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Master’s in Advanced Studies in Health Informatics

BMI 593 Applied Project

**Relational Database for the Relationship of Disease and Nutrition**

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**Abstract**

Cardiovascular disease (CVD) and type 2 diabetes (T2D) are leading causes of morbidity and mortality worldwide, with diet playing a crucial role in disease prevention and management. The Mediterranean diet, characterized by high consumption of fruits, vegetables, whole grains, nuts, and healthy fats, has been extensively studied for its protective effects against these conditions. This paper reviews current nutrition research on the Mediterranean diet's impact on CVD and T2D, highlighting key differences between the Standard American Diet. The research showed clear benefits for both diseases, among many others. However, utilizing this information can be difficult for many patients who do not have the time or background to properly understand every dietary choice they make. Additionally, patients often have more than one condition or other dietary influences that must be considered.

An important goal of this review is to determine what the current evidence says about how the Mediterranean diet affects CVD and T2D. This was completed by reviewing several studies, both metanalyses and randomized control trials, discussing the diet for each disease. Once the information was gathered and organized, food was categorized based on their safety for each disease. This was done by taking foods from the Mediterranean diet and assigning a safety value based on the diet, as well as other general properties relevant to the diseases, such as sugar and saturated fat content. The research and table of rated foods suggest that the Mediterranean diet is suitable for both diseases, with a large overlap in safe food choices.

The next goal is to build upon this research and design a relational database to translate evidence-based medicine into evidence-based practice with a clinical tool for patients. This tool would utilize the database that categorizes foods based on their safety for individuals with CVD and T2D, resulting in the foundation for a health application that users could use to search for appropriate dietary options, helping to solve the challenge patients face in utilizing evidence-based medicine.

In addition, the applied project briefly discusses the implications of integrating this database within an electronic health record (EHR) and the benefits and challenges that would be presented. By integrating nutrition science with medical informatics, this system aims to bridge the gap between research and patient care, facilitating informed dietary choices and promoting long-term health outcomes.

**1. Background**

Around the world, cardiovascular disease (CVD) is one of the most common causes of death. According to the U.S. Centers for Disease Control and Prevention (CDC), it is the leading cause of death in the United States, accounting for about 1 in 5 deaths.1 This problem is not unique to the US. According to the World Heart Federation, the global CVD burden increased 24% from 2000 to 2019.2 The estimated age-standardized mortality per 100,000 people from CVD in the US is 157, while it is 126 in Italy.3

Type 2 diabetes (T2D) is another common disease with a large worldwide burden. The International Diabetes Federations estimates that approximately 537 million adults worldwide have diabetes.4 This number is expected to increase to 783 million by 2045, with a 24% increase in North America, compared to 13% in Europe.4 In the US, it is estimated that 14.7% of adults have diabetes, while in Italy it is estimated that 9.9% of the adult population has diabetes.5,6

From these brief statistics, we can see that Italy has a slightly smaller burden than the US related to both diseases. It is important to remember that these diseases are complex, and nutrition is not the only factor involved. Other factors include lifestyle habits, such as exercise and smoking, however, nutritional choices are certainly crucial and play an integral role in mitigating the risk of these illnesses.

The goal of this applied project is to focus on the nutritional factor and determine what the current evidence suggests is the healthiest dietary pattern for patients with CVD and T2D. Using this evidence, the project seeks to create a rating system that can be utilized to visualize which foods are appropriate for patients with each disease. Finally, the project hopes to utilize health information technology and health informatics by applying these ratings to a database that can be used to create a patient resource to assist in choosing appropriate foods for their conditions.

In this project, we are going to find out what dietary recommendations exist in the US and Italy, and how the population of these countries tend to eat. Then, we will review studies discussing the impact of the Mediterranean diet on CVD and T2D. The final step of the project is to design a database with the insights gained from the research, including discussion on how this can be adapted to a patient resource tool as an application, or even by linking it to an electronic health record (EHR).

**2. Evidence-Based Medicine in Dietary Choices for Patients with CVD and T2D**

**2.1 Introduction**

Cardiovascular disease and diabetes are two diseases that are extremely prevalent worldwide, with dire impacts on health and quality of life in every part of the globe. These two diseases are complex, and many factors play into developing these conditions. However, as with many complex diseases, nutrition is a key puzzle. The food that we eat plays a large role in our health, and cardiovascular disease and diabetes especially have strong ties to food. A healthy diet is a key component of the prevention of both illnesses, as well as the treatment of them.

A diet known to be beneficial for both CVD and T2D is the Mediterranean diet, which follows a pattern of food intake that is particularly beneficial when compared to that of the Standard American diet.7 Using evidence-based medicine, an analysis can be completed of this topic, and how regions that tend to follow these dietary patterns compare in rates of morbidity and mortality due to the illnesses. For this comparison, statistics from Italy were used as this is a country where the general dietary pattern follows the Mediterranean diet and is part of the region from which the diet is based.7

Considering the dietary impact, we can compare the dietary patterns of the US and Italy. In the US, MyPlate is a common educational tool to teach about good dietary choices. According to MyPlate, a healthy diet balances fruit, grains, vegetables, protein, and dairy products.8 It recommends that fruit and vegetables make up 50% of your plate, half of all grains are whole grains, and that the protein sources are varied.8 In Italy, there are several recommendations, including eating more fruits and vegetables, eating whole grains, limit the quantity of unhealthy fats, eat a variety of foods, and limit sugar intake.9 Between these recommendations, an important difference is that in Italy there is a stronger focus on entirely choosing whole grains. Also, in the US, it is recommended to eat a variety of protein sources, including lean beef, while Italian guidelines focus on a total reduction of red and processed meats.8,9

Dietary recommendations and actual dietary patterns do not always align. In the US, a study found that the diet most followed, the Standard American Diet, was far from following the recommendations.10 When compared to these recommendations, it was found that Americans eat much more refined grains, more meat, more added sugars, and less than half the daily recommended intake of fruits and vegetables.10 In Italy, dietary patterns tend to reflect diets more similar to the Mediterranean diet, although close adherence to this specific diet is not as common as it once was.11 However, the general dietary pattern is slightly closer to the recommendations than in the US.

**2.2 Nutritional Impact on Cardiovascular Disease (CVD)**

Cardiovascular disease remains the leading cause of death in the US, affecting all genders, races, and backgrounds.1 Diet is well documented to play a critical role in its prevention and progression. A healthy diet can protect against CVD, including coronary artery disease, heart attack, and other closely related illnesses, including stroke. It is known that a diet in whole grains, fruits, vegetables, and healthy fats is beneficial, while excessive intake of processed foods, sugars, and unhealthy fats is harmful.12 Understanding the impact of nutrition on cardiovascular health is essential for developing effective dietary strategies to reduce risk and promote long-term health. To learn about this impact, it is important to delve into what the evidence shows is best to help protect against CVD.

In a study from 2021, a group of researchers looked closely at the Mediterranean diet and how it affects many facets of health.7 They reviewed observational and intervention studies as well as public health impacts regarding human health and planetary health.7 While this study focused on several diseases, the first and foremost was that of CVD. The researchers discovered that through several studies, the Mediterranean diet was found to be very beneficial for protecting against CVD, including coronary heart disease and stroke. They reported that across various observational studies, adherence to the diet indicated reduced CVD risk by 29% in one study and 27% in another, while another study showed a 25% decrease in all-cause mortality.7 The article also analyzed interventional studies. One randomized controlled trial (RCT) showed decreased LDL and triglyceride levels when the Mediterranean diet was compared to other dietary interventions, while another study showed that 1 year on the diet was enough to reduce systolic and diastolic blood pressure.7

In 2022, Delgado et al. presented the results from an RCT that compare the Mediterranean diet and a low-fat diet in secondary prevention for patients with established coronary heart disease.13 The study was based in Cordoba, Spain. It included 1002 patients who were randomized into two groups, a low-fat diet group and a Mediterranean diet group, with a 7 year follow-up period.13 This study found that the Mediterranean diet was more beneficial in secondary prevention than the low-fat diet.13 Low-fat content is a common marker for foods healthy for patients with CVD, but fat in general is not the problem, but rather unhealthy fats like saturated and trans fats. In fact, despite some of the highest fat intake, farmers in Crete have some of the lowest cardiovascular mortality rates.14 These farmers, who are from a region significant to the origins of the Mediterranean diet, consume most of their dietary fat from olive oil, a source of monounsaturated and polyunsaturated fats, further supporting the notion that fat itself is not evil.

The studies supporting the Mediterranean diet do not end there. There are hundreds of other studies that support this diet as it relates to many diseases, not just CVD. In 2019, a meta-analysis of 29 articles found that the diet has a strong protective effect against the risk of CVD, including coronary heart disease and ischemic stroke.15 A recent study in 2023 had similar results. This study, another systematic review, chose 24 studies and found evidence that overall, high adherence to Mediterranean diet suggests a decrease in risk of heart attacks, stroke, CAD, and cardiovascular mortality.16 This study also discusses that the benefits are more prominent in men, a finding that the 2019 study noted as well.15,16 Although there is a greater benefit for men, the evidence did show a benefit for women nonetheless. The reason for the gender disparity is unclear, but its existence provides an opportunity for further research.

**2.3 Nutritional Impact on Type 2 Diabetes**

Another common disease worldwide is diabetes. Type 2 diabetes (T2D) is directly related to diet and lifestyle factors. This is an especially important illness to consider, not only because it has a large prevalence, but also because it is a risk factor for developing other conditions, including CVD. For these reasons, it is one that must be avoided as best as possible, and one way to do that is by eating an appropriate diet. This section will discuss the Mediterranean diet and how it impacts diabetes development and management.

The first study to be discussed is a 2020 meta-analysis that reviews studies including over 100,000 patients in total comparing the Mediterranean diet to other healthy diets, including the DASH diet, low-fat diets, and various vegetarian diets to compare the effect on T2D development.17 This study discusses the background of diabetes as well, including discussion on hemoglobin A1C levels and glycemic control. Overall, the evidence reveals that the Mediterranean diet provides significant protective benefits against T2D when compared to meat-based diets, including low fat diets. However, it does not provide significant benefits over other plant-based diets.17 This suggests that the Mediterranean diet is comparable to vegetarian and vegan diets in terms of protecting against T2D, giving patients a healthy diet option that does not entirely prohibit meat consumption.

In 2023, a study reviewing clinical studies from the prior 15 years was conducted with the goal of comparing various diets for diabetes management. This study revealed many benefits from various diets. For example, there was evidence suggesting that low-carb diets enhance glycemic regulation and help prevent insulin resistance, high-protein diets that maintain low fat intake positively affect satiety and body weight, and plant-based diets help with weight management and cardiometabolic health.18 However, the authors state that the Mediterranean diet appears to be the most well-recognized diet to have positive effects on obesity and T2D.18 All diets discussed are clearly beneficial as well, especially when compared to the Standard American Diet.

A plethora of other studies exist that reveal the Mediterranean diet is a protective diet against the development of T2D. A 2015 review of 13 studies suggested higher adherence to the diet led to a 49% increased probability of remission from metabolic syndrome, as well as providing benefits on body weight, total cholesterol, and HDL levels.19 In 2021, a study was published in which the researchers address studies from the prior 20 years and considered other aspects of the diet, including affordability. The study addresses concerns regarding the reliability of data on the topic, resulting in reassurance that the evidence truly does suggest that the Mediterranean diet is greatly beneficial for T2D management.20 The study also argues that the diet is relatively affordable, making it an accessible option for many people worldwide.20

**2.4 Foods of the Mediterranean Diet**

Between all these studies, there is a clear pattern showing that the Mediterranean diet, and similar plant-based diets, are beneficial for both illnesses in question. The primary focus of these diets is to increase the intake of whole foods, such as fruits, vegetables, legumes, nuts, and more, while decreasing intakes of processed foods, foods with added sugars, and red and processed meats.

Although these diets are shown to benefit health, people are often hesitant to follow these dietary patterns due to the common misconception that they lead to nutritional deficiencies if certain foods, especially meats, are not consumed. However, the key to the Mediterranean diet is that it is plant-based, meaning it most consists of plant-based foods, but not only those foods. Therefore, meat is not entirely excluded, but rather healthier meats are eaten less often. The components of vegan diets include a wide range of healthy foods, and lead to more favorable profiles of various nutrients, including fats and sodium, with the mean value of most nutrients remaining adequate when compared to diets containing meat.11 Therefore, if a vegan diet is sufficient, then the less restrictive Mediterranean diet is more than adequate.

Given the evidence supporting this diet for these illnesses, it is important to take a close look at what foods and food groups make up the diet. Doing so, we can recognize what foods people can eat as primary and secondary prevention for CVD and T2D, as well as many other illnesses. In the Mediterranean diet food pyramid from the Journal of Internal Medicine, seen in Figure 1, we can see the basics of the diet: the foundation is an abundance of a variety of whole grains, fruits, vegetables, nuts, and legumes, followed by intake of fish and poultry in low to moderate amounts, as well as moderate intake of dairy and eggs.7 At the top of the pyramid, sweets and refined foods with added sugar are **A pyramid of food and a diagram

AI-generated content may be incorrect.**alongside red meat, indicating these should be strictly limited.7

Figure 1. Foods of the Mediterranean Diet.7

The benefits of these food choices are abundant. These foods provide many important requirements for healthy eating, including highly complex carbohydrates, fiber, polyunsaturated fatty acids, and bioactive compounds with antioxidative properties.21 Complex carbohydrates and fiber are important for gut health and healthy microbiomes, while polyunsaturated fatty acids are much more nutritious than saturated fats, and these bioactive compounds are important for immune function. Additionally, the diet contains an excellent balance of micronutrients.21 Vitamins and minerals are extremely important for proper body functioning, and the foods of this diet are rich in these nutrients. These foods are generally low calorie, especially when compared to the Standard American Diet. Therefore, these nutrient-rich foods are beneficial in body functioning, while also helping with weight management.

Looking back at the idea of the pyramid, we can dive into the specific foods in each tier. The base tier emphasizes an abundance of: fruits; vegetables; whole grains, including brown rice, whole wheat bread, and whole grain pasta; potatoes; beans; nuts; seeds; and olive oil as the primary source of fat.7,14 The middle tier suggests limited intake of dairy products, including eggs and yogurt; fish; poultry; and wine.7,14 And finally, the most restrictive group is that of red meat, processed meat, and foods with added sugars.7,14 Due to the nature of alcohol and how it affects the body, it is generally not recommended for anyone, especially those with CVD and diabetes. In traditional regions of the dietary pattern, alcohol intake depends on the culture and regional preferences, and alcohol is usually not part of the diet.7 Interestingly, the modern take on the Mediterranean diet does allow for low to moderate red wine intake with meals.

Not only is it important to evaluate which foods are best, but it is just as valuable to consider which foods Americans typically eat that are especially unhealthy. The Standard American diet is characterized by high intake of unhealthy fats, refined grains, sugar, salt, and alcohol, while having insufficient intake of fruits and vegetables.21 A common component of this diet is refined carbohydrates, such as white bread and white flour, which have many nutrients stripped.21 Between 1970 and 2008, the average American’s intake increased 617 calories each day, with most of these calories coming from added fats and oils, added sweeteners, and cereal and flour products.22 It is important to note that honey is included in the list of sweeteners in question, but is generally acceptable in the Mediterranean diet. Honey is better than other sweeteners, like sugar and high fructose corn syrups, but intake should remain moderate, especially in patients with diabetes.

A screenshot of a screen

AI-generated content may be incorrect.There are two major sources of added caloric intake that are especially unhealthy. These are calories from fats and sugars, specifically added fats and sugars. While mono and polyunsaturated fats are considered healthy, saturated and trans fats are not. These bad fats are present in grain-based desserts; pizza; fried potatoes; and animal products such as cheese, yogurt, dairy desserts, red meat, and processed meat.22 Added sugars usually come from soda; fruit drinks like juice; dairy desserts; candy; and grain-based desserts like cakes, cookies, and pies.22 Sugar itself is not harmful, however in large quantities, like it tends to be in this list of foods, it is harmful. For this reason, the Mediterranean diet focuses on decreasing these foods while increasing fruit intake, which contains natural sugars and other important nutrients.

Table 1. Safety Rating System

If we rate foods based on this research, considering the safety of consumption for these two diseases, we can come up with a simple rating system. In this system, the ratings are defined as shown in Table 1. Using these rating guidelines, we can assign a number to each individual food, considering the recommended levels of the foods within the Mediterranean diet, as well as considering which foods are slightly less friendly for diabetes, those with a lot of sugars, and those which are slightly less optimal for CVD, those with high quantities of animal fats and salt. Once we have rated all the food, our spreadsheet will take the format seen in Table 2, but with a much more exhaustive list of food.

A screenshot of a medical survey

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Table 2. Sample Representation of Food Classification

Once many common foods are rated and added to the spreadsheet, we can begin comparing the various food types and how they rate on average, as well as comparing safety trends between illnesses. Creating a PivotTable allows us to view the category of food and average safety level for each disease, this PivotTable can be seen in Table 3.

A table with text on it

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Table 3. Category of Food with Average Safety Level

Each food of each category contributes to the overall average shown in the chart for each disease, giving an idea of whether that food is safe or unsafe. Additionally, there is a grand total column and row. The grand total column gives us a general idea on the safety level of a category of food when considering both diseases, while the grand total row lets us see the average rating of all foods for the two diseases. With a different grand total in the row, it suggests that one disease may require more dietary restrictions than the other. In this case, diabetes is slightly more limited with an average safety rating of 2.84 versus CVD’s rating of 2.98, likely due to the high sugar content of fruits and dairy substitutes. Finally, we can visualize the information from the table into a graph as seen in Figure 2.

Figure 2. Graphic Representation of Food Safety per Disease.

**2.5 EBM Conclusion**

The Mediterranean diet is a pattern of eating that primarily consists of plant-based whole foods, particularly fruits, vegetables, whole grains, beans, and nuts. It does include some non-plant-based foods, such as dairy products, poultry, fish, and very limited red meat intake. This diet has shown over years of research to be healthy and extremely beneficial for patients of various diseases, including two of the most common illnesses in the US, cardiovascular disease and diabetes. The research suggests that the diet is both protective against developing illnesses, as well as beneficial as a means of secondary prevention to manage them.

**3. Design of a Relational Database**

**3.1 Navigating Nutritional Decisions**

The evidence is clear that the Mediterranean diet is greatly beneficial to human health. This is especially true when compared to the Standard American Diet. The foods individually are healthy when consumed in reasonable amounts, and a variety of them are consumed together. However, this is a lot of general information that can be difficult for a patient to navigate. This leads to a lack of access to the specific details of this knowledge, leading to an opportunity for new patient resources. One way that this knowledge gap can be closed is by using appropriate education and tools for patients to use. These patient resources could come in many forms, but a promising option is that of an application that can determine what foods are safe for patients given their medical history.

The application would be a simple program that allows a patient to choose a food, and the program would return the safety rating of the food when cross referenced to the diseases a patient has. The result returned would be the one with the lowest rating between all the patient’s diseases. The most efficient way of achieving this would be to link the application to a patient portal within an EHR, automatically linking the patient’s health history. However, this would be a later step in the process and is beyond the scope of this paper. The process will include many steps prior to needing an EHR. Following the research, the first step is to create a database, followed by coding a basic program. The remainder of this paper will focus on database creation.

**3.2 Building a Database**

To create a resource for patients that can use their medical history and compare it to foods, a database will be needed to provide the application with the raw data and information from the research. Utilizing the Excel spreadsheet from before, we have raw data already, but a database will need to be built before we can import it for use. For this project, Microsoft Access will be used to create the database.

The first step is creating the tables we are going to be using. There will be four tables in this database: diseases, foods, safety\_ratings, and food\_safety\_ratings. Diseases is the first table and is a simple table consisting of a primary key, the disease\_id, which is an integer, and the disease\_name, a unique short text. The design view for the table is pictured in Figure 3. In Access, “AutoNumber” refers to integer and “Short Text” refers to varchar 255.

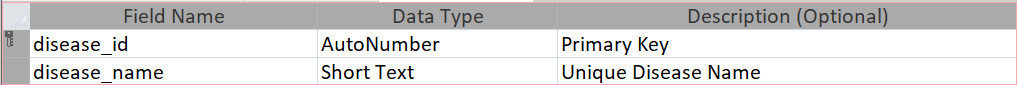


Figure 3. Design view of the diseases table.

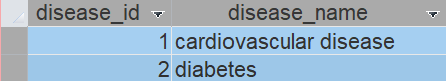


Table 4. Populated diseases table.

This table will be populated with diseases, in this case, we will use cardiovascular disease and diabetes. The populated table is pictured in Table 4. However, in the future we could add more diseases.

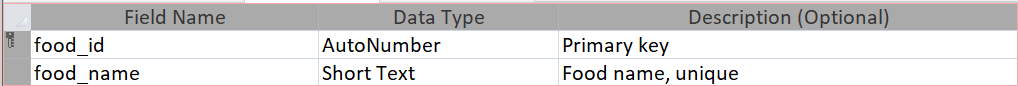
The next table is the foods table, which is like the disease table, but will consist of food\_id and food\_name. The design view is pictured in Figure 4.

Figure 4. Design view of the foods table.

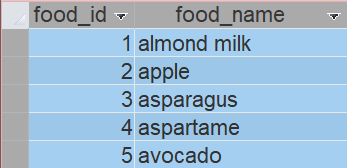


Table 5. Populated foods table.

This table will be populated the same way the diseases table was populated, using the foods from our Excel spreadsheet. The first five entries of the table are pictured in Table 5.

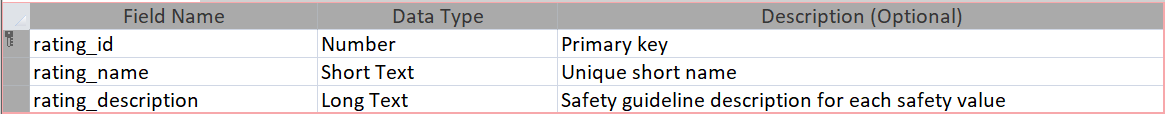
The third table is the safety\_ratings table. This table is slightly more complex, consisting of three fields. The fields are rating\_id, rating\_name, and rating\_description. The first field is simply a number from 1 to 4, correlating to our safety rating from the research section. This field is also the primary key. The second field is a short name for the rating, while the third field is a longer description with the relevant information to share to the patient. The design view and populated table are pictured in Figure 5 and Table 6.

Figure 5. Design view of the safety\_ratings table.

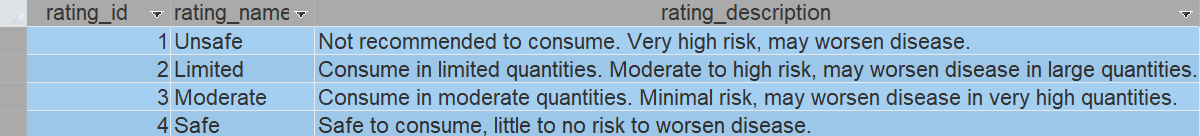


Table 6. Populated safety\_ratings table.

The final table is the food\_safety\_ratings table. This table will be the table with the information linked together, including the food, disease, and corresponding rating. In this case, the primary key is a composite primary key, utilizing both the food\_id and disease\_id, which are also the foreign key to the foods and diseases tables, respectively. The purpose of the composite key is to ensure that each food is rated only once per disease. This prevents duplicate records while also avoiding the requirement of an extra ID field within the table. The design view is pictured in Figure 6.

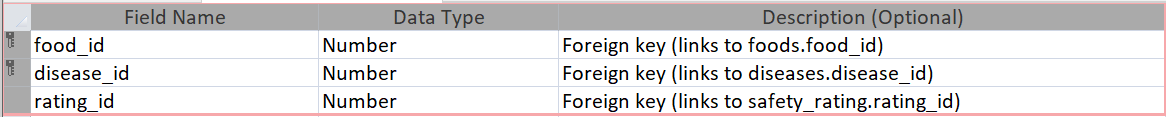


Figure 6. Design view of the food\_safety\_ratings table.

A screenshot of a computer

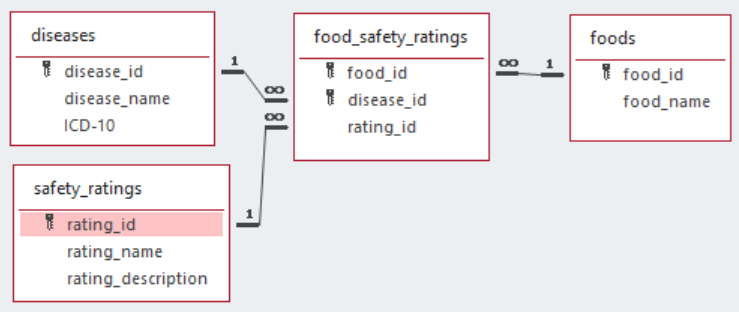
AI-generated content may be incorrect.To populate the food\_safety\_ratings table, we will first need to create the relationships between the previous tables. To create these relationships, we need to ensure that our keys match between the food\_safety\_ratings table and the other relevant tables. For example, the food\_id key will be related to the same field from the foods table. The same will be done for disease\_id and rating\_id. The Access relationship view can be seen in Figure 7. Once these relationships are created, data can begin being entered into the table. This table will have a simple appearance with seemingly little information, as the table will only show three numbers: the food id, disease id, and rating id. The first few entries can be seen in Table 7. Although this information does not appear useful, once we utilize queries, this table will become crucial.

Figure 7. Relationship schema of food\_safety\_ratings database table table.

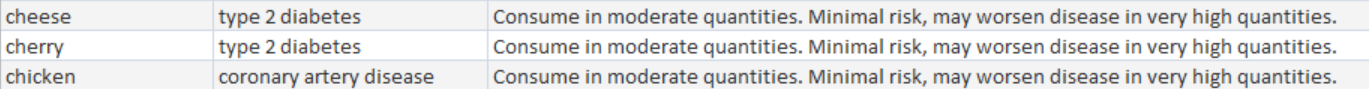
Table 7. Populated food\_safety\_ratings table.

Our first query will simply turn this information from the food\_safety\_ratings table into something more legible. To do so, we can write a query that turns the food id into the food name, the disease id into the disease name, and the rating id into the relevant description of the rating. This code follows:

SELECT foods.food\_name, diseases.disease\_name, safety\_ratings.rating\_description FROM safety\_ratings INNER JOIN (foods INNER JOIN (diseases INNER JOIN food\_safety\_ratings ON diseases.disease\_id = food\_safety\_ratings.disease\_id) ON foods.food\_id = food\_safety\_ratings.food\_id) ON safety\_ratings.rating\_id = food\_safety\_ratings.rating\_id;

The resulting table will be a large table that has the same format as the food\_safety\_ratings table, but with readable information instead of the corresponding ids. A small sample of the table can be seen in Table 8.

Table 8. Table resulting from first query.



The final function of the database comes from a critical WHERE clause that we add to this table. The clause will specify the food name and disease name and therefore return the information the user seeks. For example, if a patient with cardiovascular disease wants to know if they should be consuming whipped cream, the clause would read: WHERE diseases.disease\_name = ‘coronary artery disease’ AND food\_name = 'whipped cream'.

**4. Database Considerations & Next Steps**

This database is a rudimentary version of what could become a more complex database system, that can include more food and diseases and incorporate ontologies. The database could be accessed by a web application or mobile application that could employ this information as a simple search function for people to use. The application could ask a user for basic medical history and then the user could choose the foods they are interested in, and the program would return the relevant safety ratings given the medical history the user had input.

Another option for accessing the database requires interoperability with an EHR. This application could be developed using SMART on FHIR, allowing access to the medical history of the patient. Therefore, building the same system within the EHR permits a connection of these databases that could be a critical tool for patients to use as a resource in managing their health. Although this would be a much more complex application to build, it would provide copious opportunities for more in-depth analysis of a patient’s medical history to determine what food choices are best. Instead of having the user input a brief medical history, the application could pull that information directly from the patient’s medical record, requiring only that the patient select which foods they are interested in learning about. This would allow the program to consider not only what medical conditions a patient has, but also allergies, medications, dietary preferences, and more. To complete this successfully, there are other challenges that must be faced.

The considerations that must be addressed for EHR implementation of the application would relate to the structure and standards of the EHR, and how the program will be able to access this information while abiding by privacy laws. To properly interact with various EHRs, the database could be structured as a FHIR-compatible resource. This means the program would utilize HL7 FHIR, which is a standard for healthcare data exchange.23 So, for example, the API with the database would connect to the EHR using FHIR to select the information we want. Since it would be built using a standard, that data will be present within the EHR already. This will help us tailor the results from the search for the patient’s specific situation, considering all aspects of their medical condition.

FHIR includes several resources that standardize how specific types of healthcare data are structured and exchanged within an EHR. Key resources relevant to our implementation include NutritionOrder, NutritionIntake, Condition, AllergyIntolerance, and MedicationStatement.23 Our program would initially need to interact with the NutritionOrder, NutritionIntake, and Condition resources to function effectively. Expanding the program to account for allergies and medication interactions would require incorporating additional FHIR resources. Even further in the future, we could also integrate lab values using the Observation resource, enabling patients to make informed food choices based on their latest lab results.

**Conclusion**

The Mediterranean diet has consistently shown itself to be a diet that acts as a protective factor against many diseases, as well as a practical diet for managing illness. The diet is rich in nutrients, antioxidants, and has a strong balance of healthy fats, carbohydrates, and protein. At the same time, the diet has low levels of harmful foods that contribute to disease development, especially in the context of CVD and T2D. Furthermore, the development of a database designed to translate this research into a practical tool for patients represents a crucial step in bridging the gap between scientific knowledge and real-world application. This is a critical bridge that turns evidence-based medicine into evidence-based practice. By enabling individuals to search for safe and beneficial foods, this system has the potential to empower patients to make informed dietary choices that align with their health needs. While this database is just a foundation, it provides an opportunity for an application that could help patients make these informed decisions. There are several options for next steps, but integration within an EHR to tailor recommendations to the most current patient data from their health record would be ideal, and already existing standards for EHRs and patient data would make this feasible.

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