Research Paper Assignment

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Introduction / Problem Statement

To Recommend or Not to Recommend Dietary Cholesterol Control?

Cholesterol is a waxy substance that plays an important role in the body to build cells. Cholesterol is not inherently "bad" for you, but too much cholesterol can become a problem. Cholesterol circulates through the blood in the body. The two types of cholesterol: LDL, which is considered "bad", and HDL, which is considered "good". Too much LDL or too little HDL can be a health risk. When the amount of cholesterol in the blood increases, it can cause a build-up in the inner walls of the arteries, which does the risk to your health. This explains the importance of having one's cholesterol levels tested on a regular basis to keep in a healthy range (American Heart Association, 2017).

The liver creates all of the cholesterol the body needs, and the remainder comes from foods derived from animals. As an example, meat, poultry and full-fat dairy products all contain cholesterol, which is considered dietary cholesterol (American Heart Association, 2017). Most of these products also contain saturated and trans fats, which can cause the liver to make more cholesterol than needed. This production of cholesterol can take a normal level to one that is unhealthy for the body (American Heart Association, 2017). There have been thousands of studies performed on the relationship between blood cholesterol, dietary cholesterol, and cardiovascular disease risk. Cardiovascular disease (CVD) is the leading cause of death in the United States. For several years, dietary cholesterol was thought to increase blood cholesterol, leading to an elevated risk of cardiovascular disease. To date, extensive research has not shown an association of dietary cholesterol with CVD risk. Having this evidence, should we recommend or not recommend dietary cholesterol control?

Historical Background

Prior to 2015, the dietary cholesterol recommendations range from <200 mg/dL for individuals at high risk for cardiovascular disease (CVD) up to <300 mg/dL/day for healthy individuals. Many Western countries do not have a dietary cholesterol recommended intake. In its place, dietary guidelines focus on reducing the intake of saturated fat and trans fat, because they have more compelling effects on risk factors for cardiovascular disease. However, this issue remains controversial among many (Kanter, et al. 2012).

A theoretical challenge has been placed of concerns about the opposing effects of dietary cholesterol originated from the paleoanthropology field. Human dietary needs were adaptations in response the available food supply to the human population. “Paleoanthropologists suggest that dietary cholesterol has been in the human diet for millions of years. Sources included eggs, bone marrow, and organ meats. Stone Age intake of cholesterol is uncertain, but it may well have exceeded current dietary recommendations” (Kanter, et al. 2012).

An exemption of dietary cholesterol raises a question: what was the basis for implicating that dietary cholesterol plays a role in CVD risk in the first place? Answers can be found though historical distinctions between the modern and Stone Age Food supplies. Through modern context, cholesterol and other dietary factors influence both serum lipids as well as coronary disease risk. With cholesterol and saturated fat being contributors to the typical modern diet, their linkage with CVD risk in the absence of the total diet context has been found problematic. Looking at the Stone Age context, dietary cholesterol was more consistently distinctive from saturated fat. Dairy was not consumed until about ~12,000 years ago, during the advent of agriculture. “Humans likely adapted to an intake of dietary cholesterol unencumbered by adverse

associations then encountered such associations only by modern context. Dietary cholesterol was then likely indicted by association" (Kanter, et al. 2012).

During the 1960s and 1970s, the linkage between high blood cholesterol levels and heart disease development was established. Based on this information, several medical and health groups made the recommendation to individuals to lower their dietary cholesterol intake. This recommendation was based on the assumption that dietary cholesterol in food would lower cholesterol in the blood, therefore lowering the risk of heart disease. At this time, since eggs contain a large amount of cholesterol and are frequently consumed by many, many recommendations focused on lowering their consumption (Straight Healthcare, n.d.). As shown throughout history, there have been several assumptions made by a possible linkage between dietary cholesterol and heart disease.

Political Issues

When reading an article by Marion Nestle titled, 'Food Politics,' she highlights several political topics regarding cholesterol. With egg consumption starting to decline in the 1970s, egg producers put blame on the decline on cholesterol concerns, with eggs being one of the largest sources of dietary cholesterol. One of the egg producers, Pete and Gerry's Organic Eggs, is petitioning to the FDA to update cholesterol and its definition of "healthy" so the company can advertise its eggs as "healthy" (Nestle, 2018). FDA Commissioner Scott Gottlieb said in a speech that the FDA would be updating the definition, "The 2015-2020 DGA (like previous editions) recommends building healthy dietary patterns around nutrient-dense foods. According to the DGA, eggs are a nutrient dense food, i.e., they have large amounts of beneficial nutrients in relation to their total caloric content. In fact, eggs are included in all three model diets outlined in the 2015-2020 DGA. Moreover, eggs are recognized as a good source of high-quality protein.

Eggs are among the most affordable sources of protein and also have significant amounts of other nutrients, including vitamin D and choline. Yet, under FDA's current regulation and guidance, eggs may not be labeled 'healthy.'" (Nestle, 2018). Nestle explains her confusion about the dietary guidelines regarding dietary cholesterol and eggs. Dietary guidelines are no longer recommending a specific intake for dietary cholesterol, but do say that people should eat as little cholesterol as possible, which has created confusion (Nestle, 2018).

Looking at a different article by Peter Whoriskey of The Washington Post states, "The nation's top nutrition advisory panel has decided to drop its cation about eating cholesterol-laden food, a move that could undo almost 40 years of government warnings about its consumption." With the group finding that cholesterol in the diet no longer needs to be considered a "nutrient of concern," this new view on cholesterol in food does not automatically reverse the warnings of high levels of "bad" cholesterol in the blood and its linkage to heart disease. "Moreover, some experts warned that people with particular health problems, such as diabetes, should continue to avoid cholesterol-rich diets" (Whoriskey, 2015). With this type of conflicting dietary advice being normal, the cholesterol change comes from the influential Dietary Guidelines Advisory Committee, the group that provides the scientific research behind the "Dietary Guidelines." "The federal publication has broad effects on the American diet, helping to determine the content of school lunches, affecting how food manufacturers advertise their wares, and serving as the foundation for reams of diet advice" (Whoriskey, 2015). With the change regarding recommending a dietary cholesterol limit, the complexity of nutritional science and the lack of conclusive research can contribute to public confusion (Whoriskey, 2015). While this conflicting advice contributes to confusion for Americans who are searching for dietary guidance, political issues remain.

Scientific Facts & Issues

Historically, nutritional guidelines have led us to believe that limiting dietary cholesterol to prevent cardiovascular disease. When looking at observational studies between dietary cholesterol and CVD risk, research has not generally supported an association between the two. With evidence through observational studies examining this relationship, discrepant results are likely contributed to by residual confounding (Carson, et al. 2020). It is difficult to determine the effects of dietary cholesterol and the effects of dietary patterns containing high cholesterol or saturated fat, such as bacon with eggs. "Randomized controlled trials provide a means of examining the question in a controlled setting. A meta-analysis of 17 intervention trials that ranged from 4 to 12 weeks long reported an increase in total cholesterol, LDL cholesterol, and HDL cholesterol concentrations in the intervention group compared with the control group" (Carson, et al. 2020). A related issue regarding the study of dietary cholesterol is the influence of dietary fat type. In many intervention studies, the fatty acid composition, saturated, monounsaturated, and polyunsaturated fat was not matched or adjusted between diets. This can create difficulty when distinguishing between the independent effects of the dietary cholesterol and the type of dietary fat (Carson, et al. 2020).

In addition to the observational studies witnessed, two meta-analyses of studies with significant heterogeneity report that dietary cholesterol increased the participants' total and LDL cholesterol concentrations. "Our meta-regression analysis using data from controlled feeding studies in which the ratio of polyunsaturated fatty acid to saturated fatty acid in the comparison diets was matched indicated that dietary cholesterol significantly increased total cholesterol, but the findings were not significant for the stronger predictor of CVD risk, LDL cholesterol or HDL cholesterol concentration" (Carson, et al. 2020). With the context of food-based advice

challenging clinicians and consumers to apply, guidance is focused on promoting dietary patterns to improve diet quality and cardiovascular health, rather than giving a specific target for dietary cholesterol (Carson, et al. 2020).

Furthermore, looking at the article, 'Dietary cholesterol and cardiovascular disease: a systematic review and meta-analysis,' the authors' objective was to examine dietary cholesterol effects on CVD risk in healthy adults. After looking for prospective studies that quantified dietary cholesterol, forty studies were found published between 1979 and 2013. Research shows that dietary cholesterol is not statistically and significantly associated with coronary artery disease, ischemic stroke, or hemorrhagic stroke and did not drastically change serum triglycerides or very-low-density lipoprotein concentrations (Berger, et al. 2019).

The article, 'Dietary Cholesterol and the Lack of Evidence in Cardiovascular Disease' summarizes the current literature regarding intake of dietary cholesterol and risk for CVD. The article notes that most foods that are high in cholesterol are also rich in saturated fats, which may increase the risk of CVD due to the high saturated fat content (Soliman, 2018). With the American Heart Association recommending less than 7% of calories come from saturated fatty acids, "Fielding et al. found that an intervention with an intake of 600 mg cholesterol with a diet high in the saturated fatty acids led to increased LDL cholesterol much more than when cholesterol was administered with polyunsaturated fatty acids" (Soliman, 2018). As previously noted, several foods high in cholesterol are also high in saturated fats such as beef, butter, and naturally-made cheese. Increased saturated fatty acid intake can increase the risk for CVD (Soliman, 2018) With this current research, there is no support for dietary cholesterol increasing the risk for CVD in healthy individuals. However, the evidence does does support that saturated fats and trans fats increase the risk for heart disease (Soliman, 2018). Even though dietary

cholesterol can be considered a “nutrient of no concern,” a healthy diet should still consist of nutrient-dense and calorie-controlled meals with balanced nutrients spread throughout the day.

Legal Issues

An article by the American Heart Association states, “the federal government may soon be dropping its decades-old advice about eating too much cholesterol” (2017). The federal dietary guidelines are issued every five years with widespread effects. The American Heart Association and American College of Cardiology said there was not enough scientific evidence in the 2013 cholesterol guidelines to show that dietary cholesterol could lower LDL cholesterol in the blood. The AHA’s previous advice recommended limiting dietary cholesterol to 300 milligrams or less each day. “’We don’t have enough information to put a limit on cholesterol,’ said Eckel, a past president of the AHA and a professor of medicine at the University of Colorado School of Medicine. ‘That doesn’t mean we shouldn’t restrict it – it means we don’t have enough information to make a strong statement.’” (American Heart Association News, 2017).

According to Robert Eckel, who served as a co-chair on a panel who wrote the AHA/ACC lifestyle guidelines, “Within the past 18 mo, 2 sets of nutritional guidelines, the 2013 American College of Cardiology/American Heart Association Lifestyle Guideline for the Reduction of Cardiovascular Disease and the 2015 USDA Dietary Guidelines for Americans, have indicated that the evidence for dietary cholesterol restriction to lower total and LDL cholesterol is insufficient. In fact, the USDA guidelines state that ‘cholesterol is not considered a nutrient of concern for overconsumption’” (2015).

Religious Issues

Religious beliefs and norms often influence lifestyle and behavior choices among individuals. This article did not specifically talk about dietary cholesterol, but it mentions religious practices and cardiovascular disease risks. According to Benjamins, religious communities are often synonymous for certain South Asian groups. The social influences among religious groups usually encourage or discourage behaviors that influence cardiovascular disease. CVD outcomes are highly associated with alcohol intake and patterns which result in an underlying social-focused atmosphere (Hirode, et al. 2019). Knowing that different religious groups follow diet and nutrition patterns differently, this can help tailor targeted interventions for their patients (Hirode, et al. 2019).

Furthermore, religious groups with existing norms may potentially influence how religious members understand and practice health, disease etiology, and treatment strategies. "Religious salience, which represents a combination of personal religious beliefs, faith, and commitment, may also be associated with the use of cholesterol screenings" (Benjamins, 2005). With heart disease killing more Americans than any other disease, it costs the United States more than $300 billion dollars each year for health care expenditures and loss of productivity. Cholesterol screenings are an important measure of health risks with the potential to motivate patients to make changes as needs. Religious differences among individuals vary in cholesterol screening utilization levels among a large sample of older adults (Benjamins, 2005).

At this time, there is no current research regarding religious practices and issues and dietary cholesterol. There have, however, been studies conducted on religious associations and influences on cardiovascular disease risk Dietary cholesterol consumption and religion is an area that needs more scientific research to conclude a connection.

Cultural Issues

Although there are no cultural practices concerning dietary cholesterol, choosing a low-cholesterol or cholesterol-reducing diet may be an effective choice for certain health risk factors in specific cultures. Eating patterns such as the Mediterranean, TLC, and vegan provide important health benefits that help reduce cholesterol levels overall. This section will discuss the connection between race, ethnicity, and high cholesterol, as well as other risks that play a role in heart disease.

According to the CDC, Heart disease is the leading cause of death for people of most ethnic and racial groups in the United States. This includes African Americans, American Indians and Alaska Natives, and white people. Heart disease is second only to cancer for Asian Americans, Pacific Islanders, and Hispanics (2019). Some studies are suggesting that there is a connection between race and cholesterol levels, meaning that some ethnic groups may be more inclined to have higher cholesterol levels (Salamon, 2019). “Non-Hispanic white men have the least incidence of high LDL cholesterol at 29.4% while non-Hispanic black men have 30.7% and Mexican American men have the highest incidence at 38.8%. For women, the rates are nearly equal for non-Hispanic white and Mexican American women at 32% and 31.8%, while high LDL is higher in non-Hispanic black women at 33.6%” (Salamon, 2019). In addition to heart disease obesity is highly associated with elevated cholesterol levels, high blood pressure, and diabetes, with the strength of these connections varying by race, ethnicity, and gender (Salamon, 2019).

According the the American Heart Association News, about 20 percent of cardiovascular disease risk is genetic and the other 80 percent is either behavioral or environmental. Social determinants are superior in communities where socioeconomic adversity creates gaps and

cardiovascular mortality continues (2019). These social determinants in health highly influence a person's cardiovascular health factors, practices, and behaviors. Within a culture, this can be the ability or choice to exercise or not, having access to healthful eating, feeling safe in one's neighborhood, and individual and cultural stress factors (American Heart Association News, 2019). Knowing a patient's cultural background, habits, practices, and beliefs will highly influence the approach to counsel taken for that individual.

Ethical Issues

While there are no ethical considerations with dietary cholesterol specifically, there are some ethical considerations regarding cardiovascular disease prevention. Medical ethics focuses on principles with criteria including the actions that best interests the patients (beneficence), do no harm (primum non nocere), the right of the patients to choose or refuse their treatment (autonomy), fairness in distribution of health resources (justice), and truthfulness and honesty (informed consent). This section will discuss the benefits and ethical considerations of cholesterol reduction and cardiovascular prevention.

In secondary prevention, CV disease patients have benefits that prevent the further progression and improvement of long-term prognosis that are documented in several well-known trials for cholesterol reduction with statins, antihypertensive treatment, angiotensin converting enzyme (ACE) inhibitors and angiotensin receptor antagonists (ARB) in high risk patients, aspirin and blood glucose-lowering drugs. In secondary prevention trials, most drugs used were usually tolerated well and had no, minor, or only rare side effects, resulting in clearly positive benefit-risk ratios (Follath, 2009). Looking at primary prevention methods, the protective effects of primary prevention are less convincing that those of secondary prevention. This is because of the unlimited risk of CV complication is lower overall and more CV individuals have to be

treated for a longer period of time to avoid one event (Follath, 2009). “Cardiovascular prevention fulfils the fundamental requirements of medical ethics. In view of the well-documented benefits of drug treatments to prevent or at least retard the progression of CV diseases with low risks of adverse events, good adherence to guideline recommendations for secondary prevention is a professional ethical obligation. This is also usually true for primary prevention in individuals with high risk of CV diseases, because of the presence of several risk factors” (Follath, 2009). Above all, current and recommended options for nonprescription cholesterol-lowering drugs raise a number of ethical issues to the table, such as beneficence, nonmaleficence, justice, and autonomy. Cholesterol reduction in the United States must be a mainstay for any strategy to lessen the burden of cardiovascular disease (Pearson, 2004).

Economic Issues

There is a close relationship between economics and nutrition, but this relationship can run two different directions. Nutrition influences economics conditions – improved nutrition was a decision factor for improved health and successful economic development in the United States and Europe in the 19th and 20th centuries (Bitler, n.d.). Secondly, economic condition influence nutrition – Prices and incomes are leading factors of food choices, dietary quality, and household food security (Bitler, n.d.).

With most Americans failing to meet the federal dietary recommendations, this may be due to the costs of healthy eating. This can include food prices, food preparation and other time costs, transportation costs, psychological costs, cost to obtain nutrition information, and longer life expectancy costs (Anekwe, 2013). Specifically looking at heart-healthy dietary patterns and low dietary cholesterol, Mediterranean dietary patterns are associated with lowering the incidence of CVD and lowering mortality rates (Anekwe, 2013). This diet, however, can be

expensive. This article reviewed studies that found that middle- and upper-class consumers can achieve it (with no extra costs) by focusing on the lower-cost foods from the diet. This can include legumes, nuts, dried fruits, and canned fish. A study of the affordability of the Mediterranean diet underrepresented people of low socioeconomic statues, so no specific conclusions can be made from the findings (Anekwe, 2013).

Economists are assuming that consumers try to be rational and carefully compare the costs and benefits of a decision being acting. The price of healthy foods combines with other barriers such as money restraints, time limitations, and consumer preferences for unhealthy foods, which is typically foods with high saturated fat, trans fat, sodium and dietary cholesterol. On another note, healthy diets often require travel, shopping, preparation, and clean-up that can be a burden for consumers who have time limitations. Meanwhile, mostly-unhealthy fast food restaurants and convenience store are often nearby and readily available (Anekwe, 2013). Many consumers are drawn to unhealthy foods which is typically done for convenience purposes, knowing that many convenience foods are high in nutrients that should be limited. The food environment, such as large portions, fast-food advertising, and food deserts, are settings that increase costs of a healthful diet (Anekwe, 2013). Above all, perceived costs vary among individuals based on their financial, time, occupation, food preferences, among other factors. With most of these factors being limited or strict, many individuals choose convenience foods high in saturated fats, trans fats, sodium, and dietary cholesterol, which can lead to major chronic diseases later on in life.

Institutional Involvement

The American Heart Association, the Centers for Disease Control and Prevention, and the Academy of Nutrition and Dietetics are professional agencies and organizations that have addressed different issues regarding dietary cholesterol. The American Heart Association (AHA) has provided awareness to new guidelines about how cholesterol should be on everyone's radar, providing news about new federal guidelines lifting dietary cholesterol limits, how to control your cholesterol if needs, and how the environment, culture, and other social determinants play a role in a person's heart health.

The Centers for Disease Control and Prevention (CDC) has not provided information directly about dietary cholesterol, but information about how dietary cholesterol is theoretically connected to heart disease. Foods that have high saturated fat and trans fat often have high dietary cholesterol. Knowing the connection between high saturated fat intake and heart disease, this could influence someone to make a connection about dietary cholesterol and limiting its intake. The CDC also provides significant information about one's behaviors, genetics, race, ethnicity and other health conditions that places one at risk for heart disease. The CDC has also provided myths and facts about cholesterol in general to aid in public confusion.

The Academy of Nutrition and Dietetics (AND) is the place to research anything related to food and different effects it has on the body. AND provides all kinds of research, data, evidence, and position papers written and performed by registered dietitians. The Academy commends the evidenced-based Dietary Guidelines for Americans, which is designed to help Americans eat a healthier diet. AND has also funded studies resulting in dietary cholesterol being a "nutrient of no concern."

Policies and Impact

The institutions mentioned in the previous section have all made positive impacts to the connections found between dietary cholesterol and heart disease. The American Heart Association, the Centers for Disease Control and Prevention, and the Academy of Nutrition and Dietetics have all funded studies, completed research, and created positions on dietary cholesterol in eating patterns and its existence in different health conditions. With research and evidence provided by institutions like these, dietary cholesterol has officially been found to be a nutrient of no concern, as its connection to heart disease and other health conditions has been shown to be nonexistent. However, there needs to be more research done on the exact impact that dietary cholesterol has on the body. Even though there is no connection between dietary cholesterol and heart disease, is there negative impact it has on the body that we do not know about?

The Dietary Guidelines for Americans (DGA) are published every 5 years by nutrition scientists from the U.S. Department of Agriculture and the Department of Health and Human Services. Previously, Americans have been advised to limit their cholesterol intake in order to lower LDL cholesterol. Since then, the DGA has specifically recommended that dietary cholesterol be limited to no more than 300 milligrams each day. Currently, the 2015-2020 Dietary Guidelines for Americans state that dietary cholesterol is no longer a nutrient of concern (U.S. Department of Health and Human Services and U.S. Department of Agriculture, 2015). This statement came to most of the U.S. public as a surprise, with this information being long overdue. For over two decades, we have known that for the majority of the overwhelmed population, dietary cholesterol has virtually no impact on blood cholesterol levels. Many other

countries dropped their dietary cholesterol recommendations several years ago (U.S. Department of Health and Human Services and U.S. Department of Agriculture, 2015).

With confusion still being present on the concept that dietary cholesterol and dietary saturated fat are two entirely differently things, the 2015-2020 DGA is still recommending the limitation of saturated and trans fat in the diet (U.S. Department of Health and Human Services and U.S. Department of Agriculture, 2015).

Solutions to the Problem

With the research and data provided by credible institutions and organizations, I can confidently state that dietary cholesterol is a nutrient of no concern and does not need a recommendation for control. Research has found clear results that dietary cholesterol has no impact on blood cholesterol levels, therefore no impact on risk for heart disease. Since the U.S. Dietary Guidelines were created for dietary cholesterol, there have been a large number of longitudinal observational studies and intervention trials published on the relationship between dietary cholesterol intake and cardiovascular outcomes. Dietary cholesterol did not significantly or statistically change serum triglycerides or VLDL concentrations (Berger, 2019). Furthermore, according to Kanter et al., the current epidemiological evidence indicates that dietary cholesterol does not increase the risk of heart disease in healthy individuals (2012). “Clinical studies have shown that two thirds or more of the population do not have a considerable increase in plasma cholesterol, after a dietary cholesterol challenge for extended periods of time, whereas in those who do respond, both LDL-C and HDL-C increase, and therefore they maintain their LDL-C/HDL-C ratio” (Kanter, et al. 2012). With research and evidence like this, many countries have issued their own dietary guidelines without recommendations for dietary cholesterol. These are

accurate and valid points to support that dietary cholesterol is no longer a nutrient of concern does not need to be recommended for control (Kanter, et al. 2012).

Looking from a different point of view, advising a dietary cholesterol limitation for individuals with certain health conditions might be beneficial. Patients with diabetes or heart disease might profit from such limitations, as many foods that are high in dietary cholesterol are also high in saturated fat, trans fat, and sodium. Dietary guidance should focus on a healthy eating pattern such as the Mediterranean diet or the Dietary Approaches to Stop Hypertension (DASH) diet. These diets inherently help to lower cholesterol compared to levels similar to current dietary intakes here in the United States (Carson, et al. 2020).

Lessons Learned

By completing this research paper assignment, I have learned how to perform valuable library searches for my topic, how to organize the researched information into an organized, outline-format, and how to structure the layout with headings and subheadings to create a well-ordered paper. I also have learned how to organize information to construct a well-written research paper, using proper APA citations and references. By completing this research paper, I have learned valuable research and writing skills that I can use to further myself in the dietetics and nutrition field.

Conclusion

In closing, cholesterol is a waxy substance that is needed by the body to make cells. Even though the liver makes all of the cholesterol that the body needs, too much cholesterol floating in the blood can pose a problem. The amount of increased cholesterol in the blood can impact an individual's health risks, such as cardiovascular disease. Dietary cholesterol has been suggested to increase the risk of cardiovascular disease, which has led several US recommendations to

reduce cholesterol intake (Berger, et al. 2019). With this thought, there has been extensive research performed and published on dietary cholesterol and its impact on cardiovascular disease. Extensive research has shown no linkage between dietary cholesterol intake and its impact on blood cholesterol levels, therefore no relation to the risk of cardiovascular disease. The 2015-2020 Dietary Guidelines for Americans has concluded that dietary cholesterol is a nutrient of no concern at this time. With the valid and extensive research provided, I can confidently state that dietary cholesterol does not need a recommendation for control.

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