



OPEN Knowledge, attitudes, and use of the Mediterranean diet in practice among dietitians in the United Arab Emirates: a cross-sectional study

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Dietitians are uniquely positioned to promote the Mediterranean Diet (MedDiet), a diet recognized for its health benefits and sustainability. This study aimed to assess the knowledge and attitudes regarding the MedDiet among dietitians in the United Arab Emirates (UAE), and to examine the frequency and correlates of using this diet in clinical practice. Practicing dietitians ($n = 220$) completed a 44-item web-based questionnaire, verified for face, content and construct validity, as well as internal and parallel form reliability. Total scores were computed as sum of items for knowledge and attitudes. The mean knowledge score was 6.48 ± 1.85 out of 10, with gaps related to MedDiet's benefits and nutrient composition. Despite positive attitudes, many dietitians did not agree that it is easy to encourage patients to decrease red meat (68%) and increase fruits/vegetables intake (70%). In clinical practice, 35% of dietitians rarely/never used the MedDiet. Dietitians were more likely to recommend the MedDiet if they had a Mediterranean country of origin ($p = 0.037$), higher knowledge ($p = 0.022$) and attitude ($p = 0.013$) scores, and acquired information about the MedDiet through university education ($p < 0.001$) or conferences/seminars/workshops ($p = 0.002$). Using the findings of this study, evidence-based interventions can be developed to support the role of dietitians in promoting adherence to the MedDiet.

Keywords Mediterranean diet, Dietitians, Knowledge, Attitudes, Practice, United Arab Emirates

Native to Mediterranean countries, the Mediterranean Diet (MedDiet) emphasizes the consumption of fruits, vegetables, whole grains, legumes, nuts, and seeds. The primary fat source is olive oil, especially virgin and extra-virgin varieties. The diet is also characterized by a moderate consumption of dairy products (mainly cheese and yogurt), fish, and poultry, and a restricted red meat intake¹. Due to its rich content of vitamins, minerals, antioxidants, and fiber, along with olive oil, the MedDiet has been consistently linked with enhanced metabolic health, including reduced inflammation, improved cholesterol, and increased insulin sensitivity^{1–4}. As such, adherence to this diet has been associated with reduced risk of cardiovascular disease^{5–7}, type 2 diabetes^{8,9}, and several types of cancer^{10–14}, in addition to improved BMI^{15–17}, enhanced mental health^{18–20}, and a longer lifespan^{21,22}. Despite the overwhelming evidence for the protective effect of the MedDiet, its global applicability faces challenges, particularly in non-Mediterranean countries, where availability, knowledge, and acceptability of the MedDiet components are uncertain.

As healthcare professionals whose scope of practice is focused on the application of nutrition guidelines to protect and improve health, dietitians can play a crucial role in promoting the MedDiet²³. At the public health level, dietitians can initiate campaigns to improve public awareness about MedDiet and guide the development of dietary guidelines and nutrition pyramids incorporating the principles of the MedDiet based on locally available foods. At the individual level, skilled dietitians can motivate clients to consume foods with MedDiet benefits using tailored, practical, and evidence-based nutrition counselling approaches²⁴. In a large-scale randomized clinical trial involving 6,874 participants, a dietitian-led intervention promoting an energy-

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reduced Mediterranean diet significantly enhanced adherence to this diet at 12 months, compared to controls who received standard advice without the intervention²⁵. Similarly, results from a 6-month-long randomized trial in a non-Mediterranean setting showed that intervention by dietitians significantly improved MedDiet adherence in the intervention group, with compliance as high as 78% after 12 months²⁶. Several other trials reported increased adherence to the MedDiet following dietitian-led interventions^{27–29}. However, apart from a couple of studies conducted in Australia^{30,31}, evidence regarding the extent to which the MedDiet is used by dietitians in their clinical practice is limited.

In the United Arab Emirates (UAE), the prevalence of diet-related non-communicable diseases (NCDs) has reached alarmingly high figures. In a study of 3,064 UAE residents aged 18 to 80, almost half had hypercholesterolemia, a third suffered from hypertension, and just less than a fifth had diabetes³². The prevalence of risk factors for NCDs such as obesity and overweight in the UAE is also considerably high. A recent study reported that, out of 2,142 participants living Dubai, 39.8% were overweight and 17.8% were obese, with UAE nationals exhibiting notably higher obesity figures (39.6%)³³. The reported rise of NCDs and associated risk factors in the UAE presents a substantial burden for the country's future healthcare system³⁴.

The MedDiet, renowned for its evidence-based health benefits, has been recommended by many scientific bodies to combat diet-related NCDs^{35–37}. Thus, adopting this diet could provide the UAE with a valuable strategy to mitigate the escalating burden of NCDs. Existing evidence indicates that the levels of adherence to the MedDiet in the UAE are moderate to low^{38–40}. Given the pivotal role dietitians can play in promoting the MedDiet, understanding their perspectives and practices regarding the MedDiet can help bridge the gap between this diet's promising benefits and its adoption in non-Mediterranean countries such as the UAE. Therefore, the objective of this study is to assess knowledge and attitudes regarding the MedDiet among dietitians in the UAE, and to examine the frequency and correlates of using this diet in clinical practice.

Methods

Study design and participant recruitment

The study used a cross-sectional design to explore MedDiet knowledge, attitudes, and use in clinical practice among dietitians in the UAE. A URL link to the questionnaire was shared through emails, social media, professional networking sites (LinkedIn), and text messages. The output was collected anonymously. In the UAE, there exists no formal association or registry for practicing dietitians. Therefore, participants were identified and recruited through lists acquired from health authorities, nutrition societies, and educational institutions. The required sample size for the study was calculated using Raosoft software⁴¹. Accordingly, a minimum of 211 participants were needed to estimate a 50% prevalence of outcome, recommendation of the MedDiet (never/rarely vs. sometimes/always), at a power of 80% and a 6% margin of error. Given the exploratory nature of this study, the margin of error was selected to be between the recommended range of 4–8%⁴².

To be eligible to participate, dietitians had to be (1) licensed and practicing in the UAE at the time of the survey and (2) conversant in either Arabic or English. Participants were first asked to read and e-sign an informed consent form, which outlined the study's purpose, protocol, estimated completion time, and the voluntary, anonymous nature of participation. No incentives were offered, and participants could withdraw at any time. After consenting, participants could choose to complete the questionnaire in Arabic or English. All methods used in this study were performed in accordance with the declaration of Helsinki. The Research Ethics Committee at the University of Sharjah approved the consent form, study protocol, and both language versions of the questionnaire (reference number: REC-21-10-23). Subjects provided informed consent forms before participating in this study.

Questionnaire for data collection

To collect the data, a self-administered online questionnaire was developed by a panel of experts consisting of a UAE-based practicing dietitian, a nutrition epidemiologist, a public health nutritionist, and a nutrition/dietetics instructor. The development process followed a four-step approach, including question generation, question design and structure, validation, and revision. In question generation, an extensive review of pertinent literature was conducted by searching key databases (PubMed, Web of Science, and Google Scholar) using broad search terms like knowledge, attitudes, clinical practice, and MedDiet^{30,43–46}. During the design stage, questions were formulated using clear and concise language, minimizing vagueness, avoiding any leading or biased questions. The validation process encompassed face and content validity, construct validity, internal and parallel form reliability. The face and content validity were checked by the panel, who ensured that the questions adequately addressed the study's objectives. The construct validity of the knowledge and attitude dimensions of the questionnaire was confirmed using confirmatory factor analysis, conducted a posteriori after data collection. This analysis revealed two main factors with the questions of knowledge and attitudes loading separately on each factor (Supplementary Table S1). Internal reliability testing produced an overall Cronbach alpha of 0.71. The questionnaire was first developed in English and then translated into Arabic. To ensure parallel form reliability, back translation to English and comparison with the original questionnaire were performed by an independent translator. Lastly, the revision stage was conducted in an iterative manner, where an internal review by the panel identified and rectified concerns related to question phrasing, clarity, and relevance. The questionnaire was piloted on a sample of 10 dietitians, after which wording was further revised. Pilot responses were not included in the results.

The questionnaire consisted of four main sections. The first section collected demographic information such as sex, age, educational level, nationality (country of origin), type of work license, type (hospital/non-hospital) and location of practice setting, years of experience, familiarity with MedDiet, sources of information about this diet, and interest in learning more about the MedDiet. The nationality was later grouped as either Mediterranean or non-Mediterranean. In the second section, which aimed to assess knowledge of the MedDiet, the participants

were presented with ten statements about the MedDiet which they indicated as true or false. The statements included questions about the origin, importance, sustainable nature, and lifestyle aspects of the MedDiet. They also probed participants' knowledge about the fat, carbohydrate, and calorie content of the MedDiet. The third section focused on the attitudes of dietitians towards the MedDiet. On a 5-point Likert scale ranging from strongly disagree to strongly agree, dietitians rated eight statements regarding how interested they believe patients are in the MedDiet, and how easy it is for the dietitian to encourage patients to adhere to the principles of this diet. For instance, dietitians were asked how easy it is for them to encourage patients to have a lower intake of red meat, at least 2 servings of fish per week, and five servings of fruits and vegetables per day. Lastly, the fourth section of the questionnaire addressed the use of the MedDiet in clinical practice, the barriers, and common health conditions. In this section, dietitians reported how often they recommended the MedDiet for their patients (never, rarely, sometimes, or always), the perceived barriers to using this diet in clinical practice, and the medical conditions they would recommend the diet for. A copy of the questionnaire can be found in an additional file (Supplementary File S2).

Statistical analysis

Descriptive statistics, such as frequencies and percentages, were used to display categorical variables. Knowledge scores were calculated out of 10 by giving participants a point for each correctly answered statement of the 10 true/false statements. Attitude scores were also calculated out of 40, by giving participants a score ranging from 1 for selecting strongly disagree to 5 for selecting strongly agree for each of the 8 attitude statements with higher scores indicating more positive attitudes. Inferential statistics were performed to identify variables associated with the frequency of MedDiet recommendation by among dietitians. First, simple logistic regression was conducted to explore the effect of each variable on the frequency of recommending the MedDiet in clinical practice. Age, educational level, years of experience, international license, nationality, emirate of practice, source of information about the MedDiet, and practice setting were entered individually as independent variables with frequency of MedDiet use in clinical practice (rarely/never or sometimes/always) as a dependent variable. Variables displaying a p-value of <0.05 were subsequently entered into a multiple logistic regression. Statistical significance was set at a p-value of <0.05. All data analyses were carried out using the IBM SPSS statistics software (IBM Corp (2017). IBM SPSS Statistics for Windows, Version 25.0. Armonk, NY: IBM Corp). This study complies with the STROBE guidelines. All relevant items from the STROBE checklist have been addressed, including clear reporting on study design, setting, participants, variables, data sources, and statistical methods.

Results

The questionnaire was completed by 220 dietitians. Most participants were female (98.2%) and held a bachelor's degree (78.6%). Almost half of the respondents were aged 30 or below (49.5%) and more than half were of Mediterranean country of origin (50.5%). The working license held by most dietitians was the Dubai Health Authority license (49.5%), followed by the Ministry of Health license at (42.7%). Nearly a quarter of the dietitians held the Department of Health Abu Dhabi (DOH) license (22.7%), and about one-fifth held an international work license. Further details about the characteristics of the study population are described in Table 1.

The mean knowledge score of dietitians was 6.48 ± 1.85 . Most dietitians were aware of the protective effects the MedDiet has on the environment (80.9%), and 72.3% knew that it has been named as an intangible cultural heritage by UNESCO. About 64.5% were aware that the MedDiet is slowly disappearing from the Mediterranean countries. The majority of dietitians correctly identified olive oil as a main pillar of the MedDiet (86.4%) and 78.6% were aware that the diet is not calorie-restricted. That said, many dietitians assumed that the MedDiet belongs to Greece (57.7%), and 59.1% assumed the diet's benefits are limited to CVD but not to cancer. Around 44.1% of dietitians assumed fat content in the MedDiet should be low, and 35.0% assumed carbohydrate content should be low. Moreover, 40% did not know that the MedDiet is a lifestyle not only a diet (Table 2). Figure 1 depicts the distribution of MedDiet knowledge scores among dietitians.

In terms of attitudes, a sizeable proportion of participants agreed that it is easy to encourage patients to follow the MedDiet (45%). Moreover, 56% of dietitians agreed that it is easy for them encourage patients to utilize olive oil as the major source of fat in their diet, and 41.8% agreed to the same regarding encouraging patients to consume at least 2 servings of fish per week. As for complex carbohydrates, 51% and 37.7% of dietitians agreed that it is easy to encourage patients to increase their intake of whole-grain breads and cereals, and to consume at least 3 servings of legumes per week, respectively. However, only 32.3% of dietitians agreed that it is easy to encourage a decrease in the intake of red meat, and a lower proportion (30.4%) agreed that it is easy to encourage patients to consume 5 servings of fruits and vegetables per day (Table 3).

While many dietitians recommended the MedDiet to their patients either sometimes or always, 35% reported rarely or never doing so. Among the most frequently cited barriers to MedDiet promotion are the acceptability of the diet principles by patients (70.5%) and the lack of support for MedDiet from the multi-disciplinary team treating the patients (42.3%). The health conditions for which most dietitians used the MedDiet in practice include CVD (71.8%), obesity and weight management (65.5%), and hypertension (60.5%) (Table 4).

In the univariate model, several variables were associated with a higher frequency of using the MedDiet in clinical practice. These associations remained significant after adjustment. Participants were more likely to use the MedDiet if they reported 'having a Mediterranean country of origin' (OR = 2.014, $p = 0.037$), 'practicing in Dubai' (OR = 2.267, $p = 0.019$), obtaining information about the MedDiet 'through university education' (OR = 5.489, $p = < 0.001$), or 'through attending conferences, seminars, and workshops' (OR = 2.855, $p = 0.002$). Furthermore, higher knowledge (OR = 6.523, $p = 0.022$) and attitude' (OR = 1.101, $p = 0.013$) scores were positively associated with the frequency of MedDiet recommendation by dietitians (Table 5).

	<i>n</i>	%
Sex		
Females	216	98.2
Males	4	1.8
Age (years)		
≤ 30	109	49.5
> 30	111	50.5
Educational level		
Bachelor's degree	173	78.6
Master's or higher	47	21.4
Nationality		
Mediterranean (Levant, North Africa, etc.)	111	50.5
Non-Mediterranean	109	49.5
Issuing health authority of dietetic practice licensure ^a		
Dubai Health Authority (DHA)	109	49.5
Ministry of Health (MOH)	94	42.7
Department of Health Abu Dhabi (DOH)	50	22.7
International dietetic practice licensure		
Yes	46	20.9
No	174	79.1
Practice Setting		
Hospital	128	58.2
Non-hospital (Clinics, health centres, etc.)	92	41.8
Practice Location		
Dubai	85	38.6
Northern Emirates ^b	78	35.4
Abu Dhabi	57	25.9
Years of experience as a licensed dietitian		
≤ 5	109	49.5
> 5	111	50.5
Familiarity with the Mediterranean diet		
Familiar	171	77.7
Neutral	38	17.3
Not familiar	11	5.0
Sources of information about the Mediterranean diet ^a		
University education	163	74.1
Conferences, seminars, and workshops	121	55.0
Personal interest (internet/ other sources)	107	48.6
Cultural background	52	23.6
Interest in attending Mediterranean diet training sessions		
Interested	198	90.0
Not interested	22	10.0

Table 1. Demographic and general characteristics of participants (n = 220). ^aMultiple-answer question. ^bSharjah, Ajman, Umm Al Quwain, Ras Al-Khaimah, Fujairah.

Discussion

This study is the first to shed light on MedDiet knowledge, attitudes, and use in clinical practice among dietitians in the UAE and the region. The study revealed important gaps and opportunities in dietitians' knowledge of the MedDiet. For instance, dietitians were aware of olive oil being one of the diet's main pillars and of the protective effects of the MedDiet on the environment. However, some misconceptions existed surrounding the MedDiet's fat and carbohydrate content, as well as its benefits for certain disease conditions, such as cancer. Dietitians displayed generally positive attitudes towards the MedDiet, with the many believing their patients to be interested in the diet and finding it easy to encourage patients to follow the diet's principles concerning fish, olive oil, legumes, and whole grain consumption. In terms of using the MedDiet in clinical practice, one-third of the dietitians stated that they rarely or never recommend the MedDiet to their patients. The most frequently cited barriers for recommending this diet include patient's acceptability and multidisciplinary team support. Among dietitians, using the MedDiet in clinical practice was associated with having a Mediterranean country

	True/false	% answered correctly	% answered incorrectly
The Mediterranean diet belongs to Greece	F ¹	42.3	57.7
Eating a Mediterranean diet will help protect the environment	T ⁴⁶	80.9	19.1
The Mediterranean diet decreases the risk of cardiovascular diseases but not cancers	F ¹⁰	40.9	59.1
Olive oil is a main pillar of the Mediterranean diet	T ⁴⁷	86.4	13.6
The Mediterranean diet refers to a diet and not a lifestyle	F ⁴³	60.9	39.1
In the Mediterranean diet, fat content should be low	F ⁴³	55.9	44.1
In the Mediterranean diet, carbohydrate content should be low	F ⁴³	65.0	35.0
The Mediterranean diet is a calorie-restricted diet	F ⁴⁴	78.6	21.4
The Mediterranean diet is slowly disappearing in the Mediterranean countries	T ⁴⁸	64.5	35.5
The Mediterranean diet has been named as an intangible cultural heritage by the UNESCO	T ⁴⁹	72.3	27.7

Table 2. Evaluation of Mediterranean Diet-related knowledge among dietitians (n = 220).

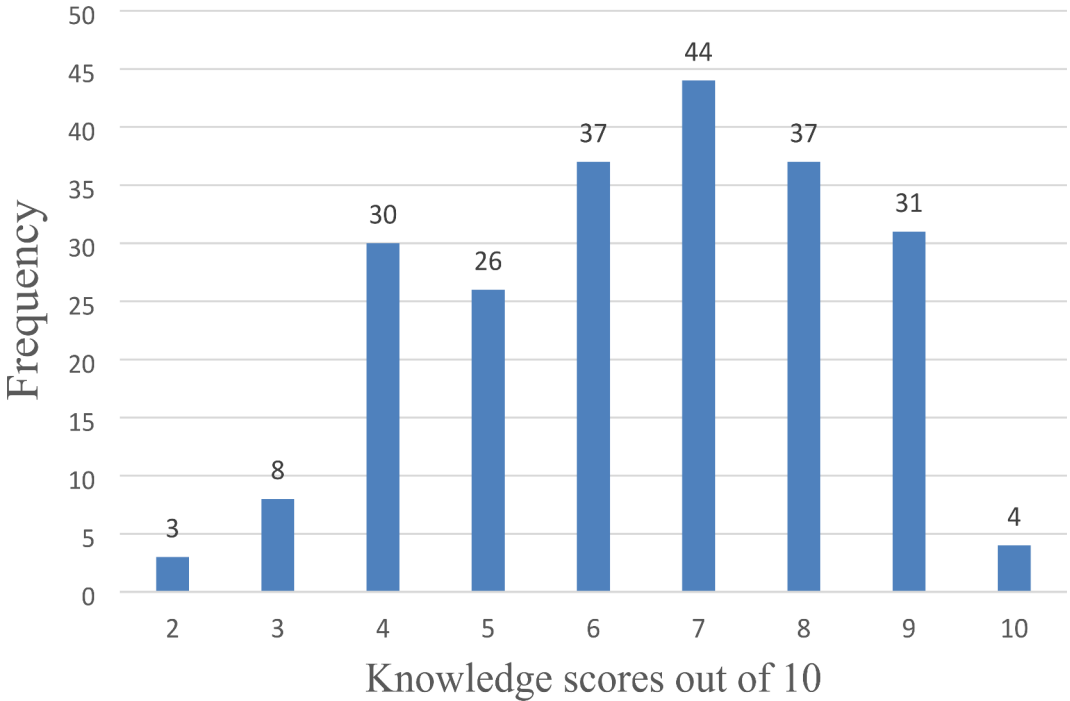


Fig. 1. Distribution of Mediterranean-diet knowledge scores among dietitians.

Statement	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
Patients are interested in the Mediterranean diet	2 (0.9)	28 (12.7)	117 (53.2)	65 (29.5)	8 (3.6)
It is easy for me to promote the Mediterranean diet in my clinical practice	4 (1.8)	34 (15.5)	83 (37.7)	89 (40.5)	10 (4.5)
It is easy for me to encourage my patients to adhere to: A lower intake of red meat	10 (4.5)	68 (30.9)	71 (32.3)	58 (26.4)	13 (5.9)
It is easy for me to encourage my patients to adhere to: At least 2 servings of fish per week	7 (3.2)	52 (23.6)	69 (31.4)	74 (33.6)	18 (8.2)
It is easy for me to encourage my patients to adhere to: Five servings of fruits and vegetables per day	23 (10.5)	68 (30.9)	62 (28.2)	54 (24.5)	13 (5.9)
It is easy for me to encourage my patients to adhere to: At least 3 servings of legumes per week	8 (3.6)	58 (26.4)	71 (32.3)	76 (34.5)	7 (3.2)
It is easy for me to encourage my patients to adhere to: A higher intake of whole-grain breads and cereals	15 (6.8)	34 (15.5)	59 (26.8)	96 (43.6)	16 (7.3)
It is easy for me to encourage my patients to adhere to: Olive oil as the major source of fat in their diet	5 (2.3)	25 (11.4)	67 (30.5)	95 (43.2)	28 (12.7)

Table 3. Attitudes of dietitians towards the promotion of the Mediterranean diet (n = 220).

of origin, practicing in Dubai, higher knowledge and attitude scores, and acquiring MedDiet information from university education or conferences, seminars, and workshops.

Most dietitians correctly identified olive oil as one of the main pillars of the MedDiet, and 4 in 5 dietitians were aware of the diet's beneficial effects on the environment. The majority of dietitians were also aware that

	n	%
How often do you recommend the Mediterranean diet to your patients? (n = 220)		
Never	37	16.8
Rarely	41	18.6
Sometimes	100	45.5
Always	42	19.1
Perceived barriers to recommending the Mediterranean diet in clinical practice (n = 220) ^a		
Acceptability of the diet principles by patients	155	70.5
Support from / goals of the multi-disciplinary team or other clinicians treating your patients	93	42.3
Cost of the diet	73	33.2
Time allocated to patient consultations	67	30.5
Cultural background of the dietitian	53	24.1
Which health conditions would you recommend the Mediterranean diet for? (n = 183) ^{ab}		
Cardiovascular diseases	158	71.8
Obesity and weight management	144	65.5
Hypertension	133	60.5
Diabetes	120	54.5
Cancers	70	31.8
Kidney diseases	31	14.1
Cognitive diseases	28	12.7

Table 4. Use of the MedDiet in clinical practice, the barriers and common health conditions (n = 220).
^aMultiple-answer type question. ^bResponses to this question exclude participants who answered “never” to the question “How often do you recommend the Mediterranean diet to your patients?” (n = 183).

the MedDiet is not a calorie-restricted diet. These findings indicate a good understanding of some of the MedDiet’s fundamental principles among dietitians. However, results showed that one in two dietitians had the misconception that fat content in the MedDiet should be low. This misconception may be based on outdated information, such as the historical dietary guideline that once advocated for low-fat diets as a means of reducing heart disease risk. Once a prevailing belief among healthcare professionals and the public alike, low-fat diets have long been superseded by moderate-fat approaches⁵⁰. As early as 2005, the USDA Dietary Guidelines were modified with the top percentage of fat adjusted from 30% (2000 guidelines) to 35%⁵¹. Findings of this study also showed that more than half of the dietitians assumed MedDiet benefits are limited to CVD but not to cancer. This finding is concerning, especially considering the mounting evidence for the beneficial health implications of MedDiet on cancer. Recently, a large meta-analysis of 83 studies involving 2,130,753 subjects demonstrated an inverse association between high adherence to the MedDiet and mortality from colorectal, breast, gastric, liver, head and neck, and prostate cancers¹². The relative scarcity and the significant challenges of research on cancer in comparison to CVD may have led to limited awareness among dietitians about MedDiet benefits for cancer. These findings underscore the necessity of ongoing education and training for dietitians to translate recent research into clinical practice, ensuring patient benefit and combating misinformation among dietitians.

Study findings revealed overall positive attitudes towards the MedDiet among dietitians. Many dietitians reported believing patients to be interested in the diet and finding it generally easy to encourage patients to follow the diet’s principles. In particular, dietitians believed it is easy to encourage their patients to meet the recommended servings of fish, legumes, and whole grains. Such findings are promising given that most studies from the UAE report medium to low adherence to the MedDiet among various population groups^{38–40}. That said, only 1 in 3 dietitians agreed that it is easy to encourage patients to decrease red meat. This finding is not surprising considering that even more than a decade ago, meat consumption in the UAE exceeded global average⁵². Despite being a good source of essential nutrients, red meat should be consumed in moderation due to its high-fat content and links with heart disease, colorectal cancer, and other adverse health outcomes⁵³. Similarly, less than a third of the dietitians agreed that it is easy to encourage patients to consume five servings of fruits and vegetables per day. Addressing this challenge is paramount considering the essential role fruits and vegetables play in promoting digestive health and reducing the risk of chronic disease⁵⁴. Interestingly, the easiest component to encourage patients to consume according to dietitians is olive oil. Both knowledge and attitude components concerning olive oil received better results among survey respondents, highlighting a distinctive popularity of olive oil in comparison to other aspects of the MedDiet.

One in three dietitians reported rarely or never using the MedDiet in their clinical practice. In light of the substantial evidence supporting the benefits of the MedDiet,^{1,5,8,10,55} the reluctance of some dietitians to recommend the MedDiet raises concerns about missed opportunities to improve their patients’ health and reduce NCDs. The most cited barrier to recommending the MedDiet was the acceptability of the diet principles by patients, which could be attributed to the diverse cultural backgrounds of patients in the UAE, where the majority are not from a Mediterranean country of origin⁵⁶. That said, almost half the dietitians perceived patients to be interested in this diet and the majority reported a sense of self-efficacy in encouraging patient adherence to most of the diet’s individual principles. These findings present an opportunity for dietitians to integrate the

	Univariate logistic regression			Multiple logistic regression		
	Exp (B)	Sig	95% CI	Exp (B)	Sig	95% CI
Age (years)						
< 30	Ref					
30 and above	0.690	0.191	0.369–1.203			
Education level						
Bachelor's	Ref					
Master's	0.855	0.646	0.439–1.666			
Years of experience						
< 5	Ref					
> 5	0.587	0.062	0.336–1.027			
International license						
No	Ref					
Yes	0.160	0.661	2.677–1.330			
Nationality						
Non-Mediterranean countries	Ref			Ref		
Mediterranean countries	2.125	0.009	1.208–3.736	2.014	0.037	1.044–3.888
Emirate of Practice						
Abu Dhabi and Northern Emirates	Ref					
Dubai	2.227	0.009	1.223–4.057	2.267	0.019	1.141–4.503
Practice setting						
Hospitals	Ref					
Non-hospital	0.894	0.693	0.511–1.562			
Source of information: University education						
No	Ref			Ref		
Yes	6.150	< 0.001	3.191–11.853	5.489	< 0.001	2.684–11.225
Source of information: Conferences, seminars, workshops						
No	Ref			Ref		
Yes	2.624	< 0.001	1.487–4.629	2.855	0.002	1.482–5.501
Source of information: Personal interest (internet/ other sources)						
No	Ref					
Yes	0.849	0.561	0.488–1.475			
Source of information: Cultural background						
No	Ref					
Yes	2.157	0.035^b	1.055–4.411			
Knowledge Score	5.295	0.016	1.362–20.583	6.523	0.022	1.307–32.550
Attitudes Score	1.076	0.024	1.010–1.147	1.101	0.013	1.020–1.188

Table 5. Associations of demographic and general characteristics of dietitians with frequency of using the MedDiet in clinical practice, as derived from simple and multiple logistic regression analyses^a. ^a“Frequency of using the MedDiet in clinical practice” as a binary variable with the values “rarely/never” and “sometimes/always” was entered into the regression model as a dependent variable. ^bThe variable “Source of information about MedDiet: Cultural background” was excluded from the multiple logistic regression model for its high correlation with the variable “Nationality.” Significant values are in bold.

MedDiet into their practice more frequently. A second barrier to recommending the MedDiet was the lack of support from the multi-disciplinary team treating the patients. Previous literature highlighted the value of a multidisciplinary team strategy in patient care^{57,58}, and identified poor communication, absence of collaborative decision-making, and inadequate dietary knowledge exchange across and within multidisciplinary teams as barriers to the effective provision of dietetic services^{31,59}.

Having a Mediterranean country of origin correlated positively with the frequency of MedDiet recommendation. Dietitians with a Mediterranean country of origin may find it easier to integrate the MedDiet into their practice, as it aligns with their cultural heritage and traditional dietary choices. Similarly, practicing in Dubai was also correlated with a higher frequency of MedDiet recommendation compared to other emirates. Dubai has the largest population in the UAE and is the primary destination for expatriates in the country⁶⁰, providing opportunities for dietitians to engage with diverse communities and gain insights into various dietary patterns.

Consistent with previous findings⁶¹, results from this study demonstrated that higher knowledge and positive attitudes are significantly associated with frequency of diet recommendation among dietitians. This emphasizes the multifaceted nature of dietetic practice, where both the technical knowledge and mindset of dietitians play

a pivotal role in their effectiveness in recommending diets for patients. Furthermore, a comparison among the several knowledge sources revealed that dietitians who obtain information about the MedDiet through university education are five times more likely to recommend the diet to their patients, while those who obtain information through conferences, seminars, and workshops are at least twice as likely to recommend the MedDiet compared to their counterparts. In contrast, personal interest (internet, social media, etc.) as a source of information showed no significant correlation with MedDiet recommendation. These findings are in line with existing literature, which suggests that access to evidence-based education and professional development enabled the promotion of the MedDiet by dietitians³⁰, whereas perceived lack of knowledge and practice skills hindered it³¹. This underscores the significance of incorporating evidence-based dietary education on the MedDiet into both formal university curricula and ongoing professional development initiatives within the dietetics field.

The findings of this study shed light on the MedDiet knowledge, attitudes, and use among dietitians. Furthermore, they provide a basis for future research and interventions aimed at promoting MedDiet use among dietitians and healthcare professionals. That said, the results of the study should be considered in the light of a few limitations. First, due to cultural and religious restrictions on alcohol in the UAE, the questionnaire used excludes red wine, a component of the MedDiet known for its high concentration of beneficial polyphenols. This exclusion may affect the questionnaire's relevance for Mediterranean countries like Italy and Spain, where red wine is more commonly consumed. Another limitation is the study's reliance on self-selection may have led to a selection bias, as the respondents may be those with the highest interest in the MedDiet. Therefore, the study findings may reflect an optimistic bias in dietitians' knowledge, attitudes, and aspects of practice. Secondly, the absence of a formal association or registry for dietitians may have impacted the recruitment of subjects, potentially limiting the reach of the study. Nonetheless, the generalizability of the results is supported by the sample's adequate size and the inclusion of participants with various age groups, cultural backgrounds, and practice locations. The online nature of data collection ensured the absence of observer bias. However, it may have led to misinterpretation of certain questions. To minimize issues with question misinterpretation, the questionnaire was piloted on a sample of 10 dietitians and adjusted for clarity.

This study underscores that both knowledge and positive attitudes are pivotal in influencing dietitians' use of the MedDiet in clinical practice. The study findings support incorporating evidence-based education on the MedDiet into formal dietetic curricula and ongoing professional development programs of dietitians. Future research could evaluate the efficacy of such recommendations in enhancing the use MedDiet by dietitians in their clinical practice. Moreover, prospective research could explore how dietitians' knowledge and practices regarding the MedDiet influence patient adherence to this diet in the UAE, as well as the associated health outcomes.

Data availability

The data that support the findings of this study are available from the corresponding author upon reasonable request.

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Author contributions

SAQ led data collection and analysis and drafted the original manuscript. HR contributed to study design and questionnaire development. LCI contributed to data collection and manuscript editing and revision. MA contributed to data interpretation and edited the final version of the manuscript. MM contributed to study design and data collection. FN conceived the idea and the methodology of the study, contributed to data analysis and interpretation, and edited the final version of the manuscript. All authors have read and agreed to the final version of the manuscript. All authors declare that the content of the manuscript has not been published elsewhere.

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Competing interests

The authors declare no competing interests.

Additional information

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