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The Mediterranean and Vietnamese diets: A Historical and Health comparison and a cross-cultural analysis of dietary practice among Vietnamese populations

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Abstract

In an era of increasing global interconnectivity, there has been a growing recognition of the relevance of understanding dietary practices among immigrant populations in promoting their overall health and well-being. The importance of diet and its impact on health has garnered considerable attention worldwide, particularly with the emergence of prominent diet trends in recent years. Among these trends, the Mediterranean diet has gained substantial recognition due to its documented health benefits and association with reduced risks of chronic diseases. Additionally, the Vietnamese diet, characterized by its reliance on plant-based foods, lean protein, and an abundance of herbs and spices influenced by Vietnamese culinary traditions, also deserves attention in this context. Therefore, investigating the dietary practices of Vietnamese populations and exploring the potential for adopting the Mediterranean diet among Vietnamese immigrants residing in diverse host cultures is an intriguing and relevant topic. Understanding how these populations adapt their dietary habits in new environments can provide valuable insights into the dynamics of cultural influences on food choices and facilitate the promotion of healthier eating habits among immigrant communities.

This thesis explores and compares the Mediterranean and Vietnamese diets, considering their historical context, health implications, and cross-cultural variations among Vietnamese populations. Using a mixed-method approach, both quantitative surveys and qualitative interviews were conducted to investigate dietary habits, food preferences, cultural influences, and challenges encountered by participants. The findings shed light on the strategies employed by participants to make the Mediterranean diet more accessible and appealing, such as blending Vietnamese and Mediterranean cuisines, altering macronutrient sources, and incorporating more nuts, fish, and fruits into their meals. The results also revealed differences in adaptation between Vietnamese participants living in Mediterranean and non-Mediterranean countries.

Keywords: *Mediterranean diet, Vietnamese diet, dietary habits, history, cultural influences, immigration populations, cross-cultural analysis*.

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Chapter 1. Introduction

1.1 Rationale of the study

In recent years, there has been a remarkable global trend towards healthy eating habits. People around the world have become increasingly conscious of the relationship between their diet and overall health (Singapore Accreditation Council, 2022). This heightened awareness has prompted individuals to seek out dietary patterns that offer both enjoyment and health benefits. As a result, several renowned healthy diets have gained popularity. The Mediterranean diet, known for its emphasis on fresh fruits, vegetables, whole grains, lean proteins, and olive oil, has emerged as one of the most influential and widely recommended diets for promoting heart health and overall well-being (Altomare, et al., 2013). This diet has gained considerable attention in recent years due to its numerous health benefits and its association with a reduced risk of chronic diseases (Moreno-Altamirano, et al., 2016). Similarly, the Vietnamese diet, characterized by its reliance on plant-based foods, lean proteins, and an abundance of herbs and spices, has gained recognition for its balance and nutritious qualities. These diets have captivated the attention of health-conscious individuals owing to their demonstrated positive effects on health and their correlation with decreased chances of chronic illnesses.

Despite originating from the Mediterranean regions, the adherence to the Mediterranean diet has extended far beyond its geographical boundaries (Castro-Quezada et al., 2014). This dietary pattern has garnered attention and interest from individuals across diverse cultures and continents. Numerous studies have examined the adherence to the Mediterranean diet in populations geographically distant from the Mediterranean areas, revealing varying degrees of adoption and modification (Altomare, et al., 2013). This phenomenon highlights the global appeal and adaptability of the Mediterranean diet, which has been embraced by individuals seeking to incorporate its health-promoting principles into their lifestyle. Understanding the factors that influence adherence to the Mediterranean diet in non-Mediterranean populations is crucial for assessing its potential effectiveness and feasibility as a dietary recommendation in diverse cultural contexts (Martínez-González et al., 2017).

Both the Mediterranean and Vietnamese diets have received a lot of attention for their possible health advantages, but a comprehensive comparative analysis of these two dietary patterns, including their historical context and health implications, remains limited. Therefore, this study aims to bridge the research gap by examing how Vietnamese immigrants in different host countries perceive the Mediterranean diet, how they have adapted it within their cultural contexts, and the challenges they encounter when trying to follow this dietary pattern. Understanding the experiences of Vietnamese populations with the Mediterranean diet can provide valuable insights into their unique cultural perspectives, preferences, and adaptations. Additionally, exploring the strategies employed by

Vietnamese immigrants to make the Mediterranean diet more accessible and appealing to their own culinary traditions will contribute to a deeper understanding of cross-cultural dietary practices.

1.2 Aim and objectives of the study

The primary aim of this study is to examine the dietary habits and adherence to the Mediterranean diet among Vietnamese populations residing in various regions of the world. To achieve the purpose of the study, the research is guided by the following objectives:

- To compare the Vietnamese and the Mediterranean diets, in terms of their history and health benefits.
- To evaluate the dietary habits and adherence to the Mediterranean diet among different Vietnamese populations using a quantitative research approach.
- To explore the attitudes and perspectives of Vietnamese immigrants towards healthy diets and their challenges in adopting the Mediterranean diet through qualitative research.
- To identify strategies and tips employed by some Vietnamese immigrants to make the Mediterranean diet more accessible and appealing in their daily lives.
- To compare and analyze the similarities and differences in dietary practices between Vietnamese immigrants residing in Mediterranean and non-Mediterranean countries.
- To provide insights and potential recommendations for promoting healthy dietary practices among Vietnamese populations, particularly in relation to the Mediterranean diet.

By addressing these objectives, this study aims to contribute to the existing body of knowledge on dietary patterns and cultural influences among different Vietnamese populations, as well as provide practical recommendations for improving health outcomes and promoting healthy eating habits within this specific context.

1.3 Research questions

In accordance with the stated aim and objectives of this study, the following questions are hoped to be answered:

- What are the dietary habits and levels of adherence to the Mediterranean diet among Vietnamese populations residing in different regions of the world?
- What are the attitudes and perspectives of Vietnamese immigrants towards healthy diets, specifically regarding the adopting of the Mediterranean diet?

- What challenges do Vietnamese immigrants face when trying to follow the Mediterranean diet in their host countries, and what strategies do they employ to overcome these challenges?
- How do the dietary practices of Vietnamese populations residing in Mediterranean countries compare to those residing in non-Mediterranean countries?
- What are the favorite Vietnamese Mediterranean dishes among the participants, and how do they perceive the nutritional aspects of these dishes?
- What insights and recommendations can be derived from the findings to promote healthy dietary practices among Vietnamese populations, particularly in relation to the Mediterranean diet?

1.4 Structure of the study

The thesis is organized into six main chapters to provide a comprehensive analysis of the research topic.

Chapter 1: Introduction

The first chapter provides an overview of the research topic, which consists of several sections namely: rationale of the study, aim and objectives of the study, research questions, and the organization of the study.

Chapter 2: Literature Review

This chapter provides a comprehensive review of the existing literature, focusing on dietary habits, cultural influences on food choices, and the Mediterranean diet. This part explores the history and health factors of both the Vietnamese and the Mediterranean diets, while also indicating the differences between these two dietary patterns. Moreover, the chapter examines the impact of acculturation on the dietary habits of Vietnamese immigrants and discusses the challenges and facilitators associated with adopting the Mediterranean diet.

Chapter 3: Methodology

The third chapter describes the research methodology employed in the study. It provides an overview of the quantitative survey conducted to assess dietary habits and adherence to the Mediterranean diet using the Mediterranean Diet Score System. Additionally, it outlines the qualitative approach involving semi-structured interviews to explore participants' perspectives, challenges, and strategies related to the Mediterranean diet.

Chapter 4: Results

In this chapter, the results and findings from the quantitative survey and qualitative interviews are presented. This chapter provides a detailed analysis of the participants' dietary habits, food preferences, adherence scores, and their perspectives on adopting the Mediterranean diet as Vietnamese immigrants. The results are organized and discussed based on themes and patterns identified in the data.

Chapter 5: Discussion

The fifth chapter focuses on the interpretation and discussion of the results. It explores the implications of the findings in the context of existing literature, identifies key themes, and discusses the cultural influences and challenges faced by Vietnamese immigrants in adopting the Mediterranean diet. This chapter also highlights the limitations of the study.

Chapter 6: Conclusion

The final chapter summarizes the main findings of the study, reiterates the research objectives, and addresses the research questions. It offers concluding remarks, discusses the practical implications of the study, and suggests avenues for future research.

Chapter 2. Literature review

2.1 Vietnamese Dietary pattern

2.1.1 Vietnamese dietary patterns through historical periods

The Vietnamese diet has altered and evolved throughout the history of the country, shaped by various cultural, political, and economic factors. Some notable periods in the history of the Vietnamese diet can be listed including Ancient Vietnam, Vietnam under Chinese rule, the French colonial period, the Post-colonial period, and Economic modernization.

In ancient times, the Vietnamese diet was heavily based on rice and freshwater fish, as well as wild game, vegetables, and fruits. In this period, indigenous Vietnamese people were able to sustain their life by hunting and harvesting plants in the River Valley. Thanks to agricultural advances, the ancient Vietnamese people started wet rice farming, leading to rice becoming the main staple for the people in the country. For the typical Vietnamese adult, the daily diet consists of three meals that primarily feature steamed rice as the staple food, accompanied by a variety of vegetarian or protein-based accompaniments such as vegetables, meat, or fish (Tu, 2001). Although rice is the primary source of carbohydrates and energy in Vietnam, refined white rice is considered nutritionally inadequate due to its lack of protein, fat, vitamins, fiber, and minerals. In terms of nutrition, the Vietnamese diet aims to balance the deficiencies of refined white rice by incorporating various local ingredients (Avieli, 2011). Protein is obtained from seafood and fish, while fiber, vitamins, and minerals are provided by a range of leafy greens, fresh fruits, and vegetables, as well as aromatic herbs such as mint, Thai basil, coriander, and so on. Fats are supplied by coconuts and nuts. Especially, aromatic herbs and raw greens are crucial components of traditional Vietnamese cuisine.

In the second century B.C., all of what is now known as Nam Viet was considered to be a Chinese province. The Vietnamese people lived under the rule of various Chinese dynasties for one thousand years and, although their relationship with the Chinese was often politically tense, they did adopt a by-product, which is called “noodles” (Ronald, 2022). The invention of noodles can be traced back to China during the East Han Dynasty and was originally made with millet (Vallery, 2022). The Vietnamese adapted and used noodle-making techniques, adding ingredients like wheat, rice, and eggs over time. While noodles were a popular addition to the Vietnamese diet, they were mainly a source of carbohydrates, lacking protein in other essential nutrients. Therefore, to balance the diet, Vietnamese people also incorporated fish and seafood as a source of protein, and leafy greens and aromatic herbs for fiber, vitamins, and minerals.

1887 to 1954 was the French colonial period in Vietnam. During this time, the Vietnamese diet was strongly influenced by French cuisine, with the introduction of exotic ingredients such as baguettes, butter, cheese, and wine. Vietnamese cuisine during this time period experienced the fusion of French and Vietnamese flavors and cooking methods, resulting in unique and creative dishes. The arrival and habitation of French people also increased the consumption of meat, including pork, beef, and poultry, in the Vietnamese diet. Overall, the French colonial period had a significant impact on the Vietnamese diet and helped to shape the cuisine into the rich and diverse culinary tradition that it is today.

Following the end of French colonial rule, or in other words the post-colonial period, the Vietnamese diet shifted back towards traditional foods. Vietnamese cuisine during this time period placed a greater emphasis on using fresh and seasonal ingredients, such as vegetables, fruits, and herbs. The post-colonial period also saw a reduction in the consumption of dairy products and meat, as the traditional Vietnamese diet focused on fresh ingredients and balanced flavors. In general, this period marked a return to traditional foods and cooking methods in Vietnamese cuisine and helped to establish the healthy and delicious culinary tradition that still thrives today.

The economic modernization period in Vietnam, which started from the year 1986, has brought considerable changes to the diet of Vietnamese people. There has been a shift towards a more Westernized diet, with increased consumption of processed foods, meat, and dairy products. The growth of the fast-food industry in Vietnam has escalated the availability and popularity of quick, convenient meals, such as instant noodles and packaged snacks. However, as a population undergoes a dietary transition, greater intake of saturated fat may serve as a contributing factor to the onset of chronic diseases, including but not limited to diabetes, obesity, and cardiovascular disease, all of which represent notable public health and nutritional challenges (Dien et al., 2004).

Overall, each historical period has had its own unique impact on the Vietnamese diet, but traditional foods and cooking methods continue to be highly valued and preserved in contemporary Vietnamese cuisine.

Regardless of the time, the importance of food nutrition is a persistent concern among the Vietnamese population. Vietnamese people hold the conviction that certain foods possess medicinal properties. Vietnamese adults, particularly the older generation, adhere to the yin/yang classification of food in Chinese philosophy, which categorizes food into yang or “hot” and yin or “cold. It is a commonly held belief among many Vietnamese individuals that disruptions in the body’s yin/yang balance can lead to illness (Tu, 2001). As such, they strive to maintain a harmonious balance through the consumption of yin or yang-classified foods.

2.1.2 The Vietnamese Food Pyramid

According to the Food and Agriculture Organization of the United Nation (FAO), The Vietnamese food pyramid is a three-dimension representation of the country's dietary guideline, consisting of seven layers arranged in a hierarchical order based on recommended levels of consumption. This pyramid reflects the country's traditional food culture and the latest scientific evidence on nutritional and health (Hop et al., 2011).

Figure 1. Vietnamese Food Pyramid

At the bottom of the pyramid are cereals and tubers, followed by vegetables, fruits, and protein rich foods. Fats and oils are also included, and sugar and salt are located at the top of the pyramid, indicating that they should be consumed in moderation (Food and Agriculture Organization of the United Nations, 2020)

The guidelines emphasize the importance of eating a balanced range of meals that include all four food groups, with a focus on protein-rich foods from both vegetable and animal sources. Shrimp, crab, fish, and beans/peas are recommended to increase the protein intake. Vegetable and animal fats/oils should be consumed in appropriate amounts, with sesame and peanut oils recommended (Hop et al., 2011). The recommendations also urge daily use of sufficient boiled water and emphasize the significance of food safety throughout food selection, processing, and preservation.

Last but not least, the guidelines recommend increasing physical activity, maintaining a healthy weight, abstaining from smoking, and limiting consumption of alcohol, soft drinks, and sugary foods (Food and Agriculture Organization of the United Nations, 2020).

2.2 The Mediterranean diet

2.2.1 History of the Mediterranean diet

The Mediterranean diet consumed by people in the Mediterranean area during the 1950s and 1960s, right after World War, is referred to as the traditional Mediterranean diet. It has a long history, dating back to the times of ancient Greece and Rome, and has evolved over the centuries in response to changing cultural, economic, and environmental factors. The Mediterranean diet is also viewed as a connection to food production where the source of the food, as well as its diversity, freshness, and seasonal availability, plays a crucial role (Centre international de hautes é tudes agronomiques mé diterrané ennes, 2012).

The Mediterranean diet has been shaped by the diverse cultures and cuisines of the regions, including Italy, Spain, Greece, Morocco, and others, and is characterized by a heavy reliance on fresh, whole foods, such as fruits and vegetables, whole grains, legumes, and nuts, as well as healthy fats like olive oil. Meat and dairy products are consumed in moderation, and seafood and fish are an important part of the diet. The use of herbs and spices, as well as moderate amounts of red wine, help to add flavor to the meals while also providing numerous health benefits.

The Mediterranean region has a rich and diverse history, marked by the influence of various cultures and civilizations over thousands of years. During ancient times, the Minoan and Mycenaean civilizations of Crete and Greece laid the foundation for a diet that emphasized plant-based foods, including olive oil, fruits, vegetables, and grains (Centre international de hautes é tudes agronomiques mé diterrané ennes, 2012).

In the Roman period, the Mediterranean diet evolved to include more fish and vegetables, as well as wine, cheese, and other dairy products (Altomare, et al., 2013). During the Middle Ages, some Mediterranean regions were ruled by various Muslim empires, which brought with them new spices, herbs, and culinary techniques, such as the use of tagines and other slow-cooking methods.

In the Renaissance, the Mediterranean diet was influenced by the arrival of new crops, such as tomatoes and potatoes, as well as by the spread of new cooking methods, such as sautéing and grilling. During this time, the diet also became more diverse, incorporating new ingredients from Africa and the Americas, such as peppers and chocolate. In the modern era, the Mediterranean diet has continued

to evolve but still focuses on whole, healthy foods and has links to lower rates of chronic diseases. Lorenzo Piroddi, a nutritionist, was the first to research the Mediterranean diet. His initial version of this diet called for fewer animal fats and more vegetable fats to be consumed (Leandro et al., 2016). Ancel Keys first introduced the Mediterranean Diet to the public by highlighting its distinctive traits and health benefits, as a result of his observation of a low incidence of coronary heart disease among those consuming the "good Mediterranean Diet" in Naples, Southern Italy (Altomare R et al., 2013). Between 1958 and 1964, Ancel Keys started the Seven Countries Study, which found a strong link between dietary practices and death from coronary heart disease and had a major impact on the belief that food can prevent chronic and fatal illness. As a result, healthy and balanced diets were incorporated into diet guidelines across the globe (Menotti et al., 1999). This research also led him to the conclusion that the Mediterranean diet was the best lifestyle as it is an optimal dietary pattern for promoting longevity and improved health outcomes, leading to its widespread recognition and popularity globally.

2.2.2 The Mediterranean diet pyramid

The Mediterranean diet dietary pattern, known for its health benefits, has been widely disseminated through the use of a pyramid representation, which effectively illustrates the recommended frequency of food consumption (Centre international de hautes é tudes agronomiques mé diterrané ennes, 2012). The inaugural illustration of the traditional Mediterranean diet in the form of a pyramid was presented at the International Conference on Mediterranean Diets, hosted by the Harvard School of Public Health in Boston in 1993. Then, in the following year, it was officially protected by the Oldways Preservation & Exchange Trust through a copyright (Willett, 2006). In 2008, the Oldways Preservation & Exchange Trust updated the Mediterranean Diet Pyramid at the 15th Anniversary Mediterranean Diet Symposium in Cambridge, Massachusetts, and secured its copyright. The updated version was published by the Trust in 2009 (Centre international de hautes é tudes agronomiques mé diterrané ennes, 2012).

The most recent Mediterranean diet pyramid incorporates both the health benefits and disease prevention capabilities of the Mediterranean diet, as well as contemporary lifestyle and environmental factors, based on the latest scientific evidence (Centre international de hautes é tudes agronomiques mé diterrané ennes, 2012).

Figure 2. Mediterranean Diet Pyramid

According to the Mediterranean diet pyramid, different food groups are assigned to each layer of the pyramid based on their recommended consumption frequency and quantity.

- At the base of the pyramid is the category of "Plenty", which includes whole grains, legumes, vegetables, and fruits. These foods are the foundation of the Mediterranean diet and should be consumed daily in large quantities.
- Above the base, the next layer is the category of "Moderate", which includes cheese, yogurt, poultry, eggs, and fish. These foods should be consumed in moderate amounts, about 2 to 4 servings per week.
- At the next level, there is a category of "Occasional": red meat, processed meat, sweets, and saturated fats. These foods should be consumed sparingly and only on special occasions.
- Olive oil is prominently featured in the center of the pyramid due to its status as the primary source of dietary lipids in the Mediterranean diet. The high nutritional quality and health benefits of olive oil have been documented by research. Additionally, oleic acid is the primary fatty acid found in adipose tissue, where it serves as an antioxidant (Berry, 1997).
- Moreover, plant-based foods should be the foundation of this dietary pattern as they are rich in essential nutrients and health-promoting compounds. The use of herbs, spices, onions, and garlic adds flavor to the diet and helps to reduce the consumption of salt (Altomare, et al., 2013).

The Mediterranean diet Pyramid also suggests drinking wine in the context of meals and in moderation, defined as up to one glass per day for women and up to two glasses per day for men. The recommendation to consume wine in moderation recognizes its potential health benefits, such as reducing the risk of heart disease, but also acknowledges the potential risks associated with excessive alcohol consumption. In addition to moderate wine consumption, the pyramid highlights the importance of physical activity, socializing during meals, and overall promoting a healthy lifestyle.

2.3 Health factors of the Vietnamese diet

The Vietnamese diet has been recognized for its potential health benefits, which are attributed to its traditional food choices and preparation methods (Tu, 2001). The traditional Vietnamese diet is largely plant-based, with an emphasis on fresh vegetables, fruits, and herbs. These foods are high in vitamins, minerals, and antioxidants, all of which are essential for good health and illness prevention.

2.3.1 Rice - The main staple food

According to the Vietnam Household Living Standard Survey (VHLSS), rice (plain, specialty, and sticky), maize, and cassava are dominant sources of plant-based calorie supply in the country. These three crops accounted for over 70% of the harvested area according to VHLSS 2016 statistics (Kim, et al., 2021). The most widely grown crop in Vietnam is rice, which is also the most highly consumed item, with an average consumption of almost 300g per person per day (Kim, et al., 2021). Additionally, it is the only staple crop that is commonly eaten by nearly all households. Rice provides a source of complex carbohydrates and fiber, which can help regulate blood sugar levels and promote feelings of fullness. Moreover, rice is a low-fat and low-sodium food, which can help to prevent chronic diseases such as heart disease, high blood pressure, and stroke. This staple food is also a food source of B vitamins, such as thiamin and niacin, which are important for energy production and maintaining a healthy nervous system.

2.3.2 Spices and herbs

Other plant-based foods such as vegetables, fresh herbs, and spices are also an important part of the Vietnamese diet and contribute to its overall healthiness. These foods are typically low in calories and fat, but high in fiber, vitamins, minerals, and antioxidants, which can help to prevent chronic diseases. Additionally, the emphasis on using herbs and spices adds flavor to Vietnamese dishes without adding salt or sugar, which can also contribute to a healthy diet. Herbs and spices are often used in Vietnamese cuisine not only for their flavor but also for their potential medicinal properties. Traditional Vietnamese medicine incorporates many herbs and spices into its treatments, and many

are believed to have health benefits such as boosting the immune system, improving digestion, and reducing inflammation (Nguyen, et al., 2022). Since ancient times, natural products have been employed to discover anti-inflammatory agents. Celsius (in 30 A.D.) described inflammation as having four typical signs, namely redness, heat, pain, and swelling, and he used the extracts from willow leaves to relieve these symptoms (Nguyen, et al., 2022). Vietnamese cuisine contains a wide range of herbs and spices with medicinal properties such as coriander, Vietnamese mint, Lemongrass, perilla, garlic chives, and mustard leaves, among others. The synergistic combination of these herbs with various spices, chilies, and aromatics, including ginger, galangal, and turmeric, yields a powerful phytochemical blend (Leonov, 2014). In fact, the Vietnamese people have a lengthy history of utilizing different types of medicinal plants in the form of decoctions, medicinal liquor, and tea (Anh et al., 2021). Historically, ginger, lime, lemongrass, and kumquat, which are commonly used spices, have been utilized to alleviate cough, cold, sore throats, and stomachaches (Anh et al., 2021). It is quite common in Vietnamese cuisine to pair hot and spicy dipping sauces with dishes that are perceived as "cooling", such as seafood, in order to create a balance of flavors and sensation. For example, Vietnamese people have a very delicious and interesting dish called "boiled snail" that is often accompanied by a dipping sauce made from fish sauce, lime, chili, garlic, ginger, lemongrass, and some other ingredients, creating a dish with a balance of sweet, sour, salty, and spicy flavors. This dish was created thanks to the philosophy of yin and yang balance in Vietnamese cuisine since the snail is cold so it needs a hot sauce to go with it. Not only creating a balance of yin yang in cuisine, extracts from ginger, lemongrass, and kumquat have also been proven to have antimicrobial and antioxidant properties (Anh et al., 2021).

2.3.3 Lean and plant-based protein sources

The Vietnamese diet is commonly considered healthy and nutritious due to its incorporation of various lean protein sources, such as fish, poultry, and plant-based proteins, which provide essential amino acids and help maintain muscle mass. Around 23% of all households in Vietnam produce the most frequently made animal-sourced foods (ASFs), which include chicken, poultry eggs, various types of duck meat (including Muscovy), goose meat, and shrimp (Kim, et al., 2021). These animal foods source are also among the most commonly consumed, with pork, chicken, fish, and shrimp being the top choice (Kim, et al., 2021). In terms of nutrient contribution, eggs, pork, and shrimp are the highest sources of calories among animal-source foods. Poultry eggs, in particular, are responsible for over 85% of the total vitamin A supply (Kim, et al., 2021). The Vietnamese diet also includes tofu, which is a protein source derived from plants. Tofu, which has its roots in China, is produced by condensing soy milk and subsequently pressing it into compact white blocks, resembling the technique used in the production of cheese. Tofu is considered a healthy food due to its high protein

content and low levels of saturated fat. It is also a good source of iron and calcium and is often fortified with vitamins such as B12. Tofu also provides all of the important amino acids your body needs, as well as a variety of minerals and vitamins such as calcium, manganese, iron, and vitamin A. For a significant period of time, epidemiologists have observed that individuals from Asian populations who regularly consume soy-based foods experience a lower frequency of cardiovascular disease in comparison to individuals who follow a standard Western diet (Erdman, 2000). It is also believed that the primary reason for tofu's health benefits is due to the presence of isoflavones, which are present in all soy-based foods including tofu (Petre, 2022). Isoflavones are a type of phytoestrogen, a plant-based compound that has been found to have a range of health benefits, including reducing the risk of heart disease, certain cancers, and osteoporosis. A meta-analysis conducted in 1995 comprising 38 controlled clinical studies showed that when soy protein is used to replace animal protein in the diet, it results in a significant reduction in levels of total cholesterols, LDL cholesterol, and triglycerides while having no impact on HDL cholesterol (Erdman, 2000).

2.3.4 Green tea

Green tea is a prevalent beverage in the Vietnamese diet that is frequently consumed alongside meals throughout the day. Its significant antioxidant content has contributed to its reputation as a beneficial dietary component believed to offer a range of health benefits. The positive effects of green tea are mostly credited to its polyphenol, specifically flavanols and flavonols, which make up about 30% of the dry weight of fresh tea leaves (Chacko, et al., 2010). The majority of health-promoting benefits of green tea were linked to its most prevalent catechin, (-)-epigallocatechin-3-gallate (EGCG) (Chacko, et al., 2010). Catechins are a type of flavonoid, a natural plant compound that is found in high concentrations in green tea. Consuming catechins from tea in the long term may have advantages against obesity and type II diabetes induced by a high-fat diet and could help decrease the chances of developing coronary heart disease (Chacko, et al., 2010). Studies by Weinreb et al., (2004) and Pan et al., (2003) also suggested that the immune system can be fortified through the antioxidant and radical-protective actions of green tea. Additionally, GTPs have been identified as potentially protective against neurodegenerative diseases like Alzheimer's and Parkinson's disease. Green tea has also been found to have carbohydrate metabolism. To be more specific, the polyphenols in green tea, particularly EGCG, may help to regulate blood sugar levels and improve insulin sensitivity (Potenza, et al., 2007). This could potentially make green tea a useful dietary supplement for people with type II diabetes or those at risk of developing the condition. Moreover, according to data from human studies, green tea and its extracts have shown promising results in reducing body weight, primarily body fat, in humans by boosting post-meal thermogenesis and enhancing the oxidation of fat thanks to the presence of catechins and caffeine (Chacko, et al., 2010). Additionally, green tea

consumption can improve insulin sensitivity and glucose tolerance, which can help prevent obesity and related metabolic disorders. However, more research is needed to confirm the optimal dosage and duration of green tea consumption for these aforementioned effects.

2.4 Health Factors of the Mediterranean diet

2.4.1 Complex Carbohydrates

The Mediterranean diet is rich in complex carbohydrates, which are found in various plant-based foods such as cereals, fruits, vegetables, and legumes. Cereals that the Mediterranean populations mostly consume include wheat, barley, rice, corn, and spelt. Whole grains, as defined by the Whole Grains Council, contain bran, germ, and endosperm, and provide a wide range of essential nutrients, including vitamins, dietary fiber, and bioactive compounds. They are a fundamental source of macronutrients in the human diet, supplying complex carbohydrates in the form of starch, which can be broken down into glucose to provide energy to the body. Cereals belong to the first group in the Mediterranean diet pyramid and must be consumed on a daily basis and in several servings. Based on current epidemiological evidence, the consumption of whole grains has been linked to various health benefits, including a significant reduction in the risk of cardiovascular heart disease, diabetes, and cancer (Leandro et al., 2016). Moreover, whole grains also contribute to weight management and promote digestive health thanks to the high level of dietary fiber. Consuming a significant amount of dietary fiber from whole grains, which contain phytoestrogens such as lignans and isoflavones, may reduce the risk of developing various types of cancer, particularly those affecting the digestive system (Augimeri & Bonofiglio, 2021). The Mediterranean diet encourages the consumption of more whole foods, including whole grains, as they have a lower glycemic index compared to their refined counterparts. This is due to the fact that whole foods contains more dietary fiber, which slows down the digestion and absorption of carbohydrates and results in a more gradual release of glucose into the bloodstream. Aune et al. (2011) indicated that due to its high content of insoluble fiber, consumption of whole wheat as part of a balanced diet is associated with a decreased risk of coronary heart disease, stroke, cancer, and type II diabetes mellitus (Aune, 2011). Additionally, whole wheat intake may help to lower overall mortality rates (Capurso, 2021). Besides cereals, the Mediterranean diet also emphasized the consumption of fruits and vegetables since they have a low energy density and contain a significant amount of water, fiber, vitamins, and minerals. Consumption of dietary fiber from fruits and vegetables promotes gastric distension, leading to increased satiety and reduced consumption of other calorie-dense food types. In the Mediterranean diet, consuming seasonal and local fruits and vegetables is also highlighted since fresh and local products offer peak freshness,

flavor, and nutritional value, as they are harvested at the optimal time. This ensures that individuals can obtain the full range of nutrients that fruits and vegetables have to offer, such as vitamins, minerals, and antioxidants. Another important element in the "plenty" group of the Mediterranean diet is legumes, which include beans, chickpeas, lentils, and among others. They are a good source of plant-based protein, fiber, vitamins, and minerals, and have been associated with a reduced risk of various chronic diseases, including heart disease, diabetes, and certain cancers. Legumes are often used as a substitute for meat in Mediterranean cuisine and are consumed in a variety of ways, including soup, stew, salads, and side dishes. Legumes possess the potential to regulate the glycemic index response of the body to the meal.

2.4.2 Olive oil - a wonderful source of monounsaturated fatty acids

Olive oil is a key component of the Mediterranean diet and is associated with numerous health benefits. It is rich in monounsaturated fatty acids (MUFAs) which help reduce the risk of cardiovascular disease. Olive oil is composed mostly of oleic acid, which constitutes 70-86% of its fatty acid profile (Leandro et al., 2016). The content of the monounsaturated fatty acid, oleic acid (C18:1 n-9), in olive oil is significantly higher (ranging between 55-83%) compared to other fatty acids, such as linoleic, palmitic, or stearic acids, which range between 3% and 21% (Schwingshackl & Hoffmann, 2014). As a result, it is considered a beneficial condiment for managing serum concentrations of very low-density lipoproteins that are rich in LDL cholesterol. These lipoproteins have a tendency to accumulate in the bloodstream and form deposits in arterial walls. Olive oil also contains polyphenols which have antioxidant properties and may help to reduce inflammation and improve endothelial function. Extra virgin olive oil (EVOO) has been suggested to have chemo-preventive effects due to its polyphenolic content, which includes hydroxytyrosol, tyrosol, oleuropein, and oleocanthal. These compounds possess antioxidant and antiproliferative properties, which may contribute to the health benefits of the Mediterranean diet (Servili, et al., 2014). The European Food Safety Authority (EFSA) issue a statement in 2011 that recognized the potential health benefits of polyphenols found in olive oil. The claim suggested that these compounds may help protect blood lipids from oxidative stress (Mazzocchi et al., 2019). In addition, olive oil has been linked to a lower risk of type II diabetes and certain cancers and has been shown to have a beneficial effect on bone health. According to the PREDIMED study, there is clear evidence that EVOO consumption may help prevent major cardiovascular events and type 2 diabetes mellitus. In this study involving persons at high cardiovascular risk, the incidence of major cardiovascular events was lower among those assigned to a Mediterranean diet +EVOO or nuts groups than among persons assigned to a reduced-fat diet; furthermore, glucose metabolism improved and body weight decreased in 80 cases of new-onset diabetes allocated to the Mediterranean diet +EVOO group (Mazzocchi et al.,

2019). In the PREDIMED study, participants in the Mediterranean diet +EVOO group were instructed to consume at least four tablespoons of EVOO per day (Estruch, et al., 2018). It is important to note that the amount of EVOO consumed can vary depending on individual dietary needs and preferences. It is recommended to consume EVOO in moderation as it is still a source of calories and fat. Overall, incorporating olive oil, especially EVOO, as the primary source of fat in the diet is considered an important factor in the health benefits of the Mediterranean diet.

2.4.3 Wine

The consumption of wine, particularly red wine, is a notable aspect of the Mediterranean diet due to its potential health benefits. Wine contains antioxidant compounds, such as resveratrol and quercetin, which can protect cellular protein, lipids, and nucleic acids from damage caused by free radicals (Leandro et al., 2016). This may play a role in reducing the risk of chronic diseases, such as cardiovascular disease and cancer. The composition of wine is made up of various elements such as water, ethanol, glycerol, polysaccharide, acids, and volatile compounds (Minzer et al., 2020). The percentage of these compounds varies, with water being the most abundant. Wine contains a complex mixture of compounds that are present in low concentrations but have been found to play an important role in wine quality and protection against non-communicable diseases (NCDs). Wine contains a wide range of phenolic compounds, also known as polyphenols, which are responsible for the unique color, flavor, and aroma of the wine. The primary polyphenols present in wine are anthocyanins, resveratrol, catechins, and tannins (including, proanthocyanidins and ellagitannins) (Minzer et al., 2020). These compounds are present in small quantities, ranging from 2000 to 6000 mg/L in red wines (Yoo et al., 2010). Moreover, polyphenols possess antioxidant and anti-inflammatory properties and may have a positive impact on cardiovascular health, including the risk of coronary heart disease and stroke (Chiva-Blanch & Badimon, 2017). Studies by Amor et al. (2018) and Duan et al. (2021) have suggested that wine polyphenols may have anti-cancer properties and could potentially reduce the risk of certain cancers, such as breast, colon, and prostate cancer. Furthermore, wine polyphenols may have neuroprotective effects, potentially reducing age-related cognitive decline and neurodegenerative diseases such as Alzheimer's and Parkinson's, according to Chiva-Blanch & Badimon (2017) However, it is important to note that excessive alcohol consumption can have detrimental effects on health, and any potential health benefits of wine consumption should be balanced with moderation. The World Health Organization (WHO) highlights the significant role played by the amount and pattern of alcohol consumption in determining the impact on health. In particular, the WHO emphasizes the importance of understanding the patterns of alcohol consumption in order to identify the associated health risks. This includes not only the total amount of alcohol consumed, but also the frequency of drinking, the duration of the habit, and the circumstances of the

consumption, such as whether it is consumed with meals or on an empty stomach. The definition of what constitutes moderate alcohol consumption can vary depending on the country and region (Minzer et al., 2020). Additionally, the amount of alcohol content in a drink can also vary. According to the American Dietary Guidelines Advisory Committee, the moderate alcohol intakes as a daily amount consumed is no more than 10 grams of ethanol (or one drink) for women and no more than 20 grams of ethanol (or two drinks) for men who are of legal drinking age.

2.5 Main differences between the Vietnamese diet and the Mediterranean diet

The exact makeup of a dish and its preparation techniques can vary greatly between Vietnam and the Mediterranean region. Such variations may lead to different health benefits between the two diets.

2.5.1 Macronutrient ratios

Compared to the Vietnamese diet which is generally high in carbohydrates and low in fat, the Mediterranean diet places more emphasis on healthy fats, specifically monounsaturated fats found in olive oil, nuts, and seeds, and omega-3 fatty acids present in fish and seafood. A study by Schwingshack and Hoffmann conducted in 2014 found that the typical fat intake in the Mediterranean diet ranged from 30% to 40% of total calories (Schwingshackl & Hoffmann, 2014). To be more specific, the utilization of olive oil as the primary fat source, with predominantly monounsaturated fatty acids, is a fundamental and widespread characteristic of all forms of the Mediterranean diet (Mazzocchi et al., 2019). In contrast, the Vietnamese diet may include a wider variety of fats, including vegetable oils, coconut milk, and fish sauce, but fat intake may be lower overall, ranging from 15% to 30% of total calories. The Vietnamese Recommended Dietary Allowances (VRDA) 2007 also suggest that Carbohydrates should account for 61% to 70% of total calorie intake, while fat should not exceed 25% of total energy intake. According to a report by the Food and Agriculture Organization of the United Nations (FAO), about 70% of the dietary energy intake at the national level in Vietnam is derived from Carbohydrates, while approximately 17% and 13% of energy come from fats and protein, respectively (Kim, et al., 2021). These values align with the recommendations for a “balanced diet” by the WHO and FAO, which recommend that carbohydrates, fat, and protein should be consumed in the proportion of 55-75%, 15-30%, and 10-15% of total energy intake, respectively (Kim, et al., 2021).

2.5.2 Sources of Vitamins and Minerals

The Vietnamese and Mediterranean diets differ in their sources of vitamins and minerals. According to the Vietnamese National Institute of Nutrition, the Vietnamese diet, in general, is characterized by

high consumption of fruits and vegetables, which are rich sources of vitamins and minerals such as vitamin A, vitamin C, folate, iron, and calcium. Plain rice is a staple food in almost every Vietnamese meal and serves as the primary source of riboflavin, niacin, iron, and calcium from own-produced and consumed food (Kim, et al., 2021). Additionally, eggs are a common food source for Vietnamese people and contribute significantly to the availability of vitamin A and fat (Kim, et al., 2021). Tubers, such as sweet potato, cassava, and taro, are commonly consumed by Vietnamese people, especially the older generations. They are good sources of carbohydrates and provide various vitamins and minerals, such as vitamin C, potassium, β-carotene, and magnesium (Chandrasekara & Josheph Kumar, 2016). In Vietnamese cuisine, tubers are often used in stew, soups, and porridge. The Mediterranean diet, in contrast, promotes a diverse range of nutrient-rich foods, such as whole grains, fresh fruits, vegetables, cereals, legumes, nuts, virgin olive oil, and fish, which are excellent sources of essential vitamins and minerals, such as vitamin E, Vitamin K, omega-3, B vitamins, magnesium, potassium, and zinc. For example, green leafy vegetables like spinach and kale are abundant in vitamin K, while nuts and seeds are high in vitamin E and magnesium. Moreover, seafood and shellfish are excellent sources of selenium and zinc. However, certain nutrients such as vitamin D and vitamin B12 may be lacking in the Mediterranean diet as they are mainly obtained from animal-based foods (Castro-Quezada et al., 2014).

2.5.3 Antioxidants

Both the Vietnamese and Mediterranean diets contain a plethora of antioxidant-rich foods, but they differ in their specific sources. The Vietnamese diet is particularly high in polyphenols, which are found in green tea, coffee, and herbs like ginger and turmeric. Additionally, Vietnamese cuisine commonly includes a variety of tropical fruits such as dragon fruit, mango, papaya, and guava, which are also good sources of antioxidants such as vitamin C and carotenoids. Lim et al. (2007) discovered that guava, papaya, and star fruit exhibit higher primary antioxidant potential compared to oranges, as determined by scavenging DPPH and iron (III) reducing assays (Ellong et al., 2015). The Mediterranean diet, on the other hand, includes more antioxidants from fruits, vegetables, olive oil, and wine. For instance, the consumption of olive oil and red wine in the Mediterranean diet has been associated with high levels of polyphenols, which have been linked to a reduced risk of chronic diseases such as cardiovascular disease and cancer (Del Rio, et al., 2013).

2.5.4 Cooking methods

The Vietnamese and Mediterranean diets differ not only in the types of food consumed but also in cooking methods. On one hand, the Vietnamese diet involves a lot of stir-frying, boiling, grilling, and stewing, while the Mediterranean diet features more raw and baked foods. These different cooking

methods may have an impact on the nutrient content of the food. For example, stir-frying may result in some loss of water-soluble vitamins, such as vitamin C, while boiling and grilling may cause some loss of nutrients, such as minerals and vitamins, due to leaching into the cooking water or denaturation. Yuan et al. (2009) investigated the impact of various cooking methods on health-promoting compounds of broccoli and found that all cooking treatments except for steaming resulted in substantial declines in chlorophyll and vitamin C content, as well as significant reductions in total soluble proteins and soluble sugars. The Mediterranean diet, on the other hand, prioritizes the consumption of raw foods which could potentially maintain the nutritional value of the food. Furthermore, the use of healthy oil, such as olive oil, in Mediterranean cuisine may aid the absorption of fat-soluble vitamins and phytochemicals. While both Vietnamese and Mediterranean cuisines use marinating as a common cooking technique, the main difference lies in the ingredients used in the marinade. In Vietnamese cuisine, the marinade is often made with fish sauce, lots of herbs and spices, and other seasonings. While this enhances the flavor of the dish, it may also lead to excessive sodium intake, which in turn can have negative health effects. In Mediterranean cuisine, the marinade typically consists of olive oil, lemon juice, and fewer herbs. The use of olive oil and lemon juice in Mediterranean marinades provides a healthier alternative to the use of high-sodium sauces in Vietnamese cuisine. Additionally, cooking meat using high temperatures methods such as grilling and frying can result in the production of carcinogenic heterocyclic aromatic amines (Hoffman & Gerber, 2013). However it has been shown that marinades containing extra virgin olive oil, onions, garlic, herbs, or red wine can hinder the formation of heterocyclic aromatic amines, thanks to their high antioxidant capacity (Hoffman & Gerber, 2013).

2.6 Acculturation and dietary habits of Vietnamese immigrants

Acculturation is the process by which immigrants and their descendants adopt the cultural norms and practices of the host society (Berry, 1997). One area where this process is particularly evident is in dietary habits, as food is a key cultural marker and a means by which people maintain a connection to their heritage. Studies have shown that Vietnamese immigrants tend to experience a significant shift in dietary habits as they acculturate to the host culture. This shift is often characterized by a decrease in the consumption of traditional Vietnamese foods, such as rice, vegetables, and seafood, and an increase in the consumption of Western foods, such as meat, dairy, and processed foods (Tran D et at., 2015). In the study “Dietary acculturation and interest in modification of staple foods: a preliminary qualitative with rice”, Thuy Xuan Uyen and Chambers (2020) explored the acculturation process and dietary habits among Vietnamese immigrants in the United States, with a focus on their consumption of rice (Thuy Xuan Uyen & Chambers, 2020). The authors found that Vietnamese

immigrants often have a strong attachment to rice as a staple food and that their dietary habits surrounding rice may be slow to change even as they adopt other aspects of American culture. They also noted that some Vietnamese immigrants may consume fewer vegetables in the United States due to their higher cost and lower availability compared to rice, which may be more accessible and affordable. According to Holmboe-Ottesen and Wandel (2012), South Asian immigrants in Europe tend to adopt more Western dietary habits which can include an increased consumption of meat, dairy, and processed foods, and a decreased consumption of traditional foods such as grains, legumes, and vegetables. These changes in dietary patterns may increase the risk of chronic diseases, such as obesity, Type II diabetes, and cardiovascular disease, which are more prevalent in Western countries. (Holmboe-Ottesen & Wandel, 2012).

2.7 Challenges and facilitators associated with the adoption and adherence to the Mediterranean diet of Vietnamese immigrants

Despite the evidence of its health advantages, the Mediterranean diet may pose difficulties for individuals residing outside the Mediterranean region. This includes Vietnamese immigrants, who may face various factors that hinder their adoption and adherence to this dietary pattern. Factors that affect the adoption and adherence to the Mediterranean diet can be classified into different categories such as cognitive, financial, motivational, socio-cultural, accessibility and availability, sensory and hedonic, lifestyle, and demographic (Tsofliou et al., 2022).

One of the first obstacles that Vietnamese people frequently encounter when attempting to follow the Mediterranean diet is the lack of familiarity with the ingredients as well as Mediterranean food literacy. Food literacy refers to the knowledge and skills needed to plan, purchase, prepare, and enjoy healthy foods (Vidgen & Gallegos, 2014). Without adequate food literacy of Mediterranean cuisine, Vietnamese people in general and Vietnamese immigrants, in particular, may find it challenging to adopt and adhere to the Mediterranean diet. Therefore enhancing food literacy is a key facilitator for increasing the acceptance and adoption of the Mediterranean diet among Vietnamese people.

Moreover, Vietnamese people, especially those who do not reside in the Mediterranean region, may find it more difficult to follow this diet due to the availability and expense of Mediterranean foods and products. Many people have reported that they find it hard to eat healthily because of the lack of availability and accessibility of healthy food, but some foods that are typical of the Mediterranean diet may have particular issues (Tsofliou et al., 2022). According to López et al. (2009), following the Mediterranean diet closely required more expenses than following other dietary patterns closely. Hence, the challenge that Vietnamese immigrants may face when trying to follow the Mediterranean

diet is that they may not be able to find or afford some of the foods and ingredients that are typical of this diet. For example, they may have limited access to fresh or diverse fruits and vegetables, seafood, olive oil, nuts, seeds, or whole grains that are part of the Mediterranean diet (Martínez-González et al., 2017). They may also have to pay more for these foods compared to their native or local foods. These factors may make it harder or less appealing for them to adopt the Mediterranean diet, as they may increase their food budget or shopping time.

The adoption of the Mediterranean diet among Vietnamese immigrants may be influenced by several social and cultural factors. These include the level of acculturation or integration into the host country's culture and food environment, as well as the attachment to or preference for their traditional Vietnamese cuisine and foods (Tsofliou et al., 2022). The food choices and habits of Vietnamese immigrants may also be affected by the influence of their family, friends, peers, or community. However, Vietnamese immigrants may perceive the Mediterranean diet as more or less compatible with their cultural values, beliefs, norms, or practices. Another factor that may affect the adoption of the Mediterranean diet is the availability and accessibility of culturally appropriate or familiar foods and ingredients that are part of this dietary pattern (Woodside, Young, & McKinley, 2022). Furthermore, Vietnamese immigrants may need to acquire or improve their knowledge in skills to prepare and consume Mediterranean foods and dishes. Finally, the taste, palatability, and satisfaction derived from Mediterranean foods and dishes may also play a role in the adoption of this diet (Woodside, Young, & McKinley, 2022).

Chapter 3. Methodology

3.1 The context of the study

The Mediterranean diet has been widely recognized as a healthy dietary pattern that can prevent chronic disease and promote longevity (Capurso, 2021). However, little is known about how Vietnamese immigrants, who have a different culture, history, and culinary background, perceive and adopt this diet in their host countries. Therefore, the setting of the study was the exploration of the dietary habits of Vietnamese populations living in different parts of the world, with a particular focus on their adherence to the Mediterranean diet. The study consists of two parts, a quantitative survey and a qualitative interview, which aim to provide a comprehensive understanding of the dietary practices, challenges, and strategies of Vietnamese immigrants in adopting a healthy diet.

The first part of the study was quantitative research involving an online dietary habit survey with sixty-seven participants from various regions of the world. The main objective of this survey was to evaluate the dietary habits of Vietnamese populations and their adherence to the Mediterranean diet using the Mediterranean Diet Score (MDS) (Stewart, et al., 2016). The survey aimed to provide quantitative data to identify trends and patterns in their dietary practices of different Vietnamese populations and to determine the extent to which they adhere to the Mediterranean diet.

The second section of the study employs a qualitative research approach that includes semi-structured interviews with six Vietnamese immigrants. These six volunteers were chosen from among sixty-seven responders to the dietary habit survey, with three from Italy and three from non-Mediterranean countries. The main purpose of the interviews was to access the participant's attitudes towards healthy diets, the problems they confront as Vietnamese immigrants following the Mediterranean diet, and their strategies and ideas for making the Mediterranean diet more accessible and appealing. The interviews aimed to provide rich qualitative data to complement and deepen the findings from the quantitative survey.

3.2 Research design

3.2.1 Quantitative research

In the dietary habit survey, participants were asked to report their weekly consumption of the following food categories:

- whole grains (wheat flour, brown rice, corn, oats, …)
- vegetables (excluding potatoes)

- legumes (beans, peas, peanuts, chickpeas, …)
- fruits (fresh or dried)
- fish (fresh-water and ocean fish, including dried and canned fish)
- meat/poultry (beef, pork, lamb, chicken, …)
- refined milled grains (white flour, white rice, pasta, noodles,…)
- deep fried food
- sweetened drinks
- dessert/sweet snacks (cake, cookies, pie, chocolate, …)
- dairy products (mild, butter, yogurt, cheese, …)
- eggs
- tofu/soybean curd (textured vegetable protein, soya milk, …)
- tea (green, black, herbal, …)
- fermented drinks (kombucha, ginger beer, kefir, …)

Possible answers for each food category were: never or rarely; once a week; several times a week; 1-2 servings/day; 3 or more servings/day. Participants were also asked how many glasses of alcohol they consumed during a typical week. MDS was defined assigning scores from 0 to 4 for increased consumption of whole grains, vegetables, legumes, fruits and fish (0=lowest consumption, to 4=highest consumption), and for decreased consumption of meat (0=highest consumption, to 4=lowest consumption); for alcohol, 0 points were assigned to participants consuming no alcohol or having >6 drinks at one time at least once/week, 4 points for mild alcohol consumption (≤7 drinks/week for women or ≤14 drinks/week for men), and 2 for a moderate alcohol consumption (>7 drinks/week for women or >14 drinks/week for men) (Stewart, et al., 2016). Overall, MDS can range from 0 to 28, with higher scores indicating higher adherence to the Mediterranean diet. Three classes of adherence to the Mediterranean diet can be defined considering MDS: ≤12 (low adherence), 13-14 (moderate adherence), ≥15 (high adherence) (Stewart, et al., 2016).

Participants were also asked to report their favorite sources of fat, carbohydrates, and protein, and their favorite drinks and herbs/spices. For fat, participants were asked to select their current most used option from a list including sunflower oil, olive oil, canola oil, butter, lard, and other. For carbohydrates, they were asked to choose up to three favorites from options such as rice (brown or white), pasta, white bread, sourdough bread, whole wheat bread, potatoes, beans and lentils, barley, couscous, faro, and other. In the protein category, participants were asked to select up to three favorite sources from options such as red meat, poultry, fish, eggs, tofu, beans and lentils, chickpeas, and nuts and seeds. When it comes to drinks, participants were asked to choose up to three from options such

as soft drinks, water, pure tea, coffee, beer, fermented drinks, wine, milk, juice, and milk tea. Finally, participants were asked about the herbs and spices they frequently used in their kitchen, with options including black pepper, garlic, basil, bay leaves, oregano, thyme, rosemary, parsley, coriander, cumin, clove, sage, lemongrass, star anise, ginger, curry, paprika, turmeric, cinnamon, chili pepper, and dill. Finally, participants were asked if they think that their palate alters as living environment changes, their diet alters as their living environment changes, and if they were satisfied with their diet. It should be noted that the questionnaire items were associated with a five-point Likert scale (1: strongly disagree/strongly dissatisfied; 2: disagree/dissatisfied; 3: neutral; 4: agree/satisfied; 5: strongly agree/strongly satisfied) (Corallo, Latino, Menegoli, & Spennato, 2019).

3.2.2 Qualitative research

The study employed a semi-structured interview method to gather information from six selected participants. The interview comprised seven questions, with the first six being obligatory and the seventh being optional. The interview questions were designed to explore the dietary practices of participants, including their preferred Vietnamese or Mediterranean dishes or both of them, the obstacles associated with adhering to the Mediterranean diet as a Vietnamese immigrant, tactics to enhance the accessibility of the Mediterranean diet, the effects of adopting the Mediterranean diet on their health, and their interactions with healthcare professionals regarding their dietary patterns.

3.3 Sampling

3.3.1 Quantitative research

Considering Daniel's formula and a study by Naing et al., (2006) (Daniel, 1999) (Naing, 2006), setting precision d=0.07 (for preliminary study), and hypothesizing a potential prevalence of adherence to the Mediterranean diet in Vietnam between 10 and 15% (Stewart, et al., 2016), we estimated that a sample size of 70 participants will allow to estimate the prevalence rate of moderate/high adherence to the Mediterranean diet among Vietnamese individuals (living in Vietnam or abroad).

A convenience sample was enrolled through email and targeted social media outreach on relevant Instagram and Facebook groups. The recruitment strategy took into account the demographics of the groups' members and aimed to reach people of Vietnamese origin living in different countries around the world. Being Vietnamese was the only eligibility criteria for the survey. Recruitment posts were shared with a brief introduction in Vietnamese and in groups of Vietnamese community. The online survey link was also provided in the posts. They survey was open to those who met the inclusion

criteria. To verify that the participants were Vietnamese, screening questions were asked about their place of birth, ethnicity, and language. Participation was voluntary, and all responses were kept confidential.

3.3.2 Qualitative research

Six participants for the semi-structured interview, three from Italy, and one each from the US, UK, and Germany, were chosen from the 67 respondents who completed the dietary habits survey. These participants were selected based on their willingness to participate in the interview, their interest in the Mediterranean Diet, and their country of residence. The selected participants were then contacted by email and explained the purpose of the study and the interview process. The participants who agreed to participate signed a consent form and schedule a date and time for the interview.

Table 1. Profile summary of the 6 participants

Participant ID	Age	Gender	Country of living	Occupation
1	23	Female	Italy	Student
2	28	Female	Italy	Student
3	80	Male	Italy	Retired
4	28	Female	UK	Full-time employed
5	28	Female	Germany	Full-time employed
6	29	Male	US	Full-time employed

The interviews were conducted separately via videoconferencing software such as Zoom and Google Meet to accommodate the participants' schedules and preferences. The interviews lasted between 30 and 45 minutes and were recorded for later analysis.

3.4 Data analysis

3.4.1 Quantitative data analysis

Participants' characteristics are presented as counts and percentages for categorical variables. Comparisons between groups defined according to living area (Vietnamese living in Vietnam, in Mediterranean country or in other countries) or to MDS dichotomized into low vs moderate/high adherence, ≤12 vs ≥13, were performed considering the Chi-squared or the Fisher exact tests for categorical variables.

All statistical tests were two-tailed and statistical significance was assumed for p-value <0.05. The analyses were performed using SAS, V.9.4 (SAS Institute, Cary, NC).

3.4.2 Qualitative data analysis

Data were collected through semi-structured interviews, which were conducted in English. As some participants spoke in Vietnamese during the interviews, their responses were translated into English for transcription purposes. The verbal data were transcribed using a conventional transcription approach. The transcriptions were then reviewed and coded using thematic analysis. Thematic analysis was used to identify patterns in the data and categorize the responses into themes that were relevant to the research questions. This involved a systematic and iterative process of data familiarization, generating initial codes, searching for themes, reviewing themes, and defining and naming themes.

3.5 Ethical considerations

To ensure ethical considerations were met, the study followed strict guideline to protect the rights and privacy of the participants. Informed consent was obtained from all participants prior to their inclusion in the study. The participants were informed about the purpose, procedures, and potential risks of the study, and they were given the option to withdraw at any time without penalty. During the interviews, that participants were reminded that their participation was voluntary and that their responses would be kept confidential. To protect their anonymity, pseudonyms were assigned to each participant, and all audio recordings and transcribed material were stored securely and only accessed by the author of this study.

Chapter 4. Results

4.1 Quantitative results

Sixty-seven individuals were interviewed: 26 lived in Vietnam at the time of the interview, 21 in Mediterranean area countries (Italy and France) and 20 in other countries (including Australia, Korea, Singapore, Taiwan, United States, United Kingdom, Poland, and Germany; **Figure 3**). About a quarter of the respondents were under 25 years, 60% were between 25 and 34, and 18% were 35 or older; participants living in Vietnam were younger than those living in Mediterranean or in other countries (≤24 years, 35% vs 10% and 20%, respectively; p=0.033; **Table 2**). Over 60% of the respondents were females, with no significant differences in females' proportion according to the country of residence. The majority of the sample residing in Vietnam at the time of the interview was composed of students (69%) and only 27% were workers; the individuals resident in the Mediterranean countries or in other countries, instead, were mainly workers (86% and 60%, respectively), while less were students (10% and 35%, respectively) (p<0.001).

Figure 3. Number of respondents by country

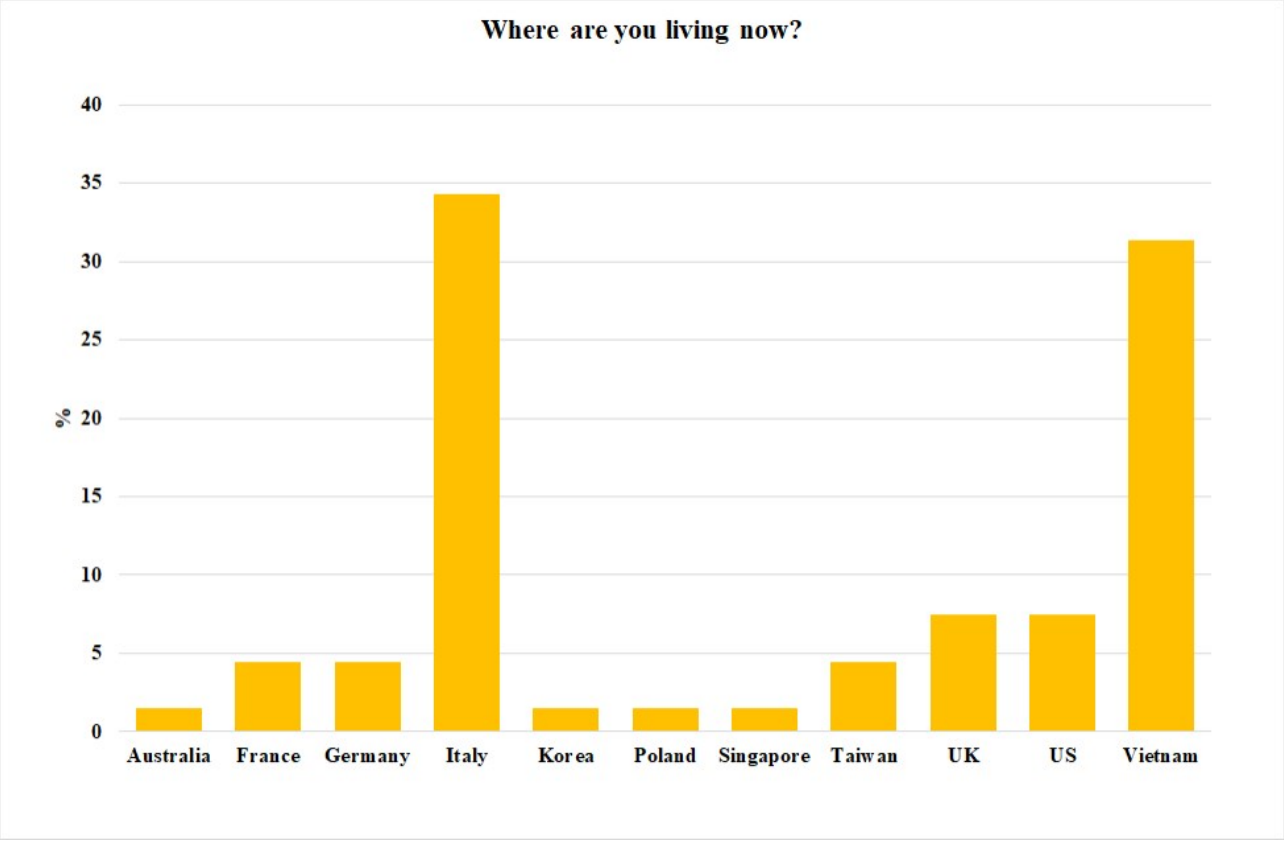


Table 2. General characteristics of respondents

	Total sample (n=67)	Participants living in Vietnam (n=26)	Participants living in Mediterranean countries (n=21)	Participants living in other countries (n=20)	p-value
Age range, n (%)					0.033
≤24 years	15 (22.4)	9 (34.6)	2 (9.5)	4 (20.0)	
25-34 years	40 (59.7)	15 (57.7)	11 (52.4)	14 (70.0)	
35-44 years	8 (11.9)	1 (3.9)	5 (23.8)	2 (10.0)	
≥45 years	4 (6.0)	1 (3.9)	3 (14.3)	0 (0.0)	
Sex, females, n (%)	43 (64.2)	17 (65.4)	15 (71.4)	11 (55.0)	0.541
Main occupation, n (%)					<0.001
Unemployed	1 (1.5)	0 (0.0)	0 (0.0)	0 (0.0)	
Student	27 (40.3)	18 (69.2)	2 (9.5)	7 (35.0)	
Worker	37 (55.2)	7 (26.9)	18 (85.7)	12 (60.0)	
Retired	2 (3.0)	1 (3.9)	1 (4.8)	0 (0.0)	

Answers to food frequency questionnaire, overall and by country of residence, are presented in **Table 3**. One or more serving/day of vegetables was reported by 60% of the participants, for fruits by 42%, for refined/milled grains by 40%, for whole grains and dairy products by 19%, for legumes by 15%, for eggs by 10%, for dessert/sweet snacks by 9%, for meat/poultry by 8%, for fried foods or tofu/soybean curd by 3%, and for fish by 2% of the study participants. In relation to drinks, one or more serving/day of tea was reported by 13% of respondents, sweetened drinks by 6% and fermented drinks by less than 2% of the participants. No significant differences for food frequency were found in relation to the country of residence at the time of the interview ($p>0.05$); a borderline significance was found only for sweetened drinks, more consumed by Vietnamese individuals living in the Mediterranean countries (daily consumption 19%, vs 0% among those living in Vietnam and 10% among those living in other countries; $p=0.066$). The consumption of alcohol was very low in the whole sample, and only 25% of the respondents declared a moderate use of alcohol, with no significant differences by country of residence. More than 83% of the respondents drinks alcohol only in special events, and this percentage is higher among participants living in Mediterranean countries

or in other countries, with respect to those living in Vietnam (91% and 95% vs 69%, p=0.062). The use of spice and herbs when cooking is very frequent, and almost 40% of the respondents used them often or very often.

Table 3. Answers to food frequency questionnaire

	Total sample (n=67)	Participants living in Vietnam (n=26)	Participants living in Mediterranean countries (n=21)	Participants living in other countries (n=20)	p-value
How many times a week do you consume: (n, %)					
Whole grains (wheat flour, brown rice, corn, oats, …)					0.269
Never or rarely	19 (28.4)	10 (38.5)	6 (28.6)	3 (15.0)	
Once or several times a week*	35 (52.2)	11 (42.3)	13 (61.9)	11 (55.0)	
≥1 serving/day	13 (19.4)	5 (19.2)	2 (9.5)	6 (30.0)	
Vegetables (excluding potatoes)					0.498
Never or rarely	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	
Once or several times a week*	27 (40.3)	11 (42.3)	10 (47.6)	6 (30.0)	
≥1 serving/day	40 (59.7)	15 (57.7)	11 (52.4)	14 (70.0)	
Legumes					0.395
Never or rarely	16 (23.9)	7 (26.9)	3 (14.3)	6 (30.0)	
Once or several times a week*	41 (61.2)	13 (50.0)	16 (76.2)	12 (60.0)	
≥1 serving/day	10 (14.9)	6 (23.1)	2 (9.5)	2 (10.0)	
Fruits					0.330
Never or rarely	1 (1.5)	1 (3.9)	0 (0.0)	0 (0.0)	
Once or several times a week*	38 (56.7)	13 (50.0)	15 (71.4)	10 (50.0)	
≥1 serving/day	28 (41.8)	12 (46.2)	6 (28.6)	10 (50.0)	

	Total sample (n=67)	Participants living in Vietnam (n=26)	Participants living in Mediterranean countries (n=21)	Participants living in other countries (n=20)	p-value
Fish (fresh-water and ocean fish, including dried and canned fish)					0.954
Never or rarely	7 (10.5)	3 (11.5)	2 (9.5)	2 (10.0)	
Once or several times a week*	59 (88.1)	23 (88.5)	18 (85.7)	18 (90.0)	
≥1 serving/day	1 (1.5)	0 (0.0)	1 (4.8)	0 (0.0)	
Meat/poultry (beef, pork, lamb, chicken,…)					0.495
Never or rarely	25 (37.3)	7 (26.9)	8 (38.1)	10 (50.0)	
Once or several times a week*	37 (55.2)	17 (65.4)	12 (57.1)	8 (40.0)	
≥1 serving/day	5 (7.5)	2 (7.7)	1 (4.8)	2 (10.0)	
Refined/milled grains (white flour, white rice, pasta, noodles, …)					0.554
Never or rarely	5 (7.5)	2 (7.7)	2 (9.5)	1 (5.0)	
Once or several times a week*	35 (52.3)	15 (57.7)	8 (38.1)	12 (60.0)	
≥1 serving/day	27 (40.2)	9 (34.6)	11 (52.4)	7 (35.0)	
Deep fried food (French fries, potato chips, samosas, egg rolls, …)					0.776
Never or rarely	22 (32.8)	10 (38.5)	6 (28.6)	6 (30.0)	
Once or several times a week*	43 (64.2)	16 (61.5)	17 (61.9)	14 (70.0)	
≥1 serving/day	2 (3.0)	0 (0.0)	2 (9.5)	0 (0.0)	
Sweetened drinks (excluding diet drinks)					0.066
Never or rarely	20 (29.8)	10 (38.5)	4 (19.1)	6 (30.0)	
Once or several times a week*	43 (64.2)	16 (61.6)	15 (71.4)	12 (60.0)	
≥1 serving/day	4 (6.0)	0 (0.0)	2 (19.1)	2 (10.0)	

	Total sample (n=67)	Participants living in Vietnam (n=26)	Participants living in Mediterranean countries (n=21)	Participants living in other countries (n=20)	p-value
Dessert/sweet snacks (cake, cookie, pie, chocolates, …)					0.603
Never or rarely	14 (20.9)	5 (19.2)	6 (28.6)	3 (15.0)	
Once or several times a week*	47 (70.1)	20 (76.9)	13 (61.9)	14 (70.0)	
≥1 serving/day	6 (9.0)	1 (3.9)	2 (9.5)	3 (15.0)	
Dairy products (milk, butter, yogurt, cheese, …)					0.311
Never or rarely	3 (4.5)	1 (3.8)	1 (4.7)	1 (5.0)	
Once or several times a week*	51 (76.1)	19 (73.1)	17 (81.0)	15 (75.0)	
≥1 serving/day	13 (19.4)	6 (23.1)	3 (14.3)	4 (20.0)	
Eggs					0.452
Never or rarely	1 (1.5)	1 (3.9)	0 (0.0)	0 (0.0)	
Once or several times a week*	58 (86.6)	22 (84.6)	19 (90.5)	17 (85.0)	
≥1 serving/day	7 (10.4)	3 (11.5)	2 (9.5)	3 (15.0)	
Tofu/soybean curd (textured vegetable protein, soya milk, …)					0.146
Never or rarely	18 (26.9)	10 (38.5)	2 (9.5)	6 (30.0)	
Once or several times a week*	47 (70.2)	15 (57.7)	18 (85.7)	14 (70.0)	
≥1 serving/day	2 (2.9)	1 (3.8)	1 (4.8)	0 (0.0)	
Tea (green, black, herbal, …)					0.983
Never or rarely	13 (19.4)	6 (23.1)	3 (14.3)	4 (20.0)	
Once or several times a week*	45 (67.2)	17 (65.4)	14 (66.7)	14 (70.0)	
≥1 serving/day	9 (13.4)	3 (11.5)	4 (19.0)	2 (10.0)	
Fermented drinks (kombucha, ginger beer, kefir, …)					0.466
Never or rarely	43 (64.2)	17 (65.4)	13 (61.9)	13 (65.0)	
Once or several times a week*	23 (34.3)	9 (34.6)	8 (38.1)	6 (30.0)	
≥1 serving/day	1 (1.5)	0 (0.0)	0 (0.0)	1 (5.0)	

	Total sample (n=67)	Participants living in Vietnam (n=26)	Participants living in Mediterranean countries (n=21)	Participants living in other countries (n=20)	p-value
Units of alcohol** consumed during a typical week					0.140
None or <weekly	50 (74.6)	16 (61.5)	17 (81.0)	17 (85.0)	
Women 1-6 units/week, men 1-13 units/week	17 (25.4)	10 (38.5)	4 (19.0)	3 (15.0)	
Women ≥7 units/week, men≥14 units/week	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	
>6 units at one time at least once/week	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	
When do you normally consume wine? n (%)					0.062
During meals	11 (16.4)	8 (30.8)	2 (9.5)	1 (5.0)	
Only in special events	56 (83.6)	18 (69.2)	19 (90.5)	19 (95.0)	
What term best characterizes your wine drinking style? n (%)					0.049
Do not like drinking wine	23 (34.3)	5 (19.2)	13 (61.9)	5 (25.0)	
Drink wine to get tipsy	9 (13.4)	3 (11.5)	1 (4.8)	5 (25.0)	
Enjoy wine little by little and pair with specific foods	28 (41.8)	14 (53.9)	6 (28.6)	8 (40.0)	
Just take a sip and then play with the glass because it makes me look cool	7 (10.5)	4 (15.4)	1 (4.8)	2 (10.0)	
Overall, how much do you use herbs/spices?					0.536
1	11 (16.4)	3 (11.5)	5 (23.8)	3 (15.0)	
2	12 (17.9)	6 (23.1)	1 (4.8)	5 (25.0)	
3	19 (28.4)	6 (23.1)	6 (28.6)	7 (35.0)	
4	15 (22.4)	7 (26.9)	6 (28.6)	2 (10.0)	
5	10 (14.9)	4 (15.4)	3 (14.3)	3 (15.0)	

*: several times a week, but not every day

**: a medium glass of wine corresponds to 2 units of alcohol

The distribution of the MDS is presented in **Figure 4**. The overall mean score is 11.7±3.2; 48% of the Vietnamese respondent had a moderate/high adherence to a Mediterranean diet style (score ≥13), and no significant differences by country of residence were found, even if participants living in other countries or in Vietnam tended to adhere more to the Mediterranean diet with respect to those living in the Mediterranean area countries (50%, 42% vs 24%, p=0.141; **Figure 5**).

Figure 4. Mediterranean Diet Score (MDS) distribution among respondents

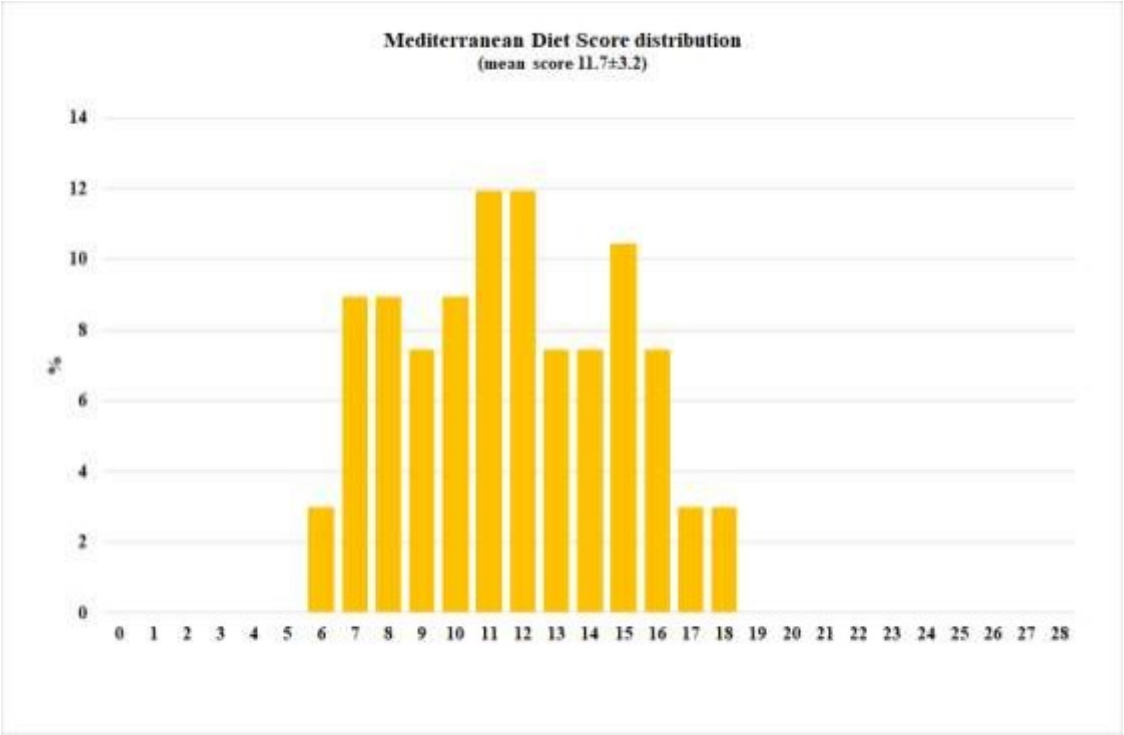
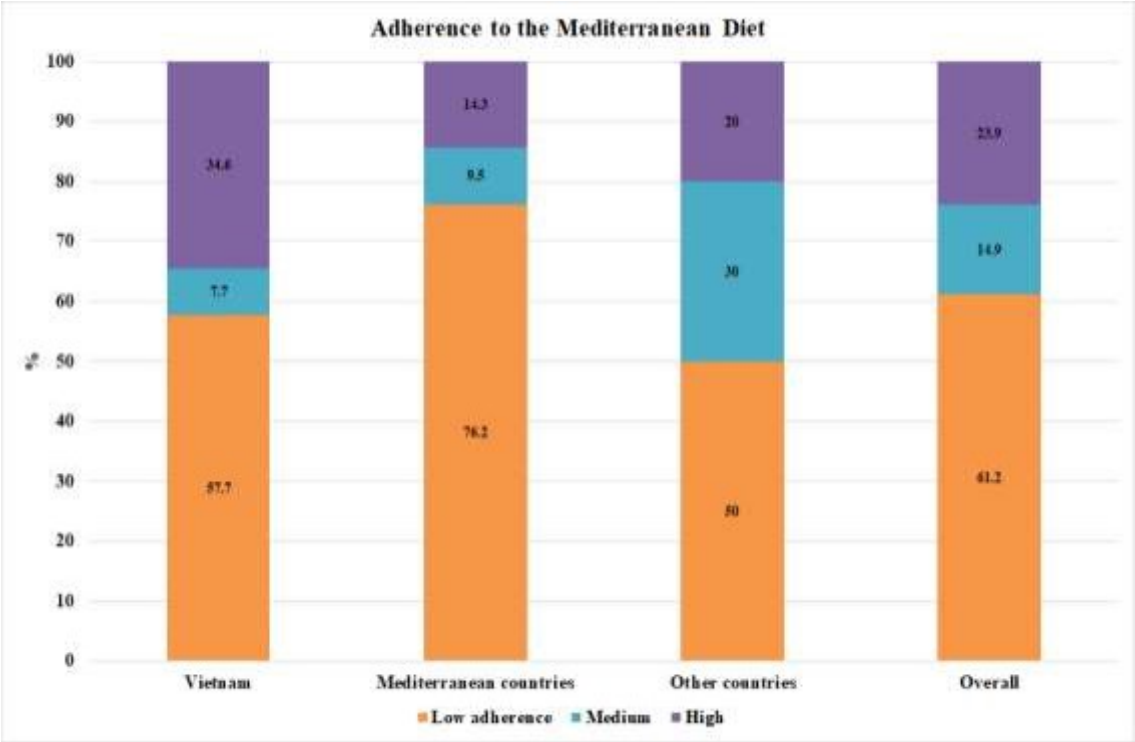


Figure 5. Classes of adherence to the Mediterranean diet according to countries of residence (p=0.141)



No significant differences related to age group, gender, main occupation or residence area at the time of the interview were found when comparing general characteristics of the group of respondents with low adherence to the Mediterranean diet (MDS≤12) with those with moderate/high adherence (MDS≥13) (**Table 4**). Participants with higher adherence to the Mediterranean diet were more often flexitarian (i.e. mostly vegetarian, but sometimes eat meat, fish, or poultry), pescetarian or vegetarian with respect to those having a lower adherence to the Mediterranean diet, while the latter declared more often to be omnivore (p=0.029). The favorite sources of fat reported by individuals with lower adherence to the Mediterranean diet were sunflower oil and olive oil (42% and 37%), but also the consumption of butter and lard was reported (5% for each source); among respondents with higher adherence to the Mediterranean diet, more than 92% of the respondents used sunflower or olive oil, and nobody declared to use butter or lard. No significant differences were found in relation to the favorite source of carbohydrates: more than 90% of the participants declared to prefer rice, 56% bread and 46% potatoes. The favorite source of protein among individuals adhering more to a Mediterranean diet style were fish (81%), eggs (73%), white or red meat (50%), and legumes or tofu (23%); among participants with lower adherence to the Mediterranean diet, the favorite sources were red meat (73%, white meat (71%), eggs (56%), fish (54%), tofu (15%) and legumes (10%).

Table 4. Characteristics of respondents according to Mediterranean Diet Score classes (low vs medium/high adherence)

	MDS≤12 (n=41)	MDS≥13 (n=26)	p-value
Age range, n (%)			0.784
≤24 years	11 (26.8)	4 (15.4)	
25-34 years	22 (53.7)	18 (69.2)	
35-44 years	5 (12.2)	3 (11.5)	
≥45 years	3 (7.3)	1 (3.9)	
Sex, females, n (%)	26 (63.4)	17 (65.4)	0.870
Main occupation, n (%)			1.000
Unemployed	1 (2.4)	0 (0.0)	
Student	16 (39.1)	11 (42.3)	
Worker	23 (56.1)	14 (53.8)	
Retired	1 (2.4)	1 (3.9)	
Group, n (%)			0.204

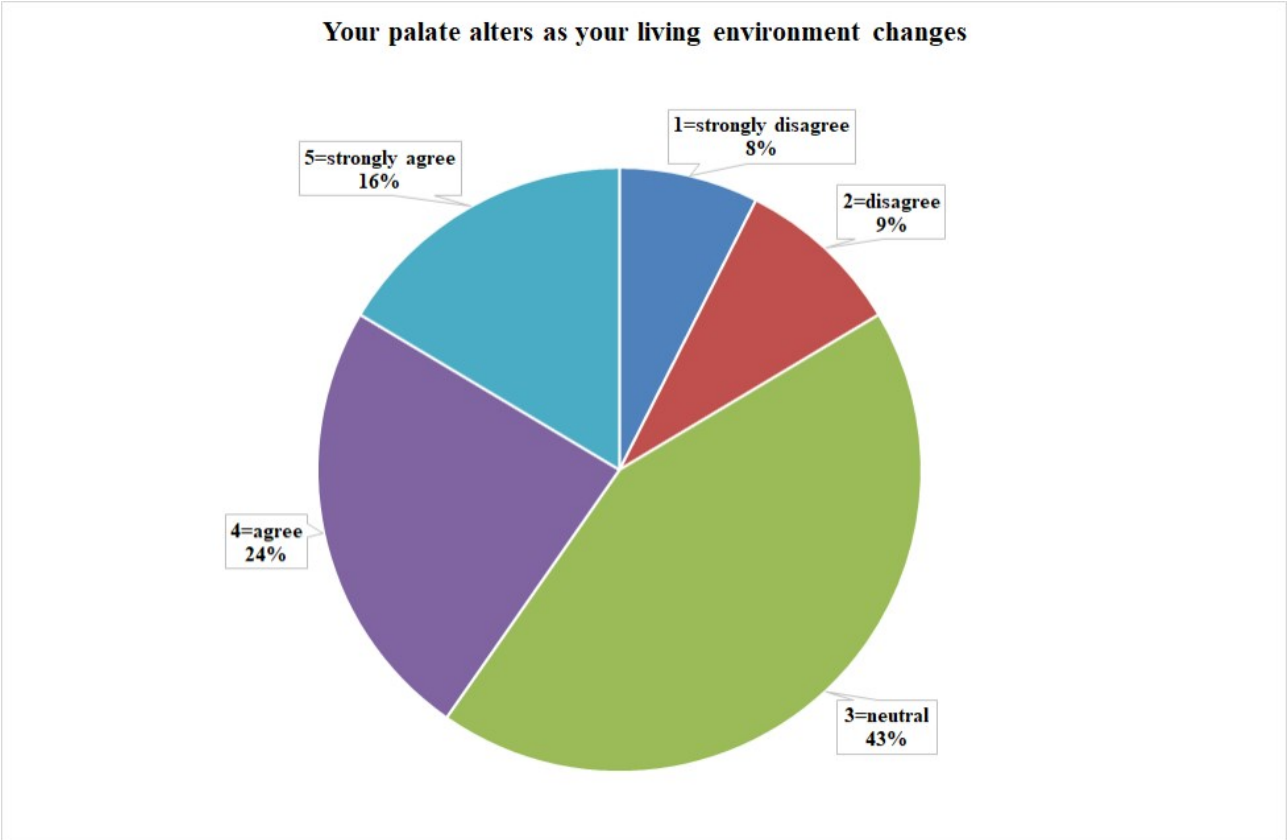
	MDS≤12 (n=41)	MDS≥13 (n=26)	p-value
Participants living in Vietnam	15 (36.6)	11 (42.3)	
Participants living in Mediterranean countries	16 (39.0)	5 (19.2)	
Participants living in other countries	10 (24.4)	10 (38.5)	
Do you identify as…, n (%)			0.029
Omnivore	33 (80.5)	14 (53.9)	
Flexitarian (mostly vegetarian, sometimes meat, fish or poultry)	7 (17.1)	7 (26.9)	
Pescetarian	0 (0.0)	3 (11.5)	
Vegetarian	0 (0.0)	1 (3.9)	
Plant-based/vegan	1 (2.4)	1 (3.9)	
Favorite source of fat, n (%)			0.830
None	1 (2.4)	0 (0.0)	
Butter	2 (4.9)	0 (0.0)	
Lard	2 (4.9)	0 (0.0)	
Olive oil	15 (36.6)	11 (42.3)	
Sunflower oil	17 (41.5)	13 (50.0)	
Other vegetable oil	4 (9.8)	2 (7.7)	
Favorite source of carbohydrates, n (%)			
Pasta	16 (39.0)	13 (50.0)	0.377
Rice	38 (92.7)	23 (88.5)	0.670
Potatoes	19 (46.3)	10 (38.5)	0.526
Bread	23 (56.1)	16 (61.5)	0.660
Favorite source of protein, n (%)			
Eggs	23 (56.1)	19 (73.1)	0.161
Fish	22 (53.7)	26 (80.7)	0.024
Red meat	30 (73.2)	13 (50.0)	0.044
White meat	29 (70.7)	13 (50.0)	0.087
Legumes	4 (9.8)	6 (23.1)	0.169
Tofu	6 (14.6)	6 (23.1)	0.515
Other	1 (2.4)	0 (0.0)	1.000
Herbs/spices frequently used, n (%)			
Basil	11 (26.8)	9 (34.6)	0.497

	MDS≤12 (n=41)	MDS≥13 (n=26)	p-value
Black pepper	34 (82.9)	19 (73.1)	0.334
Garlic	32 (78.1)	20 (76.9)	0.914
Ginger	21 (51.2)	20 (76.9)	0.035
Lemongrass	15 (36.6)	11 (42.3)	0.640
Coriander	10 (24.4)	7 (26.9)	0.816
When do you normally consume wine? n (%)			0.315
During meals	5 (12.2)	6 (23.1)	
Only in special events	36 (87.8)	20 (76.9)	
What term best characterizes your wine drinking style? n (%)			0.087
Do not like drinking wine	17 (41.5)	6 (23.1)	
Drink wine to get tipsy	7 (17.1)	2 (7.7)	
Enjoy wine little by little and pair with specific foods	12 (29.3)	16 (61.5)	
Just take a sip and then play with the glass because it makes me look cool	5 (12.2)	2 (7.7)	

Abbreviations: MDS (Mediterranean Diet Score)

Figure 6 presents the investigation whether the respondents alter their palate as their living environment changes. The respondents were asked to rate their level of agreement with the statement on a five-point Likert scale (Corallo, Latino, Menegoli, & Spennato, 2019). The results showed that 40% of the participants either agreed or strongly agreed that their palate changes as they move to a new living environment, while only 17% disagreed or strongly disagreed. The majority of respondents (43%) rated their responses as neutral. There was no significant differences in the responses between groups of participants living in Vietnam, Mediterranean countries, and other countries (p=0.520). However, some differences in the responses between the three groups were noticed. More specifically, 50% of the participants living in Vietnam agreed or strongly agreed that their palate alters as their living environment changes. This figure was considerably lower for the other two groups, at 33% and 35%, respectively. Conversely, the high percentage of participants in the second group who rated their responses as "neutral" suggests that living in Mediterranean countries may not have a significant impact on their food preferences (48%). Among Vietnamese respondents living in other countries, only 10% of them disagreed or strongly disagreed with the statement, indicating less impact on changes in tastes compared to those living in Vietnam or in Mediterranean countries.

Figure 6. Palate changes with living environment



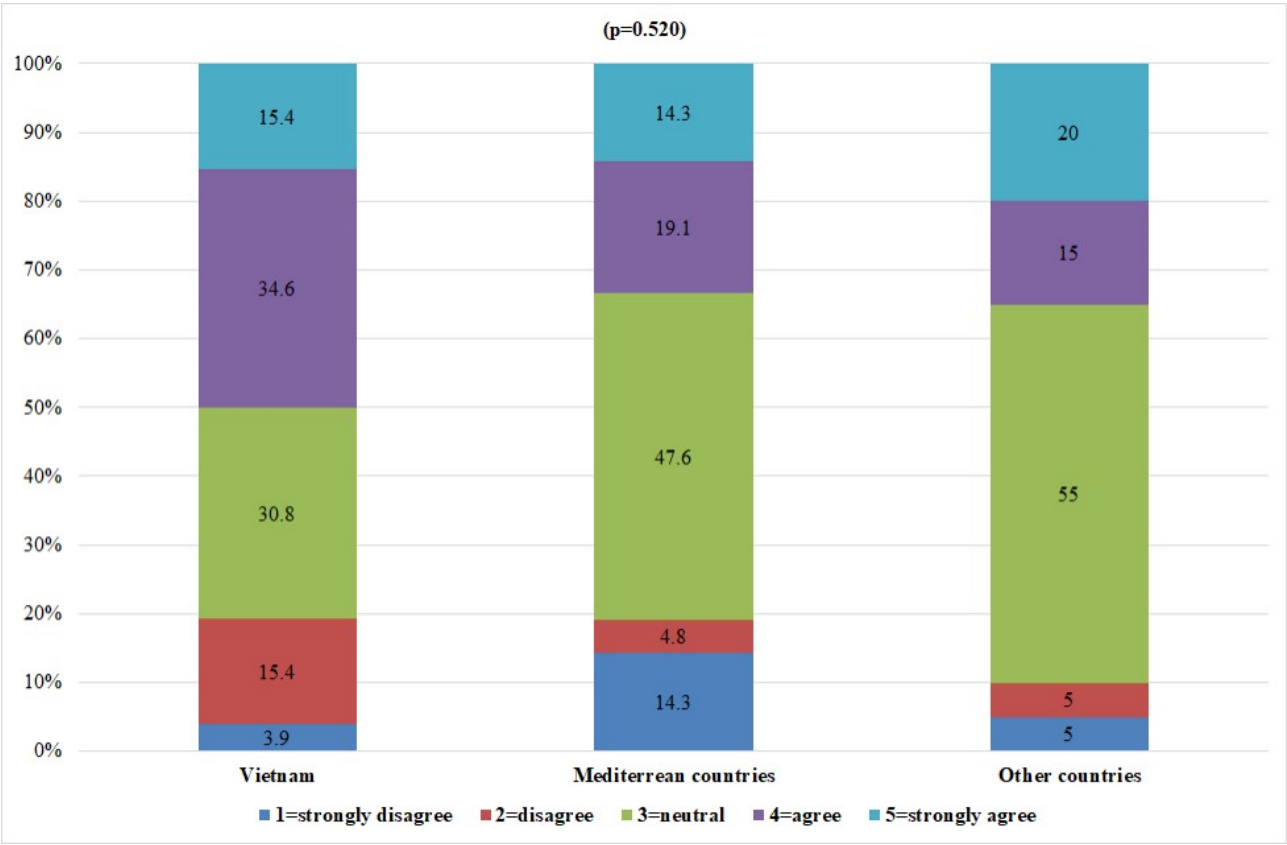
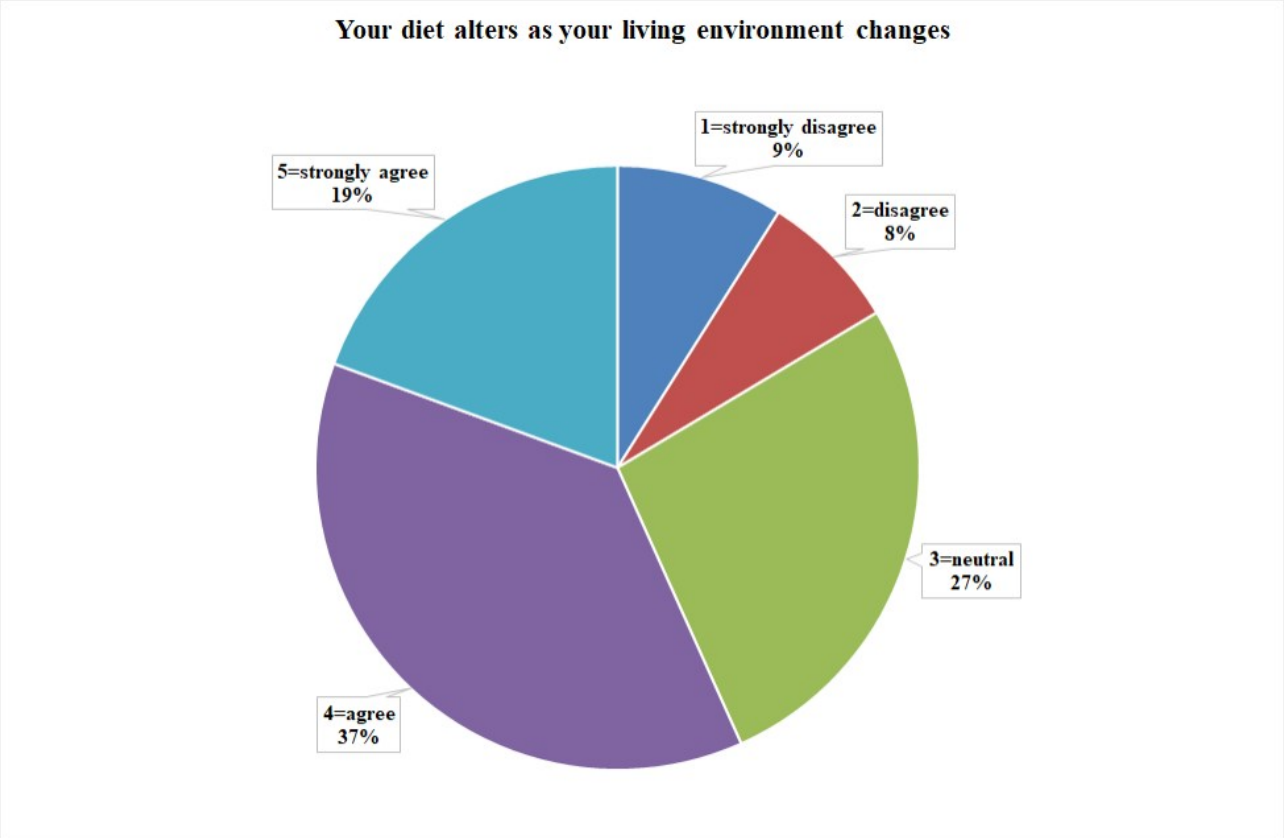


Figure 7 presents the results of the question that aimed to determine whether the respondents alter their diet as they change their living environment. 56% of the participants either agreed or strongly agreed that their diet is affected by their living environment. A p-value=0.013 indicates that there is a significant difference in responses between groups of participants living in Vietnam, Mediterranean countries, and in other countries. Participants residing in Vietnam exhibited the strongest agreement with the statement that their diet alters as their living environment changes, with about 85% either agreeing or strongly agreeing. In contrast, those residing in Mediterranean countries had the highest percentage of respondents who disagreed or strongly disagreed with the statement, with approximately 29% expressing this sentiment. Vietnamese participants living in other countries had a more even distribution of responses, with 45% either agreeing or strongly agreeing, and 20% either disagreeing or strongly disagreeing.

More than 50% of the participants were satisfied or very satisfied with their current diet, and this percentage tended to be higher among those living in Vietnam (73%) with respect to those living in the Mediterranean countries (38%) or in other countries (45%) (**Figure 8**; p=0.127). 62% of the participants with moderate/high adherence to the Mediterranean diet declared to be satisfied or very satisfied with their current diet, and the corresponding percentage among those with lower adherence is 49% (p=0.703).

Figure 7. Diet changes with living environment



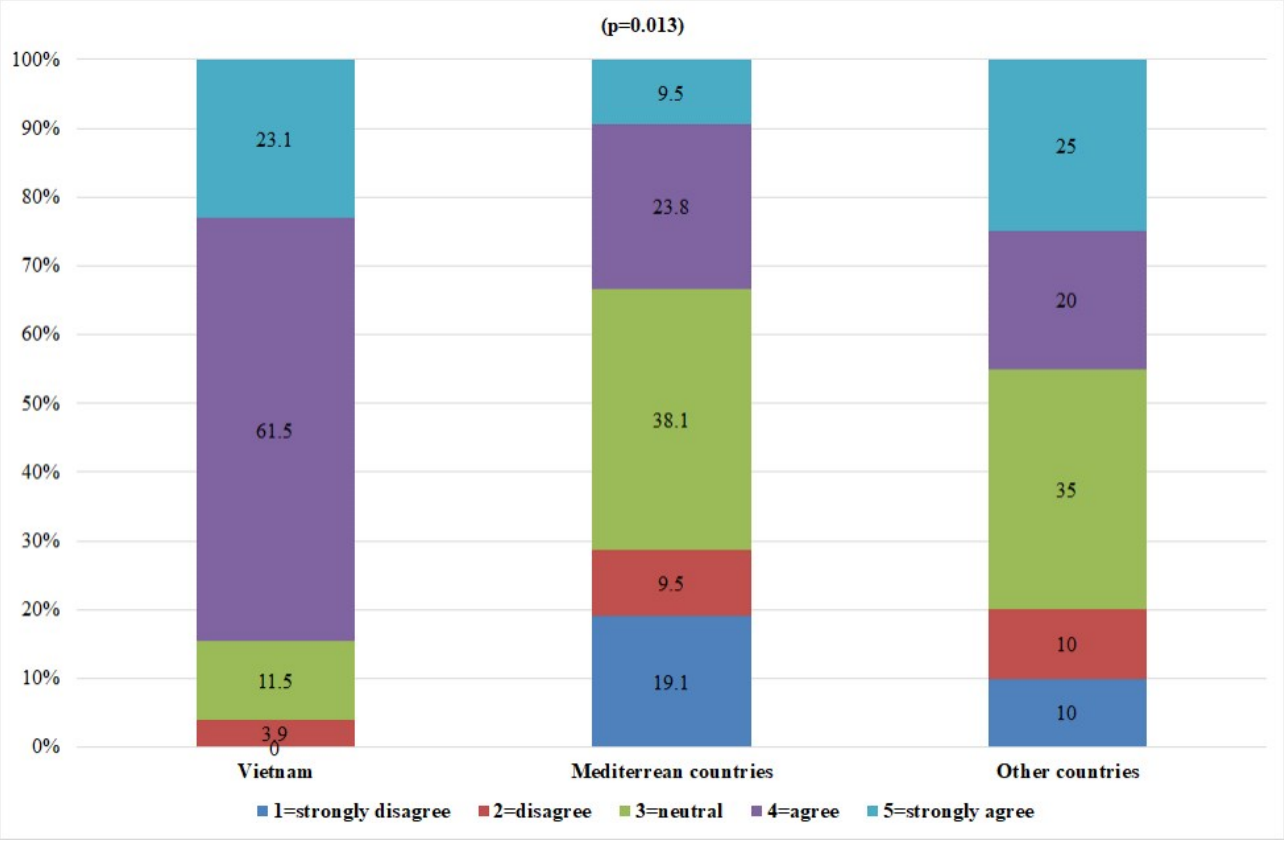
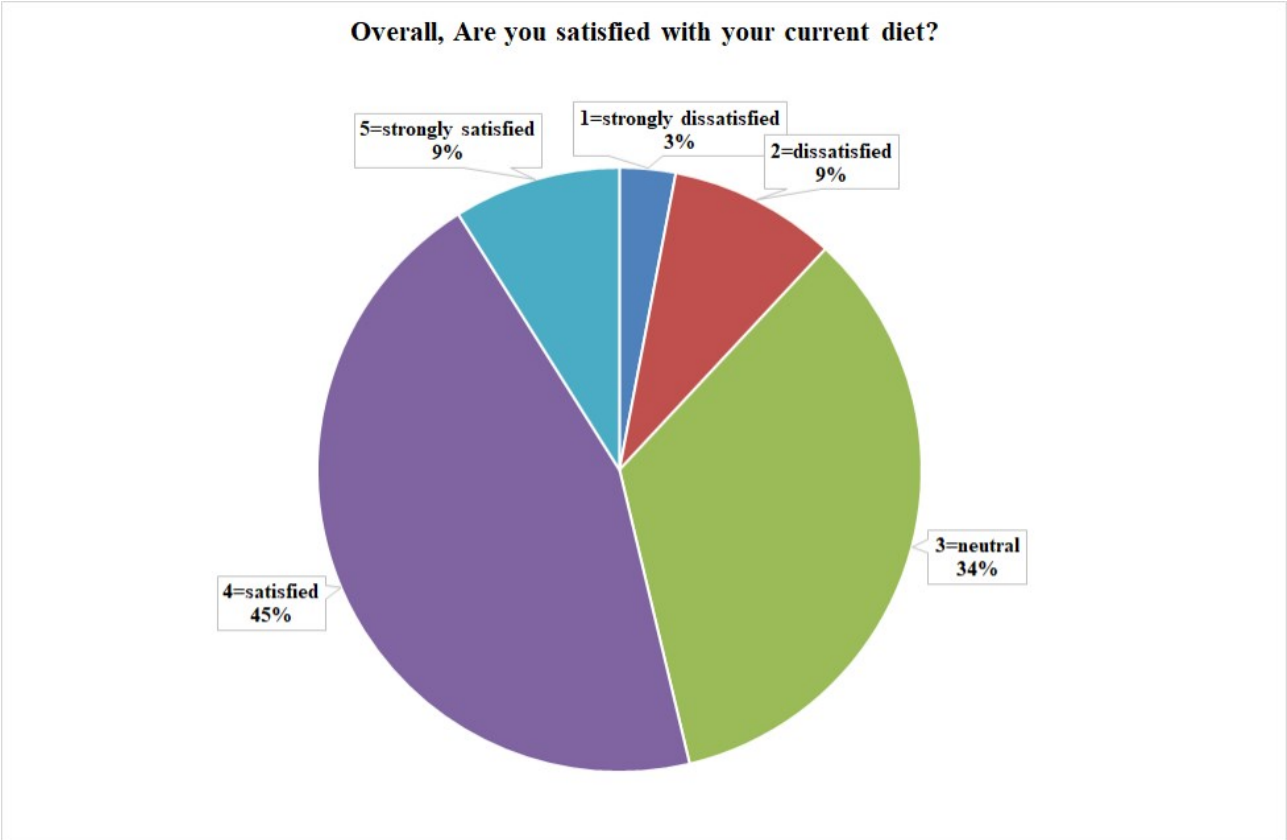
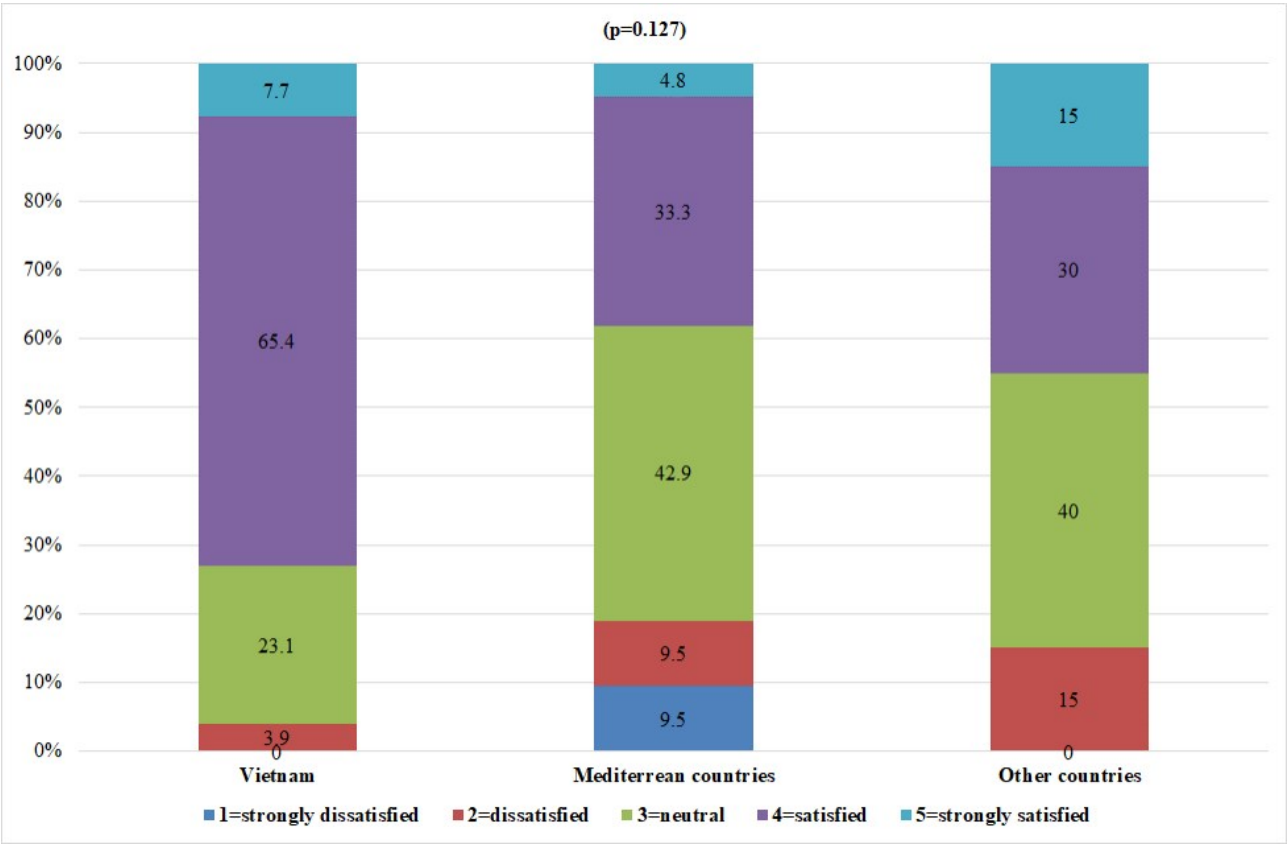


Figure 8. Diet satisfaction levels





4.2 Qualitative results

4.2.1 Dietary habits, food preferences, and health consciousness

In the first phase of the study, six participants were encouraged to share a detailed description of their daily dietary habits. While it was observed that the majority of the participants did not adhere to a specific dietary regimen, their dietary intake was found to be relatively well-balanced with regard to macronutrient distribution. These participants consumed a sufficient amount of carbohydrates, mainly sourced from rice or pasta, and protein derived from pork, shrimp, fish, and tofu. Remarkably, all six participants placed considerable emphasis on incorporating a substantial amount of vegetables into their daily dietary practices.

It can be seen that they had different eating habits and preferences, but in general, they had a diverse range of food choices throughout the day, with 2 to 3 main meals.

> …I used to have Italian food for lunch with 2 courses: pasta (mostly) and the second with pork/fish. I don't really like sweets so I often take fruit and coffee as my deserts. Recently, I have tried to change my eating habit with 3 meals per day. For breakfast, I make coffee with milk or sometimes hot tea, eating with cookies or banana. I have Italian food for lunch as usual and Vietnamese food for dinner, mostly with rice and other dishes. [Participant 1, Italy]

> In the morning I try to eat a nutritious breakfast with coffee and milk so that at lunch something light, but at dinner usually I prefer a soup with vegetables. I eat many kinds of fruit every day, fruits of the season. [Participant 3, Italy]

Also residing in Italy, a Mediterranean country, participant 2 had a more objective view of her health situation, which allowed her to share a clearer picture of how she decided what to consume during the day. To be more specific, this participant was following intermittent fasting so she skipped breakfast and ate at the university canteen for lunch. When having lunch at the university canteen, this participant tended to choose foods that she believed were healthier for her. For example, she stated:

> …For lunch, I often eat at the university canteen so basically my lunch consists of 1 primo and I often choose pasta over rice. Sometimes if they have other options like couscous, barley, or farro, I will choose those instead of pasta because I think they are healthier. For secondo, my selection varies on a daily basis as long as it looks appetizing for me since I do not care about the type of protein, instead, I focus more on the balance of the meal. [Participant 2, Italy]

For dinner, this participant frequently selected a one-pot meal such as one-pot pasta, one-pot rice, or one-pot noodle soup. Her dishes always included one type of starch, a small amount of protein, and

plenty of vegetables. Dairy products were also consumed but not too often. Participant 2 also believed that her diet was a combination of the Mediterranean and the Vietnamese diets. This participant also shared that previously in Vietnam, she used to drink a lot of green tea throughout the day, about 0.5 to 1 liter per day, as it was a habit of her whole family. In Italy, although she could no longer drink fresh green tea, she still tries to maintain drinking plenty of water and supplementing with wine instead of sugary drinks in her daily meals.

Overall, the responses suggest that the participants followed a varied diet, incorporating both Italian and Vietnamese dishes, with a focus on balanced meals and fruits. However, the limited intake of vegetables due to high cost and preference for one-pot meals could potentially impact their nutrient intake.

All three participants residing in non-Mediterranean countries had different dietary habits and preferences but shared some similarities. Specifically, participants 4 and 5 had a preference for vegetables over meat while participants 4 and 6 had a tendency to limit frying and deep-fried food. Additionally, participants from the UK and Germany consumed dairy products but the amounts varied. Particularly, Participant 4 tended to limit dairy intake while participant 5 consumed lactose-free cheese.

> I do not include a lot of dairy products in my diet, that may be explained by my low lactose tolerance. [Participant 4, UK]
>
> …Also, because of a dairy allergy, I limit my dairy intake and use lactose-free cheese instead. [Participant 5, Germany]

It can be considered that the three participants living in non-Mediterranean countries all had different levels of health consciousness. That has been demonstrated through the food choices and cooking styles.

Regarding favorite Vietnamese and Mediterranean dishes, there are some commonalities that can be extracted from the six participants.

Participants 1, 3, 4, and 6 mentioned a preference for Vietnamese cuisine, particularly rice noodle dishes with flavorful broth and other dishes with native herbs. They also liked the use of strong flavors in their dishes.

Participant 2 and participant 5 both talked about their love for Banh Mi, a Vietnamese sandwich made with vegetables, some kind of protein, and bread. Both participants highlighted the nutritious aspect of the dish, with participant 5 noting the similarity of the salad in the Banh Mi to the Mediterranean diet.

Participant 2 also suggested a Vietnamese dish that is highly compatible with the Mediterranean diet, which she often introduces to her international friends while living abroad, namely "Gỏi Cuốn" (fresh spring rolls). According to this participant, although this dish uses typically Vietnamese ingredients, it satisfies the criteria of the "Mediterranean" standards and can be customized depending on personal preferences or ingredients available in the kitchen.

Figure 9. Photo of spring rolls, shared by participant 2, Italy

Overall, six participants expressed a preference for dishes that are nutritious, flavorful, and feature fresh ingredients, whether Vietnamese or Mediterranean. There was also a clear appreciation for the use of herbs and spices in Vietnamese cuisine, as well as the simplicity and freshness of Mediterranean dishes.

4.2.2 Incorporate Vietnamese and Mediterranean elements

When asked about how to incorporate Vietnamese and Mediterranean elements in their daily meals, participants gave different opinions and views. Responses from the three participants living in Italy show that there are various ways to combine Vietnamese and Mediterranean elements in meals. While participant 1 preferred to cook pasta in the Vietnamese way, participant 2 used Mediterranean-style ingredients to replicate Vietnamese dishes such as Banh Mi, and participant 3 enjoyed pairing Italian dishes like porchetta with Vietnamese beef noodle soup. These examples highlighted the importance of experimentation and creativity in combining different cuisines, as well as the significance of personal preferences and cultural influences in shaping one's food choices. It is also noteworthy that the approaches to fusion cuisine given by these participants are not aimed at creating authentic

Vietnamese or Mediterranean dishes but rather at exploring new flavors and adapting to their current food environment. For example, participant 2 expressed:

> Overall, I just use Mediterranean ingredients to replicate some Vietnamese dishes only when I really miss food from home, most of the time, but I don't do that too often because I'm quite happy with Mediterranean food I have here in Italy.

Three participants from the non-Mediterranean countries, on the other hand, suggested that in incorporating elements from both Vietnamese and Mediterranean cuisines into their meals is not a common practice. Participant 4 could not recall ever experimenting with this combination, while participant from Germany mentioned making vermicelli noodle soup with a vegetable broth combined with marinated and fried mushrooms or sometimes, simple stir-fried rice noodles with tofu and lots of vegetables.

Figure 10. Photo shared by participant 5, Germany

In the US, participant 6 uses pasta and stir-fried beef to make a fusion dish, and sometimes, uses Mediterranean ingredients such as carrot, onion, and celery in his stir-fried dishes. However, all three participants acknowledge that the two cuisines have very different taste profiles, making it difficult to create a dish that truly combines both.

4.2.3 Challenges of following the Mediterranean diet

Three participants from Italy, in general, did not encounter any big challenges adopting the Mediterranean diet. However, they did point out some difficulties when they first got used to this diet. Participant 1 discussed the initial difficulty in adjusting to the new cuisine, highlighting the difference

in flavor profiles between Vietnamese and Italian foods. Participant 2 touched upon the lack of knowledge and familiarity with the Mediterranean diet among Vietnamese immigrants, which can make it challenging to adopt. Additionally, she pointed out that Vietnamese food tends to have more sodium and be herb-heavy compared to Mediterranean foods.

Participants from non-Mediterranean countries also provided different insights into the challenges they faced in following the Mediterranean diet. Participant from the UK, expressed difficulty in adjusting to the use of dairy products. According to this participant, the portion sizes of the Mediterranean diet are relatively larger than those of the Vietnamese diet. Participant 5 highlighted the tendency of Vietnamese people to consume meat as their main source of protein and the need to shift their mindset towards other types of healthier protein. From the US, Participant 6 mentioned the high cost and limited availability of good quality Mediterranean products in the US, particularly for those who do not have a car or live near big supermarkets.

> Products in the US are not tasty and flavorful. Good products are expensive organic types. So my salary is not enough to follow the Mediterranean diet. Good cheese is hard to find. Moreover, labels are confusing, I always have to look up on the internet before buying so that I know I could buy the correct cheese from Europe or Italy. Same for wine. Good fish are very hard to find for me. In the US, normally big and good supermarkets (Costco, Hmart, etc) are very far away, about 30 to 40 minutes driving, so without a car I typically have a lot less options. Buying online might be a solution, but you don't get to choose and have to keep the delivery even though it is not fresh. [participant 6, US]

To sum up, the above participants demonstrated various challenges when adhering to the Mediterranean diet. These obstacles depend on several factors, such as taste preference, knowledge about nutrition and dieting, environment factors, and high cost and limited availability of Mediterranean products.

4.2.4 Changes in health status

After reviewing the health benefits of adopting the Mediterranean diet or combining it with traditional Vietnamese cuisine, it can be seen that six participants all have noticed some positive changes in their health and body thanks to their current diet even though they have not consulted with any healthcare professional regarding their diet. Some of them were unsure if their diet alone is responsible for their health improvements or weight loss due to other factors such as exercise. To be more specific, participant 2 from Italy reported a more stable weight, less bloating, and improved skin.

> I have noticed that my weight is more stable, I rarely feel bloated after eating, and my skin also looks more ruddy. However, I'm not sure if it's because of my diet alone as I exercise regularly. [Participant 2, Italy]

Participant 3 noticed significant weight loss after following the Vietnamese diet for several months, whereas he did not experience the same effect with the Mediterranean diet. However, participant 1 did not experience any changes in her health since adopting the Mediterranean diet or combining it with her traditional Vietnamese diet. She shared:

> I have seen a lot of positive changes in my body and my health but I believe it's coming from my habit like more walking and cycling every day.

Interestingly enough, participants 1 and 2 both reported that they consume fewer vegetables than they did when they were in Vietnam because the cost of buying vegetables in Italy is relatively expensive. Participant 1 believed that consuming more vegetables could further improve her+ current health status.

> If I could combine the veggies from Vietnamese meals and the fact that Italian food doesn't have a lot of spices, I think I would have a very healthy diet. Unluckily, I cannot afford green veggies in Italy. [Participant 1, Italy]

Participant 4 stated that incorporating more vegetables and Greek yogurt into her diet helped with weight loss and reducing her sugar intake. After attempting to follow the Mediterranean diet, participant 5 from Germany reported that she now feels healthier, has more energy, and has a more balanced physique. Last but not least, participant 6 also noticed improvements in his health, particularly in terms of his body weight and mood stability. While he acknowledged the health benefits of the traditional Vietnamese diet, he noted that the Mediterranean diet is a healthier alternative to both the Vietnamese and American diets.

4.2.5 Strategies and tips

While being asked about suggestions and strategies for making the Mediterranean diet more accessible and appealing, participants shared a variety of opinions and perspectives. Some common themes in their responses were the importance of incorporating both Mediterranean and Vietnamese diets into their daily meals, using fresh ingredients and healthy fats and olive oil, and gradually introducing new ingredients or dishes.

From Italy, participants 1 and 3, on the one hand, suggested alternating between Italian and Vietnamese meals.

> In my family, we used to eat 2 kinds of diet in a single day, Vietnamese and Mediterranean diets. Usually the Mediterranean diet at lunch and Vietnamese diet at dinner because the Vietnamese dishes (rice with soup) are much lighter than the Mediterranean ones and help to sleep better at night. [participant 3, Italy]

Participant 2, on the other hand, believed that the strategies offered should be tailored to the interests and health conditions of each individual, she expressed:

> …In my opinion, we can start by gradually changing our source of macronutrients. For example, for me, I currently use very little butter and animal fats, and instead, I have switched to using olive oil. And even though I eat fewer vegetables here but I eat more fruits when they are in season because they are of better quality and cost less.

Participant 2 also mentioned that she ate more fruits when they are in season and was inspired by her Mediterranean friends while living in Italy. Additionally, she prioritized simple preparation methods to retain the vitamins and nutrients of the food.

Participants from the UK, Germany, and the US also offered various ideas that, in their opinion, can help make the Mediterranean diet more accessible and enjoyable. For instance, participant 4 shared:

> Fresh vegetables, olive oil, use of lemon as a substitute for vinegar. Taking a portion of wine is also helpful I think. You take more time during your meal, and wine benefits the digesting process. Greek yogurt is also very good. Creamy and rich. A substitute for the soup normally served in Vietnamese meals.

Participant 4 noted that the Mediterranean diet is highly accessible to everyone and easier to follow than other diets because the menu is diverse and does not completely restrict any particular food. She recommended prioritizing vegetables as the main course and choosing white starches or refined cereals, as well as whole grain bread, rice, and flour whenever possible.

From the US, where Mediterranean products are somewhat more difficult to find and considerably more costly than in Europe, participant 6 was not too rigid about reinventing Mediterranean dishes, instead, he came up with more creative ideas to diversify the menu.

> I think trying one new ingredient at a time is very helpful. This gives me time to explore and think about how to incorporate it into my diet. Moreover, trying to make a new dish, and learning the key technique or food combination broadens my option when it comes to making food, especially fusion ones. [participant 6, US]

Figure 11. Photos shared by participant 6, US

Chapter 5. Discussion

5.1 Adherence to the Mediterranean diet of different Vietnamese populations

Based on the responses from the dietary habits survey, the study results shows an overall mean score of 11.7±3.2 for MDS, indicating a moderate adherence to the Mediterranean diet among Vietnamese respondents. With only sixty-seven respondents, it is important to note that the findings may not be fully representative of the Vietnamese population. However, the results suggest that there was some level of awareness and practice of the Mediterranean diet among different Vietnamese populations, as 39% of the respondents had a moderate/high adherence to this diet style.

Results from the survey implies that there were no significant difference in adherence by country of residence, with participants living in Vietnam and non-Mediterranean countries tending to adhere more to the Mediterranean diet than those living in the Mediterranean area countries. It could be argued that the lack of significant differences in adherence by country of residence may be attributed to the fact that the Mediterranean-style diet is not limited to the Mediterranean region but rather as a universal dietary pattern that can be embraced by individuals regardless of their geographical location (Hutchins-Wiese, Bales, & Porter Starr, 2022). The Mediterranean-style diet can be adapted to different culture and environment contexts, as long as it follows the general principles of eating plenty of plant-based foods, healthy fats, fish, moderate amounts of poultry, dairy and eggs, and limiting processed foods, added sugar and red meat (McManus, 2023). Therefore, it is possible that the Vietnamese respondents living in Vietnam or non-Mediterranean countries have adopted the Mediterranean-like diet by using local and seasonal foods that are similar to those found in the Mediterranean region, such as rice, vegetables, fruits, legumes, nuts, seeds, fish, and olive oil. Another possible explanation for why there were no significant difference in adherence by country of residence could be that the Mediterranean diet is losing popularity or relevance in the Mediterranean countries themselves (Obeid et al., 2022). Some studies have suggested that the Mediterranean diet is undergoing a decline or a transformation in the Mediterranean region due to various factors, such as globalization, industrialization, urbanization, economic development and cultural changes (Moreno-Altamirano, et al., 2016), (la Fauci, et al., 2020). These factors may have influenced the dietary habits and preferences of the people living in the Mediterranean countries, leading them to consume more processed foods, animal products, sugary foods, and unhealthy fats than before. This may have reduced their adherence to the Mediterranean diet and made it more similar to that of the Vietnamese respondents living in Vietnam or in other countries. However, further research would be needed to explore this possibility.

The higher adherence rate to the Mediterranean diet style among respondents living in Vietnam compared to those living in Mediterranean area countries is also an interesting finding. It is possible that this could be due to cultural and traditional dietary practices in Vietnam that are similar to those in the Mediterranean region, such as the consumption of vegetables, fruits, legume, and seafood. This findings highlights the importance of considering cultural factors in promoting healthy dietary habits.

Additionally, the study found that participants with higher adherence to the Mediterranean diet were more often flexitarian, pescetarian or vegetarian, while those with lower adherence declared more often to be omnivores. This is consistent with the observation that the MDS is influenced by the type of diet that the respondents follow. Specifically, those who follow plant-based diet tend to have higher MDS than those who follow animal based-diets. It can be seen from the study that individuals with higher adherence to the Mediterranean diet showed a preference for olive oil or sunflower oil as their main fat and fish, eggs, and legumes/tofu as their main sources of protein. This aligns with the recommendations for the Mediterranean diet. In contrast, individuals with lower adherence to the Mediterranean diet showed a preference for animal fats such as butter and lard, which are high in saturated fat and not recommended in a healthy diet.

Overall, the findings from this study provide valuable information for promoting healthy dietary habits and improving adherence to a Mediterranean diet style. The moderate adherence to the Mediterranean diet style among the Vietnamese respondent suggests that there is still room for improvement in their dietary habits, especially for those with lower adherence to this diet. When promoting healthy dietary patterns, cultural factors, such as traditional dietary practices, should be taken into account. The preference for healthier sources of fat among Vietnamese individuals with higher adherence to the Mediterranean diet underscores the significance on education of healthy dietary practices. Therefore, efforts to promote the Mediterranean diet among Vietnamese populations should be tailored to specific cultural and environmental factors, considering the unique dietary practices of different Vietnamese populations.

5.2 Impact of living environment and cultural factors on preference and dietary patterns

The Dietary Habits Survey reveal that cultural and environmental factors may have a significant influence on the dietary patterns of Vietnamese populations. The findings indicate that changes in living environment can affect the food preferences of 40% participants, while 56% agreed that their diet is influenced by their living environment. These findings are in line with earlier research by Drewnowski and Popkin (1997), which emphasized the crucial role of cultural factors in shaping food choices and eating behaviors (Drewnowski & Popkin, 1997). These factors can impact the quality

and quantity of food consumed, highlighting the complex interplay between culture, environment, and dietary patterns. Additionally, in can be inferred that Vietnamese culture strongly influences food choices as shown by the high percentage of respondents (85% of those residing in Vietnam) who agreed that their diet is affected by their living environment. This implies the considerable impact of cultural factors on food preferences among Vietnamese populations.

Regarding the level of satisfaction with their diets, more than 50% of respondents expressed satisfaction with their current dietary practices. Interesting, respondents living in Vietnam tended to report higher level of satisfaction (73%) with their diets compared to those living in the Mediterranean countries (38%) or in other countries (45%). The high level of satisfaction with their current diet among Vietnamese respondents may also related to the fact that Vietnamese cuisine is generally considered to be healthy, with a focus on fresh vegetables, fruits, and lean protein sources (Le, 2023). Moreover, the high percentage of respondents with moderate/high adherence to the Mediterranean diet who reported satisfaction with their current diet (62%) implies that adherence to this type of diet may lead to increased satisfaction with one's diet.

5.3 Challenges when following the Mediterranean diet

Six semi-structured interviews were conducted with Vietnamese immigrants, three residing in Italy and three in non-Mediterranean countries, to examine the challenges they faced when attempting to adopt the Mediterranean diet. From the responses provided by these participants, it seems that the biggest challenges they have encountered were related to taste preferences, lack of nutrition knowledge, and availability of certain food products.

Some participants mentioned that they found the Mediterranean diet to be less flavorful compared to the Vietnamese cuisine, which is known for its abundant use of spices and herbs. It can be seen from the study that participants residing in Mediterranean countries, such as Italy, may have an edge in adapting to the Mediterranean diet, as they are already acquainted with some of the ingredients and flavors characteristic of this diet and may be more exposed to the diet thanks to the surrounding environment. Participants residing in non-Mediterranean regions encountered more difficulties related to obtaining the appropriate Mediterranean food products, especially cheese and fish, which are essential components of the Mediterranean diet (Castro-Quezada et al., 2014). This findings are in line with a review by Mattavelli et al., (2022), which highlighted that the availability and affordability of these foods may vary depending on the geographic location and socioeconomic status of the population.

In addition, there was some emphasis on the importance of having proper knowledge about nutrition and dieting to follow the Mediterranean diet effectively. The insufficient awareness and comprehension of nutritional and dietary principles among older Vietnamese cohorts can pose a challenge for them to change their eating habits, especially when they differ significantly from their customary cuisine.

Overall, these findings indicate that the difficulties faced by Vietnamese immigrants in adhering to the Mediterranean diet are multifaceted and are influenced by various factors such as taste preferences, availability and cost of Mediterranean food products, and understanding of nutrition and dieting. However, it is important to note that these findings are based on a small sample size and may not be generalizable to all Vietnamese immigrants living in these abovementioned countries.

5.4 Strategies and tips

The responses from the study indicate that the participants came up with various recommendations for making the Mediterranean diet more accessible and appealing to them. Some of the common suggestions include combining Vietnamese and Mediterranean cuisines in daily meals, gradually changing the source of macronutrients (such as using olive oil instead of butter or lard), snacking on nuts or veggies, eating more fish and less meat, trying new ingredients or dishes, and having fruits for dessert. These strategies are consistent with some of the best tips for mastering the Mediterranean diet suggested by experts (McManus, 2023).

Regarding participants living in Italy (a Mediterranean country), it was observed that incorporating seasonal fruits and vegetables, using olive oil instead of animal fats, and consuming wine during meals were commonly cited strategies for following the Mediterranean diet. Moreover, they emphasized the importance of drawing inspiration from the Mediterranean food culture and being aware of the foods included in the diet. Therefore, it can be seen that participants living in Italy seem to have easier time adapting to the Mediterranean diet, as they were already familiar with some of the ingredients and flavors. They also had more exposure to the diet thanks to the surrounding environment.

> “For me, the surrounding environment is very important also, because I have been inspired a lot by my Mediterranean friends when living here. I just need to know what foods are included in this diet so I can pick what I like and find suitable then prepare them the way I prefer. Mostly I choose to cook them in simple way to retain most vitamins and nutrients” [Participant 2, Italy].

On the other hand, participants living in non-Mediterranean countries viewed the Mediterranean diet as highly accessible and diverse, with a menu that does not completely restrict any particular food. They suggested prioritizing vegetables as the main course, incorporating white starches or refined cereals, as well as whole grain bread rice, and flour whenever possible. Additionally, some of them recommended trying one new ingredient at a time and exploring key techniques and food combinations to broaden options when making food, especially fusion dishes. From the study, it can be seen that despite facing more challenges related to accessing essential ingredients for the Mediterranean diet, Vietnamese participants living in non-Mediterranean countries demonstrated a greater curiosity and willingness to explore new foods and techniques to adopt the diets in creative ways.

5.5 Limitations of the study

As with any research endeavor, this study has some limitations that need to be acknowledged.

To begin with, the sample size for the quantitative study was relatively small, with only sixty-seven (67) participants primarily from Vietnam and Italy. This may have limited the generalizability of the findings to other populations and contexts.

Additionally, it is worth noting that the study was conducted in English, despite the fact that neither the participants nor the researcher were English speakers. As a result, some participants may have encountered difficulties in articulating their ideas and thoughts accurately due to their limited range of English vocabulary. Moreover, this data collection limitation could have affected the accuracy and reliability of the data, particularly among Vietnamese participants who may not have been proficient in English.

Furthermore, regarding the qualitative study, some of the participants may not have had sufficient knowledge about diet in general, and the Mediterranean diet in particular. While efforts were made to ensure that all participants had a basic understanding of the Mediterranean diet, some may not have had prior exposure to it, which may have affected their ability to provide detailed and accurate information about their dietary habits and preferences. This may limit the applicability of the findings to individuals who are more knowledgeable about the Mediterranean diet and its associated health benefits

Last but not least, the study used a cross-sectional approach, which limited its ability to establish causal relationships between variables or explore changes overtime. While this research design might

have been appropriate for the current study, future research may benefit from incorporating a longitudinal or experimental design to address these issues better.

Chapter 6. Conclusion

6.1 Summary of Research

In this study, the primary research objectives were to examine the dietary habits, cultural influences on food preferences, and the adoption of the Mediterranean diet among Vietnamese populations. The study aimed to explore the similarities and differences between the Vietnamese and Mediterranean diets in terms of history and health factors, as well as identify the challenges and strategies associated with adopting the Mediterranean diet among Vietnamese immigrants residing in some selected regions. Moreover, the study provided insights into tactics for promoting healthier dietary practices within this population.

By combining both quantitative and qualitative methods, a comprehensive understanding of the dietary patterns and cultural influences among Vietnamese populations was obtained. The research design allowed for the examination of not only the quantitative aspects of dietary habits and adherence but also the qualitative experiences and motivations that shape individual's dietary choices.

The study's findings shed light on the dietary patterns, food preferences, adherence scores, and perspectives of Vietnamese immigrants regarding the Mediterranean-style diet. Through the research process, important insights were gained into the challenges faced by this population in adopting a new dietary pattern, as well as the factors that facilitate their transition towards a healthier lifestyle.

Overall, this study contributes to the existing literature by providing a deeper understanding of the dietary habits and cultural influences among Vietnamese populations, focusing on Vietnamese immigrants in some particular regions, and the potential for adopting the Mediterranean diet. It highlights the importance of considering cultural contexts and individual experiences when promoting healthier dietary practices in immigrant populations.

6.2 Key findings and insights

This study has generated several key findings and insights that contribute to a deeper understanding of dietary habits and cultural influences among Vietnamese populations, as well as the potential for adopting the Mediterranean diet. These findings carry important implications for promoting healthier dietary practices within Vietnamese immigrant communities.

Firstly, the study revealed diverse dietary habits and varying levels of adherence to the Mediterranean diet among Vietnamese populations residing in different regions of the world. The findings shed light on the preferences and attitudes of Vietnamese immigrants towards healthy diets, particularly their

perspectives on adopting the Mediterranean diet. In terms of dietary habits and cultural influences, the study indicated that Vietnamese populations have unique dietary patterns influenced by their cultural background, with a preference for traditional foods. According to this study, Vietnamese immigrants exhibited a blend of traditional Vietnamese dietary patterns and influences from the host culture, showcasing the dynamic nature of dietary habits among immigrant populations (Thuy Xuan Uyen & Chambers, 2020). This exploration allowed for a deeper understanding of the challenges faced by Vietnamese immigrants when trying to follow the Mediterranean diet in their host countries, as well as strategies employed to overcome these challenges.

A comparison between Vietnamese immigrants residing in Mediterranean and non-Mediterranean countries highlighted differences in their dietary practices. Participants living in Mediterranean countries, specifically in Italy, demonstrated a relatively easier adaptation to the Mediterranean-style diet, given their familiarity with the ingredients and flavors intrinsic to the diet. Conversely, participants living in non-Mediterranean countries encountered challenges in accessing essential Mediterranean ingredients. However, they exhibited a greater curiosity and willingness to explore new foods and techniques, showcasing their adaptability and creativity in adopting the Mediterranean diet in diverse cultural contexts.

Regarding the adoption of the Mediterranean Diet, it was found that many Vietnamese immigrants have had limited awareness and knowledge about the Mediterranean diet itself. However, once introduced to the concept, they showed a positive perception of its health benefits. Through the exploration of favorite Vietnamese and Mediterranean dishes among participants, the study also delved into their perceptions of the nutritional aspects of the theses dishes. This provided valuable insights into the intersection of cultural culinary traditions and nutritional choices among Vietnamese populations.

6.3 Recommendations

The research findings have important implications for promoting healthy dietary practices among Vietnamese populations, particularly in relation to the Mediterranean diet. The following recommendations can be derived from the study:

- Blending Vietnamese and Mediterranean diet cuisines can be a practical strategy to make the Mediterranean diet more accessible and appealing to Vietnamese immigrants. This approach allows for the preservation of cultural culinary traditions while incorporating the health benefits of the Mediterranean diet.

- Gradually transitioning to Mediterranean macronutrient sources, snacking on nuts or veggies, increasing fish consumption, and trying new ingredients or dishes were suggested strategies to facilitate the adoption of the Mediterranean diet among Vietnamese immigrants.
- Further research is recommended to explore additional dimensions of cultural influences on dietary practices among Vietnamese populations and assess the long-term effects of adopting the Mediterranean diet. Additionally, future studies can involve larger and more diverse samples, covering a wider range of regions and cultural backgrounds, to enhance the generalizability of the findings.

In conclusion, this study contributes to a deeper understanding of dietary habits, cultural influences, and the potential for adopting the Mediterranean diet among Vietnamese populations. The implications and recommendations derived from the findings can guide the development of effective strategies and interventions aimed at improving the overall well-being of Vietnamese communities, particularly in relation to their dietary choices.

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