), then the patient has secondary dyslipidemia (Murphy, 2011).Once the type of dyslipidemia is determined, a plan of action may take place, for in order to treat the disease successfully, the health care provider must determine the origin.

There are several ways to control cholesterol, such as lowering low-density lipoproteins, increasing high-density lipoproteins, and maintaining lipoproteins particle counts; however, therapy is predominantly directed at lowering low-density lipoprotein levels. All other factors are secondary goals (Dembowski & Davidson, 2009). As mentioned previously, low-density lipoproteins should be limited to 130 mg/dL or less, and high-density lipoproteins should be above 60 mg/dL; however, this is a standardized recommendation for the average person. To guide planning for treatment for an individual, his/her lifestyle and risk factors must be taken into consideration in order to set a realistic goal for the patient. As the number of risk factors

present increase, the patient's life is increasingly threatened. Therefore, the treatment options

become more rigorous, resulting in a narrow window for the individual's cholesterol goal.

However, it is also important to monitor treatment options in order to prevent the cholesterol

concentrations from shifting too far in the other direction. It is critical to remember that

cholesterol is vital to the daily function of the human body; the goal is to maintain the cholesterol

concentrations within the normal range.

Pharmaceutical Interventions

Medication administration is the method of choice by health care professionals and

patients in disease management. For hyperlipidemia, health care providers characteristically

prescribe medications classified as statins. Statins block the function of HMG-CoA within the

body, thus are classified as HMG-coenzyme A reductase inhibitor. These medications help the

body absorb excess cholesterol and block the synthesis of cholesterol (Mayo Clinic Staff, 2013).

McLain and Edlund (2012) reported that, "[With statins,] a 20% to 60% reduction in LDL-C

levels is achieved, as well as a moderate increase in high-density lipoprotein cholesterol (HDL-

C) levels of 2% to 16% and a decrease in triglyceride levels of approximately 7% to 37%" (p.

10). Cholesterol production is at its highest during the night; therefore, researchers have deemed

statins most effective when taken before bed (McLain, & Edlund, 2012). It is often the treatment

of choice for moderate or high-risk patients; they are ineffective in low-risk patients

(Dembowski & Davidson, 2009). Health care professionals should initiate the patient's

treatment with a low dosage of a statin medication; if it is ineffective, then a greater dose may be

prescribed in order to achieve the desired low-density lipoproteins level (Ashen & Foody, 2009).

Forty milligrams of Rosuvastatin (Crestor) proved to be the most effective statin medication

overall, reducing low-density lipoprotein levels by 63%. Aside from managing cholesterol

levels, statins also have anti-inflammatory and plaque prevention properties; new research

confirms that due to these secondary functions of statin medication, it is associated with a

decreased risk for Alzheimer's disease and cataracts (McLain, & Edlund, 2012).

Generic forms of statins are also available for management of hyperlipidemia. The cost

is approximately four dollars per month and/or offers a co-pay option, making it a low-cost

method of management (McLain & Edlund, 2012). The effectiveness of generic versions of

medications is widely disputed among researchers; however, the validity of the generic forms to

be the brand name equivalent in managing hyperlipidemia is beyond the scope of this essay.

"A lower achieved LDL in atorvastatin-treated patients was associated with a 16%

reduction in recurrent CVD events at 24 months after acute coronary syndrome. However, there

was still a 22.4% recurrent event rate despite an achieved LDL of 62 mg/dL. As clinicians, we

must be concerned about residual risk, because we do not have complete assurance of plaque

stabilization even at LDL cholesterol of less than 70 mg/dL" (Braun, 2010, pp. 241- 242).

Moreover, "The Heart Protection Study (HPS) demonstrated that, in patients with a history of

coronary artery disease, peripheral vascular disease, diabetes mellitus, hypertension, or other

vascular disease, 40 mg of simvastatin per day reduced the risk of first stroke" (Schwertz &

Badellino, 2008, p. 9). No two cases are the same. Therefore, each patient should be assessed as

an individual rather than generalized as a hyperlipidemic patient. As previously stated, in

various cases, atorvastatin can prevent a cardiovascular event from recurring, but not every time.

Therefore, an individual's risks should be analyzed prudently to determine a plan of care that

will improve patient outcomes.

For patients with severely high cholesterol levels, a combination of statins and additional

medications may be used in order to balance cholesterol levels effectively. Furthermore, by

reducing cholesterol levels significantly, an individual's risk for an adverse event is reduced

considerably; therefore, combinations of medications are typically prescribed to have a greater

impact on the patients' low-density lipoprotein levels. In fact, Braun (2010) reported that

"combination therapy with niacin and simvastatin produced a 60% to 90% reduction in coronary

heart disease (CHD) events" (p. 241). Senaratne, Griffiths, MacDonald, and Senaratne (2012)

discovered that when statins alone have proved ineffective to meet the goal for the low-density

lipoprotein concentrations, the use of ezetimibe therapy in combination were proven more

effective; ezetimibe is ineffective in individuals that had a successful response to statin

medications. Ezetimibe results in a 15% to 25% reduction in low-density lipoproteins (Thorton-

Miller, 2008).

Although statins are considered the mainstream drugs for hyperlipidemia, there are

certain individuals that should avoid this medication. For instance, since statins act on the liver,

patients with hepatic disease should avoid this medication if possible ("Keys to managing your

cholesterol", 2012). Alternative medications include bile acid binders, fibrates, and niacin which

help by preventing cholesterol absorption as well ("Keys to managing your cholesterol", 2012).

Because of the alterations that statins make within the liver, the health care provider should

occasionally assess hepatic enzyme levels to prevent drug toxicity and preserve hepatic function

(Murphy, 2011). In addition to the risk for hepatic impairment, patients may experience a

memory deficiency- an adverse effect of the medication that should be reported to the health care

provider immediately (Hudzik, Szkodzinski, & Polonski, 2012). Relatively 10% of the clients

taking this medication may experience muscle weakness; in severe cases, approximately one

percent of clients will present with rhabdomylosis, the breakdown of muscular tissue (McLain &

Edlund, 2012). Hydrophilic statins (e.g. Pravastatin, Rosuvastatin, and Fluvastatin) have a lower

risk of causing muscle-related symptoms (McLain & Edlund, 2012). Furthermore, in diabetic

patients, statin use has been associated with an increase in the Hg_{A1c} results, a test that measures

the amount of glucose attached to the hemoglobin (Hudzik, Szkodzinski, & Polonski, 2012).

Unfortunately, statins also pose a risk for amyotrophic lateral sclerosis, a neurodegenerative

disease, for it can deprive the muscles of the necessary nutrients to thrive (Samson, 2008).

Bile Acid Sequestrants are an adequate alternative to statins, which include

cholestryamine (Questran), colestipol (Colestid), and colesevelam (Welchol). The mechanism of

action for this medication class is inhibiting the reabsorption of cholesterol into the ileum by

intercepting the receptor site of bile acid, preventing it from returning to the liver (Murphy,

2011; Thorton-Miller, 2008). Bile acid sequestrants can reduce low-density lipoprotein

concentration by 15% to 30% and increase high-density lipoproteins by three to five percent, but

they also increase triglyceride levels; therefore, these medications should be prescribed with

extreme caution, and it is recommended to avoid this class of medications if triglyceride levels

are elevated already in a patient (WebMD, 2010). The patient should take this pharmaceutical

agent one hour before or five hours after taking other medications (Thorton-Miller, 2008). In

addition, he/she should remain well hydrated, for this medication may cause bloating and

constipation (Thorton-Miller, 2008).

Instead of taking medications, individuals may only want to consider supplements such

as Niacin and fish oil. Niacin acts on the body by preserving apolipoprotein-A1, thereby

increasing high-density lipoproteins. While statins lower the low-density lipoproteins, niacin

significantly increases the quantity of high- density lipoproteins to carry the low-density

lipoproteins out of the body, having a profound effect in reducing an individual's risk (Mayo

Clinic Staff, 2011). Niacin also creates a larger low-density lipoprotein particle so that it cannot

diffuse into the blood stream; in result, the blood serum concentrations of low-density lipoproteins are reduced by 10% to 15% (Thorton-Miller, 2008). The health care provider should carefully prescribe and monitor niacin, for excessive consumption can lead to gout and liver damage (Dudek, 2010). Fish oil, a supplement containing high levels of omega- 3 fatty acids, has been proven to reduce triglyceride levels by decreasing the synthesis of cholesterol in the liver (Hessel, 2010). Fish oil dilutes the blood; therefore, individuals taking anticoagulants should consult their doctor before using to avoid bleeding complications (Dudek, 2010). Hessel (2010) conducted a study analyzing the effects of Lovaza, a brand of fish oil, on cholesterol levels. Hessel (2010) concluded that, "Lovaza produced a 20% reduction in total cholesterol, a 13% increase in HDL cholesterol levels, and a 32% reduction in VLDL cholesterol levels" (p. 225). A daily dose between two to four grams is recommended; however, fish oil is contraindicated in children, pregnant women, and women that are breast-feeding (Hessel, 2010).

Although aspirin, acetylsalicylic acid, has no effect on cholesterol levels, some, especially high-risk individuals, may benefit from this medication. Aspirin is classified as a non-steroidal anti-inflammatory drug (NSAID); most commonly known as a "blood thinner". For individuals at high risk, this agent will allow the blood to flow smoothly, decreasing the risk for a blood clot if atherosclerotic plaque is present (Caboral, 2013). Because the blood is thinner, the vessels are not easily congested, reducing the incidence of clot formation and plaque detachment.

Regardless of the medications prescribed to the patient, educating about the medication and emphasizing the importance of adhering to medication regimen is crucial to sustaining its beneficial effects on cholesterol. After one year, it is estimated that approximately 40% of patients stop taking their medication (Hessel, 2010). For a health care provider, it is important to

discover the cause of noncompliance with the medication program and to explore other suitable

options for the patient. In addition, although medicine can do wonders, it is necessary to educate

the client about non-pharmaceutical interventions as well, since medication is *not* always a cure

for a condition. Medications simply manipulate the body to mimic a healthy one. On the

contrary, in a cooperative patient, non-pharmaceutical methods can serve as a cure, for they

typically attack the etiology.

Non-pharmaceutical Interventions

Seventy-five percent of cholesterol is maintained through the body in the blood, liver,

and other cells; the remaining 25% is defined by the patient's diet (American Heart Association,

2012b). When treating a patient, many health care providers will emphasize dietary concerns in

relation to cholesterol.

Overall, dietary cholesterol should be limited to 200 milligrams per day (mg/day) –the

equivalent to the weight of a one-carat diamond (Woods, 2010). Dietary cholesterol is only

available in animal products; it is not plant-based (Dudek, 2010). Therefore, it is important for

vegetarians and vegans to find an acceptable source of dietary cholesterol to meet the body's

daily requirement. Eating a low fat and/or Mediterranean diet can further promote a reduction in

low-density lipoproteins and increase in high-density lipoproteins (Dudek, 2010).

Carbohydrates should be less than 45% of your daily intake to help decrease triglyceride

levels (American Heart Association, 2013a). The body produces sufficient amounts of saturated

fat to meet the daily requirements; therefore, the consumption of additional saturated fat is

unnecessary and potentially hazardous to the blood vessels (Murphy, 2011). Saturated fat can be

limited by consuming lean meats, low-fat dairy products, and avoiding fast food (Murphy, 2011).

Unsaturated fat is the best alternative for fat consumption. Unsaturated fats include olive oil,

canola oil, peanut oil, avocado, cashews, almonds, corn, soybean, safflower, cottonseeds oil, and

fish (Dudek, 2010).

Foods such as red meat and egg yolks result in an imbalance of cholesterol levels.

However, it is also "important to remember that eggs are good sources of the carotenoids, lutein

and zeaxanthin, that have been shown to prevent macular degeneration and LDL oxidation and

of choline, an essential nutrient for fetal development" (Fernandez, 2012, p. 120). Therefore, the

health care provider should consider the benefits of eggs versus the risks. Soy protein may act as

a dairy substitute, for it has been proven to reduce low-density lipoprotein levels by 25

grams/day (Dudek, 2010). Breast milk has high cholesterol content; the high levels are believed

to expose the child early on so that he may develop a control mechanism to manage cholesterol

throughout life (Dudek, 2010).

Increasing fiber to about 25 grams per day can help reduce low-density lipoprotein

concentration and particle count as well; high fiber foods include fruits, vegetables, whole grains,

beans, and seeds (Thorton-Miller 2008; Woods, 2010). "People who eat three or more servings

of whole grains daily have 20% to 30% lower risk of atherosclerotic cardiovascular disease"

(Dudek, 2010, p. 33). Small traces of sterols are found in high fiber foods as well. Plant sterols

and stanol esters inhibit the absorption of cholesterol and prevent the body from converting it

into a usable form; these actions cause a reduction in low-density lipoproteins (Jones &

AbuMweis, 2009). Ingesting approximately, two grams of plant sterols per day can result in a

7.5 to 11.6% reduction in low-density lipoproteins (Jones & AbuMweis, 2009). A few examples

of products containing a high percentage of sterols are psyllium, eggplant, okra, and oats ("Keys

to manage", 2012). Due to increased demand in the produce market, individuals now may buy

specifically sterol-fortified foods, such as orange juice and cereal (Griffin, 2012). However,

plant sterols have the capability to reduce the effectiveness of fat-soluble vitamins by inhibiting

absorption into the body- beta-carotene by 25%, alpha-carotene by ten percent, and vitamin E by

eight percent (Jones & AbuMweis, 2009).

Foods that are broiled, grilled, or baked are strongly encouraged for their positive effects

on cholesterol levels as well (Griffin, 2012). Murphy (2011) stated that "eliminating Trans fats

from the diet can decrease the risk of cardiovascular disease up to 19%" (p. 30). On the opposing

spectrum, because of the high content of low-density lipoproteins, salad dressings and

mayonnaise should be limited in the diet (Murphy, 2011). Avoiding foods high in trans-fat such

as margarine and fried foods is also recommended, for they can cause an increase in low-density

lipoproteins while decreasing high-density lipoproteins; this results in fatty deposits within

vessels ("Is 'good' cholesterol still good for you?", 2012). Additionally, a clove of garlic per

day is associated with decreased low-density lipoprotein levels (Dudek, 2010).

According to the Centers of Disease Control and Prevention, one out of three adults and

one out of six children are classified as obese, a major risk factor for high cholesterol (2011).

Low activity has likely contributed to the growth in obesity in the United States. In fact,

Williams (2008) stated "41% percent of women and 35% of men engaged in no leisure-time

physical activity, and 73% of women and 66% of men are inadequately active" (p. 433).

"Approximately 60% of overweight American children also have hypertension,

hyperinsulinaemia, and/or hyperlipidemia" (Barrett, Huffman, & Johnson, 2011, p. 52). Rather

than encouraging these children to take cholesterol medication, regular physical exercise should

be encouraged as a healthier method to manage cholesterol levels.

Exercise is a means of primary and secondary prevention; it can prevent hyperlipidemia

and reverse hyperlipidemia in its early stages (Lavie, Church, Milani, & Earnest, 2011). In

general, weight loss can promote a reduction in low-density lipoproteins: losing 10 pounds can

reduce the low-density lipoprotein count by approximately seven milligrams per deciliter (Braun,

2010). Furthermore, losing 20 pounds can reduce the low-density lipoprotein particle count by

50% (Thorton-Miller, 2008). Beyond its effects on low-density lipoproteins, weight loss can

also promote a lower blood pressure, lower blood sugar, and most importantly, an increase in

high-density lipoproteins to rid the body of excess low-density lipoproteins ("Is 'good'

cholesterol still good for you?", 2012). The author of Mayo Clinic Staff (2013) recommended

exercising for 30 minutes, five days a week to reduce the low-density lipoprotein concentration

efficiently. As stamina develops, one should increase the length of their exercise routine to 40

minutes at least four days of the week (Murphy, 2011). Thorton-Miller (2008) reported that with

continuous exercise, patients' low-density lipoprotein particle count dropped by 62%, while the

high-density lipoproteins increased by 11%. Conversely, United States society emphasizes rapid

weight loss plans, but it fails to encourage a healthy weight loss plan; therefore, the health care

provider should educate the patient about the hazards of losing too much weight too suddenly.

Researchers have shown that the intensity of exercises does not affect cholesterol levels

as positively as the frequency of exercising (Thorton-Miller, 2008). Some patients squirm at the

thought of exercising. For these individuals, it is imperative to offer alternatives such as taking

the stairs instead of the elevator or parking further away from the entrance of a building; any

exercise is better than no exercise. However, before beginning exercise, it is crucial to speak to a

healthcare provider before performing any strenuous activity to ensure patient safety.

Smoking habits and alcohol consumption may influence cholesterol levels as well. In

fact, the cessation of smoking can increase the amount of high-density lipoproteins in the body,

allowing for increased transport of low-density lipoproteins out of the body ("Is 'good'

cholesterol still good for you?", 2012). Secondhand smoke can also cause an increase in low-density lipoprotein levels (Woods, 2010). Alcohol has no particular benefit to lowering low-density lipoproteins. However, if an individual is an alcohol drinker, alcohol should be limited to one or two drinks per day, in order to maintain a healthy high-density lipoprotein levels ("Is 'good' cholesterol still good for you?" 2012). According to Thorton-Miller (2008), one alcoholic drink is defined as one and a half ounces of hard liquor, five ounces of wine, or 12 ounces of beer. Although alcohol has proven to have beneficial effects to high-density lipoprotein levels, it is a situation to weigh benefits versus risks. "Alcohol can be addictive, and high intakes are associated with high triglyceride levels, hypertension, liver damage, physical abuse, vehicular and work accidents, and increased risk of breast cancer" (Dudek, 2010, p. 498).

Health Promotion

In order for a change in health behavior to occur, the individual must have confidence that the change can occur. Often, individuals believe that there is a lack of time, knowledge, or motivation for a change to transpire in their lives; therefore, health care providers must actively promote a transtheoretical approach to overcome these barriers to meet each individual's need (Peterson, 2012). The Health Belief Model (HBM) states that, "the degree to which a person engages in health promotion activities depends on the perceived benefits of healthy behaviors related to the perceived threat of not engaging in preventive behaviors" (Peterson, 2012, p. 297). Although this has not been an effective tool with all samples, it is helpful to a few samples, making it a valuable tool to consider in promoting secondary or tertiary prevention (Peterson, 2012). Going beyond the disease process, the Health Promotion Model emphasizes the positive role that self- improvement plays in health behavior change. Peterson (2012) found that in older

women, the thought of lifting their spirits and improving their sense of well-being increased the number willing to participate in physical activity. Health care providers must talk with their patients to discuss any fears or concerns that they may have with changing health behaviors and to discuss ways to overcome these barriers, regardless of whether or not they can alter their health behavior (Peterson, 2012). If the individual perceives that he/she cannot, then the individual will not (Peterson, 2012).

The Social Cognitive Theory (SCT) targets interpersonal relationships (e.g. support person, peer pressure, and media) to improve compliance (Peterson, 2012). In fact, Johansson et al. (2012) associated the increase of hyperlipidemia in Sweden with the promotion in media for a low carbohydrate- high fat diet, demonstrating the impact media has on the population health trends. Furthermore, the SCT emphasizes the use of persuasion by encouraging independence in care and developing goals (Peterson, 2012). Thorton-Miller (2008) suggested that patients record their meals for one week then return to the health care provider to review the record. The health care provider should not criticize the unhealthy food product consumed, as it will discourage the patient, but rather identify the positive aspects and review the components of a nutritious diet (Thorton-Miller, 2008).

Social and environmental factors may also influence health behaviors. The health care provider must ensure that the recommendations she or he provides correlate with what the individual is capable of completing. If there is no grocery store nearby selling fruits and vegetables or the individual cannot afford to purchase these items, the client will be noncompliant to care plan that identifies the need to increase the nutrient value within the diet; therefore, outside resources must be identified and readily available to the client (Peterson, 2012). Health care providers must assess the community resources available for the client. If the

patient is not consuming a healthy diet due to poverty, then meals on wheels may be an option. Locally, Meals on Wheels is on 1500 Second Avenue in Columbus, Georgia, and extends their services to the surrounding area. For individuals that may be struggling to pay for health care and/or may refuse to seek medical treatment because of financial circumstances, there are several income-based health care services offered locally, such as Valley Health Care and Mercy Med. Furthermore, public transportation is offered throughout town. The homeless resource network is located on 2221 Second Avenue in Columbus, Georgia for those that need a place to stay, improving sanitation and overall health. Valley Rescue Mission provides several options for impoverished individuals. These are a few of the resources that Columbus has to offer to alter social and environmental circumstances; several more options should be explored to meet the patient's needs. If the patient is poverty stricken, then compliance is typically minimal. The patient will not buy healthy food products or buy medications if he or she is unable to afford housing. In order for continuity of care to occur, then resources outside the hospital must be identified for the client.

Is Hyperlipidemia Life Threatening for Every Patient?

Hyperlipidemia can be beneficial to a minority of the population. A few conditions warrant the need for high cholesterol levels in order to improve the health of a client. Samson (2008) testified that individuals with amyotrophic lateral sclerosis (ALS) suffer with hypermetabolism; in result, they are often weak and malnourished. Hypercholestremia can prolong life in these patients by approximately one year (Samson, 2008).

Although an imbalance in cholesterol levels can have detrimental effects on men and women, elevated levels of low-density lipoproteins in children should not be alarming, for abnormal levels do not affect children as severely as adults. There have been several instances

where children have been reported to have exceedingly high levels of low-density lipoproteins,

greater than 160 mg/dL (Potera, 2010). Nonetheless, it is recommended to wait at least three

years before considering treatment options, for upon re-examination, many children will show a

vast decrease in these levels; therefore, treatment is not usually necessary (Potera, 2010).

Although these children may not require treatment, they must be monitored closely throughout

adulthood to ensure that hyperlipidemia does not develop and progress into other complications

(Potera, 2010).

In a few situations, there are individuals with severe hyperlipidemia that present with no

chronic illness. For instance, a patient can test with elevated levels of low-density lipoprotein

concentrations, but they may have a depressed low-density lipoprotein count. Therefore,

although the low-density lipoproteins are carrying large concentrations of cholesterol, they are

not passing into the blood stream because of their size. Thus, the typical cholesterol tests may

illustrate an elevation in concentrations within the body; however, the number of particles within

the bloodstream, not the concentrations, is the most hazardous.

Conclusion

Millions of dollars are invested each year into controlling the incidence and prevalence of

hyperlipidemia; nevertheless, hyperlipidemia remains prevalent worldwide. To assist in

decreasing the pervasiveness of this disease, an increase in health literacy in the population,

access to health resources in the community, and the patients' willingness to alter lifestyle

behaviors must be present and emphasized by health care professionals and the media.

Individuals need to be screened for hypercholestremia every five years if no risks factors are

present; they should be screened every year if a risk factor is present. Although statins and other

cholesterol-lowering medications and supplements are deemed effective methods for treatment,

they are not a cure and should be used with extreme caution in patients with hepatic disease,

renal disease, and alcoholism. Non-pharmacological approaches to treatment include, but are not

limited to, weight loss, dietary changes, and smoking cessation. Before making any changes to

health behaviors, clients should first speak with their health care provider to ensure the safety of

doing so.

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