

An Exploratory Study Examining Mediterranean Diet Perceptions, Eating Practices, and Food Choice of Emerging Adults from Cyprus and the United States

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ABSTRACT

Background. The Mediterranean Diet (MD) is a food pattern that offers numerous potential health benefits. Mediterranean countries, including Cyprus, are experiencing a decline in adherence to the traditional MD while other non-Mediterranean countries, such as the United States (U.S.), are providing recommendations to increase adherence to the MD.

Objective. The aim of this research was to explore the foods, eating practices, and perception of the MD in emerging adults (18-25 years of age) from a Mediterranean (Cyprus) and non-Mediterranean (U.S.) country to better understand emerging adult adherence and behaviors related to a MD pattern.

Design. An exploratory descriptive study was designed to include focus group interviews to understand perceptions and eating practices as well as dietary assessment using the Mediterranean Diet Score Survey and Harvard Food Frequency Questionnaire for calculation of the alternate Mediterranean Diet Score to determine MD adherence among emerging adults in Mediterranean and non-Mediterranean regions.

Participants/Setting. Twenty-four emerging adults from Cyprus and the U.S. participated.

Analysis. Descriptive approaches for analysis of qualitative and quantitative data were used. A qualitative content analysis was used for focus group interview data that included both inductive and deductive processes. Descriptive statistics were used to describe participant demographic and dietary characteristics.

Results. Themes that emerged from the focus group interviews included perceptions of MD foods, health benefits of a MD, lifestyle cooking and eating practices, and influences on food choice in Cyprus and the U.S. While perception of MD foods and eating practices differed, MD adherence scores and participant identification of health benefits did not differ. Likewise, there were similar influences on food choice among emerging adults from both populations.

Conclusion. These findings suggest that emerging adults may acknowledge health benefits of a MD but can benefit from emphasis on food preparation and other behaviors to promote MD food pattern adherence in both Mediterranean and non-Mediterranean countries.

INTRODUCTION

The Mediterranean diet (MD) has numerous potential cardiovascular, metabolic, cognitive and oncologic health benefits as well as overall promotion of longevity (Keys et al. 1966; Martínez-González et al. 2019; Esposito et al. 2014; Shannon et al. 2019; Sadeghi et al. 2019; Couto et al. 2011; Eleftheriou et al. 2018). The food pattern of the MD is characterized by a high consumption of vegetables, fruits, legumes, nuts, cereals, and olive oil; a moderately high intake of fish; and a low intake of red and processed meats, sweets, and saturated lipids (Willett et al. 1995). Behavioral characteristics of the Mediterranean lifestyle include serving sizes based on moderation, food seasonality, sourcing local ingredients, consuming traditional products, sustainability, personal participation in the preparation of food, physical activity, adequate hydration, and relaxation and rest (Bach-Faig et al. 2011).

It is important to note that there is no single “MD;” rather, it varies by cultural heritage and geographic region, food preferences, and food availability in countries of the Mediterranean basin, including Cyprus, Croatia, Spain, Greece, Italy, Morocco, and Portugal (Vareiro et al. 2009; UNESCO 2013). Historically, the MD is considered to be the dietary pattern found in areas that cultivated olive oil in the Mediterranean region in the late 1950s and early 1960s, before a Western food culture was introduced to that area (Trichopoulou et al. 2014). When this dietary pattern was first associated with cardiovascular health benefits, it was influenced by cultural traditions and by poverty. Since this time, traditional MD food patterns have grown in popularity around the globe.

The most recent Dietary Guidelines for Americans (2015-2020) have taken some steps to recommend adaptation to the MD food pattern for the American population (USDA n.d.). In the U.S., promotion of Mediterranean culinary practices is multifaceted and includes cookbooks, internet websites, personal blogs, and news articles (Martínez-González et al. 2017). However, there are several myths, misconceptions, and challenges that present themselves when the ideals of the MD are transferred to the U.S (Martínez-González et al. 2017; Jacobs et al. 2018). Furthermore, the literature lacks a description of how the MD is interpreted and perceived by American adults, and even less is known of younger generations who can benefit from long-term healthy dietary patterns. Assessing the health and nutrition practices of emerging adults is important because these habits can be carried from young adulthood to advanced age (Nelson et al. 2008).

Emerging adulthood is a life stage transition that often coincides with greater responsibility and independence in food choices (Nelson et al. 2008). While the MD is growing in popularity in the U.S., there has been a decline in traditional dietary patterns among people living in Mediterranean countries (Vareiro et al. 2009; Balanza et al. 2007; da Silva et al. 2009); particularly poor adherence to the MD food pattern has been observed in young adults from Greece, Portugal, Spain, and Cyprus (García-Meseguer et al. 2014; Albuquerque et al. 2017; Farajian et al. 2011; Hadjimbei et al. 2016; Kyriacou et al. 2015). Younger generations in Mediterranean countries risk losing the traditional culture and potential health benefits of this dietary and lifestyle pattern (Cabrera et al. 2015; Serra-Majem et al. 2001; Saulle et al. 2016).

Several indexes have been developed to evaluate the degree of adherence to the MD food pattern (Fung et al. 2006; Panagiotakos et al. 2006; Schröder et al. 2011; Serra-Majem et al. 2004); however, none measure lifestyle behaviors for emerging adults or influences on food and eating practices. Most MD research to date has focused on the food pattern but not the lifestyle, behavioral, and eating practices that accompany the traditional Mediterranean lifestyle. In

acknowledgement of the MD health benefits, an understanding of eating practices and behaviors with the foods that compose this dietary pattern are needed.

Although the decline in the MD food pattern in Mediterranean countries is known, there is a gap in the literature on how young adults perceive and understand the MD and associated lifestyle practices and how this and other influences can impact eating patterns and food choice (Hadjimbei et al. 2016). This lack of knowledge is problematic from an assessment as well as health and dietary education standpoint (Hardcastle et al. 2015; Sogari et al. 2018). Studying the perception of the MD, eating practices, and influences of food choice can provide an awareness of MD food and dietary behaviors among emerging adults. Furthermore, exploring these perceptions using a sample of emerging adults from Mediterranean and non-Mediterranean countries can offer insights into how culture and tradition impact perceptions of dietary patterns, food choice, and eating behaviors. Therefore, the purpose of this study was to explore the cultural, lifestyle, and behavioral eating patterns and practices, perceptions of, and adherence to the MD in emerging adults from Cyprus and the U.S.

METHODS

Study Design

This study used an exploratory descriptive approach, with qualitative and quantitative data collection methods. Exploratory descriptive designs allow for an in-depth study of phenomena, of which little is known, from the perspective of persons being studied, offering understandings that can contribute to theory development or preface causal research (Brink and Wood 1998; Kim et al. 2017). Focus group interviews were used to explore diet perception, eating practices and influence on food choices, and descriptive questionnaires to examine MD and lifestyle influences on eating patterns and food choice in emerging adults from Cyprus and the U.S. These data collection methods were chosen to describe eating patterns and influences in relation to the MD in Mediterranean and non-Mediterranean countries to offer insights into mechanisms of diet practices and intervention design. The study was approved by the Eastern Michigan University Institutional Review Board; all participants provided written informed consent to participate in this research.

Participant Recruitment in Cyprus and U.S.

Emerging adults aged 18-25 years were recruited from Cyprus and the U.S by the same member of the research team (EA). Recruitment in Cyprus occurred during the summer of 2015 while U.S. recruitment occurred during fall of the same year. In Cyprus, emerging adults were recruited through word of mouth and snowball sampling, using flyers posted at summer camps and locations where university students typically work or volunteer during summer break. In the U.S., recruitment was isolated to the campus of a comprehensive regional university in southeast Michigan using flyers posted around campus, word of mouth, and snowball sampling. In order to be included in the study, participants must have been between 18-25 years old and spent the majority of their lives in the country in which they were recruited. Exclusion criteria included chronic conditions that might impact dietary behaviors (i.e., diabetes mellitus, inflammatory bowel disease, or food allergies) as well as those who were enrolled in a dietetics program, as it was assumed that they would have an unrepresentative knowledge of diets and nutrition.

Potential participants were screened for inclusion/exclusion criteria via a brief phone interview. Cypriot participants were enrolled at multiple universities at the time of the study and were all raised in Cyprus. All U.S. participants were enrolled at the same university and all raised in the U.S. Upon inclusion into the study, described above, participants were assigned to a focus group interview session, depending on their availability.

Data Collection

Three focus groups were held in each country (6 total) in order to generate necessary data for thematic analysis relative to eating practices and perceptions of MD in each population (Guest et al., 2017). The number and size of focus group interviews were determined based upon the logistical constraint of completing this study within a specific time period, a desire to have smaller, more intimate discussions, and the purpose of this data collection method to offer exploratory insights to address research questions (Krueger and Casey 2015). Participants only participated in one group each.

Focus group interviews were led by the same facilitator (EA) who is bilingual in Greek and English, following established procedures of data collection (Lincoln and Guba 1985). Two out of three focus group interviews with Cypriot participants were conducted in Greek. All three focus group interviews in the U.S. were conducted in English.

Focus group interviews were conducted in private rooms in both locations for a duration of 30-45 minutes each. Each focus group began with the facilitator reminding participants of the confidentiality of responses and the use of first names only during the interview. Questions that were included in the interview guide were derived from an extensive review of the literature to assess factors that influence understanding of the MD as well as eating practices among people in Mediterranean and non-Mediterranean regions. Focus group interview questions were initially developed by the first author to provide insights and perceptions about key components of the MD as well as participants' own eating and lifestyle habits (Charmaz 2014). These questions were revised and finalized based upon feedback from the second and third authors and from piloting them with individuals who speak and understand both the Greek and English languages. The final focus group interview guide was structured from the work of Kruger and Casey (Krueger and Casey 2015). See Figure 1 for a list of questions.

In reflexive efforts to enhance trustworthiness of the research (Lincoln and Guba 1985), the first author (EA) reflected upon the process and content of interview sessions and debriefed these reflections with other members of the research team in a reflective dialog after each interview, via video conference or in person. These reflective dialogs allowed for initial notation of emerging findings and to modify the focus group interview process. For example, after the facilitator noted that the focus group interviews may proceed more smoothly in the native Greek language, she conducted the second and third Cypriot focus groups in the Greek language.

In addition to focus group data collection, participants completed a questionnaire to provide demographic information and health histories. Participants' height and weight were measured for BMI calculation (kg/m²). Weight and height were measured with the use of portable scales and a stadiometer at the two different locations. All measurements were taken with shoes and heavy clothing removed. To assess physical activity of the participants, the Rapid Assessment of Physical Activity (RAPA) questionnaire was used which included questions about the type and intensity of physical activity (Topolski et al. 2006).

Adherence to the MD was evaluated by self-report using two different instruments, the Panagiotakos MD Score (MDS) questionnaire (Panagiotakos et al. 2006) and the alternate MD

Score (aMed) (Fung et al. 2006). The MDS food groups were assigned a score from 0-5, with points for all food categories totaled, for a possible range of 0-55 (Panagiotakos et al. 2006). The aMed is based on the scale Trichopolou and colleagues (Trichopoulou et al. 1995; Trichopoulou et al. 2003) designed to assess the traditional MD. Some modifications were made for use in the U.S. and to determine adherence based on Food Frequency Questionnaire (FFQ) data (Fung et al. 2006). The Harvard FFQ was used in this study to calculate the aMed score and to determine average total calorie and macronutrient intakes (Willett et al. 1985). Scoring for the aMed calculation followed procedures outlined by Fung et al (Fung et al. 2006); the aMed score ranges from 0-9. For both scales, higher score represents higher adherence to the MD food pattern.

Figure 1. Focus group interview questions asked of emerging adults from Cyprus and the U.S. who participated in the exploratory descriptive Mediterranean diet research study

Focus Group Questions:
What do you think is important to include in a healthy diet or lifestyle?
What are your meals like in a typical day? <ul style="list-style-type: none"> ● Where do you usually eat your meals?
When you hear the term, MD, what do you think of?
What are some foods that are included in the typical MD?
Please describe your meal circumstances. For instance: <ul style="list-style-type: none"> ● How might your eating habits/meal patterns be similar to the MD? ● How might they be different from the MD? ● What is your biggest meal of the day? (time?) ● Who do you share that meal with? ● What goes into the preparation of your biggest meal?
What influences your food choices and meal circumstances? <ul style="list-style-type: none"> ● Location/convenience/ taste/ health/ cost/ who you are with?
What health benefits, if any, would you associate with a MD?
Is there anything else you want us to know about the Mediterranean style of eating/diet?

Data Analysis

All focus group interviews were audio recorded and transcribed verbatim, replacing names with participant numbers. The focus group interviews conducted in Greek were translated into English (by EA) during the transcription process. A qualitative content analysis was used to analyze focus group data, as described below, for confirmability (Charmaz 2014; Lincoln and Guba 1985; Merriam and Tisdell 2016). Focus group interview transcripts were printed and data germane to the research questions were highlighted and coded by the first author with a descriptive word or phrase that describes the data. While coding, the first author noted important emerging understandings and similarities among participants' perceptions. Re-occurrence of codes among transcripts were used to consider significance in initial coding development. Using the initial codes, an inductive process of coding, including line-by-line coding, was performed adding additional descriptive codes that were not included in the initial code list (Merriam and Tisdell 2016). Consensus coding occurred between authors on this manuscript; codes and operational definitions were discussed and refined and individual coding of transcripts was performed to confirm a consistent coding process. A codebook was developed with all codes and

associated quotes with operational definitions of codes. These codes were then grouped together, where category concentrations were generated from code groupings through research team discussion. Themes and subthemes were then organized through deductive analysis into a spreadsheet by thematic finding based upon research questions (understanding perceptions and eating practices of emerging adults in Mediterranean and non-Mediterranean regions) with relevant quotes from focus group transcripts (Merriam and Tisdell 2016). Once the initial thematic spreadsheet was developed and organized by research question, the third author (HHW) examined each transcript independently to confirm all relevant quotes were included in spreadsheet and thematic descriptions fit the raw data.

Data analysis of measures included in the quantitative questionnaires was performed using the Statistical Package for Social Science (SPSS) version 25 and used descriptive statistics. Continuous variables are presented as mean±SD, whereas categorical variables are presented as frequencies and percentages. When examining dietary data, extremely low (<500 kcals per day) and extremely high (>6,000 kcals per day) reported intakes via the FFQ were removed from analysis. Due to the small sample size, only demographic and dietary data are used to describe participant characteristics.

After focus group interviews were analyzed and adherence score data were calculated, findings were compared to develop a larger understanding of perception of the MD within the context of actual food consumption patterns. This analysis strategy using qualitative findings and descriptive data allowed for a broader understanding of Mediterranean lifestyle patterns related to dietary intake and will be reported together.

RESULTS

Participant Characteristics

Twenty-four emerging adults aged 18-25 from Cyprus and the U.S. participated in the study. Cyprus focus groups included an average of 5 participants in each group (range: 4-6; 15 total Cypriot participants) and U.S. focus groups included an average of 3 participants in each group (range: 2-4; 9 total U.S. participants). Of the 24 participants, 13 were men and 11 were women with a mean age of 22.72± 1.93 (Table 1). At the time of data collection, most of the participants from Cyprus lived in a house (n=14) with their family (n=14), whereas the majority of the participants from the U.S. lived in apartments (n=5) with a non-family roommate (n=5). The majority of the participants from Cyprus were college graduates (n=11) and the majority of the participants from the U.S. had completed some college (n=6).

Mediterranean Diet Adherence and Perceptions

Perceptions of MD will be presented here along with the descriptive results of the MD adherence measures to provide a context of food intake regarding similarities and difference in perception among participant groups.

Mediterranean Diet Adherence

The MDS and aMed dietary scoring systems were used to assess adherence to a MD food pattern. Two participants were excluded from dietary analysis in the aMed score due to

Table 1: Characteristics of emerging adult participants from Cyprus and the USA who took part in focus group interviews to explore healthy eating and Mediterranean diet perceptions.

Variables	All (n=24)	Cyprus (n=15)	USA (n=9)
Age (years)	22.73 ± 1.94	23.43 ± 1.73	21.53 ± 1.73
Height (cm)	1.69 ± 0.13	1.67 ± 0.97	1.71 ± 0.17
Weight (kg)	70.1 ± 14.34	66.06±12.73	76.8 ± 15.6
Body Mass Index^a	24.31 ± 3.31	23.33 ± 2.79	25.98 ± 3.61
Gender			
Male	13 (54.2%)	8 (53.3%)	5 (55.6%)
Female	11 (45.8%)	7 (46.7%)	4 (44.4%)
Race/ Ethnic Background			
Asian/ Pacific Islander	2 (8.3%)	0 (0%)	2 (22.2%)
Black/ African American	1 (4.2%)	0 (0%)	1 (11.1%)
Hispanic/ Spanish	1 (4.2%)	0 (0%)	1 (11.1%)
White/ Caucasian	18 (75%)	14 (93.3%)	4 (44.4%)
Other	2 (8.3%)	1 (6.7%)	1 (11.1%)
Marital Status			
Married/Significant other	2 (8.3%)	2 (13.3%)	0 (0%)
Divorced	1 (4.2%)	0 (0%)	1 (11.1%)
Single	19 (79.2%)	11 (73.3%)	8 (88.9%)
Other	2 (8.3%)	2 (13.3%)	0 (0%)
Living Situation			
House	16 (66.7 %)	14 (93.3%)	2 (22.2%)
Apartment	6 (25%)	1 (6.7%)	5 (55.6%)
Dormitory Hall	2 (8.3%)	0 (0%)	2 (22.2%)
Living With			
Family	16 (66.7%)	14 (93.3%)	2 (22.2%)
Spouse	1 (4.2%)	1 (6.7%)	0 (0%)
Alone	2 (8.3%)	0 (0%)	2 (22.2%)
Roommate	5 (20.8%)	0 (0%)	5 (55.6%)
Type of education			
High school graduate	4 (16.7%)	2 (13.3%)	2 (22.2 %)
Some college	8 (33.3%)	2 (13.3%)	6 (66.7%)
College graduate	8 (33.3 %)	7 (46.7%)	1 (11.1%)
Post-graduate work	4 (16.7%)	4 (26.7%)	0 (0%)
Smoking			
Currently smoking	7 (29.2%)	4 (26.7%)	3 (33.3%)
Used to smoke	1 (4.2%)	0 (0%)	1 (11.1%)
Never smoked	16 (66.7%)	11 (73.3%)	5 (55.6%)
Drinking			
Yes	17 (70.8%)	11(73.3%)	6 (66.7%)
No	7 (29.2%)	4 (26.7%)	3 (33.3%)

Activity level

Sedentary, Underactive	4 (16.7%)	3 (20.0%)	1 (11.1%)
Underactive, Light	6 (25.0%)	4 (26.7%)	2 (22.2%)
Underactive, Regular	4 (16.7%)	4 (26.7%)	0 (0%)
Active	10 (41.7%)	4 (26.7%)	6 (66.7%)

Mediterranean Diet**Adherence**

Total aMed Score ^b	4.38 ± 2.04	4.00 ± 1.84	5.14 ± 2.34
MDS	29.50 ± 6.38	29.50 ± 6.45	29.50 ± 6.68

Data are presented as mean ± SD or number of participants (%)

aMed= alternative Mediterranean Score, MDS= Mediterranean Diet Score

^aCalculated as kg/m²

^bAll participants n=21, U.S. participants n=7

extremely low (n=1 from Cyprus) or extremely high (n=1 from U.S.) reported intake on the FFQ. The average aMed and MDS scores did not differ by country (Table 1). Macronutrient intake as a percent of total calories by country was determined from the FFQ data. U.S. participants reported a clinically meaningful higher caloric consumption, on average, compared to the average amount of calories consumed by Cypriot participants (2440±846 vs. 2036±673, respectively). To understand where differences in intake may have occurred, macronutrients as a percent of total caloric intake were assessed. Cypriot participants consumed less carbohydrates and more total fat; whereas, the opposite was observed from U.S. participants (43% of energy from carbohydrates and 36% of energy from total fat vs. 55% of energy from carbohydrates and 28% of energy from total fat, respectively).

Mediterranean Diet Perception

Differences and similarities of MD perceptions among U.S. and Cypriot participants emerged as a major theme during qualitative analysis of focus group interview data. This theme of MD perception was further organized into three subthemes, which yield an understanding of insights or misconceptions of the MD. This section is organized by the three subthemes: *perceptions of MD foods*, *health benefits of the MD*, and *perceptions and practices of eating behaviors that align or differ to that of a MD and lifestyle*. Quotes to support themes and subthemes are presented in Figure 2.

Perception of Mediterranean Diet Foods: Focus group participants were asked to describe foods they commonly considered when they heard the term “MD.” Responses from participants had both similarities and differences between countries. Participants from both countries identified fish/seafood, vegetables, and one of the most important components of the MD: olive oil. U.S. participants also identified fruits, shawarma, hummus, and grape leaves, as common components of a MD. Two of the U.S. participants perceived Mediterranean foods as including foods from Middle Eastern cuisine; some of which are also considered in a MD, but some not (e.g., shawarma). Participants from Cyprus were able to identify more food items specific to a MD food pattern as understood in the literature.

Health Benefits of a Mediterranean Diet: While participants' understanding of and adherence to MD food patterns differed slightly, the majority of participants from both countries were able to identify similar health benefits associated with the MD, such as increased life span,

decreased risk of developing cardiovascular disease, lower blood pressure and lower cholesterol. However, not all participants associated the MD with health benefits or knew of health or medical conditions associated with this dietary pattern. While Cypriot participants characterized the MD as one that contains healthy foods, not all participants from Cyprus emphatically considered the MD to be a healthy one, or had a clear definition of the MD. Overall, lack of clear understanding of a MD, in both groups, seemed to impact some participants' assessment of this diet.

Perception of Similarities in Eating Practices to the Mediterranean Diet: Most of the Cypriot participants reported that their eating patterns were similar to the MD at meal times; however, they described differences in between-meal snacking habits. As with the health benefits, some participants from Cyprus wanted to have a clear description of the MD to be able to identify if their eating practices were similar. Nearly all of the participants in the U.S. reported that their diet was not similar to the MD.

Meal preparation was identified as an important aspect of the MD for the emerging adults from Cyprus, but not for the U.S. young adults. Cypriot participants reported that their grandmother or mother usually takes a good deal of time to prepare the family meals. Conversely, participants from the U.S. reported that they usually eat something "quick" that does not require a lot of preparation and they often eat "take-out" food. When participants were asked to describe their own meal preparation practices to identify if they were similar to the MD practices, Cypriot participants reported that there is personal participation when it comes to the preparation of food which aligns with the MD practices.

Eating Patterns and Practices of Emerging Adults in Cyprus and U.S.

Qualitative data analysis of focus group interviews revealed a second major theme of eating patterns and food practices among participants in the U.S. and Cyprus. Participants described personal eating patterns and habits as well as cultural and circumstantial influences on food practices. Components of eating patterns and practices included: *healthy eating and lifestyle, living arrangements, meal preparation, largest meal of the day, activities or distractions during meal consumption, and influences on food choice*. These eating pattern components are described below and in Figure 3, with representative quotes.

Healthy Eating and Lifestyle

Participants from both Cyprus and the U.S. identified fruits, vegetables, and exercising as components of a healthy eating pattern. Olive oil was also included as a component of healthy eating from a Cypriot group. The idea of moderation and portion size was discussed by one U.S. focus group. Overall, the participants from both countries were able to identify components that are important for healthy eating and lifestyle.

Living Arrangements, Meal Preparation, and Eating Patterns

As noted in the participant characteristics results, the majority of the Cypriot participants were living with family; whereas, the majority of U.S. participants were living on campus or with roommates in apartments. Living arrangement and meal preparation were intertwined components of eating practices and with how participants viewed their perception of personal

Figure 2. Qualitative coding scheme with illustrative supportive quotes from emerging adult participants in Cyprus and the U.S.

THEME: Mediterranean Diet Perceptions		
SUBTHEME	SUPPORTING QUOTES- CYPRUS	SUPPORTING QUOTES- U.S.
Food Perception	“Olives, olive oil, fish, vegetables”	“Shawarma” “Hummus, grape leaves”
	“Olive oil, dish, salads, wine (one glass per week), chicken”	“Lots of seafood and fruits and vegetables, I guess”
	“MD for me contains mostly fish, cooking with olive oil, the salads contain olives”	“I grew up with Middle Eastern food, so hummus is not new to me. When we eat at Mediterranean restaurants, I eat grape leaves, gyros, hummus. When I hear the term MD, I think about foods that they are consisted with vegetables and less meat.”
		“Olive oil, feta cheese”
		“When I think MD, I think of Arabic foods that are involved with the MD”
Health Benefits	“Live longer”	“Longer life expectancy”
	“We consume lots of olive oil which contains ‘good’ fat that helps you reduce your cholesterol” “Better blood pressure”	“They are less likely to suffer from a cardiovascular disease”
	“I am not sure about the benefits because I do not have a clear definition of the MD in my head. I think it is a healthier lifestyle compared to other diets but I never got a clear definition of the MD and how it benefits me so I cannot answer this question with confidence.”	“I believe that [the MD] is a healthier diet compared to the American diet and it has a distinctive taste so a lot of people who are trying to eat healthier and have a vegetarian diet, this is the perfect diet for them because it has a lot of flavors and it is healthy at the same time. There are a lot of people that need to eat more vegetables or fruits and do not know where to begin. A lot of doctors are recommending the MD. I have a heart condition so my doctor recommended me this diet.”
	“Cardiovascular disease”	“I do not think that it is the most healthy diet but I do consider it to be healthier than the American diet so yes [MD is a healthy diet].”
	“I really thought that the MD is not that healthy and that is what we are used to eat.”	
Perception of Similarities and Differences in Food Practices	“I think that my diet is similar to the MD, I eat legumes, vegetables fish but also eat chocolate and sweets, and ice-cream.”	“I don’t think that it will be similar because I do not eat healthy and I eat a lot of red meat”
	“It differs a little, as I mentioned earlier, I do not eat legumes. I do not eat five times per week fish, but we do eat meat. I use olive oil”	“I usually have take-out or frozen food, which usually does not require preparation”

	<p>“I think it depends from the season, but some days my diet is fully based on the MD, I will eat fish, a salad. Other days I going to consume red meat, muesli for breakfast, pizza for dinner so it will not be similar to the MD”</p>	<p>“We are into eating a lot of nutritional food as well, even though when I am at school I can’t find it and I don’t have a lot of access and I eat a lot of bad food, but when I am home I see a lot of similarities (with the MD).”</p>
	<p>“I think it is, because I eat a lot of salads, usually the salad dressing that I use is olive oil. If we are going to cook something, we are going to use olive oil and usually the products that we consume are low in carbohydrate and since we are in the Mediterranean, I think our diet is Mediterranean”</p>	<p>“I try to follow not specifically the MD but when I think MD, I think of Arabic foods that are involved with the MD so I try to stick as close to the Arabic MD as I can do, because I grew up with that diet and it is definitely healthy”</p>
	<p>“There is a lot of preparation going into my meal but I do not do it, my mother does the preparation”</p>	<p>“If I need something quick, I will grab something that would require the least amount of preparation”</p>
	<p>“I eat with my family; we sit around the table and my grandmother prepares the meal”</p>	

eating and dietary behaviors. Both groups of Cypriot and U.S. participants noted differences in eating behaviors and meal preparation when living with family or while at school. For participants in both countries, when at home, usually either a mother or grandmother cooked meals for the members of the family. The amount of preparation in the meals varied. As reported in the section above, Cypriot participants noted meal preparation without pre-packaged ingredients when at home but due to lack of time the challenge in maintaining this practice while living at school or otherwise away from family. The participants from the U.S. reported that they usually eat something “quick” that does not require a lot of preparation and frequent consumption of “take-out” food. This differed for some U.S. participants when they were with family, but not for all.

Biggest Meal of The Day

Mealtime was also discussed in the focus groups to gather a sense for when the participants have time to prepare and eat a large meal. The majority of Cypriot participants identified lunch as their biggest meal of the day, some noted that dinner is sometimes the largest meal but that lunch is preferred. Most of the U.S. participants, however, identified dinner as their biggest meal or both breakfast and dinner as a large meal, without time in the day to stop for lunch due to class schedules and therefore relied more on snacking behaviors.

Distractions During Meal Consumption

Participants in both countries described various forms of distraction while eating. Cypriots mostly noted they were eating with others and sometimes in-front of the television all together when at home. In the U.S. they reported mostly eating alone, and the majority of times in front of their television, laptop, or their phones. There were differences, however, in that some

U.S. participants also noted eating with family when at home, so this lifestyle of eating alone may be secondary to life at university.

Influences on Food Choices

Participants from both Cyprus and the U.S. reported that schedule, time, taste, and cost influence their food choices. The seasons, especially the heat in summer, was noted by Cypriot participants. Cypriot participants noted that when there is little time for themselves to cook, especially with less time during the week, they eat less healthy. Time for U.S. participants seemed to be a driver for the use of convenience foods, where participants indicated they experienced lack of time and cooking skills, contributing to lack of meal preparation when living at school. Location and living situation are also possible influences on food choice and eating patterns in emerging adults. Taste was described as an important factor for food choice in both countries; further, some participants indicated that taste had a stronger influence on their food choice than health or nutritional value of foods. Lastly, participants from both countries described that cost impacted food choice, including that they would like to consume more healthy foods but they were cost prohibitive.

DISCUSSION

This exploratory study highlights several key issues regarding perception of the MD and actual eating patterns including food preparation, food behaviors, and health benefits. There are similarities and differences in eating patterns, perceptions of and adherence to the MD food pattern, and lifestyle factors that impact food choice in emerging adults from the U.S. and the Mediterranean country of Cyprus. Emerging adults from both countries had similarities in adherence scores, perception of health benefits, and identified time, living arrangement, cost, and taste as influences on food choice and perceived healthy eating. However, there are different food-related practices and intake behaviors between emerging adults in Cyprus and the U.S. that may be partially explained by culture and living arrangements.

Key features of the MD such as olive oil and fish/seafood, that separate this food pattern from others, were identified by participants from both countries. Perceptions of the foods in the MD, however, did not seem to impact the adherence scores or eating patterns. Some foods identified from the U.S. participants are not part of the traditional MD pyramid but are similar to a Middle Eastern style diet. This could be a reflection of the location of the study in the U.S. as the U.S. participants were recruited from a midwestern university in southeast Michigan which has a high population of individuals from a Middle East background. While participants from Cyprus were able to identify major food components, some did not have a clear understanding of components of the MD. This difference in ability to readily identify diets and dieting behaviors may be attributable to a culture of diets and dieting in the U.S. that can differ in other countries and cultures (Yu et al. 2010). The majority of Cypriot participants relied on family members to prepare meals, so it is possible that they did not have to think about food patterns and cooking as much as those who live on their own. It is interesting to note that participants in this study understood that the MD goes beyond food intake, as many described behavioral lifestyle components, such as dedicated food preparation and eating with family. Both groups' perceptions of food preparation by the mother or grandmother was reflective of the traditional

Figure 3. Illustrative quotes from emerging adult participants in Cyprus and the U.S. on the theme “Eating patterns and practices of emerging adults in Cyprus and the U.S.”

THEME: Eating Patterns and Practices of Emerging Adults in Cyprus and the U.S.		
COMPONENTS	SUPPORTING QUOTES- CYPRUS	SUPPORTING QUOTES- U.S.
<i>Description of healthy eating</i>	“I think is important to include [in a healthy lifestyle] fruits and vegetables and protein, meat, especially chicken.”	“I would say fiber, a lot of vegetables and legumes, poultry, and not so much red met and obviously an active life, physical activity”
	“Eating fruits and vegetables, exercise, olive oil”	“I like the idea of, one in my health science class the plate should have 50% vegetables, 25% fruits and 25% proteins- meats and other include dairy”
	“Fruits and vegetables and some light exercise”	“Healthy diet I think would be fruits and vegetables and everything in moderation and also exercise”
<i>Living arrangement and eating patterns</i>	“Usually there is preparation going into my meal. When I am in the United Kingdom [for University] I do it myself, when I am in Cyprus, food is prepared by my mother or grandmother”	“For me definitely living in the dorms gets a lot worse because during the summer when I am home my stepmother cooks dinner at least five times a week or so”
	“When I was studying abroad, in Manchester, I used to eat with my roommates but now I eat with my family”	“I get food that is ready to eat, I haven’t cooked since I have been in college”
	“When I was in the United Kingdom, I was eating a good breakfast but now I eat breakfast, lunch, dinner, but my lunch is more like a snack”	“If I need something quick, I will grab whatever requires the least amount of preparation which is usually pop-tarts and is not as healthy as scrambled eggs but you know, I can take that and run out of the door”
	“When I am home it will make me want to cook my own food or cook meals but then otherwise, I will just eat whatever is there.”	“... When I am home with my parents, they will cook every meal, breakfast, lunch and dinner, you are going to sit down with them and eat and enjoy everything, but I feel that our culture is more go-go-go so it’s not able to enjoy the food, usually you have to eat something and keep going”.
	“I eat with my family, actually our lives are hectic so I eat with the person that is home”	“I have to say my mom [influenced meal patterns] because she took care of me and she needed to work a lot of jobs so most of the time we had take-out”.
<i>Biggest meal of the day</i>	“My biggest meal is lunch and is usually around 1:30 pm”	“I probably I eat breakfast two or three times per week not that often then I snack during the day and my lunch and my dinners are about the same size.”
	“Lunch is the most important meal for me”	“Breakfast for me is must, it’s hard for me to focus during the day if I do not have breakfast”

	“I know it is wrong but my main meal is dinner, sometimes my main meal is lunch. I try to balance lunch with dinner and not eat that much. I do not always manage to do that and I end up eating more”	“Probably dinner, usually anytime between 3pm and 6 pm, and it usually taken out”
Distractions during meal consumption	“I eat my lunch in-front of the TV, and dinner we sit around the table”	“While I am eating, I will be on my laptop doing something”
	“I eat in the kitchen with my family while the TV is on”	“I usually eat my meals in front of the TV or with my friends”
Influences on food choice		
Schedule/ time	“I think time and availability influences my food choices and patterns.”	“Schedule [influences my food choice], what I eat depends on what time I have”
	“My diet is influenced from my schedule, if I am under pressure, I will eat whatever is more convenient, and eat fast food”	“Time of the day definitely influences my meal, I believe it affects everyone’s meals, because if you have work and don’t have time to eat and even when I worked and I wasn’t on school, you don’t have unlimited time for lunch. You cannot always have somethings quick.”
Taste	“Of course [taste influences my food choices] I will not eat something that is not tasty”	“Taste, not as much as smell and the look. If it looks nasty, I am not going to eat it”
	“Yes [taste affects my eating habits], if something is not tasty are you going to eat it?”	“Vegetables are good for you, but they don't taste as good, hummus is not as healthy but I can eat it with a spoon, so definitely taste influences my choices”
Cost	“Personally, I would love to shop more healthy products but avoid it because there are much more expensive”	“Healthier foods are more expensive; I am not talking about organic foods. But it is cheaper to get a hamburger from McDonalds rather than prepare a homemade salad so definitely if I do not have the financial choice, I would definitely be eating unhealthier foods that are cheaper for me in order to survive... Cost definitely influences your choices”
	“I will avoid something that is too expensive”	“If something is healthy and too expensive, I would not get it, I would probably substitute it with the unhealthy cheap”
Season	“I think the seasons play an important role because during summer I have less appetite”	“Fall and winter I kind of think myself as a bear, I stuck myself with something and I want to be warm so I eat fatter foods, bigger portions, in the summer I will eat less food and much healthier like smoothies”
	“During summer I do not want to eat that much”	“During the summer when it is hot of course I eat healthier”

	<p>“I do believe that the weather affects appetite, during winter time I tend to eat more I am more hungry and eating I do not know why makes me warm”</p>	<p>“I think during the winter I eat more fatty food, there is no beaches!”</p>
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Mediterranean lifestyle (Bach-Faig et al. 2011; Martínez-González et al. 2017; DiBonaventura et al. 2018).

Culture influences the transition from adolescence to adulthood (Pace et al. 2016). Living arrangement impacted perceived and actual eating patterns in all Cypriot participants and most U.S. participants as well. When living with family, Cypriot participants relied on maternal family members to prepare meals but had limited food preparation when at university. A consistent finding was that when U.S. participants were at university, meals were prepared quickly or “take-out”, and were consumed alone with a screen distraction. Attending university and the transition away from a family home has a negative impact on dietary behaviors, regardless of culture (Ansari et al. 2012). When living away from family, emerging adults in both countries noted less healthy eating patterns. Indeed, studies from the U.S. and Greece found that eating patterns were less healthy (i.e., more take-out foods, sugar and alcohol, and less fruits, vegetables, and olive oil) when emerging adults moved from home to university settings (Sogari et al. 2018; Papadaki et al. 2007). These dietary patterns are associated with lower food quality in young adults compared to those who take part in meal preparation and eat with others (Larson et al. 2013; Larson et al. 2006).

Living arrangements, time and schedule, food costs, and taste preference may have influenced food choice and MD adherence by participants. The influences on food choice of time, use of convenience foods, snacking rather than eating a large meal, and perception of healthy eating align with a recent review of food choices of young adults in the U.S. (Powell et al. 2019).

In light of the commonalities in food choice discussed by participants from Cyprus and the U.S. and commonly reported moderate adherence scores from Mediterranean young adults (da Silva et al. 2009; García-Meseguer et al. 2014; Albuquerque et al. 2017; Farajian et al. 2011; Hadjimbei et al. 2016; Kyriacou et al. 2015; Noale et al. 2014), it was not a surprise that participants in both countries reported an average moderate adherence to the MD. To our knowledge, only one other U.S. study explored the MD in emerging adults and found low and moderate adherence in 90% of emerging adults at a southern U.S. university (Bottcher et al. 2017). While the MD scores did not differ between our two groups, the macronutrient intakes observed in our study suggest possible differences in eating patterns that conform with trends for the respective countries (Cohen et al. 2015; Davis et al. 2015; Powell-Wiley et al. 2014).

The lack of difference identified by adherence scoring systems, yet the macronutrient and caloric differences as well as the food, eating, and lifestyle behaviors discussed in the focus groups suggest the need to explore beyond adherence scores to better understand Mediterranean food and lifestyle practices in emerging adults from Mediterranean and non-Mediterranean countries. Our findings highlight the importance of viewing the MD as a holistic lifestyle, more than just a food pattern for health (Bach-Faig et al. 2011). Indeed, factors in addition to food intake are interrelated and included in the Mediterranean lifestyle, and therefore, also influence diet (Real et al. 2019).

Participants in this study were able to identify health benefits of the MD, or at least that it was a healthy meal plan. We identified individual and interpersonal factors that influence food choice in this age group that are similar to those found by others such as health beliefs, time

constraints, and taste preferences (Powell et al. 2019; Stok et al. 2018); however, our identification that living arrangement and culture impacted eating behaviors was novel and deserves more exploration. These findings underscore the need for nutrition education and food literacy to transcend knowledge transfer and education to address these barriers for behavior change (Thomas et al. 2019). The addition of living arrangement and culture as situational and external factors in food literacy will support nutrition education that encompasses behavior change for emerging adults.

There were several limitations to this study. The purposeful and snowball sampling methods of participant recruitment at a single U.S. university, as well as the qualitative design, limits the generalizability of our findings. Time of year for recruitment and interviews (summer vs. fall) was also a limitation. This difference may have contributed to some of the participant characteristics such as the differences of where the young adults reside and with whom. However, there was discussion from both groups about eating practices in their other living situations. Therefore, we were able to gain insights from both perspectives. The small sample size was a study limitation; however, the study design allowed for detailed focus groups and information collected about diet perception that is a new MD finding for emerging adults. Focus groups sizes were intentionally limited to five participants; however, due to difficulties in recruitments and “no-shows,” focus groups in the U.S. were smaller than initially planned. Focus group interviews with more participants may have provided a more diverse perspective regarding research questions. The method used in calculating caloric intakes, FFQ, is limited by subject recall and estimation of intake but is the standard nutrition assessment tool used for calculation of the aMed score. Lastly, language differences in focus group facilitation was also a possible limitation for the first focus group discussion in Cyprus. Likewise, EA was the only author responsible for translation of focus group questions and responses between Greek and English. There were also strengths of the present study including the multi-ethnic population, use of multiple investigators participating in reflexive analysis and interpretation of qualitative data, and standardized quantitative data gathering methods.

CONCLUSIONS

Our findings suggest that emerging adults are aware of the health benefits of the MD but the significance of food preparation and behaviors needs to be highlighted to better promote this dietary pattern. Further, living situations intertwined with other aspects of eating patterns and practices and can be considered in nutrition education, food literacy, and behavior change efforts. Future research is warranted to better understand, on a larger scale, if the trends we observed can be applied to a broader emerging adult population and how to best promote dietary and food behaviors for a lifestyle that is recognized as being beneficial to human health.

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