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Review

Obesity pillars roundtable: Obesity and individuals from the Mediterranean region and Middle East

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ABSTRACT

Background: The rates of obesity in Mediterranean and Middle East regions are increasing. This may be related to worsening physical inactivity, and gravitation away from more healthful nutrition.

Methods: This roundtable discussion includes 4 obesity specialists with experience in the clinical management of obesity. Included in this discussion are citations regarding obesity and populations from the Mediterranean and Middle East regions.

Results: Among the most studied nutritional dietary pattern having evidence-based data supporting improved cardiometabolic health is the Mediterranean Diet. Prospective studies such as the PREvención con Dieta MEDiterránea (PREDIMED) study support the cardiometabolic benefits of dietary consumption of plant-based, higher fiber foods having a relatively high proportion of unsaturated fats. Cuisine from the Middle East has both similarities and some differences compared to the Mediterranean Diet. Interim analyses of the PREDIMED-Plus study suggest the Mediterranean Diet plus caloric restriction and physical activity intervention reduces body weight and improves cardiometabolic risk factors. As with any dietary intake, Mediterranean and Middle Eastern food choices and preparation affect their nutritional healthfulness.

Conclusion: The panelists of this roundtable discussion describe their practical diagnostic processes and treatment plans for patients with obesity from the Mediterranean Region and Middle East.

1. Introduction

Dr. Bays: Hello. My name is Dr. Harold Bays. I am Editor-in-Chief of Obesity Pillars [official journal of the Obesity Medicine Association (OMA)], and Chief Science Officer of the OMA (Table 1). Today, I am serving as moderator for this “Obesity Pillars Roundtable: Obesity and Individuals from the Mediterranean Region and Middle East.” Obesity has different clinical implications among different races and ethnicities. Today I am honored to have a discussion with 4 clinicians with experiences and perspectives regarding obesity and this specific patient population.



I would like to start by asking panelists to briefly provide their background. Dr. Antoun, please summarize your clinical background as it

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Table 1
Mediterranean diet dining tips (Adapted with Permission from yourbodygoal).

HEALTHFUL MEDITERRANEAN DINING

BACKGROUND:

The Mediterranean Diet is not a specific diet. It is a meal plan pattern often found in parts of Greece, Italy, Spain, and other countries bordering the Mediterranean Sea. Of all the diet plans, the Mediterranean Diet has undergone the greatest study, and has the most consistent results in reducing heart disease. In most Mediterranean meal patterns, olive oil is the main source of fat. The Mediterranean Diet often includes vegetables, fruit, legumes, whole grains, nuts, and seeds, as well as moderate intake of red wine. Also encouraged are a moderate consumption of seafood, fermented dairy products, poultry, and eggs. Those who recommend the Mediterranean Diet often discourage high amounts of red meat, meat products, and sweets.

REGARDING BODY COMPOSITION, THE MEDITERRANEAN DIET IS NOT MAGIC:

A Mediterranean meal plan is often recommended to reduce the risk of heart disease. But no matter which nutritional plan you choose, weight loss will not be achieved unless you burn off more calories than you eat. This includes the Mediterranean diet.

VEGETABLES AND FRUITS:

Foods technically classified as fruits that are often part of a Mediterranean diet include tomatoes, eggplants, and peppers. Vegetables include broccoli, and salad-containing mixed greens, tomatoes, peppers, and Quinoa. For example, a Fattoush (Fatoosh) salad typically has mixed green vegetables, tomatoes, quinoa, and pita bread spiced with lemon juice, garlic, sumac, salt and/or pepper. Tabouli (Tabbouleh or Taboule) salad is composed of parsley, tomatoes, cucumber, wheat (burghul), spiced with lemon or lime juice, olive oil, mint, and salt.

NUTS, GRAINS AND LEGUMES:

Healthful grains often included in a Mediterranean diet include whole grain pastas, breads, and barley. Nuts often include tree-nuts (e.g., almonds and hazelnuts). Although considered by many as a grain, Quinoa (pronounced KEEN-wah) is a seed from plants in the goosefoot family. It is high in protein and comes in many colors. Like beans and lentils, chickpeas are legumes. Hummus is crushed chickpeas seasoned with olive oil, lemon, garlic, salt, and pepper.

PASTAS:

Pastas often found in a Mediterranean diet include couscous made from semolina, which is a coarse grind of high-protein durum wheat.

MEATS:

Meats often found in a Mediterranean diet include shrimp, fish, and other meats such as chicken or even beef.

OLIVE OIL:

Olive oil is a monounsaturated liquid fat made from olives. Refined olive oil removes impurities, so that it has less potential for rancidity over time. However, refinement may also remove taste and antioxidants, which are potentially healthful. Unrefined virgin olive oil maintains some of the potentially healthful properties from olives (beyond the oil) but is more pure than regular olive oil. Even more pure (and often darker) is extra-virgin olive oil. In addition to maintaining antioxidant content, some believe extra-virgin olive oil tastes better because it better maintains the olive flavor.

applies to obesity care for those from the Mediterranean Region and Middle East.



Dr. Antoun: I work as a family physician practicing in Lebanon, which is known for its delicious cuisine and social dining. I struggled with obesity until a few years ago. I then changed my mindset and developed my own simple calorie counting method. Since then, I have lost my weight and kept it off. I wanted to share this knowledge with my patients, leading me to be interested in obesity medicine. I have started the JA METHOD (Jumana Antoun) program (<http://jamethod.com/>), where I assist patients who live with obesity in losing weight. I share my

tips and experiences throughout the program. Patients feel connected to me because I understand what they are going through.

Dr. Bays: Dr. Censani, please briefly summarize your clinical background as it applies to obesity care for those from the Mediterranean Region and/or Middle East.



Dr. Censani: Thank you so much Dr. Bays for this opportunity to participate in this important discussion today. I am the Director of the Pediatric Obesity Program and Medical Director of the Adolescent Bariatric Program at an academic center in New York City, where we serve a diverse patient population. I provide treatment and education for my patients and their families. I am proud to say I am directly connected with this patient population. My grandparents were born and raised in Italy on the Amalfi Coast of the Mediterranean Sea. My grandmother immigrated to the United States at 19 years of age. My family grew up on traditional Italian dishes which incorporate the healthful principles of the Mediterranean diet taught to us by my grandmother (Nonna). We learned the benefits of eating fresh foods, whether it be from the sea or the farmland, cooking with fresh herbs, using healthful fats, and choosing natural whole grains over processed/refined starches.

For us, mealtime is not just time to eat. Meals are an important part of the Mediterranean culture, and a time for the entire family to come together and bond/share their day. This shared time and experience can bring families together. I work closely with families to change their mealtime habits – to give them a more healthful approach to their dietary choices and learn how the many benefits of the Mediterranean diet for children and families can be implemented.

Dr. Bays: Dr. Bailony, please summarize your clinical background as it applies to obesity care for those from the Middle East and/or Mediterranean Region.



Dr. Bailony: I am an internal medicine physician and have been practicing obesity medicine for 7 years. I was born and raised in San Diego, but both of my parents are from Syria. During my years at the University of California San Francisco, I worked on two public health projects in Middle East and become very familiar with how socio-economic and political environments could have lasting health consequences. At Enara Health, we get to work with many different populations and one of them is an Arabic refugee population.

Dr. Bays: Dr. Alexander, please briefly summarize your clinical background as it applies to obesity management for those from the Mediterranean Region and/or Middle East.



Dr. Alexander: Hello, Dr. Bays. Thank you for having me as part of the Obesity Pillars Roundtable discussion. I am a Board-Certified internal medicine physician, also trained and certified in Obesity Medicine and Lifestyle Medicine. I am the current Vice President for the OMA Board of Trustees. I love to garden and cook, and I am trained as a certified culinary medicine specialist. I am passionate about helping individuals with obesity attain better health by taking a weight-centric and lifestyle-forward approach, which includes the four pillars of obesity treatment, namely - nutrition, physical activity, behavioral modification, and pharmacotherapy. I have been a practicing obesity medicine physician since 2010 - initially at Kaiser Permanente in San Francisco and now as the Chief Medical Officer at Enara Health, where we use a multidisciplinary telehealth approach using all four treatment pillars in the management of obesity to patients.

I was born and raised in Detroit Michigan to Greek immigrant parents. Many of my relatives are nona- and centenarians (i.e., individuals living into their 90's to over 100 years of age) and have lived in good health. This contrasts to my experiences working in hospital medicine, where I cared for younger patients in their mid-40s–60s having obesity, type 2 diabetes, heart attacks, and strokes. I have therefore always been fascinated by how certain dietary and lifestyle patterns can affect health and longevity across populations.

2. Mediterranean region and potential health benefits of the Mediterranean diet

Dr. Bays: Thank you for your introductions. Let's begin by acknowledging that geographic terms such as "Mediterranean Region" and "Middle East" may have varying definitions. For the purposes of this discussion, we are defining the Mediterranean Region as Italy, Greece, Spain, southeastern France (Provencal), as well as applicable Mediterranean Sea areas of Portugal, Turkey, Cyprus, Egypt, west Levant area (e.g., Israel, Lebanon, Jordan, Palestine, and Syria) and northern Africa Maghreb region (e.g., Morocco, Algeria, Libya, and Tunisia).

Setting aside medical nutrition therapy and meal planning specifically for treatment of obesity (e.g., low calorie diets, ketogenic diets) the two "diets" having the most robust data to support promotion of cardiometabolic health would be the Dietary Approaches to Stop Hypertension (DASH) and the Mediterranean Diet [1]. The Mediterranean Diet is plant-based with a high proportion of unsaturated fats. It is a diet pattern associated with reduced cardiovascular disease (CVD) and reduced mortality. When implemented as part of a weight reduction strategy, the Mediterranean diet may be beneficial with healthy body weight management [2–5]. For example, adherence to the Mediterranean diet may reduce the risk of developing pre-obesity and/or obesity and reduce the risk of abdominal adiposity [6]. When the Mediterranean diet is implemented among individuals with pre-obesity or obesity as part of a weight management strategy, then the Mediterranean diet is associated with similar weight loss and cardiovascular risk factor reduction when compared to "low fat," "low carb," and other weight-loss dietary programs [7].

Perhaps the most sentinel prospective trial to evaluate the potential health benefits of the Mediterranean Diet was the PREvención con DIeta MEDiterránea (PREDIMED) study, which was a Spanish, prospective,

multicenter, randomized, controlled primary prevention trial of patients (women 60–80 years and men 55–80 years) at high CVD risk conducted from 2003 to 2011 (median follow-up 4.8 years). The PREDIMED study was designed to assess the effects of the Mediterranean Diet on the incidence of CVD among those at high CVD risk [8]. The study randomized 7447 participants to: (1) Mediterranean Diet enriched with Extra Virgin Olive Oil (EVOO) (n = 2543), (2) Mediterranean Diet plus nuts (walnuts, almonds, and hazelnuts) (n = 2454), or (3) a low-fat control group (n = 2450). The study did not restrict energy intake or include physical activity intervention. Some have noted limitations of the PREDIMED study due to a partial retraction of the initial published study results due to protocol deviations (i.e., problems with the randomization process). Others assert that reanalyses of the data with corrections had similar results [8].

In this study, again, the protocol did not restrict energy intake or include a physical activity intervention. As a result, the PREDIMED active groups did not substantially lose body weight compared to the control group. Nonetheless, the study was stopped early because the two active Mediterranean Diet groups reduced CVD events by 30% (possibly due to reduction in CVD risk factors and food-mediated antioxidant and anti-inflammatory effects), reduced the incidence of diabetes mellitus, and in some participants, reduced blood pressure [9]. A secondary analysis of the PREDIMED Trial suggested that study participants who replaced saturated fats, proteins, and carbohydrates with unsaturated fats experienced more favorable effects upon body weight and obesity [10]. Metanalyses have similarly supported that the traditional Mediterranean Diet is associated with clinically meaningful reductions coronary heart disease, ischemic stroke, total CVD, and mild reduction in body weight [11,12].

The subsequent PREDIMED-Plus study is a 6 year, single-blind, randomized, primary prevention trial that recruited 6874 participants between 2013 and 2016 with body mass index between 27 and 40 kg/m² and metabolic syndrome who were randomized to either: (1) an intensive weight-loss lifestyle intervention based on an energy-restricted Mediterranean diet, physical activity promotion, behavioral support or (2) control group using Mediterranean Diet without calorie restriction or physical activity advice [13]. Early interim results suggest relative improvement in the interventional group regarding body weight, waist circumference, hemoglobin A1c, blood glucose, blood lipids, and blood pressure. Full results are anticipated after 2022 [14]. Overall, existing data supports the combination of Mediterranean Diet with physical activity as providing benefits in reducing premature mortality versus either alone [15].

Many clinicians and patients understand the Mediterranean Diet has core elements such as consumption of olives, wheat, and grapes, often manifest by foods such as olive oil, whole grain breads, and wine (Table 1). While questions remain [16], clinical trial data generally support that replacement of margarine, butter, mayonnaise and dairy fats with olive oil reduces mortality of various causes (e.g., reduces death due to cardiovascular disease, cancer, neurodegenerative, and respiratory diseases) [17]. As noted in Table 1, some of the more popular Mediterranean foods include feta with fruit, Mediterranean-style pizza, gyros, hummus (ground chickpeas, sesame seeds, olive oil, lemon, and garlic), couscous, kebab, falafel, tapas, paella rice dish, spanakopita (spinach pie), lentils and yogurt, baba ghanoush, baklava, gelato, as well as various vegetables (i.e., ratatouille), grains, salads (e.g., tomato, avocado, and basil), pastas, white meat (i.e., Tuscan chicken), fish, and dairy.

Drs. Censani and Alexander, given the evidenced-based health benefits, do you recommend the Mediterranean Diet within your obesity medicine practice? If so, then how?

Dr. Censani: This is a great question. As you stated, studies have shown that following a Mediterranean diet is associated with health benefits, including prevention of cardiovascular diseases and type 2 diabetes. In my obesity medicine practice, incorporating the Mediterranean dietary pattern and emphasizing physical activity are key to my approach to obesity management. Risk factors for childhood obesity

include sedentary lifestyle, poor nutritional dietary intake, and minimal physical exercise, which has worsened with the COVID-19 pandemic. Contributing factors for this excess weight gain include: (1) less access to healthful and nutritious food choices leading to poorly balanced diets (i.e., increased consumption of processed foods and reduced fresh foods which reduces fiber intake) and (2) more sedentary lifestyle due to physical distancing, remote learning, and lack of physical activity opportunities [18]. This emphasizes the need for appropriate assessment of pediatric patients with increased body weight [19].

When my nutritionist and I meet with patients and their families, we discuss the benefits of incorporating foods such as high fiber fruits (e.g., pears, berries, and apples), vegetables, legumes/beans, nuts, whole grains nuts, and avoiding high calorie sugary drinks and processed foods. Great ways to include foods with more unsaturated fats and omega-3 fatty acids are to emphasize more fish and vegetables, suggest olive oils in cooking and for salad preparation (rather than store bought dressings), and using olive oil or oil-based butters instead of butter. We also discuss herbs as an alternative to salt.

Combining these dietary changes with an active lifestyle is important. For physical activity, I discuss with families the American Academy of Pediatrics recommendations for 60 minutes of physical activity daily [20]. Physical activity guidelines for children and adolescents aged 6–17 focus on aerobic, muscle strengthening, and bone strengthening activities which all have important health benefits.

Another important component of the Mediterranean lifestyle is the mealtime itself – the social aspect of the meal involves families eating together and supporting children as they learn about foods by helping them to prepare meals as well as trying new foods. This helps teach children more healthful approaches to their dietary choices. Families are provided with websites with healthful recipes that can be prepared together. The key is for families to support these dietary changes for their children, and to incorporate these changes for the entire family with family-based meals together at dinner. Children with obesity are more likely to become adults with obesity. Childhood obesity increases the risk of type 2 diabetes, stroke, and ischemic heart disease later in life. If we can intervene early to prevent future health complications and incorporate these changes in childhood, then we are helping to give children a healthier future.

Dr. Alexander: Along with physical activity, we likewise recommend the Mediterranean dietary pattern to our patients engaged in active weight loss, as well as during weight loss maintenance. The intent is to improve patient health and longevity. Our registered dietitians and exercise specialists routinely recommend and provide practical tools and teachings for incorporating healthy foods and movement into everyday life.

Regarding nutrition, I encourage dietary intake of a variety of whole fresh vegetables, legumes, and ancient grains (i.e., grains without selective breeding), and especially the addition of fermented foods such as olives, dolmathes (ancient grains and herbs wrapped in brined grapes leaves), tzatziki (cultured yogurt with herbs, olive oil and diced cucumber), and horta vrasta (leafy greens) as a way of incorporating high nutrient, high fiber foods with low caloric density. Trahanas is a staple of Greek cuisine. Spanakorizo is a spinach-rice Greek side dish preparation, often prepared with ancient grains such as bulgur, freekeh or trahana. Trahana is a dried fermented mixture of grain and yoghurt or milk that has the texture of coarse crumbs and is often made into soups. Because Greek tarhana contains cracked wheat or couscous along with fermented goat or sheep milk, it is rich in fiber, which may increase satiety. Olives, tzatziki, dolmathes and horta vrasta as well as trahana - based foods can be easily purchased, prepared, and frozen for convenient future use.

I hope we will have time to discuss inhabitants of the Greek island of Ikaria, who have exceptional longevity. But for this current discussion, longevity “Blue Zones” are areas of the world having unusually high numbers of “oldest old” individuals, often defined as ≥ 85 years of age. Examining the nutritional intakes of these populations has prompted the so-called “Blue Zone Diets.” One of these Blue Zone diets is the Ikaria

Diet. The Ikaria diet is a variant of Mediterranean diet that is generally described as an eating pattern that emphasizes vegetables, fruits, legumes, grains, dairy, fish, as well as unsaturated fats (e.g., olive oil and nuts such as almonds and walnuts), herbs, and spices. Foods to avoid include processed or cured meats and other processed foods. Recommended beverages include red wine, herbal tea, and Greek coffee, with coffee consumption also being something I hope we will have time to discuss more.

Regarding physical activity, I encourage patients to take “digestive” walks after meals, also known as “volta” or walks during or after sun-down. In Greece, post meal family walks are a popular pastime. The data regarding the effects of post-meal physical activity varies, with some studies suggesting post-meal physical activity is better than pre-meal physical activity in reducing postprandial blood glucose and blood lipids. Other studies demonstrate no difference, or more favorable effects with pre-meal physical activity. Whenever it occurs, increased physical activity reduces the risk of metabolic disease and cardiovascular disease risk [21]. If one takes a patient-centered approach via acknowledging culture, then it may be useful to know that it is customary for families with a Greek background to walk after meals. Encouraging this sort of cultural activity continue will likely have health benefits. Because basically, anytime is a good time for physical activity.

Dr. Bays: Now we will move the discussion to the Middle East. For the purposes of this discussion, we are defining the Middle East as the Levant region [Cyprus, Israel, Lebanon, Jordan, Palestine, Syria, and parts of Turkey (Anatolia)], Arabian Peninsula (e.g., Kuwait, Bahrain, Qatar, United Arab Emirates, Oman, Yemen, and Saudi Arabia), Egypt, Iran, and Iraq. Middle Eastern foods include aspects of both Arab and non-Arab cuisine, with some suggesting that Middle Eastern Arab cuisine may emphasize meats and hot spices, while Middle Eastern Persian cuisine may emphasize vegetables, rice, and herbs. Having said this, given how we defined both the “Mediterranean Region” and “Middle East,” these locations obviously have geographical overlap. When added to considerations of historic crossing trade routes, it is unsurprising to find similarities of these respective cuisines.

It is said most Muslims live in Southeast and South Asia, with 20% of Muslims residing in Middle Eastern countries. However, over 90% of many countries in the Middle East consider themselves Muslims. Time restricted eating is a method to assist with weight reduction in patients with obesity [1]. From a nutritional perspective, time restricted eating is also an eating pattern practiced by many Muslims during Ramadan. One month a year (i.e., 9th month of the Islamic Lunar calendar), those who practice Ramadan abstain from food and drink from dawn to dusk (i.e., no food or drink during daylight hours, frequently with Suhoor/Sehri eaten before dawn), followed by a communal meal (Iftar) after sunset. The month of Ramadan is followed by festival and feast. The effects of Ramadan fasting are on body composition and glucose levels are transient and variable in both healthy persons and individuals with obesity – with an overall limited effect. However, improvements in lipid parameters such as reductions in low density lipoprotein cholesterol and triglycerides and increases in high density lipoprotein cholesterol levels may be more consistent. The heterogeneity in the effects of Ramadan may be due to cultural variations in dietary habits, differences in the duration of fasting, age, sex, and socioeconomic status [22].

Regarding nutrition, I sometimes read opinions how the Mediterranean Diet and Middle Eastern cuisine are distinctly different. I am not so sure. My sense is that both the Mediterranean Diet and Middle Eastern food share foods such as hummus, yogurt, soups, olives, fruits, vegetables, grilled meats and fish, falafel, tabouleh, baba ghanoush, Fattoush, shawarma, dolma, kebab, baklava, kofta, and some coffees. I concede some differences may exist. Regarding grains, I understand Middle Eastern foods may tend to prioritize rice and wheat (e.g., bulghur and freekeh), as opposed the Mediterranean Diet whose grains may be more diverse (e.g., wheat, barley, pasta, and rice). Middle Eastern meats typically include lamb, mutton, and chicken, as well as seafood and beef. Meats more common in the Mediterranean Diet include pork, goat, veal,

and rabbit as well as seafood and beef. While some believe Greek coffee and Turkish coffee are similar, I gather those from the Middle East are quite proud of their Turkish Coffee; plus, many of those from the Middle East may have a stronger tea culture – probably influenced by nearby Asian countries. Some Mediterranean food spices may differ from Middle Eastern food spices. Overall, the healthfulness of either Mediterranean Diet or Middle Eastern diet is largely dependent on food choices and food preparation. (Table 2). Finally, while data is limited, variable, and sometimes inconsistent, it is estimated that approximately 50% of adults in the Middle East are physically inactive, with even less physical activity among younger individuals in this region [23].

One of the first Middle Eastern countries I visited decades ago was Turkey (Istanbul). The politics may have changed since then. But at that time, many of the locals considered the areas of Turkey west of Istanbul as more European, and east of Istanbul as more Middle Eastern. While attending an invited dinner, I was not prepared for the amount of food that was served. Being from the US, I understood the concept of multicourse meals (e.g., appetizer, salad, main course, and dessert). However, I believe the restaurant served at least 8 courses. I can still recall how much I was taken aback by the vast array of food offerings, such as the many appetizers on smaller plates, and the variety in food colors, textures, spices, and food presentation. It was not just a meal; it was an event. I was full (i.e., satiated) after the first course. I was told that if I stayed in Istanbul for 3 more months, “we will put 20 pounds on you.” (Disclosure: I am from Kentucky USA.)

Drs. Antoun and Bailony, please provide some general comments about Middle Eastern food, its healthfulness, and medical nutrition therapy and physical activity can be incorporated into an obesity medicine practice.

Dr. Antoun: First, I would like to discuss some aspects of Middle Eastern cuisine. There are traditional meals that are served at home such as Kibbeh Bi Sanyia (meat, burglar, pine nuts), Koussa Mehshi (zucchini

Table 2
Middle Eastern dining tips (Adapted with Permission from yourbodygoal).

HEALTHFUL MIDDLE EASTERN DINING

BACKGROUND

Many are familiar with Italian foods that emphasize pastas. Also, countries that border bodies of water (e.g., Mediterranean Sea, such as Greece), often consume a substantial amount of seafood. While Middle Eastern foods can include pastas and seafoods, Middle Eastern foods may have some variances compared to the Mediterranean Diet. Having said this, due to the influences of surrounding areas, Middle Eastern cuisine often has substantial similarities to the Mediterranean Diet, such as consumption of vegetables, fruits, whole grains, and healthful fats, fish, poultry, beans, legumes, and eggs, moderate dairy, limited red meat, and healthful fats from olive oil, nuts, and seeds.

COMMON VEGETABLES

Common vegetables include arugula, artichokes, cabbage, cucumbers, dandelion greens, eggplant, garlic, green beans, jute leaves, onions, okra, potatoes, spinach, and zucchini. Consumption of these vegetables are made less healthful when refined or deep fried.

COMMON FRUITS:

Apples, apricots, avocados, carob, citrus fruits (especially lemons), dates, figs, grapes, melons, mulberries, olives, persimmons, plums, pomegranates, stone fruits like peaches, and tomatoes. These fruits are made less healthful when refined and consumed as juices, with removal of fiber.

COMMON GRAINS AND LEGUMES

Grains include barley, bulgur, freekeh, rice, wheat, and wheat berries. Legumes include chickpeas for hummus and lentils for soups and Mujaddara. Grains are made less healthful when refined, with removal of nutrients and fiber. Couscous is a common pasta (i.e., milled durum wheat mixed with water or eggs) derived from semolina flour. Whole grain couscous will have more nutrients and fiber than refined couscous.

COMMON MEATS AND DAIRY

Meats include lamb (i.e., a sheep that is less than one year old) meat, as well as lamb spleen, liver, and kidneys, some beef, goat, eggs, poultry, and tripe. Dairy includes feta or goat cheese, labneh (kefir cheese), and Greek yogurt. While red meats such as lamb and beef have saturated fats, if lean cuts are served in moderation, such meats can be included in a balanced diet.

HEALTHFUL FATS

Foods rich in the more healthful monounsaturated and/or polyunsaturated fats include avocados, ghee, nuts (e.g., almonds, pistachios, cashews, walnuts, pine nuts), olive oil, olives, seeds (e.g., sesame and pumpkin)

stuffed with rice and meat), Kafta wa Batata (meat and potatoes), Moudjara (rice and lentil), Yakhnet Bamia (rice, okra and meat), etc.), and traditional plates that are well advertised (hummus, falafel, tabbouleh, baba ghanouj, shawarma, etc.). The latter are commonly served in restaurants (and homes) during social dinners, similar to what you (Dr. Bays) may have experienced in Turkey. Many Middle Eastern foods, particularly traditional home-style dishes, are prepared by stir frying followed by boiling. For stir frying, older generations may still use animal fats such as butter or gee, while younger and urban generations are increasingly turning to vegetable or olive oil. The traditional home-style based foods are usually either plant based or have a small amount of meat cubes, minced meat or poultry, prepared by boiling.

Getting back to the question of whether Middle Eastern food is healthful; overall, I consider Middle Eastern cuisine to be healthful because it shares many of the same characteristics of the Mediterranean diet, namely fruits, vegetables, olive oil and legumes. For example, when a group of researchers compared the traditional Lebanese dietary pattern to the European Mediterranean Diet, they discovered that the Lebanese diet was closest to the Italian Mediterranean index and farthest from the French [24]. Furthermore, only 16% of the traditional Middle East dishes contained total fatty acids more than 10% of daily values [25]. On the other hand, some common Middle Eastern dishes, such as Manouche (Lebanese Pizza) or Shawarma sandwich (roasted marinated meat, French fries, and coleslaw), are high in fats and calories and are widely consumed in the Middle East area. Although many Arabic sweets include dairy products, pistachios, and seeds, they contain a high amount of total fatty acids, exceeding 20% of daily values, and are mostly of low-fat quality in terms of polyunsaturated to saturated ratio [25]. Many Lebanese foods are high in sodium [26], and I consider many Arabic sweets very high energy-dense food items.

Overall, I believe that obesity management in the Middle East area is fragmented, with individuals going to dietitians for nutrition advice, gyms for exercise, physicians to seek medications, and surgeons for bariatric surgery. The behavioral component is often lacking. This is despite recent improvements in the emergence of comprehensive obesity care, which is expensive and still in its infancy. When it comes to medical nutrition therapy, I always encourage the individuals to eat traditional home-prepared dishes. Preparation takes a long time, which may be a barrier for working mothers or single men. Nevertheless, an increasing number of restaurants and food stores are offering dishes influenced by home cooking.

Physical inactivity is very high in the Middle East area, especially in countries such as Saudi Arabia and Kuwait, where more than 66% of the population is inactive [27]. Some specific barriers include religion (which may limit females' choices of physical activities), lack of outdoor spaces, and hot weather [27]. Social gatherings are emphasized as leisure activity rather than physical activities, and families value work and academic achievement over physical activity [27,28]. In my personal experience with patients at my primary care clinic, patients often attribute their lack of physical activity as the cause of their obesity rather than their eating habits and food consumption. They resist incorporating physical activity. Therefore, I tend to emphasize the physical activity later in therapy to maintain weight loss and encourage muscle strengthening exercises which can be done indoors.

Dr. Bailony: As you stated Dr. Bays, the Middle Eastern and Mediterranean diets have a lot of similarities. They are generally rich in vegetables, legumes, and fruit. Incorporating these into any diet is likely going to improve metabolic health. I have found that Middle Eastern recipes are great way to introduce patients to broader vegetable palate. Globalization has allowed more white rice and white breads to enter Middle Eastern cuisine. One easy change to make getting people to use traditional grains such as Freekeh and Burghol. As key ingredients become cheaper, the Middle East also started to use more butter, ghee, sugar, and molasses in their cooking. I try to keep extra ingredients to minimum which helps preserve both the authenticity and health of a dish.

3. Practical tips

Dr. Bays: Thank you all for your extraordinary insights. Overall, reports suggest those from the Middle East and North Africa have among the highest global rates of metabolic diseases such as obesity, diabetes, hypertension, dyslipidemia, and non-alcoholic fatty liver disease [29]. As with most countries, the rates of obesity in the Mediterranean Region are increasing, with countries such as Spain having an obesity prevalence rate as high as 25% [30]. Some attribute the increase in obesity, at least partially, due to the diminishing adherence to traditional Mediterranean diet patterns and movement towards a Western dietary pattern that is low in nutritional quality, high in energy density, and rich in saturated fats and refined carbohydrates [30]. Beyond dietary intake alone, I would like for each of you to provide your top 3 tips for managing obesity in patients either from, or descendants of the Mediterranean Region or Middle East.

Dr. Alexander: Beyond recommending dietary consumption of healthful unprocessed foods high in fiber, and nutrient rich vegetables, my top three tips for health and longevity include: good quality sleep, human connection, and physical activity – as practiced in regions of the world like Greece.

An example would be mindfulness regarding one's circadian rhythm including “siesta” (μεσημεριαός ύπνος) to de-stress or “down-shift.” Such an approach may help counteract the obesogenic effects of mental stress, such as: (a) interference with cognitive processes in healthful decision making (i.e., executive function and self-regulation), (b) promotion of eating behavior favoring dietary intake of unhealthy, processed, energy dense foods, (c) interference with routine physical activity, (d) interference with sleep, and (e) alterations in hormones relative to the hypothalamic-pituitary-adrenal axis and reward centers [31].

We previously discussed Blue Zone world areas of longevity. Two such areas include Sardinia Italy and the Greek island of Ikaria, who are populations having a disproportionately high self-perception of optimism and high score for self-rated health [32]. It is estimated that Greeks on the Greek island of Ikaria typically live at least 10 years longer than the average American. A cross-sectional observational study of Ikaria residents ≥ 90 years of age revealed high frequency of: (a) daily social contacts, (b) participation in religious events, (c) attendance at Panigiria festivals, and (d) physical activity. The authors concluded that this population of individuals >90 years of age had high levels of family solidarity, social interaction, and physical activity [33].

Finally, given the high prevalence of fatty liver disease in our patients with obesity, and given the relatively high consumption of coffee among Greeks, I encourage those drinking caffeine to use coffee as their main caffeine source. While the benefits of coffee on non-alcoholic fatty liver disease (NAFLD) prevention is unclear, in patients with NAFLD, coffee consumption may reduce liver fibrosis [34].

Dr. Censani:

My three tips are:

(1) One of the more important considerations for managing patients having Mediterranean and Middle East backgrounds is to be culturally sensitive to traditions and be mindful of the effects of foods these patients typically eat. For example, the provider should be aware of more healthful alternatives, such as more healthful pastas or rice alternatives. Providers should counsel patients on appropriate serving sizes Mediterranean and Middle Eastern foods. Understanding the typical cuisine is vital to connecting with patients and in managing their obesity complications. If you see a patient with elevated blood pressure, you can then provide more healthful reasonable alternatives from a food base they will understand and eat.

To improve the taste of food, people often use too much saturated fats and sodium. They may underestimate the taste and health benefits of replacing salt with fresh herbs or adding vegetables. Snacks such as nuts

are a great non animal source of protein and healthful fats. The Mediterranean diet tends to use herbs such as basil, sage, bay leaves, garlic, rosemary, fennel, and oregano which are much more flavorful and healthful and may have additional benefits. Basil contains multiple antioxidants, garlic may have cholesterol lowering properties, rosemary contains healthful oils and fennel seeds contain natural products.

(2) It is important to understand the misconceptions of cuisines perpetuated through cultural stereotypes. There is a misconception that pasta and pizza are mainly Italian dishes. But in the US, what we are exposed to in society are commercialized Italian American dishes. Also, people sometimes have the sense that the Mediterranean diet is mainly comprised of pasta dishes, when it really involves fish, vegetables, and fresh ingredients. This is important when teaching patients about the benefits of the Mediterranean Diet on cardiometabolic outcomes. In fact, in current western society, it is mistakenly believed that pasta, pizza, and deli meats such as prosciutto are the food of those of us of Italian ancestry. In actuality, people of the Mediterranean Sea eat fish and vegetables. My ancestors were farmers, our relatives live by the sea, and they eat fish – not pasta dishes and pepperoni pizza.

(3) Addressing food preparation is also an important approach to managing patients with obesity from these cultural backgrounds. In approaching meat, we can emphasize baking instead of frying and choosing more healthful cuts of meat like veal, and lean meats to reduce fat content and improve outcomes for patients. Although patients may be eating pasta, we can address the pasta itself by substituting a vegetable or protein pasta such as red lentil or chickpea alternatives, but also focus on the hidden calories in sauces. For example, sauces such as Bolognese (i.e., a meat and cream rich sauce), and bechamel sauce from Northern Italy, are energy dense options as opposed to a fresh tomato and basil sauce or a pasta primavera which is a light spring vegetable pasta. Many options exist in recommending a Mediterranean dietary pattern; however, it is important to be cognizant of the misconceptions and be ready to provide reasonable alternatives. For rice, which is an integral component of some Mediterranean cultures, choosing a jasmine or basmati rice instead of white rice as a more healthful option. If white rice is to be the rice of choice, then decreasing rice portion sizes from two cups to one cup may be more acceptable compared to recommending patients stop eating all white rice. We can also emphasize eating more fish, healthful fats, and vegetables in a stepwise nutritional approach.

Dr. Antoun:

- 1 Weight loss is hampered by several cultural beliefs. The obesity medicine practitioner should focus on a behavioral component that aims to restructure Middle Eastern culture's ideas about the value of food. For example, some believe the more you put food on the table, the more generous and caring you are. Some believe the more you feed your child, the better parent you are. It is common that people connect over food and social gatherings. At the table, mothers (or the host) are always asking their kids or visitors to eat more and more. Refusing to eat the mother's food or the host food can be interpreted as disrespectful.
- 2 Despite that Middle East cuisine is healthful and includes low energy density foods, people in the region have a habit of eating large portions that results in lots of calories. Many people believe that a healthful traditional home-cooked dish has lower calories than eating a burger or pasta plate, without noticing that a regular home-prepared traditional Yekhne (rice, meat, and legume) can contain up to 600 calories. They should also be aware of Arabic sweets, which can contain up to 400–500 calories in the commonly consumed portions.
- 3 Clinicians should learn to give advice on how to handle social gatherings, particularly when Mezze is involved. Mezze is a selection of small dishes served as appetizers. Food is continuously served during

social gathering that lasts at least 2 hours. Mindful eating and the two-plate technique (i.e., using a serving plate and an eating plate) can be beneficial because they can choose the plates they want to try and keep track of the portions. Remind the individuals that they should feel satiety at the end of the meal, which includes the various plates of Mezze, main course, fruits, and desserts. Encourage them to enjoy the company of others and spend time with friends and family instead of focusing on the food.

Dr. Bailony: I think outside of diet, the tips to managing obesity on individual level is really to look at factors influencing appetite pathways in an individual's life. When it comes to people from Middle East, socio-economic factors and mental health cannot be overlooked. My 3 tips would be:

1. Perform in-depth mental health assessment and manage underlying depression and anxiety.
2. Understand the social dynamics of food environment at home and navigate goals as a family unit if possible.
3. Focus on portion size reduction and balance to help patient manage social events and family gatherings.

4. Conclusion

Dr. Bays: Thanks to all of you for this fascinating discussion of obesity and the Mediterranean Region and Middle East. My appetite really increased after this discussion; I think I am going to order some (healthful) food from the Persian/Mediterranean restaurant down the street. Most importantly, I believe clinicians and patients will benefit from your unique perspectives and recommendations, as reflected in this Roundtable discussion. Thanks again!

Disclosures

Other than their ancestry as described, and other than providing care to patients with obesity, LA, JA, MC, and RB report no relevant disclosures. HEB is owner of YourBodyGoal, which provides body composition for clinical research trials and for patients.

Author contribution

HEB conceptualized the submission, wrote/sent questions to the other authors, and assisted with editing the manuscript. JA, MC, RB, and LA responded to their assigned questions, reviewed their sections for accuracy, and gave final approval of their contribution.

Ethical review

This Obesity Medicine Association Roundtable represents original works, with work and/or words of others appropriately cited or quoted in the submission. This submission did not involve human test subjects or volunteers. HEB was not involved in the peer review process, nor the acceptance/rejection of this submission. Responsibility for the editorial process for this article was delegated to an independent Editor and/or Associate Editor.

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References

- [1] Alexander L, Christensen SM, Richardson L, Ingersoll AB, Burrige K, Golden A, et al. Nutrition and physical activity: an obesity medicine association (OMA) clinical practice statement. *Obesity Pillars* 2022:1.
- [2] Estruch R, Ros E. The role of the Mediterranean diet on weight loss and obesity-related diseases. *Rev Endocr Metab Disord* 2020;21:315–27.
- [3] D'Innocenzo S, Biagi C, Lanari M. Obesity and the mediterranean diet: a review of evidence of the role and sustainability of the mediterranean diet. *Nutrients* 2019; 11.
- [4] Bendall CL, Mayr HL, Opie RS, Bes-Rastrollo M, Itsiopoulos C, Thomas CJ. Central obesity and the Mediterranean diet: a systematic review of intervention trials. *Crit Rev Food Sci Nutr* 2018;58:3070–84.
- [5] Barrea L, Pugliese G, Laudisio D, Colao A, Savastano S, Muscogiuri G. Mediterranean diet as medical prescription in menopausal women with obesity: a practical guide for nutritionists. *Crit Rev Food Sci Nutr* 2021;61:1201–11.
- [6] Agnoli C, Sieri S, Ricceri F, Giraud MT, Masala G, Assedi M, et al. Adherence to a Mediterranean diet and long-term changes in weight and waist circumference in the EPIC-Italy cohort. *Nutr Diabetes* 2018;8:22.
- [7] Mancini JG, Filion KB, Atallah R, Eisenberg MJ. Systematic review of the mediterranean diet for long-term weight loss. *Am J Med* 2016;129:407–415 e4.
- [8] Kargin D, Tomaino L, Serra-Majem L. Experimental outcomes of the mediterranean diet: lessons learned from the predimed randomized controlled trial. *Nutrients* 2019;11.
- [9] Billingsley HE, Carbone S. The antioxidant potential of the Mediterranean diet in patients at high cardiovascular risk: an in-depth review of the PREDIMED. *Nutr Diabetes* 2018;8:13.
- [10] Beulen Y, Martinez-Gonzalez MA, van de Rest O, Salas-Salvado J, Sorli JV, Gomez-Gracia E, et al. Quality of dietary fat intake and body weight and obesity in a mediterranean population: secondary analyses within the PREDIMED trial. *Nutrients* 2018;10.
- [11] Martínez-González MA, Gea A, Ruiz-Canela M. The mediterranean diet and cardiovascular health. *Circ Res* 2019;124:779–98.
- [12] Huo R, Du T, Xu Y, Xu W, Chen X, Sun K, et al. Effects of Mediterranean-style diet on glycemic control, weight loss and cardiovascular risk factors among type 2 diabetes individuals: a meta-analysis. *Eur J Clin Nutr* 2015;69:1200–8.
- [13] Schröder H, Cárdenas-Fuentes G, Martínez-González MA, Corella D, Vioque J, Romaguera D, et al. Effectiveness of the physical activity intervention program in the PREDIMED-Plus study: a randomized controlled trial. *Int J Behav Nutr Phys Act* 2018;15:110.
- [14] European Commission/European Research Council. Final Report Summary - PREDIMED PLUS (Long-term effects of an energy-restricted Mediterranean diet on mortality and cardiovascular disease: the PREDIMED PLUS Study). <https://cordis.europa.eu/project/id/340918/reporting>. [Accessed 6 January 2022].
- [15] Hershey MS, Martínez-González MA, Álvarez-Álvarez I, Martínez Hernández JA, Ruiz-Canela M. The Mediterranean diet and physical activity: better together than apart for the prevention of premature mortality. *Br J Nutr* 2021;1–12.
- [16] Larsson SC. Can small amounts of olive oil keep the death away? *J Am Coll Cardiol* 2022;79:113–5.
- [17] Guasch-Ferre M, Li Y, Willett WC, Sun Q, Sampson L, Salas-Salvado J, et al. Consumption of olive oil and risk of total and cause-specific mortality among U.S. Adults. *J Am Coll Cardiol* 2022;79:101–12.
- [18] Nogueira-de-Almeida CA, Del Ciampo LA, Ferraz IS, Del Ciampo IRL, Contini AA, Ued FDV. COVID-19 and obesity in childhood and adolescence: a clinical review. *J Pediatr* 2020;96:546–58.
- [19] Cuda SE, Censani M. Assessment, differential diagnosis, and initial clinical evaluation of the pediatric patient with obesity: an Obesity Medical Association (OMA) Clinical Practice Statement 2022. *Obesity Pillars* 2022:1.
- [20] Lobelo F, Muth ND, Hanson S, Nemeth BA, Council On Sports M, Fitness. Physical activity assessment and counseling in pediatric clinical settings. *Pediatrics* 2020: 145.
- [21] Solomon TPJ, Eves FF, Laye MJ. Targeting postprandial hyperglycemia with physical activity may reduce cardiovascular disease risk. But what should we do, and when is the right time to move? *Front Cardiovasc Med* 2018;5:99.
- [22] Osman F, Haldar S, Henry CJ. Effects of time-restricted feeding during ramadan on dietary intake, body composition and metabolic outcomes. *Nutrients* 2020;12.
- [23] Chaabane S, Chaabna K, Abraham A, Mantani R, Cheema S. Physical activity and sedentary behaviour in the Middle East and North Africa: an overview of systematic reviews and meta-analysis. *Sci Rep* 2020;10:9363.
- [24] Naja F, Hwalla N, Itani L, Baalbaki S, Sibai A, Nasreddine L. A novel Mediterranean diet index from Lebanon: comparison with Europe. *Eur J Nutr* 2015;54:1229–43.
- [25] Hoteit M, Zoghbi E, Rady A, Shankiti I, Al-Jawaldeh A. Fatty acids quality in Middle eastern traditional dishes, Arabic sweets and market foods frequently consumed in Lebanon. *Nutrients* 2021;13.
- [26] Hoteit M, Zoghbi E, Al Iskandarani M, Rady A, Shankiti I, Matta J, et al. Nutritional value of the Middle Eastern diet: analysis of total sugar, salt, and iron in Lebanese traditional dishes. *F1000Res* 2020;9:1254.
- [27] Sharara E, Akik C, Ghattas H, Makhlof Obermeyer C. Physical inactivity, gender and culture in Arab countries: a systematic assessment of the literature. *BMC Publ Health* 2018;18:639.
- [28] Aljayyousi GF, Abu Munshar M, Al-Salim F, Osman ER. Addressing context to understand physical activity among Muslim university students: the role of gender, family, and culture. *BMC Publ Health* 2019;19:1452.
- [29] Azizi F, Hadaegh F, Hosseinpanah F, Mirmiran P, Amouzegar A, Abdi H, et al. Metabolic health in the Middle East and north Africa. *Lancet Diabetes Endocrinol* 2019;7:866–79.

- [30] Medina FX, Solé-Sedeno JM, Bach-Faig A, Aguilar-Martínez A. Obesity, mediterranean diet, and public health: a vision of obesity in the mediterranean context from a sociocultural perspective. *Int J Environ Res Publ Health* 2021;18.
- [31] Tomiyama AJ. Stress and obesity. *Annu Rev Psychol* 2019;70:703–18.
- [32] Poulain M, Herm A, Errigo A, Chrysohoou C, Legrand R, Passarino G, et al. Specific features of the oldest old from the longevity Blue Zones in Ikaria and Sardinia. *Mech Ageing Dev* 2021;198:111543.
- [33] Legrand R, Nuemi G, Poulain M, Manckoundia P. Description of lifestyle, including social life, diet and physical activity, of people ≥ 90 years living in Ikaria, a longevity Blue Zone. *Int J Environ Res Publ Health* 2021;18.
- [34] Kositamongkol C, Kanchanasurakit S, Auttamalang C, Inchai N, Kabkaew T, Kitpark S, et al. Coffee consumption and non-alcoholic fatty liver disease: an umbrella review and a systematic review and meta-analysis. *Front Pharmacol* 2021; 12:786596.